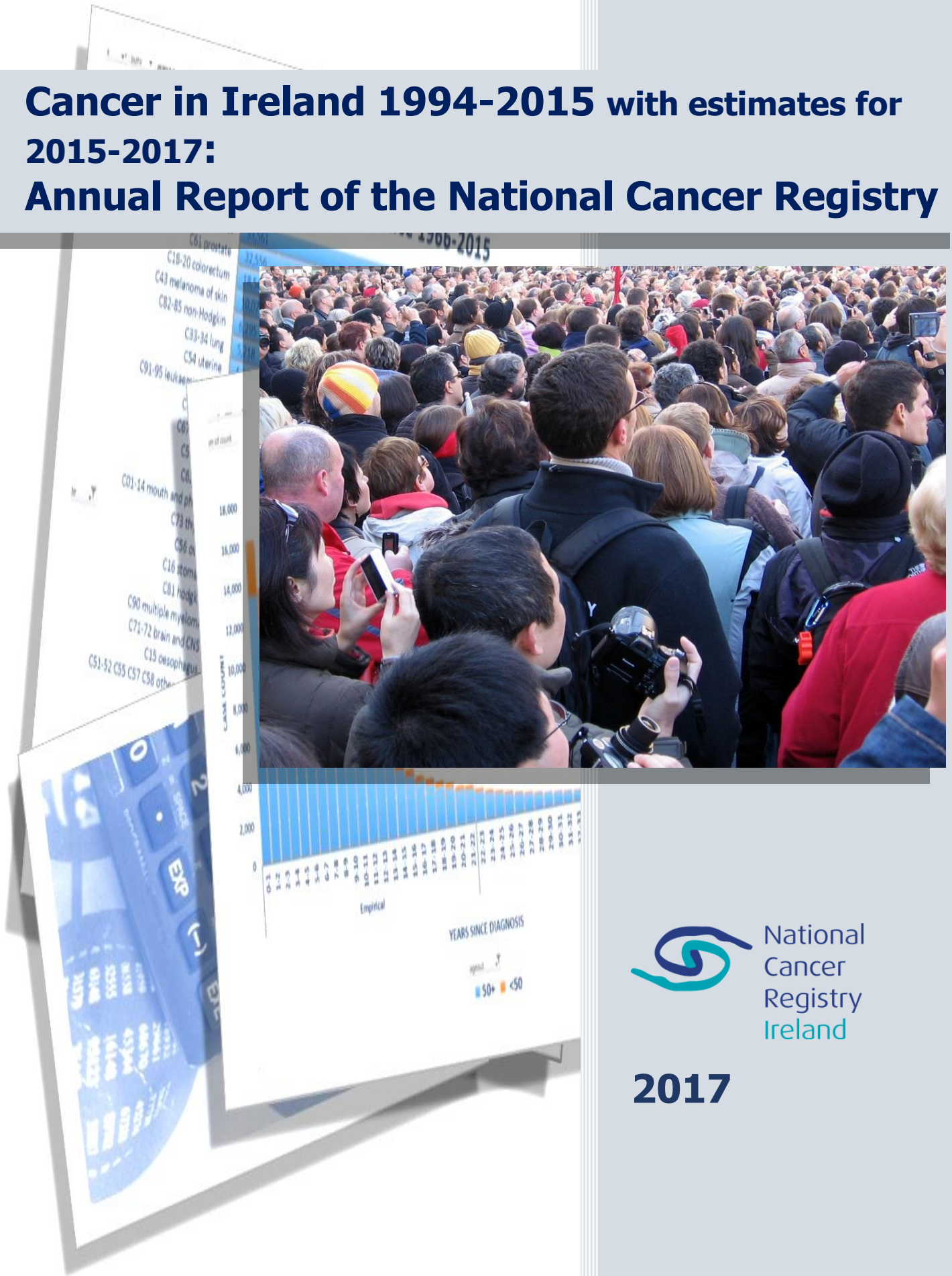
Cancer in Ireland 1994-2015 with estimates for 2015-2017:
Annual Report of the National Cancer Registry



National Cancer Registry Ireland

2017

ABBREVIATIONS	
95% CI	95% confidence interval
APC	Annual percentage change
ASR	Age-standardised rate (European standard population)
CIN	Cervical intraepithelial neoplasia
CLL	Chronic lymphocytic leukaemia
CNS	Central nervous system
CSO	Central Statistics Office
ESP	European Standard Population
IARC	International Agency for Research on Cancer
ICD	International Statistical Classification of Diseases and Related Health Problems
NCCP	National Cancer Control Programme
NCRI	National Cancer Registry, Ireland
NMSC	Non-melanoma skin cancer
NOS	Not otherwise specified
PSA	Prostate-specific antigen
TNM	Tumour, node, metastasis (staging)
WHO	World Health Organisation

Published by:

National Cancer Registry
Building 6800,
Cork Airport Business Park,
Kinsale Road,
Cork, Ireland.
T12 CDF7

Telephone: +353 21 4318014
Fax: +353 21 4318016
Email: info@ncri.ie
Website: www.ncri.ie

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CONTENTS

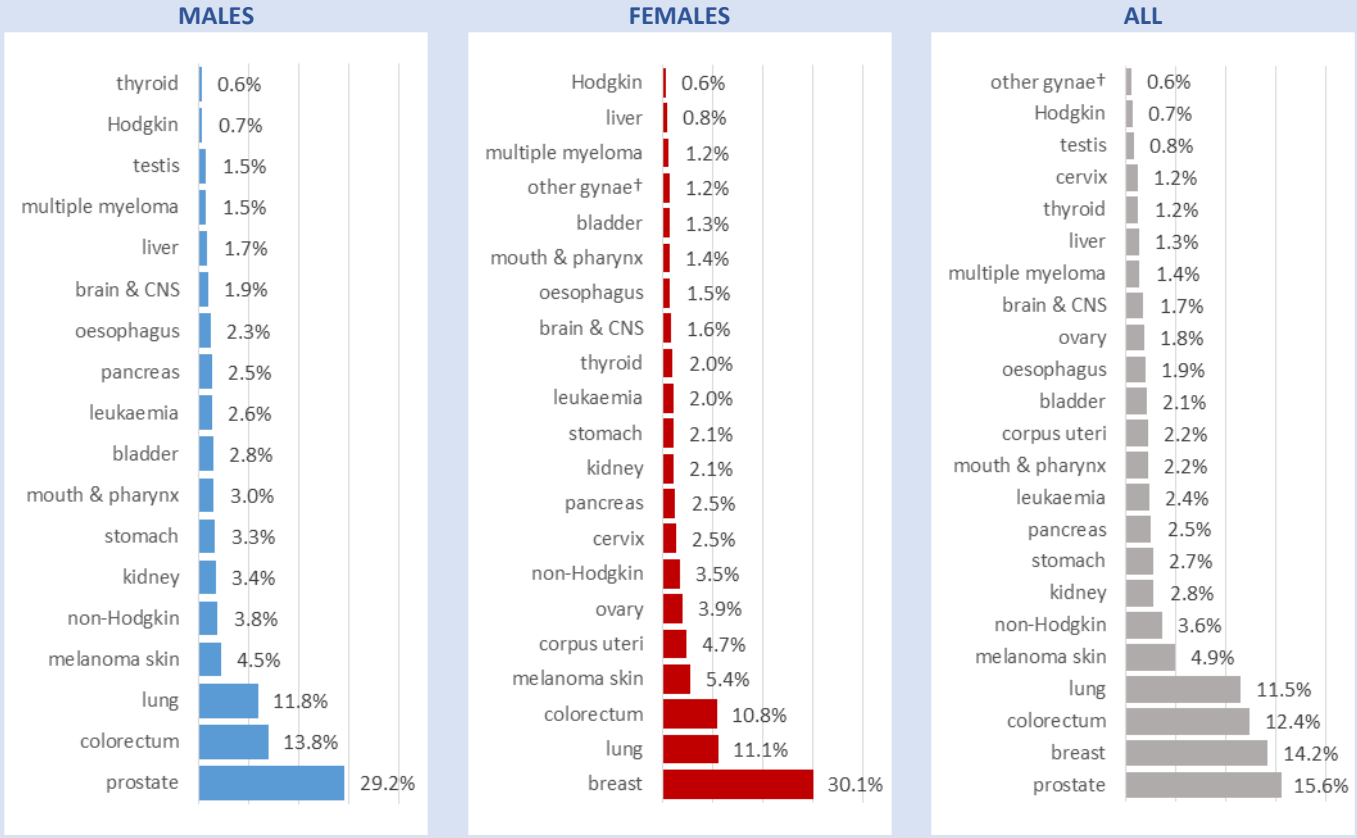
1. SUMMARY

This is the 22nd annual statistical report of the National Cancer Registry. This report summarises cancer incidence, mortality and survival in Ireland for the period 1994-2015, and provides projected estimates for *incidence* for the most recent three-year period: 2015-2017.

Estimated incidence 2015-2017

- Taking known incidence rates during 2012-2015, and applying these rates to population estimates for 2015-2017, an average of 40,570 (19,940 male, 20,630 female) cancers or other (non-invasive) tumours diagnosed annually was estimated for the period 2015-2017.
- Approximately 18% of these were non-invasive tumours (in situ carcinomas, tumours of uncertain behaviour and benign brain and CNS tumours) and 27% were invasive non-melanoma skin cancers (NMSC, 10,857 cases per year).
- Invasive cancers (including NMSC) were estimated to average 33,180 cases per year (18,010 males, 15,170 females)
- For *all invasive cancers excluding NMSC*, the figures most often quoted in international comparisons, an estimated 22,320 cases (11,890 males, 10,430 females) were diagnosed annually, representing 67% of all registered invasive cases.
- These figures assume that average cancer incidence rates do not change between the periods 2012-2015 and 2016-2017, and that population estimates for 2015-2017 at the time of writing are accurate.
- Age-standardized rates of all invasive cancers (excl. NMSC) were 26% higher in men than in women.
- The cumulative lifetime risk (to age 75 years) of an invasive cancer diagnosis (excl. NMSC) was approximately 1 in 3 for men and 1 in 4 for women.

Summary Figure 1.
Estimated percentages and rank of the most commonly diagnosed invasive cancers (excluding NMSC): annual average 2015-2017



low-incidence invasive cancers are not shown (c.10% of cases), therefore percentages do not sum to 100%
† vulva, vagina, uterus (NOS) and placenta

- If NMSC was excluded, prostate and female breast cancer were the most commonly diagnosed invasive cancers overall, and each comprised almost one-third of all invasive cancers in men and women, respectively (*Summary Figure 1*).
- Colorectal cancer, lung cancer, melanoma of skin and NHL were the 2nd, 3rd, 4th and 5th most common cancers in males, respectively.
- Lung cancer, colorectal cancer, melanoma of skin, and uterine cancer (corpus uteri) were the 2nd, 3rd, 4th and 5th most common cancers in females, respectively.

Mortality 2012-2014

- Cancer is the second most common cause of death registered in Ireland, after diseases of the circulatory system [1]).
- An annual average of 8,766 cancer deaths (4,629 males, 4,137 females) was recorded during 2012-2014.
- Age-standardized all-cancer mortality rates were 34% higher in men than in women.
- The lifetime risk (to age 75 year) of dying from cancer was approximately 1 in 10 for women and 1 in 8 for men.
- Lung cancer was the leading cause of cancer death in both sexes, accounting for 19% of cancer deaths in women and 23% of cancer deaths in men.
- Colorectal cancer was the next most common cause of cancer death in both sexes, accounting for 12% of cancer deaths in males and 10% of cancer deaths in females.
- Deaths from lung, colorectal, breast and prostate cancers combined made up almost half (47%) of all deaths from cancer during this period.
- Deaths from cancers of the, oesophagus, pancreas and stomach in males ranked 4th, 5th and 6th respectively, and comprised 15% of all cancer deaths in males.
- Deaths from cancers of the ovary and pancreas ranked 4th and 5th respectively in females and comprised almost 13% of cancer deaths in women.

Incidence and mortality trends

- Partly reflecting increasing population and average age, the number of new cancer cases increased almost year on year during most of the period 1994-2015. However, numbers of new cases registered slowed markedly from 2011 in males and less markedly in females from 2010.
- After accounting for population growth and age structure, this translated into a statistically significant 2.0% annual decline in the male cancer incidence rate during 2011-2015, and no significant change in the female rate during the same period, excluding non-melanoma skin cancers (*Summary Table 1*, *Summary Figure 2*).
- The decline in the overall male cancer incidence rate during 2011-2015 appears to largely reflect declining or static rates in prostate and lung cancers. There was a steady and significant fall in the male lung cancer rate during 1994-2015 and a marked decline in the prostate cancer rate during 2011-2015. This was balanced against steady increases in incidence of lymphomas and melanoma of the skin.
- The lack of change in the overall female cancer rate since 2010 was heavily influenced by a significant decline in the breast cancer rate since 2008, following an earlier period of increase (strongly influenced by mammographic screening). This was balanced against steady increases in lung cancer, skin melanoma, uterine cancer and lymphoma.
- Lung cancer incidence rates in males declined steadily during 1994-2015, while female rates increased significantly over the same period. Lung cancer rates track smoking prevalence from decades past.
- Rates of melanoma of the skin in both sexes increased steadily and significantly during 1994-2015, particularly in men; the mortality rate also increased significantly in both sexes. The rates of non-melanoma skin cancer also increased steadily in both sexes over the period 2001-2015.

Summary Table 1. Summary of incidence and mortality rate trends, by sex and cancer type.

Trends shown are for 1994-2015 unless otherwise indicated and are for age-standardised rates – see *Summary Figure 2* and *Figures 4-1 to 4-28* for trends in case numbers and deaths

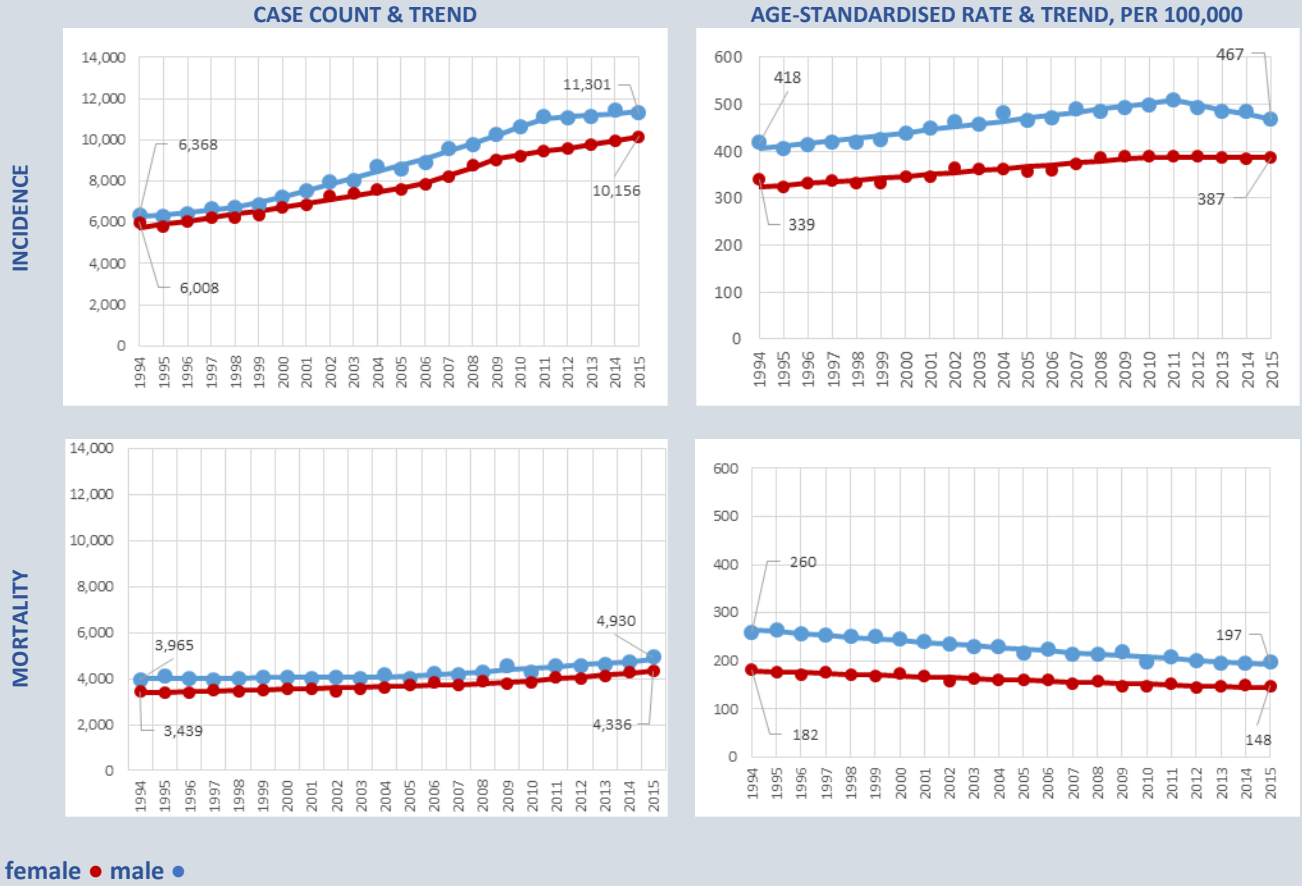
MALES	INCIDENCE TREND	MORTALITY TREND
all invasive excl. NMSC*	↓2011-2015 -2.0%‡	↓ -1.5%‡
INCIDENCE INCREASE		
C01-14 mouth & pharynx	↑2001-2015	↔2004-2015
C22 liver	↑	↑
C25 pancreas	↑	↔
C43 melanoma of skin	↑	↑
C73 thyroid	↑	↔
C81 Hodgkin lymphoma	↑	↓
C82-85 non-Hodgkin	↑	↓
INCIDENCE DECREASE		
C33-34 lung	**↓**	**↓**
C61 prostate	**↓2011-2015**	**↓2002-2015**
C67 bladder	↓	↓
C91-95 leukaemia	↓2004-2015	↓1999-2015
INCIDENCE STATIC		
C18-21 colorectum	**↔2009-2015**	**↓**
C16 stomach	↔2002-2015	↓
C15 oesophagus	↔	↓
C64 kidney	↔2012-2015	↔
C70-72 brain & CNS	↔	↔
C90 multiple myeloma	↔	↓

FEMALES	INCIDENCE TREND	MORTALITY TREND
all invasive excl. NMSC*	↔2010-2015 -0.1%‡	↓ -1.0%‡
INCIDENCE INCREASE		
C01-14 mouth & pharynx	↑	↔
C22 liver	↑	↑
C33-34 lung	**↑**	**↑**
C43 melanoma of skin	↑	↑
C54 uterine	↑	↑
C81 Hodgkin lymphoma	↑	↔
C82-85 non-Hodgkin	↑	↓
INCIDENCE DECREASE		
C15 oesophagus	↓	↓
C16 stomach	↓	↓
C50 breast	**↓2008-2015**	**↓**
C53 cervix	↓2010-2015	↓
C56 ovary	↓	↓
C67 bladder	↓	↔
INCIDENCE STATIC		
C18-21 colorectum	**↔**	**↓**
C25 pancreas	↔	↔
C64 kidney	↔2007-2015	↔
C73 thyroid	↔2011-2015	↔2006-2015
C91-95 leukaemia	↔	↓
C70-72 brain & CNS	↔	↓
C90 multiple myeloma	↔	↓

*C00-43, C45-96, i.e. excluding non-melanoma skin cancer (NMSC). ↑=significant increase, ↓=significant decrease, ↔=no change. The top three most common cancers in each sex are shown in bold.

‡ Annual percentage change (APC) over the whole period 1994-2015 or (if the trend has changed significantly) for a more recent period.

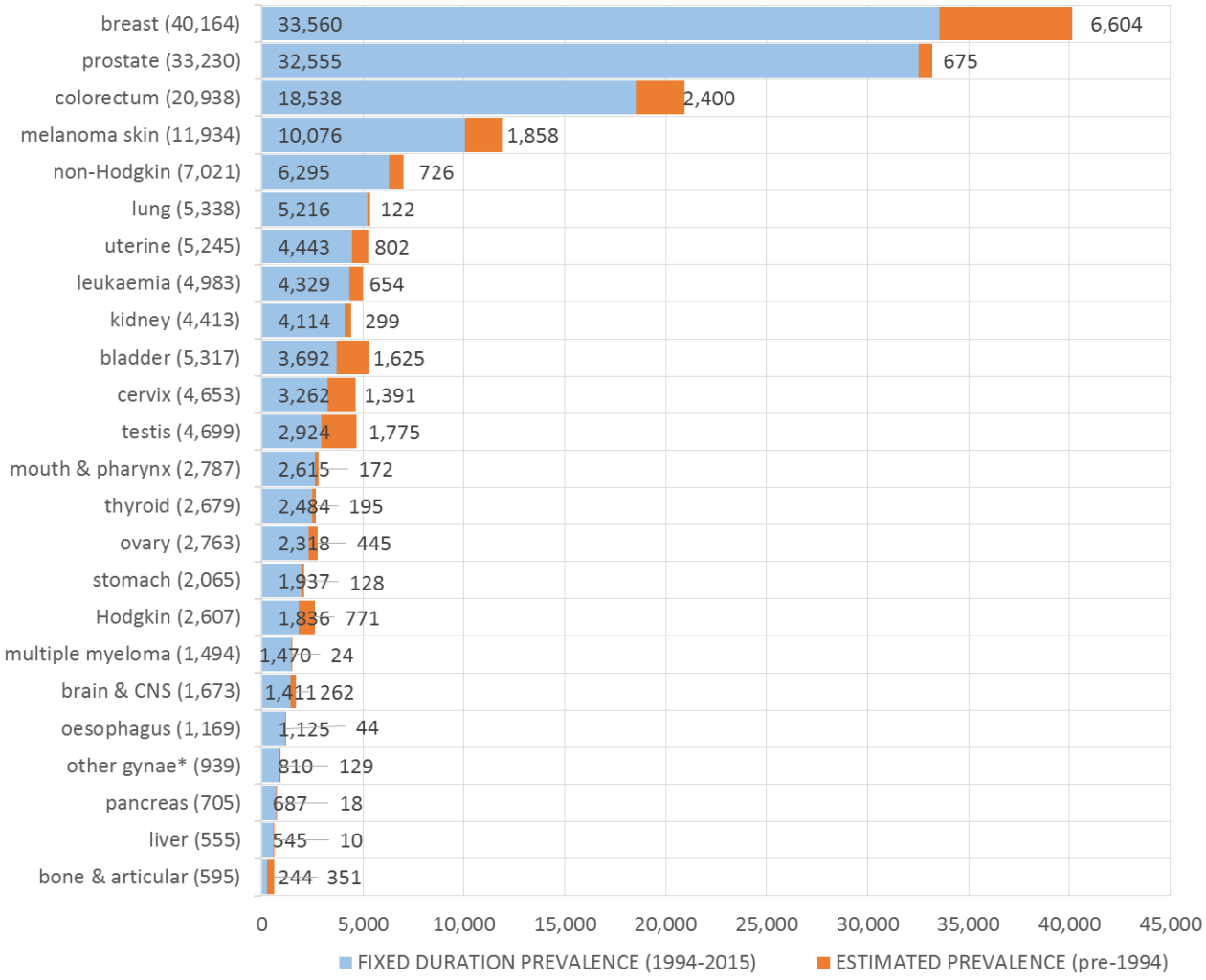
Summary Figure 2. Trend in incidence and mortality by sex: All invasive cancers, excluding NMSC



Cancer prevalence: numbers of cancer survivors

- There are two broad measures that can be used to summarise cancer prevalence (i.e. the number of cancers survivors alive at a given point in time): *fixed-duration prevalence* (survivors from a defined diagnosis period) or *complete prevalence* (all survivors regardless of when diagnosed).
- *Fixed-duration prevalence* for the period 1994-2015 (for which NCRI has collected incidence data) was estimated as 148,443 survivors of invasive cancer, excluding non-melanoma skin cancer, at 31/12/2015, almost 9,000 higher than the number of 1994-2014 survivors at 31/12/2014.
- This represented 46% of all females (163,344) and 41% of all males (179,095) diagnosed with cancer during 1994-2015 inclusive, or c.3.2% of the total Irish population in 2015.
- For the first time, this report also includes estimates including patients diagnosed *prior* to the establishment of the cancer registry in 1994 – *complete prevalence* in Ireland was estimated to be 167,715 persons alive at 31/12/2015 with a previous or current diagnosis of cancer (c.3.6% of the Irish population in 2015).
- Overall, the top six most common cancers in the prevalent cancer population were: breast cancer (24% of all cancer survivors), prostate cancer (20%), colorectal cancer (13%), skin melanoma (7%), non-Hodgkin lymphoma (4%) and lung cancer (3%) (*Summary Figure 3*).

Summary Figure 3. Fixed-duration and estimated complete prevalence by cancer type, in declining order of frequency: males and female survivors combined



The height of the bars represent the numbers surviving with a particular cancer on 31/12/2015. The figures in brackets are the estimated **complete prevalence** for each cancer type, i.e. the sum of survivors from 1994-2015 cancers and pre-1994 cancers. Only the most common individual cancer sites are shown.
*Other gynae: vulva, vagina, uterus (NOS) and placenta.

Survival by cancer type, period and stage

- Five-year *net survival* (i.e. survival that would be expected in the absence of other causes of death) has improved markedly for cancers as a whole and for most major cancer types since the mid-1990s (*Summary Table 2*).
- For invasive cancers (excluding the less generally less serious non-melanoma skin cancers), overall five-year net survival has increased from 44% for patients diagnosed during 1994-1998 to 61% for those diagnosed during 2009-2013.
- Over the same 20 years, five-year survival for colorectal cancer has increased from 50% to 63%, for lung cancer from 9% to 18%, for female breast cancer from 72% to 81%, for prostate cancer from 66% to 92%, and by substantial amounts for many other cancer types.
- Despite improvements, five-year survival remains very low for some cancers, notable pancreatic cancer (still <10%).

Summary Table 2. Five-year average net survival of Irish cancer patients (age 15-99) by diagnosis period (cohorts 1994-1998 to 2009-2013) and for the most recent, cross-sectional follow-up period (2010-2014). All estimates are age-standardized[a], and include all stages combined (invasive cancers only with the exception of bladder tumours).

	5-year net survival (with 95% confidence intervals)				
Cancer & ICD-10 code	**1994-1998 *cohort**	**1999-2003 cohort**	**2004-2008 cohort**	**2009-2013 cohort**	**2010-2014 *hybrid**
All cancers (excl. NMSC[b]) - both sexes C00-C97 ex C44	44.2% (43.7-44.6%)	50.7% (50.2-51.0%)	56.9% (56.5-57.3%)	61.1% (60.6-61.5%)	61.1% (60.7-61.5%)
All cancers (excl. NMSC) - males C00-C97 ex C44	40.0% (39.3-40.6%)	48.8% (48.2-49.4%)	57.5% (56.9-58.0%)	61.3% (60.6-61.9%)	61.7% (61.1-62.2%)
All cancers (excl. NMSC) - females C00-C97 ex C44	48.0% (47.3-48.6%)	51.7% (51.1-52.3%)	55.5% (54.9-56.0%)	59.8% (59.1-60.4%)	59.5% (58.9-60.0%)
Oral cavity & pharynx (excl. lip) C01-C14	40.1% (36.9-43.5%)	39.9% (36.6-43.4%)	46.0% (43.0-49.2%)	49.9% (46.5-53.5%)	49.6% (46.5-52.8%)
Oesophageal cancer C15	11.4% (9.77-13.2%)	12.7% (11.1-14.5%)	14.9% (13.2-16.6%)	22.6% (20.1-25.2%)	21.5% (19.3-23.8%)
Stomach cancer C16	17.4% (15.7-19.1%)	17.3% (15.6-19.0%)	23.2% (21.3-25.0%)	27.4% (25.1-29.8%)	27.3% (25.3-29.4%)
Colorectal cancer C18-C21	49.9% (48.5-51.3%)	52.1% (50.8-53.4%)	57.9% (56.7-59.0%)	62.6% (61.2-63.9%)	62.6% (61.4-63.6%)
Liver cancer C22	4.5% (2.9-7.0%)	11.0% (8.5-14.1%)	12.0% (9.8-14.6%)	17.0% (14.2-20.3%)	16.4% (13.8-19.3%)
Pancreatic cancer C25	5.6% (4.5-6.9%)	6.0% (4.9-7.3%)	7.0% (5.9-8.3%)	8.2% (6.6-10.1%)	9.7% (8.2-11.4%)
Laryngeal cancer C32	63.5% (58.2-69.2%)	52.0% (47.7-56.7%)	58.9% (54.5-63.7%)	62.0% (56.4-68.0%)	63.2% (58.6-68.1%)
Lung & tracheal cancer C33-34	9.0% (8.2-9.8%)	9.9% (9.2-10.7%)	12.4% (11.6-13.1%)	17.9% (16.8-18.9%)	17.9% (16.9-18.9%)
Bone sarcoma C41-C42	48.9% (40.3-59.1%)	47.3% (38.8-57.7%)	56.6% (48.1-66.5%)	56.9% (47.8-67.5%)	54.8% (45.9-65.2%)
Melanoma of skin C43	82.7% (80.4-85.1%)	85.5% (83.5-87.4%)	85.3% (83.6-86.8%)	89.3% (87.5-91.0%)	88.7% (87.3-90.1%)
Female breast cancer C50	71.6% (70.0-73.1%)	77.3% (75.9-78.6%)	80.8% (79.6-82.0%)	80.8% (79.6-82.0%)	82.9% (81.7-84.1%)
Cervical cancer C53	56.3% (52.4-60.5%)	62.1% (58.6-65.6%)	58.3% (55.0-61.6%)	61.0% (57.6-64.6%)	62.3% (59.2-65.5%)
Uterine cancer (age 20-99) C54	73.7% (70.0-77.6%)	72.0% (68.6-75.4%)	72.2% (69.2-75.3%)	77.7% (74.6-80.9%)	76.2% (73.3-79.1%)
Ovarian & related cancer C56, C57.0-57.4, C57.7	30.3% (27.8-32.9%)	28.7% (26.5-30.9%)	30.9% (28.8-33.1%)	35.1% (32.2-38.1%)	34.4% (31.9-36.8%)
Prostate cancer C61	65.8% (63.6-67.9%)	82.3% (81.0-83.6%)	91.0% (89.9-91.9%)	91.5% (90.3-92.6%)	92.1% (91.1-93.0%)
Testicular cancer (age 15-64) C62	89.0% (85.0-93.2%)	95.3% (93.2-97.4%)	98.0% (96.9-99.0%)	95.8% (93.3-98.3%)	96.3% (93.9-98.6%)
Kidney & related cancer C64-C66 & C68	47.9% (44.8-51.2%)	48.2% (45.4-51.0%)	53.8% (51.3-56.3%)	60.4% (57.5-63.4%)	60.3% (57.8-62.7%)
Bladder tumours (all behaviours) C67/D09.0/D41.4	71.2% (68.7-73.7%)	73.1% (70.8-75.3%)	72.6% (70.5-74.7%)	74.1% (71.6-76.5%)	73.9% (71.8-75.9%)
Brain cancer (malignant) C71	19.6% (17.6-21.8%)	22.9% (20.8-24.9%)	20.8% (18.9-22.9%)	26.0% (23.7-28.4%)	25.2% (23.1-27.4%)
Thyroid cancer C73	70.7% (65.8-75.8%)	72.3% (67.7-77.1%)	82.1% (78.5-85.8%)	86.2% (83.1-89.2%)	86.3% (83.3-89.3%)
Hodgkin lymphoma C81	73.1% (68.9-77.4%)	77.9% (74.3-81.6%)	82.3% (78.9-85.7%)	82.5% (79.4-85.6%)	82.0% (79.1-84.9%)
Non-Hodgkin lymphoma C82-C85	47.0% (44.4-49.7%)	54.4% (52.0-56.8%)	62.2% (60.1-64.4%)	67.3% (64.8-69.7%)	67.2% (65.1-69.3%)
Leukaemia C91-C95	45.6% (42.8-48.6%)	53.3% (50.6-56.0%)	60.5% (58.1-62.9%)	60.7% (57.8-63.6%)	61.6% (59.1-64.1%)
Multiple myeloma C90.0	27.5% (24.4-30.8%)	31.1% (28.3-34.0%)	46.3% (43.3-49.5%)	49.6% (45.8-53.7%)	52.1% (48.9-55.4%)

*Cohort = by year of diagnosis.
**Hybrid = by year of follow-up (all patients alive at some point 2010-2013, or diagnosed in 2009, followed up to 31/12/2014).
[a]Survival for all ages 15-99 (20-99 for bone sarcomas, 15-64 for testicular cancers) is standardised to the standard populations recommended by Corazziari et al. (2004); the age-groups used differ for prostate cancer, and greater weighting is given to younger patients for some cancers (melanoma, cervix, testis, brain, thyroid), reflecting differences in typical age-structure of patient populations for these cancers) [14].
[b]NMSC = non-melanoma skin cancers.

- Figures above relate to all stages combined, but survival varies very markedly by stage. The most recent stage-specific survival estimates are tabulated for six major cancer types in *Summary Table 3*.
- Five-year net survival from stage I cancer ranged 95%-100% for five of these cancers (all ages combined) but was only 43% for stage I lung cancer.
- For stage II cancers, five-year survival ranged 69%-100% except for lung cancer (27%).
- For stage III, five-year survival ranged 54%-99%, again with the exception of lung cancer (only 9%).
- For stage IV, five-year was quite poor for all six cancers examined, but ranged from 38% (prostate cancer) down to 3% (lung cancer).
- At any given stage, survival was generally poorer in older age-groups, although this was less pronounced for early-stage melanomas, breast and prostate cancers.

Summary Table 3. Five-year net survival by TNM 5th-edition stage for major cancers: all ages 15-99 combined, 2010-2014

	5-year net survival by stage: overall (and range by age-group)[c]				
Cancer	**Stage I**	**Stage II**	**Stage III**	**Stage IV**	**Unknown**
Colorectal cancer[a]	95% (91-98%)	86% (80-94%)	67% (50-82%)	12% (6-18%)	53% (21-79%)
Lung cancer[b]	43% (28-95%)	27% (13-59%)	9% (5-29%)	3% (2-18%)	8% (6-41%)
Melanoma of skin[b]	100% (98-100%)	85% (83-90%)	56% (40-72%)	18% (6-53%)	86% (66-93%)
Female breast cancer[a]	97% (95-99%)	89% (80-94%)	78% (53-85%)	26% (16-40%)	68% (53-84%)
Cervical cancer[b]	95% (85-97%)	69% (40-82%)	54% (26-62%)	19% (1-32%)	76% (55-88%)
Prostate cancer[b]	96% (81-98%)	<100% (87-100%)	99% (93-100%)	38% (18-64%)	81% (46-96%)

[a]Age-standardized [b]Unstandardized (insufficient data for some age/stage groups) [c]Ages 15-44 to 75+ (15-54 to 85+ for prostate)

Emergency presentation

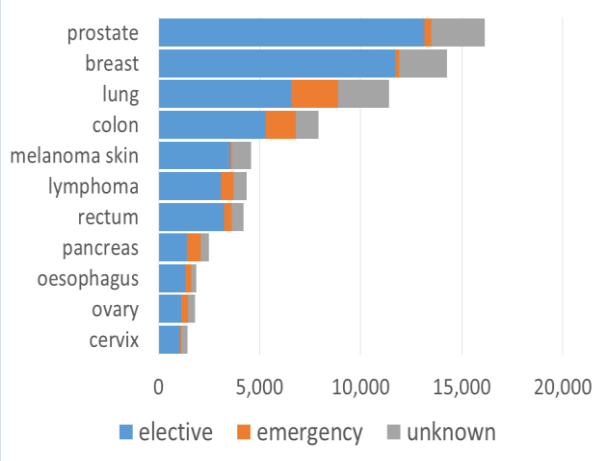
- Emergency presentation with cancer can result from lack of awareness of symptoms in patients and is generally associated with more advanced stage, limited treatment options and poorer survival outcomes.
- The number and proportion of patients first diagnosed during an emergency presentation in a hospital (i.e. presenting emergently) was calculated for the period 2010-2014 for cancers of the oesophagus, lung, colon, rectum, pancreas, breast, cervix, ovary and prostate, melanoma of skin, lymphoma and all invasive cancers combined (excl. NMSC) (*Summary Figure 4*).
- Overall, taking the first recorded invasive cancer (exc. NMSC) for each patient, the proportion of cases presenting emergently was 15% (of all cases whose admission type was known).
- The cancers with the highest proportion of emergency presentation were: pancreas (34%), lung (26%), ovary (24%), colon (22%), lymphoma (17%) and oesophagus (17%).
- The cancers with the lowest proportions of emergency presentation were: melanoma (1.1%), breast (1.6%), prostate (2.5%), cervix (6%) and rectum (11%).
- For all cancer types, patients resident in the most deprived areas were more likely to present emergently. The absolute risk difference between the most and least deprived 20% of the population

was highest for pancreatic (+14%), lung (+9%), colon (+8%), oesophageal (+8%), and ovarian cancers (+7%), and lowest for melanoma (+0.4%), breast (+0.9%), prostate (+1.2%) and cervical cancers (+1.7%).

- For all cancers examined, relative differences by deprivation were substantial, with patients from the most deprived group 25%-67% more likely to present as emergencies, depending on the cancer type (54% for all cancers combined).
- The proportion of late-stage cancers presenting emergently was (as expected) greater than the proportion of early-stage cases, but with large variation between cancer types.
- For cancers with low overall proportions of emergency presentation (including *melanoma and breast, prostate and cervical cancers*), the relative risk differential of emergency presentation between early and late stage was greatest, i.e. on the rare occasions when these patients presented emergently, they were much more likely to be late-stage presenters.
- In contrast, *pancreatic, lymphoma, colon, lung, rectal* and *ovarian* cancers had much higher proportions of emergency presentation almost irrespective of stage.

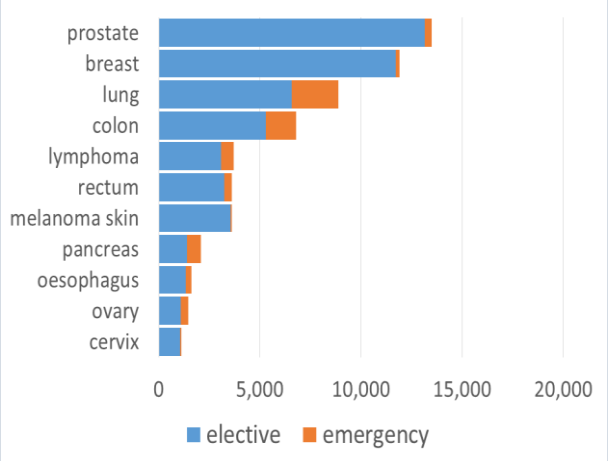
Summary Figure 4. Type of presentation, by cancer type (2010-2014)

Including 'unknown' presentation status



graph sorted in descending order

Excluding 'unknown' presentation status



graph sorted in descending order

	elective	emergency‡	unknown
pancreas	55.6%	28.2%↑	16.1%
lung	57.6%	20.3%↑	22.1%
ovary	60.7%	19.4%↑	19.9%
colon	67.0%	19.1%↑	13.9%
oesophagus	71.5%	14.6%↑	13.9%
lymphoma	70.3%	14.6%↑	15.1%
rectum	77.3%	9.1%↓	13.6%
cervix	72.7%	4.6%↓	22.7%
prostate	81.6%	2.1%↓	16.3%
breast	82.2%	1.3%↓	16.4%
melanoma skin	77.6%	0.9%↓	21.5%
all invasive* 2010-2014	**69.5%**	**12.4%**	**18.1%**
2014	70.0%	13.1%	16.9%
2010-2013	69.3%	12.2%	18.5%

*excluding non-melanoma skin cancer

‡sorted in ascending order of % presenting emergently

↑↓ greater/less than **12.4%** ('all invasive' %)

	elective	emergency‡
pancreas	66.3%	33.7%↑
lung	74.0%	26.0%↑
ovary	75.8%	24.2%↑
colon	77.8%	22.2%↑
lymphoma	82.9%	17.1%↑
oesophagus	83.1%	16.9%↑
rectum	89.5%	10.5%↓
cervix	94.1%	5.9%↓
prostate	97.5%	2.5%↓
breast	98.4%	1.6%↓
melanoma skin	98.9%	1.1%↓
all invasive* 2010-2014	**84.9%**	**15.1%**
2014	84.3%	15.7%
2010-2013	85.0%	15.0%

*excluding NMSC

‡sorted in ascending order of % presenting emergently

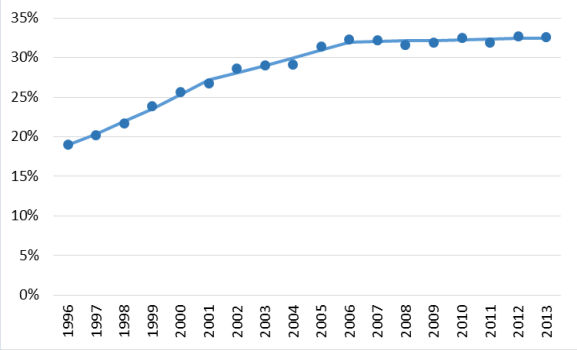
↑↓ greater/less than **15.1%** ('all invasive' %)

Trends in chemotherapy use

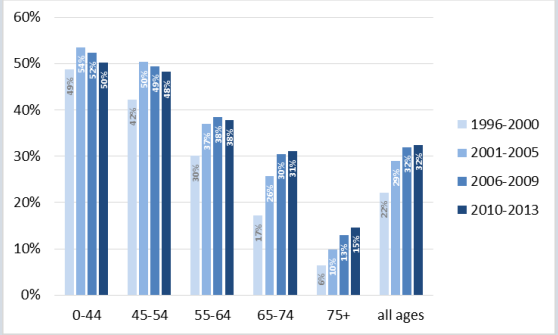
- Previous NCRI analyses have indicated that the use of chemotherapy for treatment of newly diagnosed cancer patients in Ireland has increased since the 1990s.
- A more detailed analysis in this report examined trends in chemotherapy use across the diagnosis period 1996-2013, assessing rates of annual change, possible changes in trends, and comparing across broader diagnosis periods, age-groups and stages.
- The most common pattern was a major increase between the mid/late 1990s and the early 2000s in the proportion of patients receiving chemotherapy, followed by the rate of increase slowing down, stabilising or even falling slightly more recently – noted for all cancers combined (excluding non-melanoma skin cancer) and for oral/pharyngeal, oesophageal, colorectal, pancreatic, lung, breast, cervical and kidney cancers.
- The next most common pattern was a single trend of increasing chemotherapy use over the full period examined – a pattern seen for liver, bone, uterine, ovarian, testicular and brain cancers, and for Hodgkin and non-Hodgkin lymphomas.
- The overall proportion of patients receiving chemotherapy increased in relative terms by over 50% between 1996 and 2013, or by almost 40% between the 1996-2000 and 2010-2013 periods (but only +1% between 2006-2009 and 2010-2013).
- Of the cancers examined, the highest relative change in chemotherapy use between the earliest and most recent periods was seen for liver (+370%), brain/CNS (+320%) and uterine cancer (+310%), and the lowest was for testicular cancer and non-Hodgkin lymphoma (both +10%). Between 2006-2009 and 2010-2013, the largest increase was seen for brain/CNS (+43%), uterine (+33%) and liver cancers (29%).
- There was much lower use of chemotherapy among older patients (particularly the age 75+ group), and the highest use (as a proportion of patients) was typically in patients <55 years.
- Chemotherapy use increased by the greatest amounts (relatively) for older or advanced-stage patients.
- The proportion of patients receiving chemotherapy was in general highest for stage III – for the period 2010-2013, this applied to cancers as a whole, and oesophageal, stomach, colorectal, pancreatic, lung, breast, cervival, uterine, ovarian, and testicular cancers – and it was generally also high for stage IV, and for some cancers, stage II.
- Over 6,000 patients diagnosed in 2013 had chemotherapy within 12 months of their diagnosis, compared with ≤3,000 per year in the late 1990s.
- The trends seen may also reflect a balance between chemotherapy becoming more widely used as standard cancer treatment in Ireland, and improved targeting of chemotherapy (including less use of chemotherapy in patient subgroups less likely to benefit).

Summary Figure 5. Trends (and average annual % change [APC]) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age and diagnosis period

ALL CANCERS EXCLUDING NMSC (C00-C43,C45-C96)



Period	APC	95% CI	Trend
1996-2001	+7.5%	(+6.0%, +9.1%)	↑
2001-2006	+3.3%	(+1.7%, +4.8%)	↑
2006-2013	+0.2%	(-0.3%, +0.8%)	↔



2. INCIDENCE 2015-2017

- Taking known cancer incidence rates during 2012-2015, and applying these rates to population estimates for 2015-2017, an average of 40,570 cancers or other (non-invasive) tumours diagnosed annually was estimated for the period 2015-2017, representing an age-standardised incidence rate of 770 female cases and 795 male cases per 100,000 per year (Table 2-1).
- Approximately 18% of these were non-invasive tumours (in situ carcinomas, tumours of uncertain behaviour and benign brain and CNS tumours) and 27% were invasive non-melanoma skin cancers (NMSC, estimated 10,857 cases per year).
- Invasive cancers (incl. NMSC) were estimated to average 33,180 cases per year during 2015-2017, or an age-standardised rate of 552 female and 718 male cases per 100,000 per year.
- For *all invasive cancers excluding NMSC*, the figures most often quoted in international comparisons, an estimated 22,320 cases were diagnosed annually during 2015-2017, or 67% of all invasive cases.
- This is equivalent to an incidence rate of 387 cases per 100,000 females and 478 cases per 100,000 males per year — 26% higher for men than for women.
- The cumulative lifetime risk (to age 75 years) of an invasive cancer diagnosis was approximately 1 in 3 for men and 1 in 4 for women.
- These figures assume that average cancer incidence rates did not change between the periods 2012-2015 and 2016-2017, and that the Irish population estimates or projections available for 2015-2017 at the time of writing prove to be accurate.

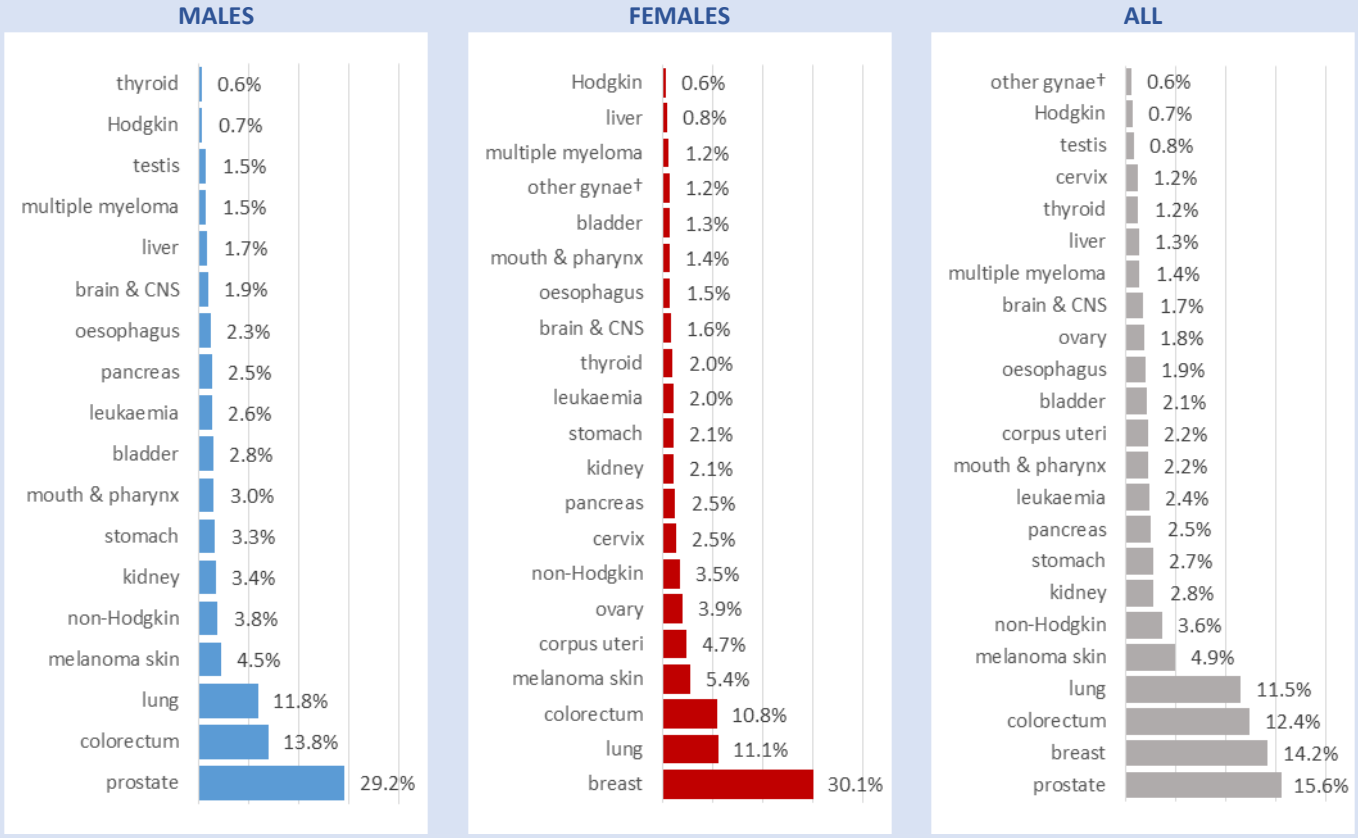
Table 2-1
Estimated annual average incidence, rate and cumulative risk of the most common cancers: 2015-2017‡

	CASE COUNT			RATE* / 100,000		%RISK to age 75		% of all invasive cancers excl. NMSC		
ICD10 cancer site**	**male**	**female**	**all**	**male**	**female**	**male**	**female**	**male**	**female**	**all**
C00-96 all invasive cancers	18,008	15,171	33,179	717.7	551.6	43.9	35.4			
C00-43, C45-96 all invasive excl. NMSC	11,894	10,427	22,321	477.6	386.9	33.0	26.8	100%	100%	100%
C00-D48 all registered tumours	19,941	20,633	40,574	794.6	769.8	47.2	45.1			
D00-48 all non-invasive tumours	1,933	5,461	7,394	76.8	218.2	5.9	15.1			
mouth and pharynx	359	142	501	14.9	5.3	1.3	0.4	3.0%	1.4%	2.2%
oesophagus	275	155	430	11.1	5.1	0.9	0.4	2.3%	1.5%	1.9%
stomach	389	214	603	15.2	7.3	1.1	0.5	3.3%	2.1%	2.7%
colorectum	1,644	1,131	2,775	65.2	39.9	5.0	3.0	13.8%	10.8%	12.4%
liver	202	83	285	8.1	2.9	0.6	0.2	1.7%	0.8%	1.3%
pancreas	302	262	564	11.9	8.7	0.9	0.7	2.5%	2.5%	2.5%
lung and trachea	1,409	1,157	2,566	55.3	41.0	4.3	3.5	11.8%	11.1%	11.5%
melanoma of skin	530	562	1,092	21.4	21.2	1.6	1.7	4.5%	5.4%	4.9%
other skin cancer (NMSC)	6,113	4,744	10,857	240.2	164.7	16.3	11.7			
breast	27	3,141	3,168	1.1	122.6	0.1	9.6	0.2%	30.1%	14.2%
cervix		264	264		10.6		0.8		2.5%	1.2%
uterine		486	486		18.9		1.7		4.7%	2.2%
ovary		411	411		15.5		1.3		3.9%	1.8%
other malignant gynaecological†		129	129		4.7		0.4		1.2%	0.6%
prostate	3,474		3,474	141.0		12.7		29.2%		15.6%
testis	176		176	7.8		0.6		1.5%		0.8%
kidney	404	218	622	16.4	8.1	1.3	0.7	3.4%	2.1%	2.8%
bladder	335	136	471	13.0	4.4	0.9	0.3	2.8%	1.3%	2.1%
all meninges, brain & CNS	317	349	666	13.1	13.4	1.1	1.1			
malignant meninges, brain & CNS	223	167	390	9.2	6.4	0.8	0.5	1.9%	1.6%	1.7%
benign meninges, brain & CNS	63	146	209	2.6	5.5	0.2	0.4			
uncertain meninges, brain & CNS	32	35	67	1.3	1.4	0.1	0.1			
thyroid	69	207	276	2.8	8.4	0.2	0.7	0.6%	2.0%	1.2%
lymphoma (total)	534	426	960	21.8	16.0	1.7	1.3	4.5%	4.1%	4.3%
Hodgkin lymphoma	82	64	146	3.6	2.8	0.3	0.2	0.7%	0.6%	0.7%
non-Hodgkin lymphoma	452	362	814	18.2	13.3	1.4	1.1	3.8%	3.5%	3.6%
multiple myeloma	177	128	305	7.0	4.5	0.6	0.4	1.5%	1.2%	1.4%
leukaemia	314	213	527	12.6	7.8	0.9	0.6	2.6%	2.0%	2.4%
other invasive cancers	1,054	794	1,848					8.9%	7.6%	8.3%

Footnote:

‡ Average age-standardised rates for 2012-2015 were calculated and applied to populations for 2016 and 2017. Estimated average annual case counts and rates for 2015-2017 are presented in the table.
* Rates are standardised to the 1976 European standard population (ESP) [2]; see Appendix II for rates standardised to the 2013 ESP.
** Invasive cancer included all tumours classified as behaviour 3 in ICD-O-3 classification (including some neoplasms previously classified as uncertain behaviour, e.g. polycythaemia vera).
† Vulva, vagina, uterus (NOS) and placenta.

Figure 2-1.
Estimated percentages and rank of the most commonly diagnosed invasive cancers (excluding NMSC): annual average 2015-2017



Low-incidence invasive cancers are not shown (c.10% of cases), therefore percentages do not sum to 100%.
† Vulva, vagina, uterus (NOS) and placenta.

- If NMSC was excluded, prostate and female breast cancer were the most commonly diagnosed invasive cancers overall, and each comprised almost one-third of all invasive cancers in men and women respectively during the period 2015-2017 (Figure 2-1).
- Colorectal cancer, lung cancer, melanoma of skin and NHL were the 2nd, 3rd, 4th and 5th most common cancers in males, respectively.
- Lung cancer, colorectal cancer, melanoma of skin, and uterine cancer (corpus uteri) were the 2nd, 3rd, 4th and 5th most common cancers in females respectively. Lung cancer has moved up the ranks from 3rd place to 2nd place ahead of colorectal cancer in recent years [2].
- Otherwise, there was no change in the relative frequency or ranks of the common cancer types from the last annual report (2016) [3].

A more detailed breakdown of incidence statistics by cancer site is given in Appendix I & II.

3. MORTALITY 2012-2014

- Cancer was the second most common cause of death registered in Ireland during 2014-2015 (30.1%, after diseases of the circulatory system, 30.6% [1]).
- An annual average of 8,766 cancer deaths (4,629 in males, 4,137 in females) was estimated for the period 2012-2014 (Table 3-1 and Figure 3-2).
- This represents an estimated age-standardised mortality rate of 149 deaths per 100,000 females and 199 deaths per 100,000 males per year (Table 3-1) — 34% higher for men than for women.
- The estimated lifetime risk (to age 75 year) of dying from cancer was approximately 1 in 10 for women and 1 in 8 for men.

Table 3-1. Annual average mortality attributed to cancer: 2012-2014

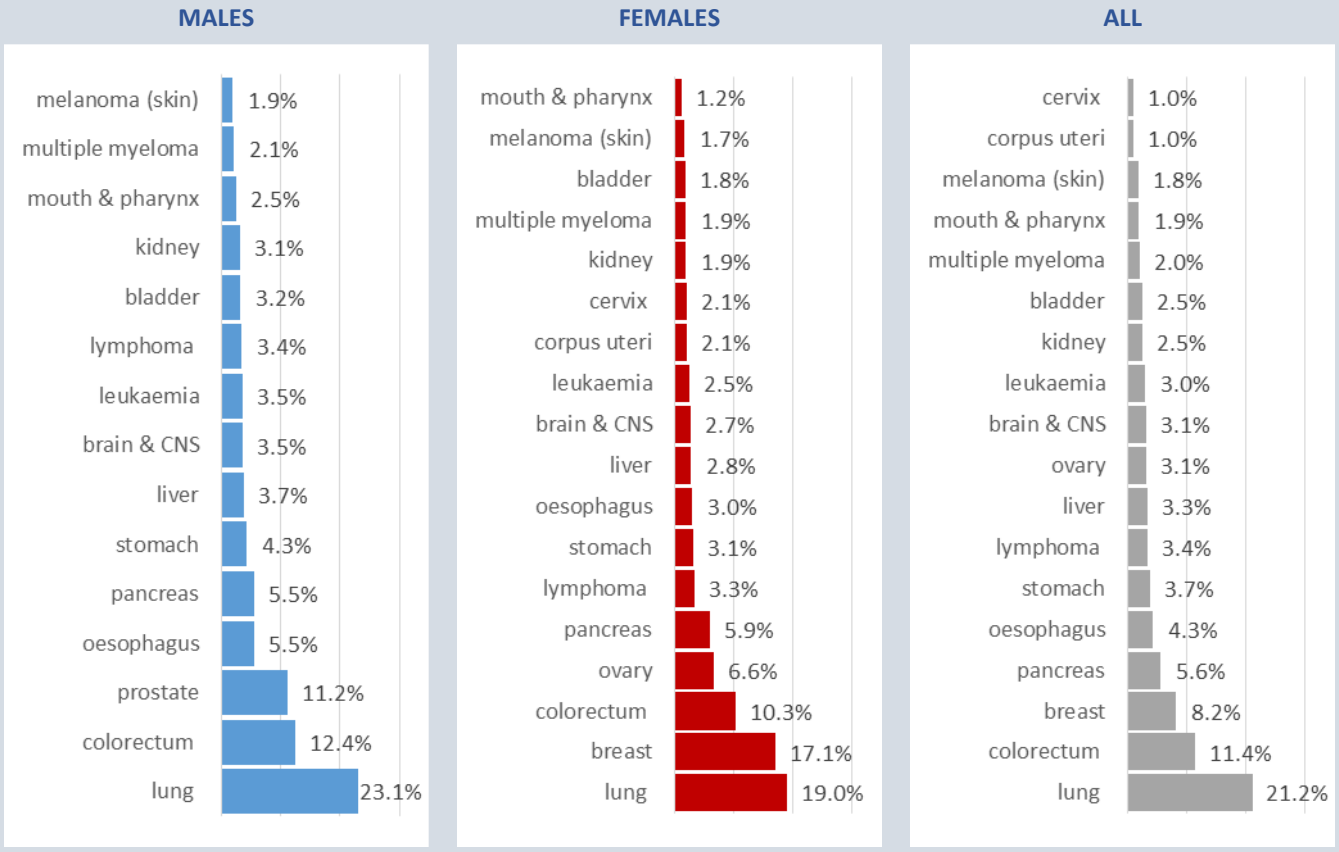
	DEATHS			RATE* / 100,000		%RISK to age 75y		% of all cancer deaths		
	male	female	all	male	female	male	female	male	female	all
C00-96 all cancers	4,629	4,137	8,766	199.0	148.5	12.4	10.1	100.0%	100.0%	100.0%
mouth & pharynx	117	50	166	5.1	1.8	0.4	0.1	2.5%	1.2%	1.9%
oesophagus	253	125	377	11.0	4.3	0.9	0.3	5.5%	3.0%	4.3%
stomach	199	128	327	8.5	4.4	0.6	0.3	4.3%	3.1%	3.7%
colorectum	576	424	1,000	24.8	14.4	1.6	0.9	12.4%	10.3%	11.4%
liver	172	118	289	7.4	4.0	0.5	0.2	3.7%	2.8%	3.3%
pancreas	252	243	495	10.8	8.5	0.8	0.6	5.5%	5.9%	5.6%
lung	1,070	786	1,855	45.9	28.9	3.4	2.3	23.1%	19.0%	21.2%
melanoma (skin)	88	71	159	3.8	2.5	0.2	0.2	1.9%	1.7%	1.8%
breast	8	709	717	0.3	26.7		2.0	0.2%	17.1%	8.2%
cervix		88	88		3.7		0.3		2.1%	1.0%
corpus uteri		88	88		3.1		0.2		2.1%	1.0%
ovary		272	272		10.3		0.8		6.6%	3.1%
prostate	519		519	22.2		0.9		11.2%		5.9%
kidney	143	77	220	6.2	2.8	0.4	0.2	3.1%	1.9%	2.5%
bladder	150	73	223	6.4	2.2	0.3	0.1	3.2%	1.8%	2.5%
brain & CNS	161	114	275	7.0	4.6	0.6	0.4	3.5%	2.7%	3.1%
lymphoma	157	138	295	6.7	4.8	0.4	0.3	3.4%	3.3%	3.4%
multiple myeloma	97	78	176	4.2	2.6	0.3	0.2	2.1%	1.9%	2.0%
leukaemia	162	102	264	6.9	3.6	0.4	0.2	3.5%	2.5%	3.0%
other cancers	505	453	961					10.9%	10.9%	10.9%

*** Rates are standardised to the 1976 European standard population (ESP).**

- Lung cancer was the leading cause of cancer death in both sexes, with an estimated average of 1,855 deaths per year or 19% of cancer deaths in women and 23% of cancer deaths in men during the period 2012-2014 (Table 3-1, Figure 3-1).
- Colorectal cancer was the next most common cause of cancer death in both sexes, with an estimated average of 1,000 deaths per year or 12% of cancer deaths in males and 10% of cancer deaths in females.
- Deaths from lung, colorectal, breast and prostate cancers combined made up almost half (47%) of all deaths from cancer during this period.
- Deaths from cancers of the, oesophagus, pancreas and stomach in males ranked 4th, 5th and 6th respectively, and comprised 15% of all cancer deaths in males. Mortality rankings for these high-fatality cancers ranked were much higher than their incidence rankings (Figure 2-1).
- Deaths from cancers of the ovary and pancreas ranked 4th and 5th respectively in females and comprised almost 13% of cancer deaths in women, again much higher than the incidences ranking for these high-fatality cancers (Figure 2-1).

A more detailed breakdown of mortality statistics by cancer site is given in Appendix III.

Figure 3-1. Estimated percentage and rank of the most common cancer deaths: annual averages 2012-2014



Cancers accounting for smaller percentages of cancer deaths (c.10% in total) are not shown, therefore percentages do not sum to 100%.
Mortality data provided by the Central Statistics Office (CSO) for 2012, 2013 and 2014 and presented as annual averages

4. TRENDS IN INCIDENCE AND MORTALITY IN IRELAND 1994-2015

As in previous annual reports, annual percentage changes (APC) in incidence and mortality over time were estimated by Joinpoint regression of case/death counts and annual age-standardised rates (ASR) of incidence and mortality [4][5]. In general, only minor changes in the trends shown will be expected with inclusion of one further year's data, but in some instances the extra data may be sufficient to identify a change in trend not previously apparent.

- In interpreting the trends reported in this section, possible changes in diagnostic activity (e.g. introduction or expansion of screening) or coding practices should be borne in mind, as well as possible changes in the true underlying risk of the cancers involved. Some mention of such factors is made under detailed results for specific cancer types (Figures 4-3 to 4-28), along with brief summaries of confirmed or probable risk factors (main sources: World Cancer Research Foundation www.wcrf.org [6], American Cancer Society http://www.cancer.org/ [7]).
- In some of the graphs presented (e.g. Figure 4-1) numbers of cases and deaths tend to increase over time, due to natural population increase and ageing, while the age-standardised rate (ASR, calculated by reference to the 1976 European Standard Population weights) can actually decrease over time after adjustment for changes in age structure and population.

Table 4-1 Summary of incidence and mortality age-standardised rate trends for cancers in males

SITE (& INCIDENCE RANK)	INCIDENCE				MORTALITY			
	PERIOD	APC	95%CI	TREND	PERIOD	APC	95%CI	TREND
all invasive excl. NMSC	**2011-2015**	**-2.0**	**[-3.4,-0.6]**	**↓**	**1994-2015**	**-1.5**	**[-1.7,-1.4]**	**↓**
all invasive excl. NMSC & prostate	**2008-2015**	**-0.3**	**[-0.7,0.0]**	**↔**	**1994-2015**	**-1.4**	**[-1.6,-1.3]**	**↓**
INCIDENCE RATE INCREASE								
C43 melanoma of skin (4th)	**1994-2015**	**5.1**	**[4.5,5.6]**	**↑**	**1994-2015**	**4.3**	**[2.9,5.8]**	**↑**
C82-85 non-Hodgkin lymphoma (5th)	**1994-2015**	**1.6**	**[1.3,2.0]**	**↑**	**1994-2015**	**-1.0**	**[-1.8,-0.2]**	**↓**
C01-14 mouth & pharynx (8th)	2001-2015	3.1	[2.4,3.8]	↑	2004-2015	0.6	[-1.1,2.3]	↔
C25 pancreas (11th)	1994-2015	0.6	[0.1,1.2]	↑	1994-2015	-0.3	[-0.8,0.2]	↔
C22 liver (14th)	1994-2015	6.2	[5.3,7.1]	↑	1994-2015	2.7	[1.9,3.5]	↑
C81 Hodgkin lymphoma (17th)	1994-2015	2.2	[1.5,2.9]	↑	1994-2015	-3.8	[-5.4,-2.0]	↓
C73 thyroid (18th)	1994-2015	5.9	[4.0,7.7]	↑	1994-2015	-0.1	[-1.6,1.4]	↔
INCIDENCE RATE DECREASE								
C61 prostate (1st)	**2011-2015**	**-4.3**	**[-6.8,-1.7]**	**↓**	**2002-2015**	**-3.1**	**[-3.7,-2.4]**	**↓**
C33-34 lung (3rd)	**1994-2015**	**-0.8**	**[-1.0,-0.6]**	**↓**	**1994-2015**	**-1.8**	**[-2.0,-1.5]**	**↓**
C67 bladder (9th)	1994-2015	-2.9	[-3.3,-2.6]	↓	1994-2015	-0.8	[-1.4,-0.1]	↓
C91-95 leukaemia (10th)	2004-2015	-2.7	[-3.9,-1.5]	↓	1999-2015	-2.3	[-3.3,-1.2]	↓
INCIDENCE RATE STATIC								
C18-21 colorectum (2nd)	**2009-2015**	**-1.0**	**[-2.1,0.1]**	**↔**	**1994-2015**	**-1.7**	**[-2.1,-1.4]**	**↓**
C64 kidney (6th)	2012-2015	-3.3	[-10.4,4.3]	↔	1994-2015	0.5	[-0.3,1.4]	↔
C16 stomach (7th)	2002-2015	-0.4	[-1.0,0.1]	↔	1994-2015	-3.2	[-3.7,-2.7]	↓
C15 oesophagus (12th)	1994-2015	-0.3	[-0.8,0.2]	↔	1994-2015	-0.6	[-1.1,-0.2]	↓
C70-72 malignant brain & CNS (13th)	1994-2015	-0.2	[-0.6,0.3]	↔	1994-2015	-0.6	[-1.2,0.1]	↔
C90 multiple myeloma (15th)	1994-2015	0.3	[-0.3,0.9]	↔	1994-2015	-1.5	[-2.1,-0.9]	↓
C44 NMSC	2011-2015	1.4	[-0.3,3.1]	↔				

APC: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression. Trend: ↑=significant increase, ↓=significant decrease, ↔=no change (static), at the 95% level.
The top five most common invasive cancers are shown in bold type.
Incidence data covered the period 1994 to 2015 (22 years). Mortality data covered the period 1994-2014 (21 years); rates for 2015 were estimated by calculating the average age-specific rates deaths during 2012-2014 and applying those rates to the population for 2015. Where more than one discrete trend was observed over the full 22 year period, only the most recent trend is shown.
See Figures 4-1 to 4-28 for a full visual representation of each individual cancer trend.

- The incidence rate of all invasive cancer (excl. NMSC) in males declined by 2.0% annually during the period 2011-2015 after a prolonged and steady increase before 2011, although it is too early to tell if this downward trend will be sustained (Fig. 4-1).
- If the most common cancer, prostate cancer, was excluded from the dataset, the downward trend was much reduced (-0.3% annually during 2008-2015) (Fig. 4-2). The overall downward trend in male cancer rates was heavily influenced by the declining rate of prostate cancer during the period 2011-2015 and lung cancer during 1994-2015.
- From a healthcare provision perspective, the actual number of male cancer cases increased almost year on year during 1994-2015, but the increase slowed during 2011-2015 (Fig. 4-1) mostly due to the fall-off in prostate cancers (Fig. 4-18) and to a lesser extent lung cancers (Fig. 4-9).

Table 4-2 Summary of incidence and mortality age-standardised rate trends for cancers in females

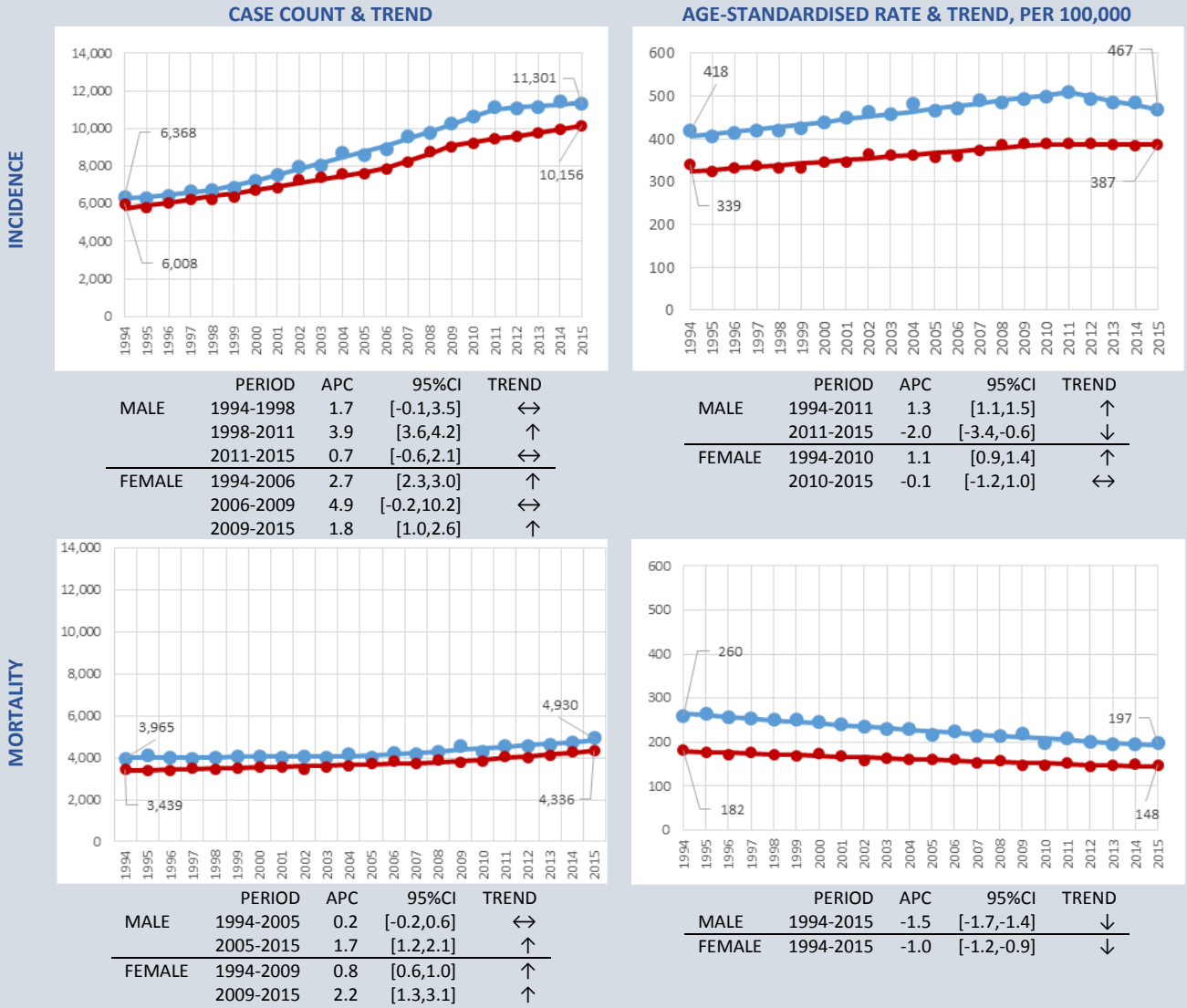
SITE (& INCIDENCE RANK)	INCIDENCE				MORTALITY			
	PERIOD	APC	95%CI	TREND	PERIOD	APC	95%CI	TREND
all invasive excl. NMSC	**2010-2015**	**-0.1**	**[-1.2,1.0]**	**↔**	**1994-2015**	**-1.0**	**[-1.2,-0.9]**	**↓**
all invasive excl. NMSC & breast	**1994-2015**	**0.7**	**[0.6,0.9]**	**↑**	**1994-2015**	**-0.8**	**[-1.0,-0.7]**	**↓**
INCIDENCE RATE INCREASE								
C33-34 lung (2nd)	**1994-2015**	**2.2**	**[2.0,2.5]**	**↑**	**1994-2015**	**0.5**	**[0.2,0.9]**	**↑**
C43 melanoma of skin (4th)	**1994-2015**	**2.6**	**[2.1,3.1]**	**↑**	**1994-2015**	**2.2**	**[1.0,3.5]**	**↑**
C54 uterine (5th)	**1994-2015**	**2.4**	**[1.9,2.9]**	**↑**	**1994-2015**	**1.9**	**[1.0,2.8]**	**↑**
C82-85 non-Hodgkin lymphoma (7th)	1994-2015	1.5	[0.9,2.1]	↑	1994-2015	-1.1	[-1.9,-0.2]	↓
C01-14 mouth & pharynx (16th)	1994-2015	2.2	[1.4,3.0]	↑	1994-2015	-0.4	[-1.4,0.6]	↔
C22 liver (19th)	1994-2015	4.8	[3.4,6.1]	↑	1994-2015	2.9	[2.1,3.7]	↑
C81 Hodgkin lymphoma (20st)	1994-2015	2.4	[1.2,3.5]	↑	1994-2015	-1.2	[-3.3,1.0]	↔
C44 NMSC	2000-2015	2.4	[2.0,2.8]	↑				
INCIDENCE RATE DECREASE								
C50 breast (1st)	**2008-2015**	**-0.8**	**[-1.5,-0.01]**	**↓**	**1994-2015**	**-1.8**	**[-2.1,-1.4]**	**↓**
C56 ovary (6th)	1994-2015	-0.6	[-1.0,-0.1]	↓	1994-2015	-1.0	[-1.5,-0.4]	↓
C53 cervix (8th)	2010-2015	-6.9	[-12.4,-1.2]	↓	1994-2015	-0.7	[-1.4,-0.0]	↓
C16 stomach (11th)	1994-2015	-1.2	[-1.6,-0.7]	↓	1994-2015	-3.0	[-3.6,-2.5]	↓
C15 oesophagus (15th)	1994-2015	-0.9	[-1.4,-0.4]	↓	1994-2015	-1.6	[-2.2,-1.0]	↓
C67 bladder (17th)	1994-2015	-2.5	[-3.3,-1.7]	↓	1994-2015	-0.1	[-1.1,1.0]	↔
INCIDENCE RATE STATIC								
C18-21 colorectum (3rd)	**1994-2015**	**-0.1**	**[-0.4,0.1]**	**↔**	**1994-2015**	**-1.8**	**[-2.2,-1.5]**	**↓**
C25 pancreas (9th)	1994-2015	0.3	[-0.2,0.9]	↔	1994-2015	0.2	[-0.3,0.6]	↔
C64 kidney (10th)	2007-2015	0.7	[-1.4,2.7]	↔	1994-2015	0.3	[-0.7,1.3]	↔
C73 thyroid (13th)	2011-2015	-0.4	[-8.0,7.8]	↔	2006-2015	3.5	[-1.2,8.4]	↔
C91-95 leukaemia (12th)	1994-2015	-0.2	[-0.9,0.6]	↔	1994-2015	-1.7	[-2.6,-0.7]	↓
C70-72 brain & CNS (14th)	1994-2015	0.4	[-0.3,1.1]	↔	1994-2015	-0.9	[-1.6,-0.2]	↓
C90 multiple myeloma (18th)	1994-2015	0.3	[-0.7,1.3]	↔	1994-2015	-1.6	[-2.5,-0.7]	↓
D05 breast (in-situ)	2009-2015	-0.3	[-3.9,3.5]	↔				
D06 cervix (in situ)	2011-2015	-3.2	[-8.2,2.1]	↔				

APC: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression. Trend: ↑=significant increase, ↓=significant decrease, ↔=no change (static), at the 95% level.
The top five most common invasive cancers are shown in bold type.
Incidence data covered the period 1994 to 2015 (22 years). Mortality data covered the period 1994-2014 (21 years); 2015 figures were estimated by applying average age-specific rates during 2012-2014 to the population for 2015.
Where more than one discrete trend was observed over the full 22 year period, only the most recent trend is shown.
See Figures 4-1 to 4-28 for a full visual representation of each individual cancer trend.

- The incidence rate of all invasive cancer (excl. NMSC) in females was stable during the period 2010-2015 after a prolonged increase during 1994-2010 (Fig. 4-1).
- However, excluding breast cancer, a steady and significant increase of 0.7% annually throughout 1994-2015 was the underlying trend; the recent decline in female breast cancer during 2008-2015 (0.8% annually) largely accounts for the overall static trend during 2010-2015.

- Cases of invasive cancer increased year on year during 1994-2014; however the accrual of new female cases slowed significantly during 2009-2015, mostly attributable to fewer breast cancers (Fig. 4-1).

Figure 4-1. Trend in incidence and mortality by sex: C00-43, C45-96 All invasive cancers, excluding NMSC



	PERIOD	APC	95%CI	TREND
MALE	1994-1998	1.7	[-0.1,3.5]	↔
	1998-2011	3.9	[3.6,4.2]	↑
	2011-2015	0.7	[-0.6,2.1]	↔
FEMALE	1994-2006	2.7	[2.3,3.0]	↑
	2006-2009	4.9	[-0.2,10.2]	↔
	2009-2015	1.8	[1.0,2.6]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2011	1.3	[1.1,1.5]	↑
	2011-2015	-2.0	[-3.4,-0.6]	↓
FEMALE	1994-2010	1.1	[0.9,1.4]	↑
	2010-2015	-0.1	[-1.2,1.0]	↔

	PERIOD	APC	95%CI	TREND
MALE	1994-2005	0.2	[-0.2,0.6]	↔
	2005-2015	1.7	[1.2,2.1]	↑
FEMALE	1994-2009	0.8	[0.6,1.0]	↑
	2009-2015	2.2	[1.3,3.1]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.5	[-1.7,-1.4]	↓
FEMALE	1994-2015	-1.0	[-1.2,-0.9]	↓

female ● **male** ● APC: annual percentage change over the PERIOD and 95% confidence interval (95%CI) based on data points fitted with Joinpoint regression. Trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level.

Males:

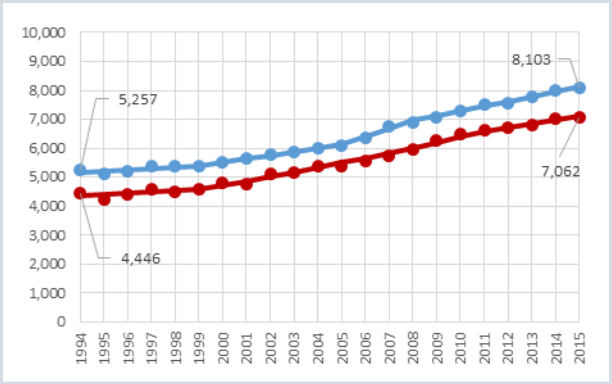
- After a slow increase from 1994 to 1998, case numbers increased significantly up to 2011, thereafter the annual case count increased only marginally during 2011-2015.
- After a sustained increase 1994-2011, the incidence rate declined significantly during 2011-2015.
- The decline in the overall rate reflects a decline in prostate cancer rates since 2011 (following earlier increases), an ongoing fall in lung cancer rates and a slight decline in colorectal cancer rates 2009-2015.
- Numbers of deaths increased significantly over the period 2005-2015, following a more stable trend during 1994-2005.
- Adjusted for population increase and aging, the mortality rate declined steadily during 1994-2015.

Females:

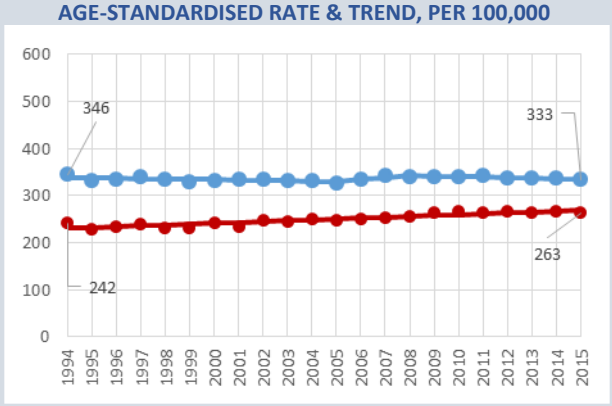
- Cases increased in a step-like fashion since 1994 with one brief period of rapid increase during 2006-2009. Thereafter, cases increased less steeply but significantly during 2009-2015.
- Incidence rates increased significantly during 1994-2010 followed by a static period during 2010-2015.

- The recent static trend in the overall rate of invasive cancer in females was heavily influenced by a recent decline in breast cancer rates.
- Numbers of deaths increased during 1994-2015, but the overall mortality rate declined over the same period after adjusting for population increase and aging.

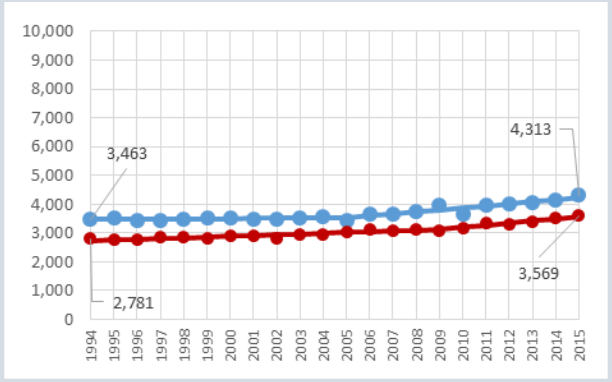
Figure 4-2. Trend in incidence by sex: C00-43, C45-96 All invasive cancers, excluding NMSC, prostate cancer & breast cancer (in females)



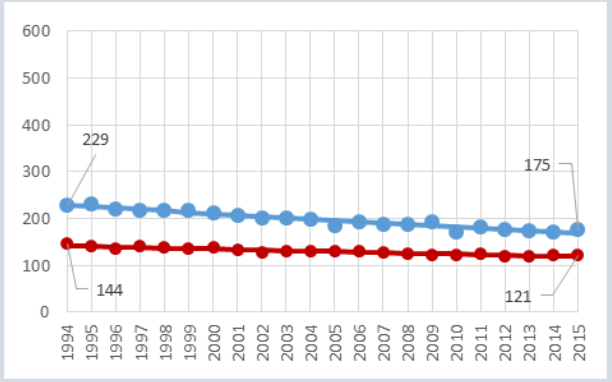
	PERIOD	APC	95%CI	TREND
MALE	1994-1999	0.9	[0.1,1.8]	↑
	1999-2005	2.1	[1.3,2.9]	↑
	2005-2008	4.3	[0.9,7.8]	↑
	2008-2015	2.3	[1.9,2.7]	↑
FEMALE	1994-1999	1.1	[-0.2,2.4]	↔
	1999-2011	3.1	[2.7,3.4]	↑
	2011-2015	1.9	[0.4,3.4]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2005	-0.2	[-0.4,-0.0]	↓
	2005-2008	1.3	[-1.6,4.3]	↔
	2008-2015	-0.3	[-0.7,0.0]	↔
FEMALE	1994-2015	0.7	[0.6,0.9]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2005	0.2	[-0.3,0.6]	↔
	2005-2015	1.9	[1.4,2.4]	↑
FEMALE	1994-2009	0.9	[0.7,1.1]	↑
	2009-2015	2.3	[1.5,3.1]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.4	[-1.6,-1.3]	↓
FEMALE	1994-2015	-0.8	[-1.0,-0.7]	↓

The graphs above are included to assess the influence of prostate cancer on trends in overall cancer rates in males and the influence of breast cancer on overall cancer trends in females, by comparison with Fig. 4-1 (showing trends without exclusion of prostate and breast cancers).

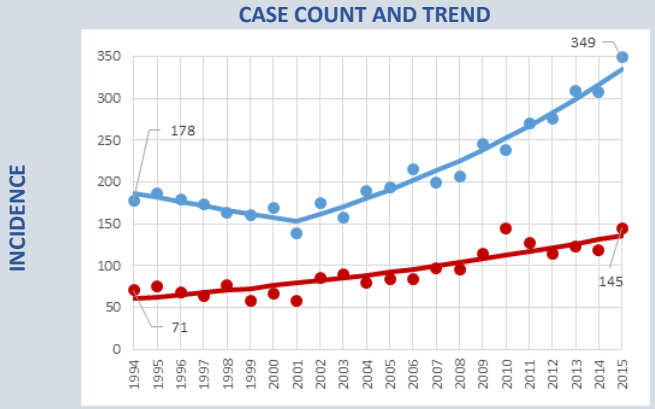
Males:

- Case numbers increased significantly during 1994-2014, with one period of steeper increase during 2005-2008.
- The incidence rate declined significantly during 1994-2005, with a marginal increase during 2005-2008. Thereafter, the rate declined marginally during 2008-2015, but with a less marked decline than that seen in for the dataset including prostate cancer.

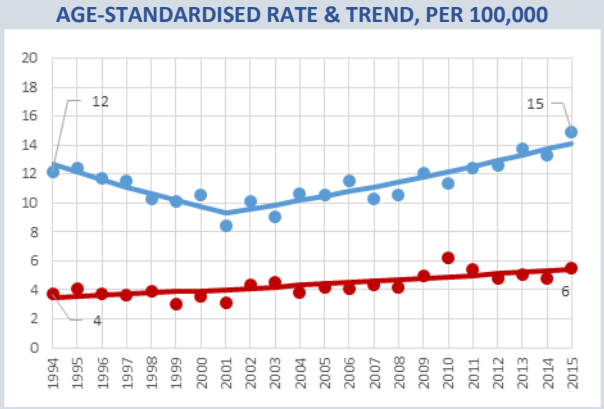
Females:

- Case numbers increased marginally during 1994-1999, followed by a steeper and significant increase during 1999-2011, followed by a less steep increase during 2011-2015.
- The incidence rate increased steadily and significantly during 1994-2015.

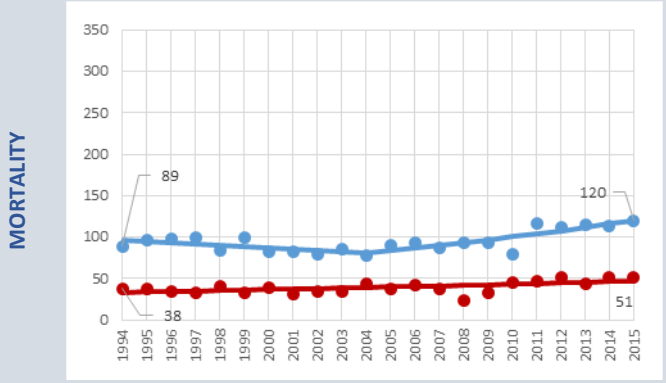
Figure 4-3. Trend in incidence and mortality by sex: C01-14 Cancer of mouth & pharynx



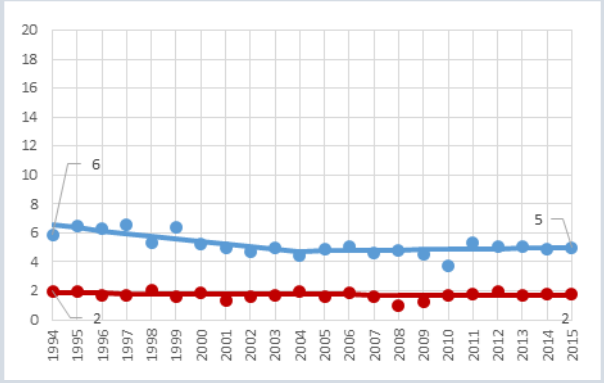
	PERIOD	APC	95%CI	TREND
MALE	1994-2001	-2.8	[-5.0,-0.6]	↓
	2001-2015	5.8	[5.0,6.5]	↑
FEMALE	1994-2015	4.0	[3.0,4.9]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2001	-4.6	[-6.8,-2.3]	↓
	2001-2015	3.1	[2.4,3.8]	↑
FEMALE	1994-2015	2.2	[1.4,3.0]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2004	-1.8	[-3.7,0.2]	↔
	2004-2015	3.6	[2.0,5.3]	↑
FEMALE	1994-2015	1.6	[0.6,2.7]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2004	-3.4	[-5.4,-1.3]	↓
	2004-2015	0.6	[-1.1,2.3]	↔
FEMALE	1994-2015	-0.4	[-1.4,0.6]	↔

Males:

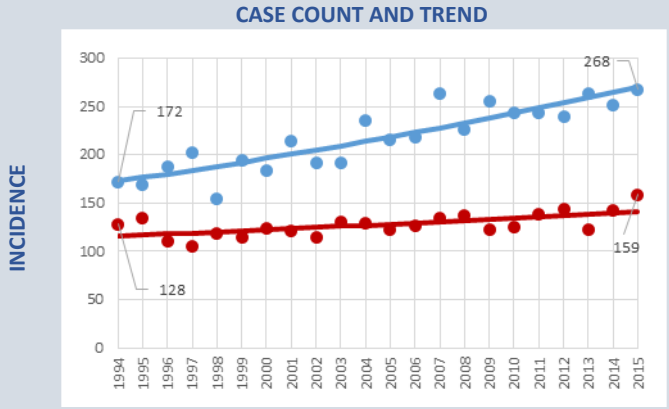
- After a period of significant decline from 1994, cases increased sharply and significantly during 2001-2015.
- The incidence rate increased significantly during 2001-2015.
- Deaths increased significantly during 2004-2015, following a stable trend (or marginal decline) during 1994-2004.
- The mortality rate was relatively static during 2004-2015 after a period of decline during 1994-2004.

Females:

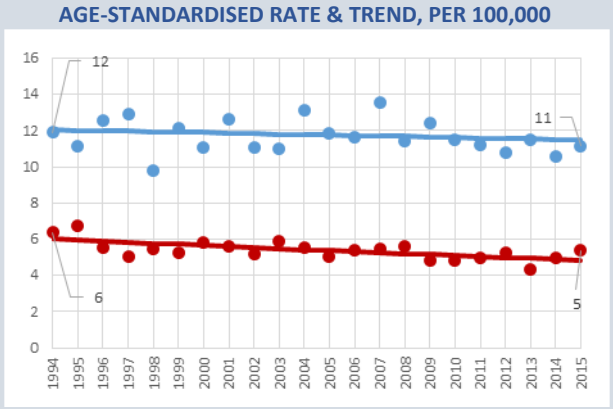
- Cases increased steadily over the full period 1994-2015.
- The incidence rate increased steadily over the full period 1994-2014.
- Deaths increased steadily over the full period 1994-2015.
- The mortality rate was static or declined slightly over the same period.

- The rather complex trends seen for these cancers may reflect trends in a number of established risk-factors, including tobacco smoking, alcohol consumption, and exposure to cancer-causing strains of human papillomavirus (HPV).

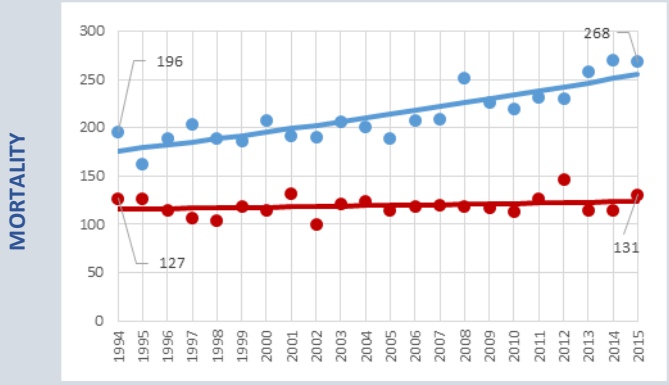
Figure 4-4. Trend in incidence and mortality by sex: C15 Oesophageal cancer



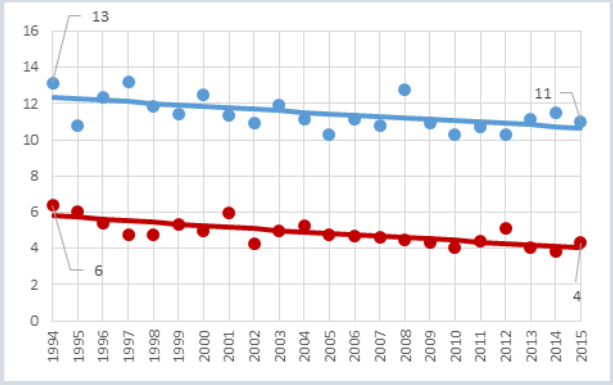
	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.2	[1.6,2.7]	↑
FEMALE	1994-2015	0.9	[0.4,1.5]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.3	[-0.8,0.2]	↔
FEMALE	1994-2015	-0.9	[-1.4,-0.4]	↓



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	1.8	[1.3,2.3]	↑
FEMALE	1994-2015	0.3	[-0.3,0.9]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.6	[-1.1,-0.2]	↓
FEMALE	1994-2015	-1.6	[-2.2,-1.0]	↓

The number of incident cases was very similar to the number of deaths, which reflects the poor prognosis for this cancer.

Males:

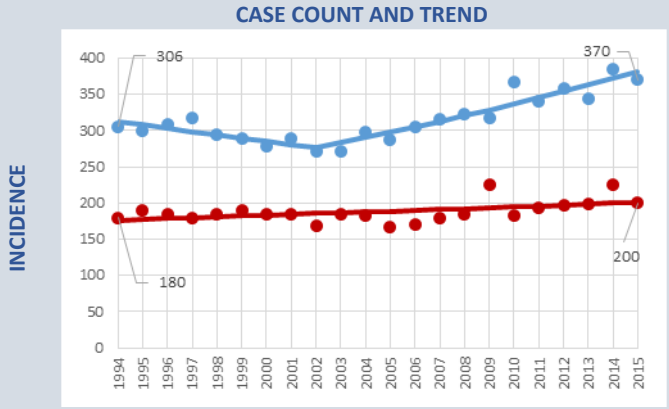
- Cases increased significantly during 1994-2015.
- The incidence rate was static over the same period.
- Deaths increased significantly during 1994-2015.
- The mortality rate declined significantly during the same period.

Females:

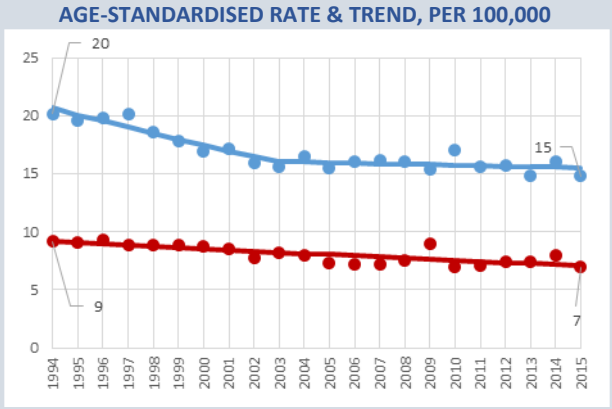
- Cases increased significantly during 1994-2015, though not as markedly as in males.
- The incidence rate declined significantly over the same period.
- Deaths were static during 1994-2015.
- The mortality rate declined significantly over the same period.

- Known risk factors for oesophageal cancer include smoking, being overweight or obese, and alcohol consumption, although their influence varies between the two main histological subtypes of oesophageal cancer (adenocarcinoma and squamous cell carcinoma).

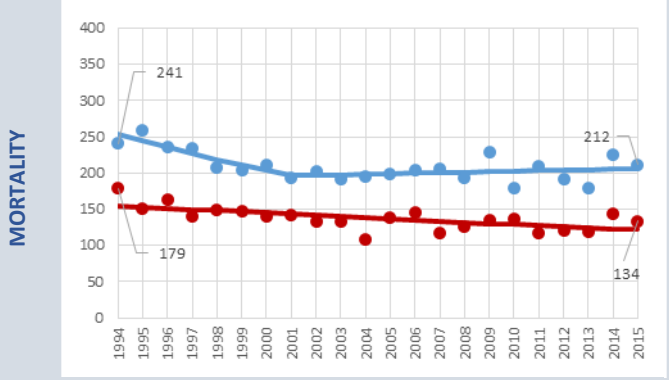
Figure 4-5. Trend in incidence and mortality by sex: C16 Stomach cancer



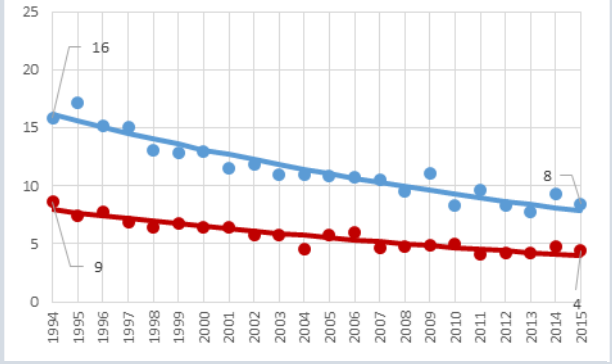
	PERIOD	APC	95%CI	TREND
MALE	1994-2002	-1.5	[-2.8,-0.3]	↓
	2002-2015	2.5	[1.9,3.1]	↑
FEMALE	1994-2015	0.6	[0.1,1.1]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2002	-3.0	[-4.2,-1.8]	↓
	2002-2015	-0.4	[-1.0,0.1]	↔
FEMALE	1994-2015	-1.2	[-1.6,-0.7]	↓



	PERIOD	APC	95%CI	TREND
MALE	1994-2001	-3.6	[-6.0,-1.1]	↓
	2001-2015	0.3	[-0.6,1.3]	↔
FEMALE	1994-2015	-1.1	[-1.8,-0.6]	↓



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-3.2	[-3.7,-2.7]	↓
FEMALE	1994-2015	-3.0	[-3.6,-2.5]	↓

Males:

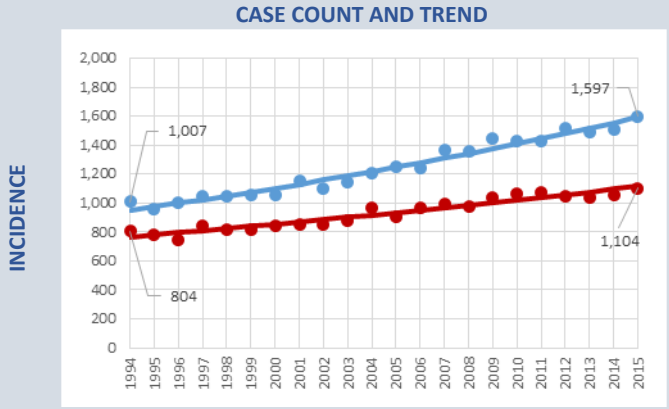
- After a period of decline during 1994-2002, cases increased sharply and significantly during 2002-2015.
- The incidence rate declined significantly up to 2002, thereafter it was static during 2002-2015.
- Deaths declined significantly during 1994-2001, and were static thereafter up to 2015.
- The mortality rate declined significantly during 1994-2015.

Females:

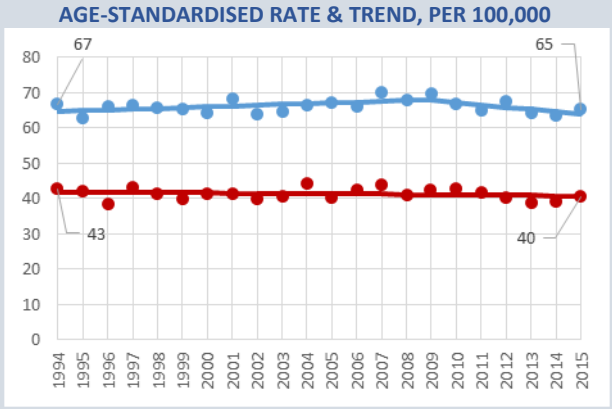
- Cases increased steadily during the full period 1994-2015.
- The incidence rate decreased over the same period.
- Deaths declined significantly during 1994-2015.
- The mortality rate declined significantly over the same period.

- Exposure to the bacterium *Helicobacter pylori* (associated with disadvantaged social status in early childhood) and tobacco smoking are confirmed causes of stomach cancer, and there is probably an association with consumption of alcohol, salt-preserved foods and processed meats and with higher levels of body fat. Declines seen in incidence rates of stomach cancer here are consistent with declines in some of these factors, although the detailed trends (consistent slow decline in women and a stabilisation of rates in men) suggest potential for further improvement.

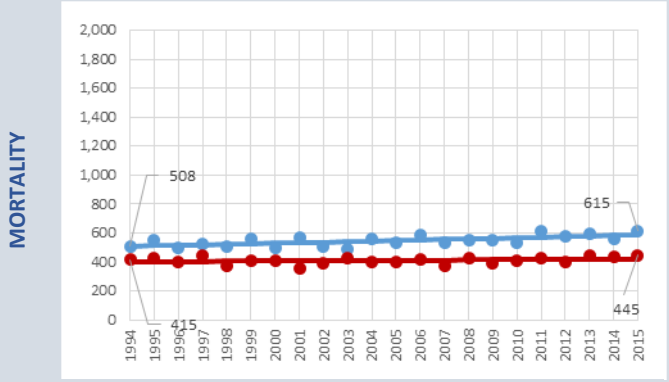
Figure 4-6. Trend in incidence and mortality by sex: C18-21 Colorectal cancer (including anus)



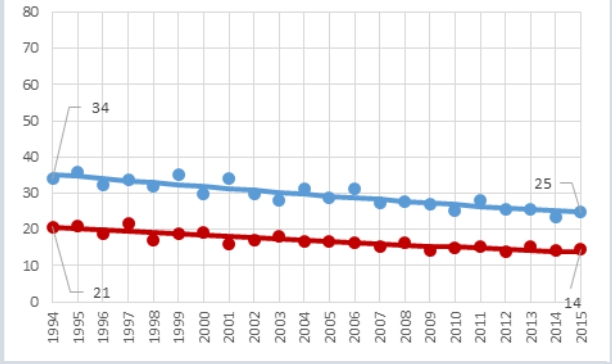
	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.5	[2.3,2.7]	↑
FEMALE	1994-2015	1.8	[1.6,2.0]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2009	0.3	[0.0,0.7]	↑
	2009-2015	-1.0	[-2.1,0.1]	↔
FEMALE	1994-2015	-0.1	[-0.4,0.1]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	0.7	[0.3,1.0]	↑
FEMALE	1994-2015	0.2	[-0.2,0.6]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.7	[-2.1,-1.4]	↓
FEMALE	1994-2015	-1.8	[-2.2,-1.5]	↓

Males:

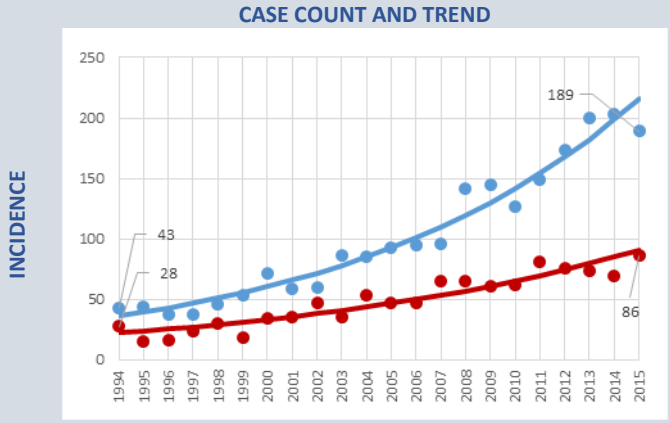
- Cases increased significantly and steadily during the full period 1994-2015.
- After a long slow increase from 1994 to 2009, the incidence rate declined modestly but non-significantly during the period 2009-2015.
- Deaths increased significantly during 1994-2015.
- The mortality rate declined significantly during 1994-2015.

Females:

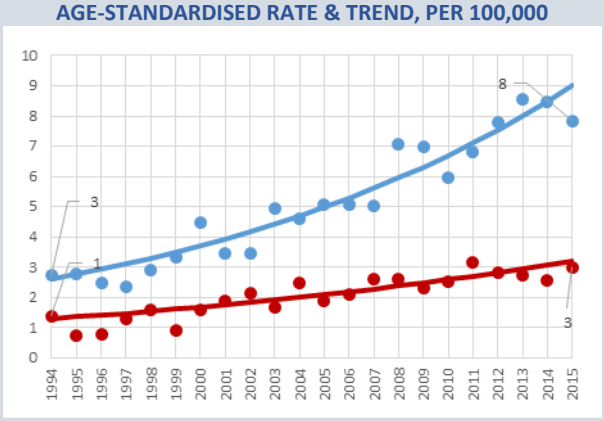
- Cases increased significantly during the full period 1994-2015.
- The incidence rate was static over the same period.
- Deaths were static during the full period 1994-2015.
- The mortality rate declined significantly over the same period.

- Modifiable factors that increase colorectal cancer risk include higher consumption of red meat, processed meat and alcohol and higher body fat, and low consumption of dietary fibre. Incidence rates of colorectal cancer in Ireland appear to be fairly static, with only limited evidence of a possible recent decrease.

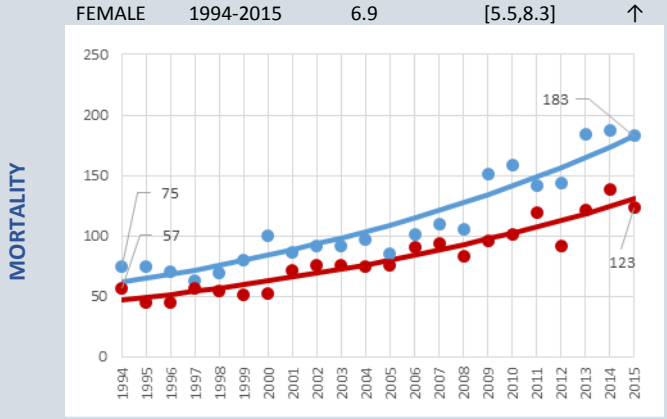
Figure 4-7. Trend in incidence and mortality by sex: C22 Liver cancer (including intrahepatic bile ducts)



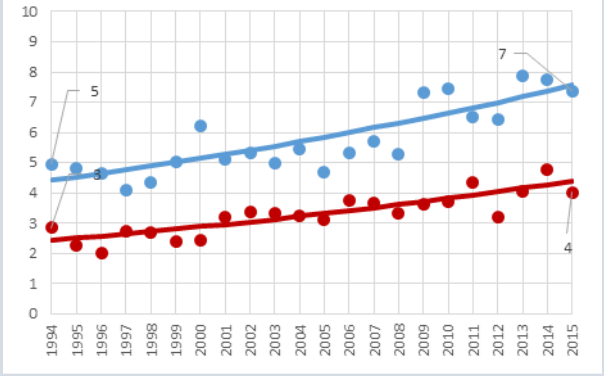
	PERIOD	APC	95%CI	TREND
MALE	1994-2015	8.8	[7.9,9.8]	↑
FEMALE	1994-2015	6.9	[5.5,8.3]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	6.2	[5.3,7.1]	↑
FEMALE	1994-2015	4.8	[3.4,6.1]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	5.3	[4.4,6.2]	↑
FEMALE	1994-2015	5.0	[4.3,5.8]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.7	[1.9,3.5]	↑
FEMALE	1994-2015	2.9	[2.1,3.7]	↑

For males, the number of incident cases was very similar to the number of deaths during 1994-2015. For females, the number of recorded deaths generally exceeded the number of incident cases during 1999-2015. It is likely that some deaths attributed to primary liver cancer actually refer to secondary liver tumours (from a different primary site).

Males:

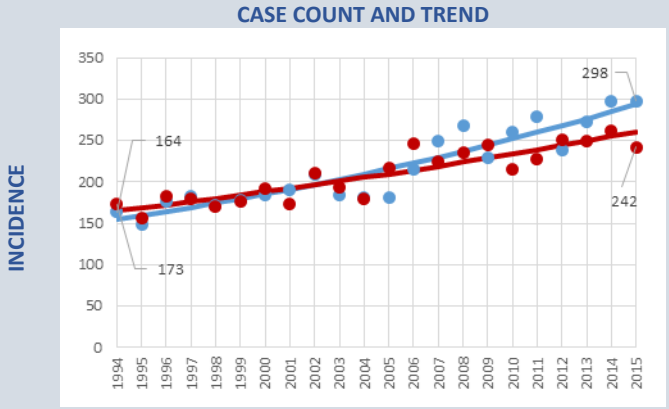
- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased significantly during 1994-2015.
- The mortality rate increased significantly over the same period.

Females:

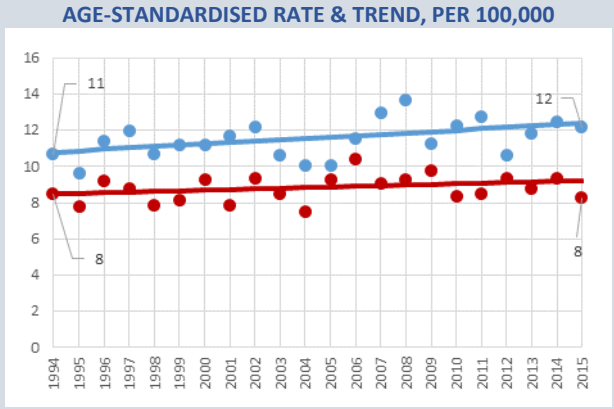
- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased significantly during the full period 1994-2015.
- The mortality rate increased steeply and significantly over the period 1994-2015.

- Risk of liver cancer is increased by alcohol consumption, exposure to aflatoxins (fungal contamination in food) and being overweight or obese. Marked increases seen in primary liver cancer rates in Ireland suggest increases in the underlying risk factors among populations here, with alcohol consumption perhaps being the most important.

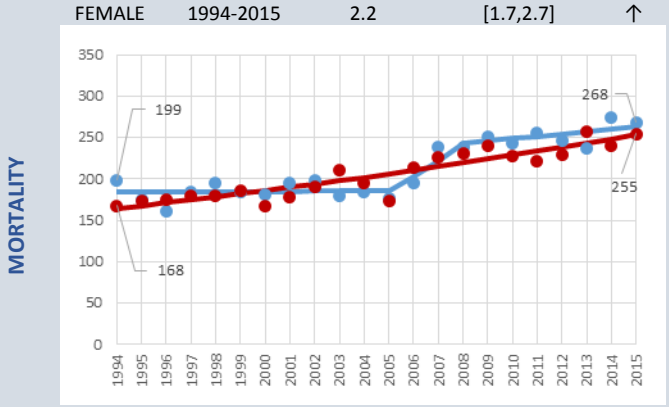
Figure 4-8. Trend in incidence and mortality by sex: C25 Pancreatic cancer



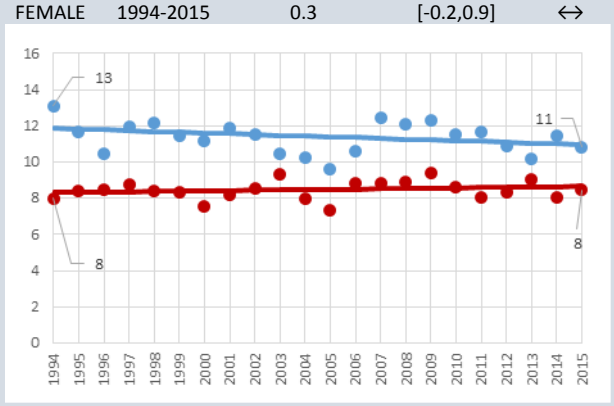
	PERIOD	APC	95%CI	TREND
MALE	1994-2015	3.1	[2.5,3.7]	↑
FEMALE	1994-2015	2.2	[1.7,2.7]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	0.6	[0.1,1.2]	↑
FEMALE	1994-2015	0.3	[-0.2,0.9]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2005	0.1	[-1.2,1.3]	↔
	2005-2008	9.5	[-8.1,30.4]	↔
	2008-2015	1.1	[-1.0,3.3]	↔
FEMALE	1994-2015	2.1	[1.7,2.5]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.3	[-0.8,0.2]	↔
FEMALE	1994-2015	0.2	[-0.3,0.6]	↔

The number of incident cases was very similar to the number of deaths throughout 1994-2015.

Males:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased overall, with one steeper period of increase during 2005-2008, although none of the individual trends was statistically significant.
- The fitted mortality rate trend was broadly static or showed a slight decline.

Females:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased non-significantly over the same period.
- Deaths increased significantly during 1994-2015.
- The mortality rate was static or increased marginally over the same period.

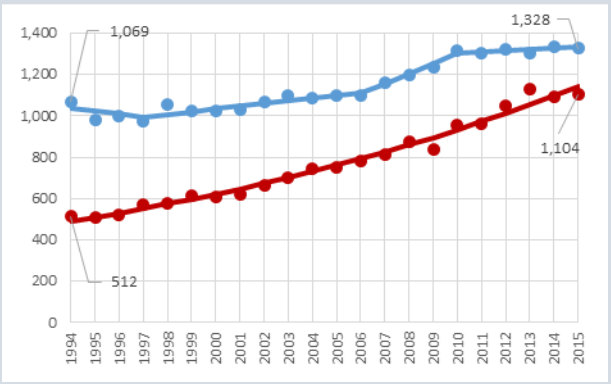
- Tobacco use and higher levels of body fat are associated with higher risk of pancreatic cancer. Trends in Irish incidence rates, although not clear-cut, suggest that the underlying risk may be increasing.

Figure 4-9. Trend in incidence and mortality by sex: C33-34 Lung & tracheal cancer

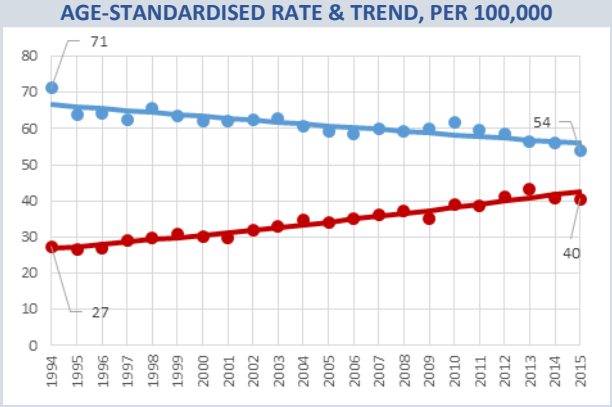
CASE COUNT AND TREND

AGE-STANDARDISED RATE & TREND, PER 100,000

INCIDENCE

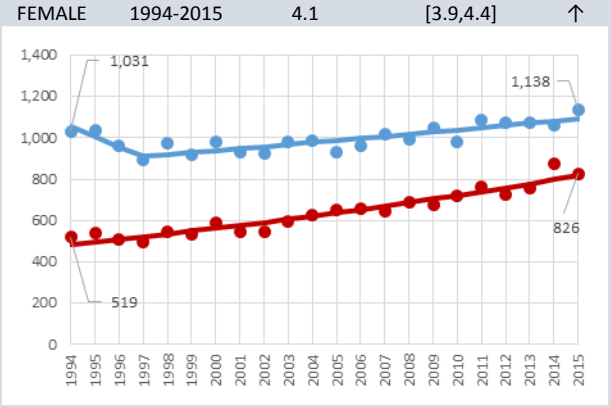


	PERIOD	APC	95%CI	TREND
MALE	1994-1997	-1.4	[-4.4,1.7]	↔
	1997-2006	1.2	[0.6,1.9]	↑
	2006-2010	4.0	[1.0,7.0]	↑
	2010-2015	0.4	[-0.8,1.7]	↔
FEMALE	1994-2015	4.1	[3.9,4.4]	↑

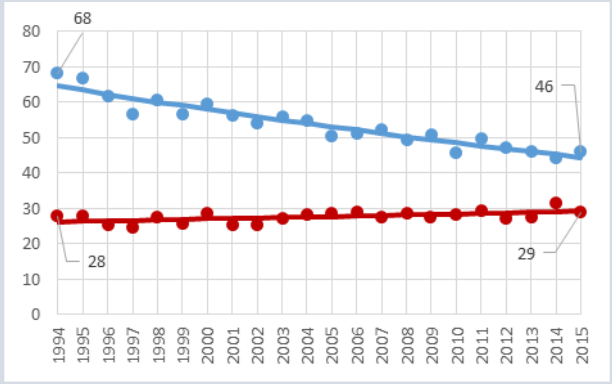


	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.8	[-1.0,-0.6]	↓
FEMALE	1994-2015	2.2	[2.0,2.5]	↑

MORTALITY



	PERIOD	APC	95%CI	TREND
MALE	1994-1997	-4.8	[-9.6,0.3]	↔
	1997-2015	1.0	[0.7,1.4]	↑
FEMALE	1994-2015	2.5	[2.2,2.8]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.8	[-2.0,-1.5]	↓
FEMALE	1994-2015	0.5	[0.2,0.9]	↑

Males:

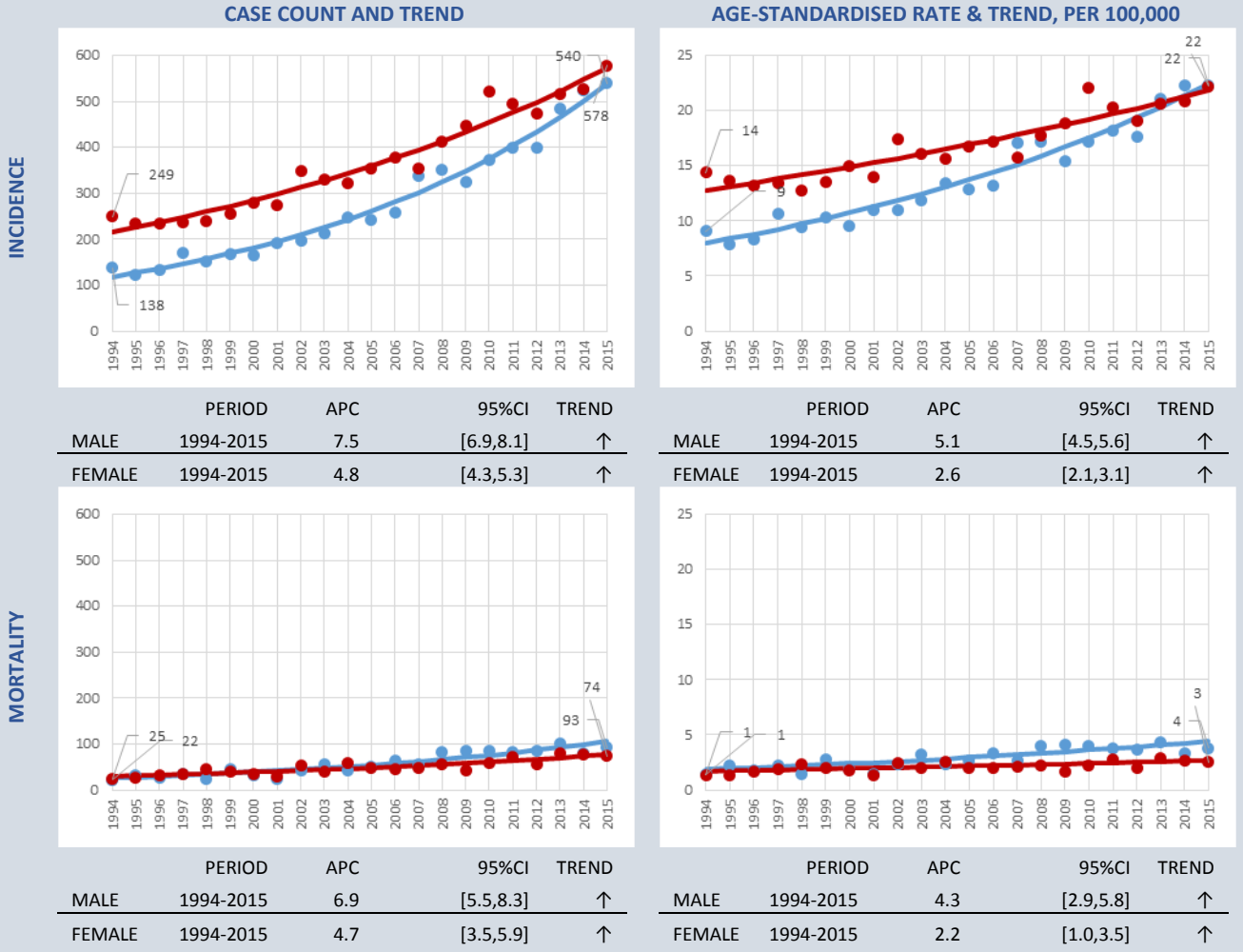
- Cases increased significantly during 1997-2006, followed by period of steeper increase during 2006-2010. Thereafter, the annual case count did not change during 2010-2015.
- The incidence rate declined significantly during the full period 1994-2015.
- Deaths increased during 1997-2015, but the mortality rate declined steadily and significantly during the full period.

Females:

- Cases increased steadily and significantly during the full period 1994-2015.
- The incidence rate increased steadily and significantly over the same period.
- Deaths increased significantly during the full period 1994-2015, while the mortality rate increased significantly but less steeply over the same period.

- The pattern of lung cancer incidence and mortality is markedly different in males and females. Incidence rates declined in males but increased steadily in females during 1994-2015. Mortality rates declined in males but increased in females over the same period. Lung cancer rates track smoking prevalence from decades earlier. It is likely that peak smoking prevalence in Irish females occurred somewhat later than in males, as seen in other countries [8–10], and that this accounts for the contrasting trends in male and female incidence rates for lung cancer.

Figure 4-10. Trend in incidence and mortality by sex: C43 Melanoma of skin



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	7.5	[6.9,8.1]	↑
FEMALE	1994-2015	4.8	[4.3,5.3]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	5.1	[4.5,5.6]	↑
FEMALE	1994-2015	2.6	[2.1,3.1]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	6.9	[5.5,8.3]	↑
FEMALE	1994-2015	4.7	[3.5,5.9]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	4.3	[2.9,5.8]	↑
FEMALE	1994-2015	2.2	[1.0,3.5]	↑

Males:

- Cases increased steadily and significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased significantly over the full period 1994-2015.
- The mortality rate increased significantly over the same period.

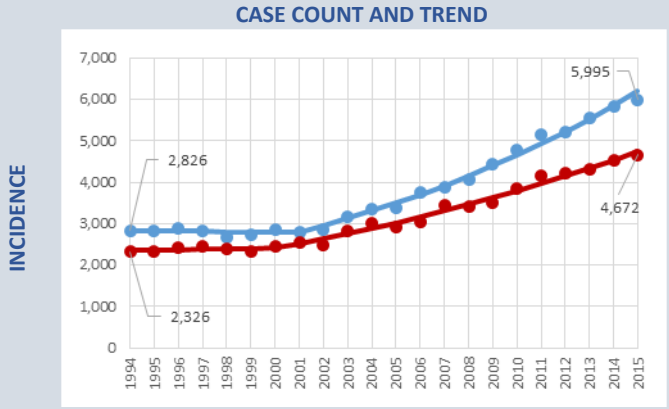
Females:

- Cases increased steadily and significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased significantly over the full period 1994-2015.
- The mortality rate increased significantly over the same period.

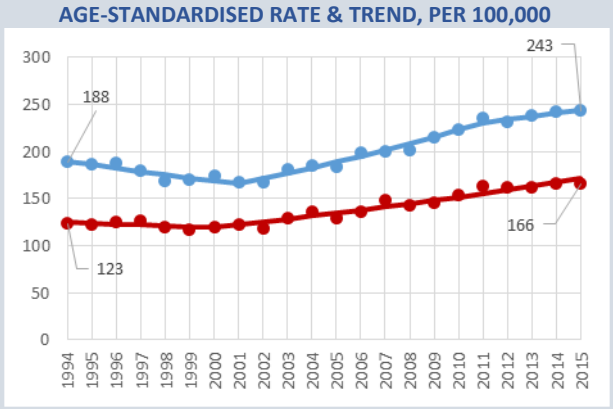
- While melanoma of the skin was more common in females overall, case counts and incidence rates for males steadily approached parity with females towards 2015.
- Trends in mortality almost exactly mirrored those in incidence, for both sexes.

- Over-exposure to ultraviolet radiation, particularly through episodic skin exposure involving severe sunburn, is the main risk factor for melanoma of the skin. Melanoma incidence is highest in more affluent populations within Ireland, and the marked increases in melanoma incidence rates in Ireland are probably associated with increases in holidaying outside Ireland.

Figure 4-11. Trend in incidence by sex: C44 Non-melanoma skin cancer



	PERIOD	APC	95%CI	TREND
MALE	1994-2001	-0.2	[-1.4,0.9]	↔
	2001-2015	5.9	[5.5,6.2]	↑
FEMALE	1994-2000	0.4	[-1.4,2.2]	↔
	2000-2015	4.6	[4.3,5.0]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2001	-1.9	[-2.9,-0.9]	↓
	2001-2011	3.4	[2.8,4.0]	↑
	2011-2015	1.4	[-0.3,3.1]	↔
FEMALE	1994-2000	-0.7	[-2.5,1.1]	↔
	2000-2015	2.4	[2.0,2.8]	↑

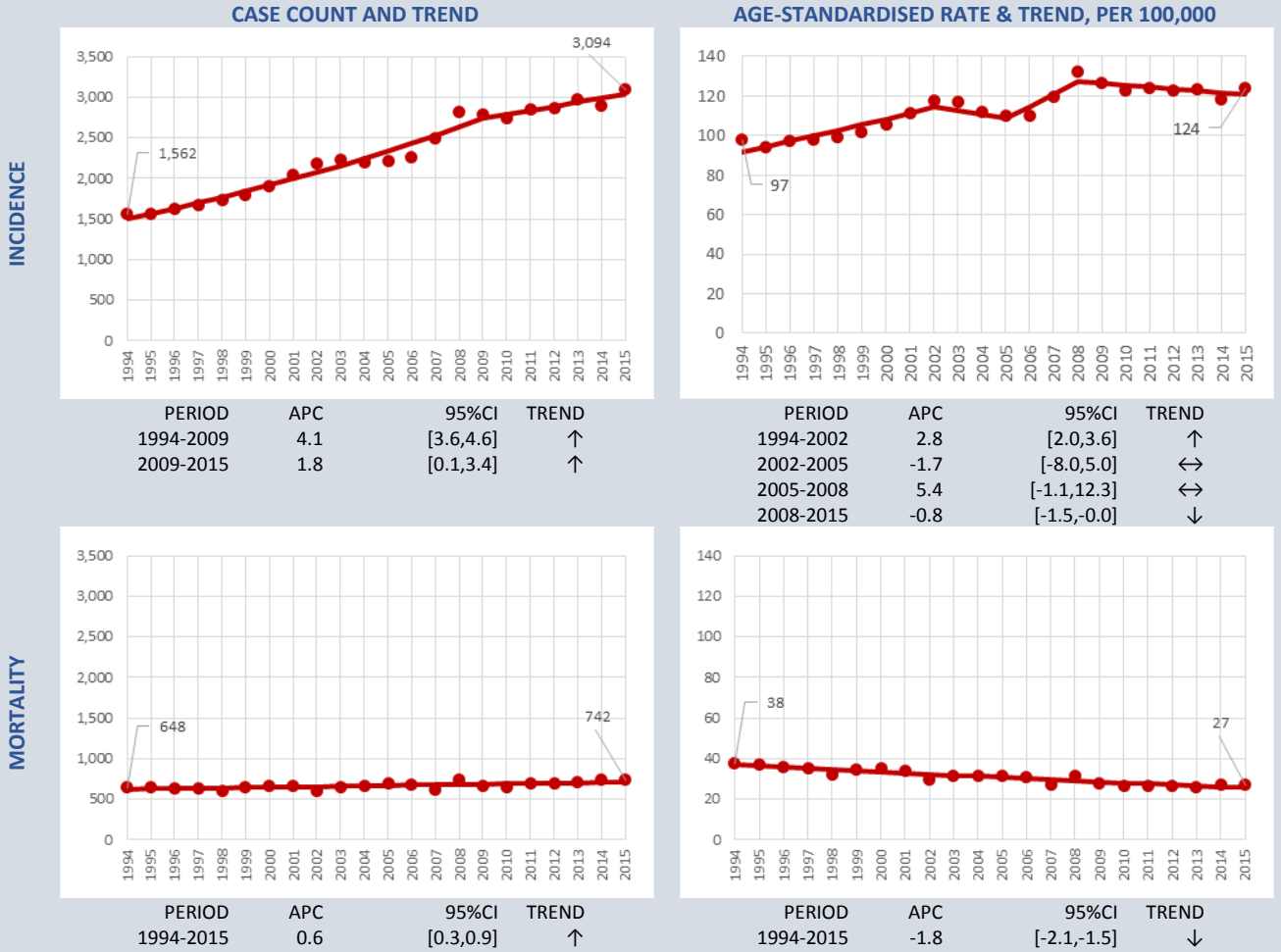
Males:

- After a static period up to 2001, cases increased significantly during 2001-2015.
- The incidence rate increased significantly during 2001-2011 and increased only marginally during 2011-2015.

Females:

- After a static period up to 2000, cases increased significantly during 2000-2015.
- The incidence rate increased steadily and significantly during 2000-2015 after an earlier period of marginal decline.
- Though very common, non-melanoma skin cancer has relatively negligible effects on mortality.
- Depending on subtype, non-melanoma skin cancers are associated with chronic (e.g. occupational) or episodic (e.g. holiday-related) overexposure to ultraviolet radiation. The more recent increases in incidence rates compared with melanoma may suggest that holiday-related exposure is now the main driving factor behind NMSC rates in Ireland, but further analysis by subtype may be informative (given that basal cell carcinomas of skin are less strongly associated than squamous cell carcinomas with chronic sun exposure).

Figure 4-12. Trend in incidence and mortality: C50 female breast cancer



PERIOD	APC	95%CI	TREND
1994-2009	4.1	[3.6,4.6]	↑
2009-2015	1.8	[0.1,3.4]	↑

PERIOD	APC	95%CI	TREND
1994-2002	2.8	[2.0,3.6]	↑
2002-2005	-1.7	[-8.0,5.0]	↔
2005-2008	5.4	[-1.1,12.3]	↔
2008-2015	-0.8	[-1.5,-0.0]	↓

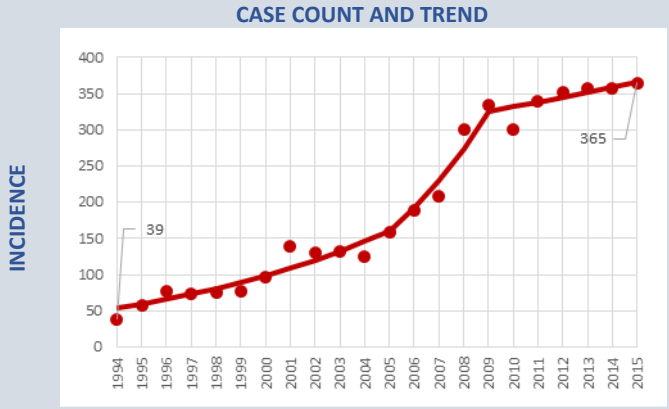
PERIOD	APC	95%CI	TREND
1994-2015	0.6	[0.3,0.9]	↑

PERIOD	APC	95%CI	TREND
1994-2015	-1.8	[-2.1,-1.5]	↓

- Cases increased significantly during 1994-2009, followed by a slower annual increase during 2009-2015.
- The incidence rate trend shows a sustained increase during 1994-2002, followed by a period of stasis during 2002-2005, another marked though non-significant increase during 2005-2008 and a significant decrease over the period 2008-2015.
- The number of deaths increased slowly but significantly during 1994-2015, but the mortality rate declined significantly over the same period.

- In large part, the detailed incidence trend for invasive breast cancer probably reflects the introduction of the national breast screening program (BreastCheck) in the eastern half of the country from 2000 and the rest of the country by 2007. This is evident from the two peaks in incidence rates which followed the two roll-out phases.
- The underlying risk of breast cancer risk is strongly though not exclusively linked to lifetime exposure to oestrogen and to factors that directly or indirectly influence this. Modifiable risk factors for breast cancer include alcohol consumption and (for post-menopausal breast cancer) body fatness. Trends in other risk factors, such as not bearing children or late first pregnancy (associated with societal changes) and early menarche and late menopause (associated in part with higher-energy diets), may also be influencing trends in breast cancer incidence rates in Ireland.

Figure 4-13. Trend in incidence: D05 carcinoma in situ of the breast (female)



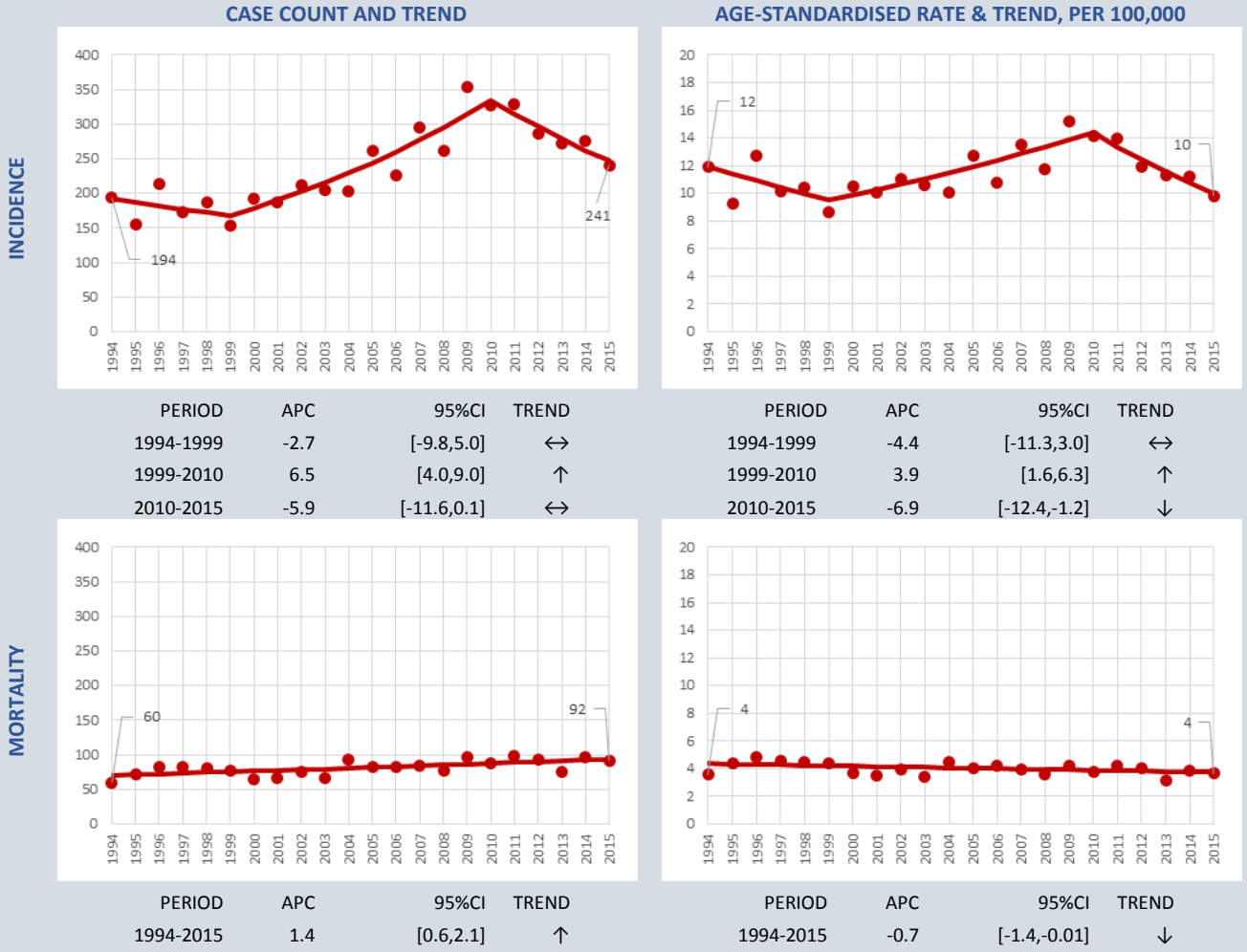
PERIOD	APC	95%CI	TREND
1994-2005	10.3	[7.0,13.8]	↑
2005-2009	19.3	[4.4,36.4]	↑
2009-2015	2.0	[-1.8,5.9]	↔

PERIOD	APC	95%CI	TREND
1994-2006	8.6	[5.8,11.4]	↑
2006-2009	18.2	[-8.5,52.6]	↔
2009-2015	-0.3	[-3.9,3.5]	↔

- Cases increased significantly in a step-like manner overall, with a steeper annual increase during 2005-2009, followed by a more modest increase during 2009-2015.
- The incidence rate increased significantly during 1994-2006, followed by a steeper increase during 2006-2009, then a period of stasis during 2009-2015.

- As for invasive breast cancer, but to a greater extent, the incidence trend for carcinoma in situ of the breast probably largely reflects the introduction of the national breast screening program (BreastCheck) in the eastern half of the country from 2000 and the rest of the country by 2007.

Figure 4-14. Trend in incidence and mortality: C53 Cervical cancer



PERIOD	APC	95%CI	TREND
1994-1999	-2.7	[-9.8,5.0]	↔
1999-2010	6.5	[4.0,9.0]	↑
2010-2015	-5.9	[-11.6,0.1]	↔

PERIOD	APC	95%CI	TREND
1994-1999	-4.4	[-11.3,3.0]	↔
1999-2010	3.9	[1.6,6.3]	↑
2010-2015	-6.9	[-12.4,-1.2]	↓

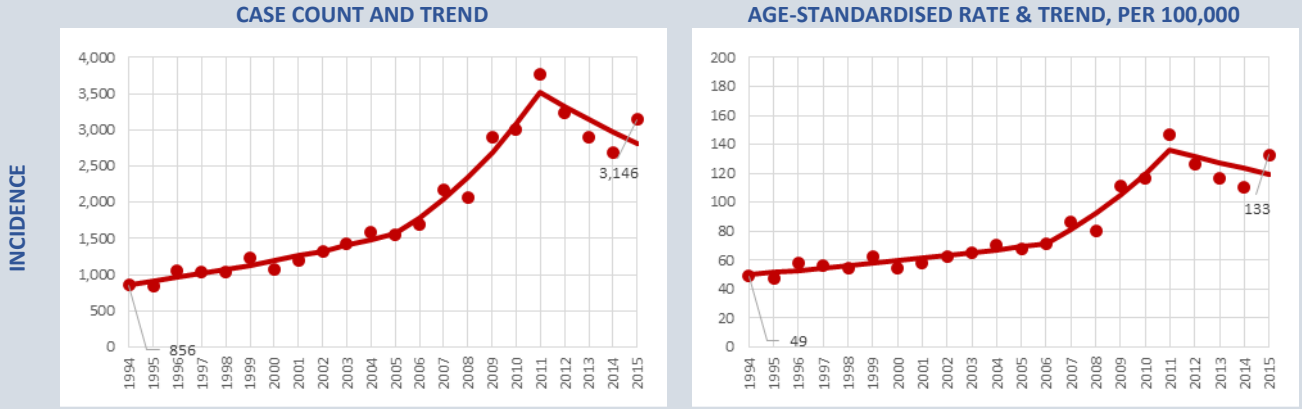
PERIOD	APC	95%CI	TREND
1994-2015	1.4	[0.6,2.1]	↑

PERIOD	APC	95%CI	TREND
1994-2015	-0.7	[-1.4,-0.01]	↓

- The case count declined modestly and non-significantly during 1994-1999, followed by a steep and significant increase during 1999-2010; thereafter, the case count declined non-significantly during 2010-2015.
- The incidence rate declined non-significantly from 1994 to 1999, followed by a significant increase during 1999-2010, then a significant decline during 2010-2015.
- Deaths increased significantly during 1994-2015, although numbers were relatively small.
- The mortality rate declined significantly during the full period of 1994-2015.

- Exposure to cancer-causing strains of human papilloma virus (HPV) is the main (and probably necessary) risk factor for cervical cancer.
- Screening activity (including the introduction of the organised Cervical Check program from 2008 onwards) may have had some bearing on the upward trend in rates seen during 1999-2010, and the increasing incidence rate during that period may (in part) reflect increased or earlier detection of invasive cases. Increased detection of in situ carcinomas of the cervix through screening (Figure 4-15) should, in theory, lead to a reduction in incidence of invasive cases, but it may be too early to see this effect. Whether the apparent downward trends in case numbers and incidence rates from 2010 onwards will continue, and the validity of these trends (or the interpretation of these trends if genuine), cannot readily be assessed at present.

Figure 4-15. Trend in incidence: D06 carcinoma in situ of cervix



PERIOD	APC	95%CI	TREND
1994-2005	5.6	[3.4,7.8]	↑
2005-2011	14.4	[9.0,20.2]	↑
2011-2015	-5.4	[-10.8,0.4]	↔

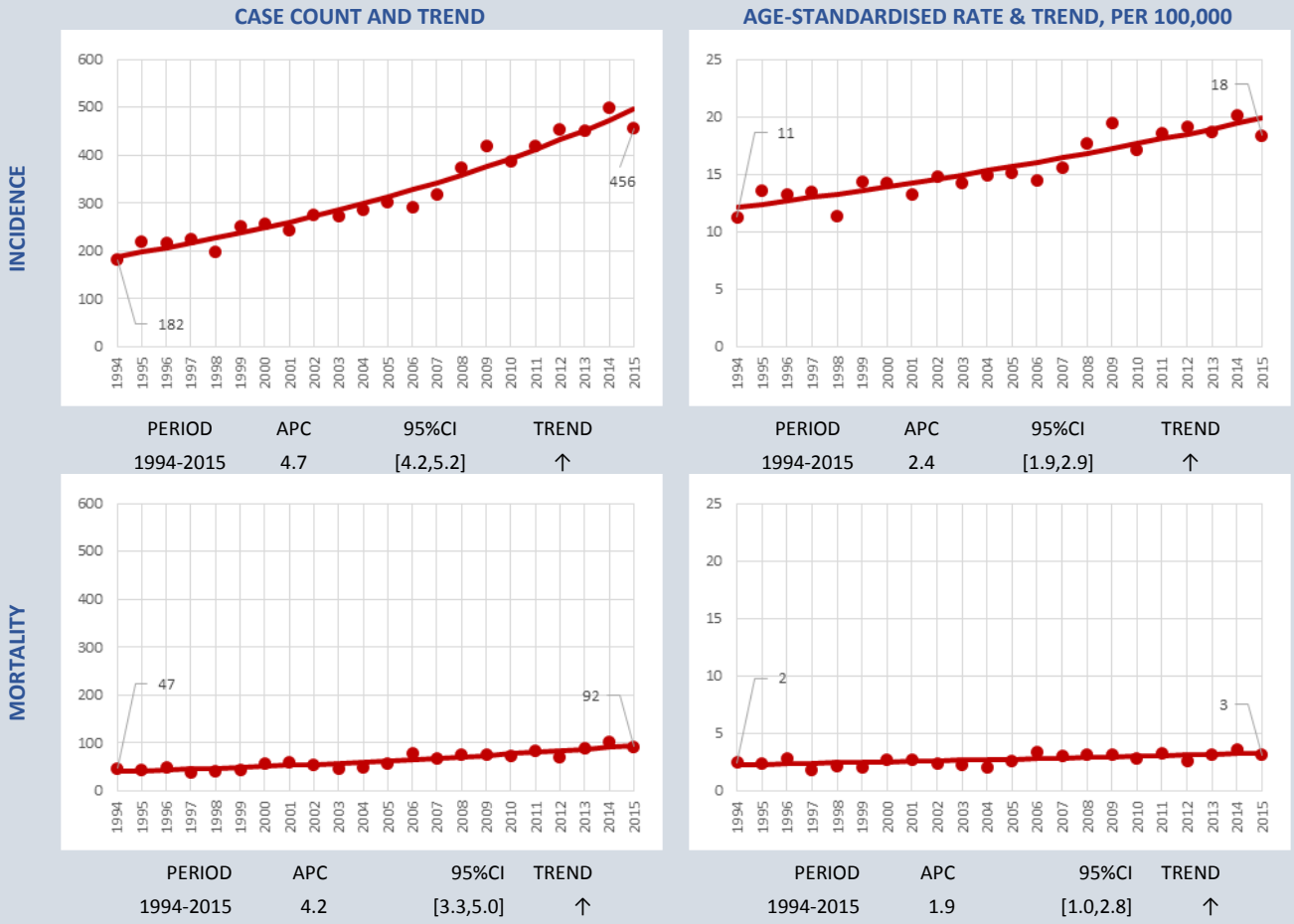
PERIOD	APC	95%CI	TREND
1994-2006	3.0	[1.2,4.9]	↑
2006-2011	13.7	[6.5,21.4]	↑
2011-2015	-3.2	[-8.2,2.1]	↔

- The case count increased significantly during 1994-2005, followed by a steeper and significant increase during 2005-2011. Thereafter, the case count declined marginally during 2011-2015.
- The incidence rate increased significantly up to 2006, followed by a significant and steeper increase during 2006-2011, then by a marginal decline during 2011-2015.

- The incidence rate of in situ cervical cancer increased in a two-step fashion during 1994-2011, the steeper period of increase (2006-2011) was probably due to widespread introduction of screening through the CervicalCheck program (2008 onwards). The reason for the marked decline in the incidence rate during 2011-2015 is unclear, although some reduction might be expected after several rounds of screening have picked up prevalent (but previously undiagnosed) cases.

- Figures here do not include all cases of high-grade squamous intraepithelial lesion (HSIL), a more modern diagnostic grouping which includes cervical carcinoma in situ but also includes abnormalities that would not meet the full (but older) definition of in situ carcinoma. Total numbers of women treated annually for HSIL would be more than twice as high as the above graphs indicate; however, under current cancer registration guidelines, not all HSIL cases are registered by cancer registries internationally or in Ireland.

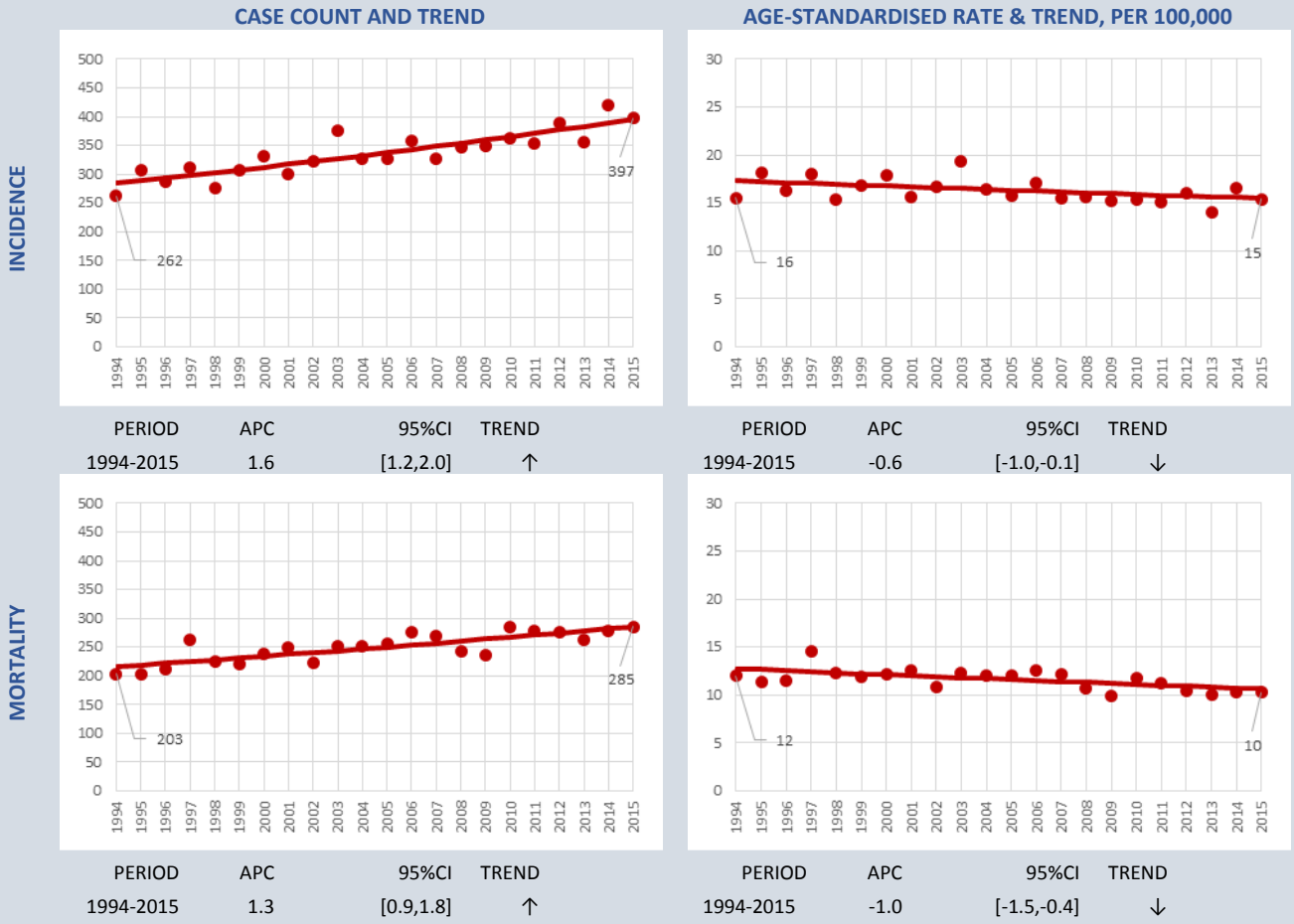
Figure 4-16. Trend in incidence and mortality: C54 Uterine cancer



- The case count increased steeply and significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased significantly during the full period 1994-2015.
- The mortality rate increased significantly over the same period.

- As in breast cancer, many of the risk factors for uterine cancer concern lifetime exposure to oestrogen. Before menopause, the ovaries are the major source of the two main female hormones, oestrogen and progesterone. A shift in the balance of these hormones towards more oestrogen increases a woman's risk for developing uterine cancer. Factors that affect this balance include use of hormone-replacement therapy (progesterone-unopposed HRT — increased risk), use of the combined contraceptive pill (reduced risk), increased body fatness and low levels of physical activity (increased risk).

Figure 4-17. Trend in incidence and mortality: C56 Ovarian cancer



PERIOD	APC	95%CI	TREND
1994-2015	1.6	[1.2,2.0]	↑

PERIOD	APC	95%CI	TREND
1994-2015	-0.6	[-1.0,-0.1]	↓

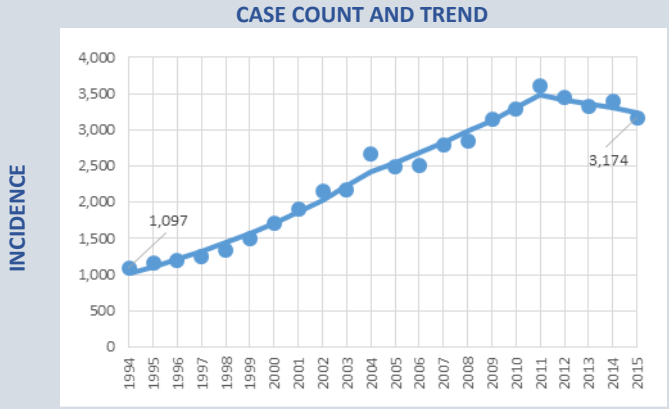
PERIOD	APC	95%CI	TREND
1994-2015	1.3	[0.9,1.8]	↑

PERIOD	APC	95%CI	TREND
1994-2015	-1.0	[-1.5,-0.4]	↓

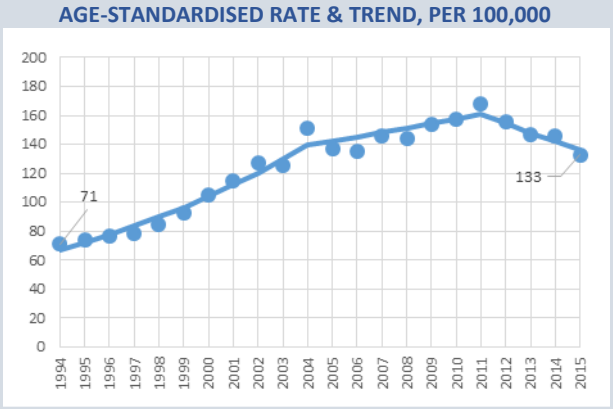
- The case count increased significantly during the full period 1994-2015.
- The incidence rate decreased modestly but significantly over the same period.
- Deaths increased significantly during the full period 1994-2015.
- The mortality rate declined significantly over the same period.

- Risk factors for ovarian cancer include obesity (high BMI; increased risk), use of HRT (progesterone unopposed HRT; increased risk), use of the combined contraceptive pill (reduced risk), multiparity (> 1 pregnancy and/or first full term pregnancy before 26; reduced risk), family history of ovarian cancer. Adult attained height appears to be associated with ovarian cancer risk, probably as a marker for genetic, environmental, hormonal and nutritional factors affecting growth.

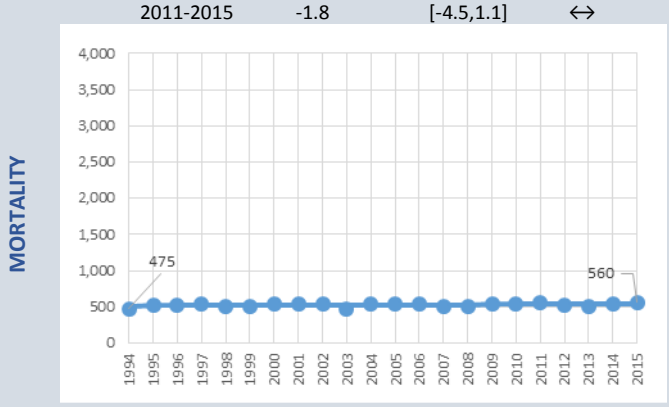
Figure 4-18. Trend in incidence and mortality: C61 Prostate cancer



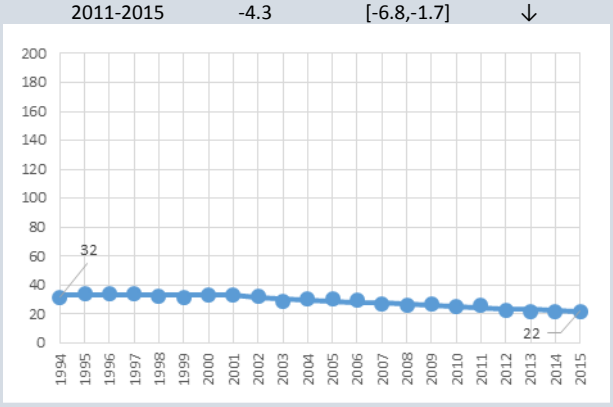
PERIOD	APC	95%CI	TREND
1994-2004	9.0	[7.9,10.1]	↑
2004-2011	5.3	[3.6,7.1]	↑
2011-2015	-1.8	[-4.5,1.1]	↔



PERIOD	APC	95%CI	TREND
1994-2004	7.5	[6.4,8.5]	↑
2004-2011	2.3	[0.7,3.8]	↑
2011-2015	-4.3	[-6.8,-1.7]	↓



PERIOD	APC	95%CI	TREND
1994-2015	0.3	[-0.1,0.6]	↔

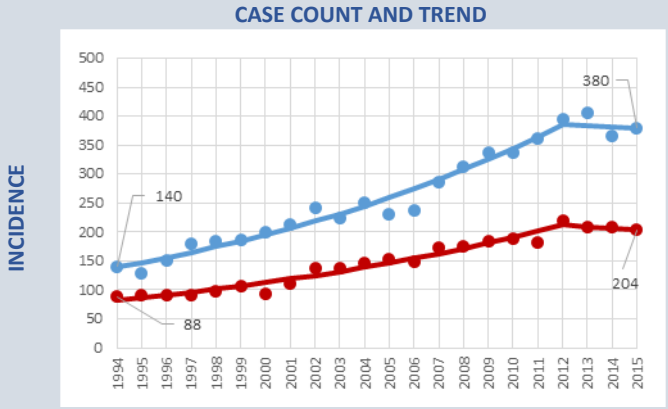


PERIOD	APC	95%CI	TREND
1994-2002	-0.3	[-1.7,1.1]	↔
2002-2015	-3.1	[-3.7,-2.4]	↓

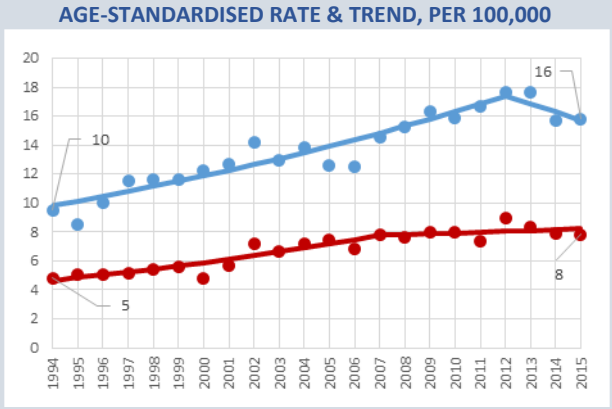
- The case count increased significantly and steeply during 1994-2004, followed by a lesser though significant increase during 2004-2011. Thereafter, the case count declined during 2011-2015.
- The incidence rate increased significantly and steeply during 1994-2004, followed by a lesser though significant increase during 2004-2011. Thereafter, the rate declined significantly during 2011-2015.
- The number of deaths was static during the full period 1994-2015.
- The mortality rate declined marginally during 1994-2002, followed by a significant decline during 2002-2015.

- Increasing incidence up to 2011 probably reflected large-scale PSA testing of asymptomatic men. The number of PSA tests carried out in Ireland increased five-fold between 1995 and 2004 [11].
- There is strong evidence that being overweight or obese increases the risk of being diagnosed with advanced prostate cancer, and that developmental factors in the womb, childhood and adolescence that influence growth are linked to an increased risk of prostate cancer. However, incidence trends for this cancer are so strongly influenced by PSA-testing that relating the trends to underlying risk factors is difficult.

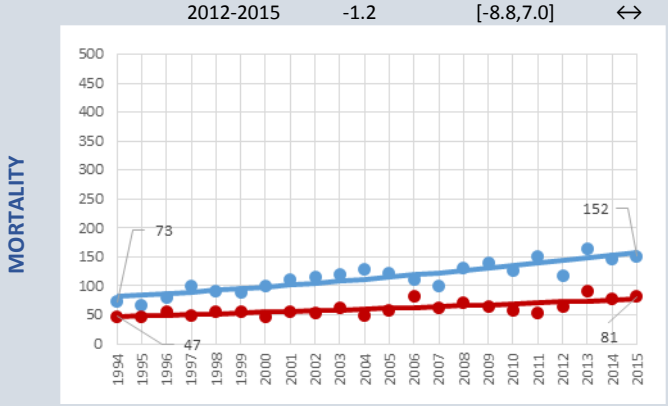
Figure 4-19. Trend in incidence and mortality by sex: C64 Kidney cancer



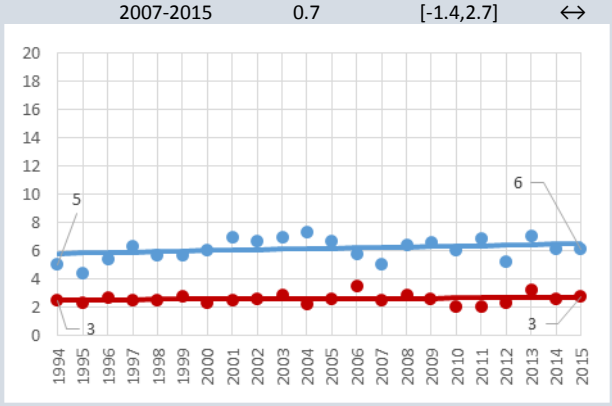
	PERIOD	APC	95%CI	TREND
MALE	1994-2012	5.8	[5.2,6.5]	↑
	2012-2015	-0.6	[-7.9,7.3]	↔
FEMALE	1994-2012	5.4	[4.7,6.1]	↑
	2012-2015	-1.2	[-8.8,7.0]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2012	3.3	[2.6,4.0]	↑
	2012-2015	-3.3	[-10.4,4.3]	↔
FEMALE	1994-2007	4.1	[2.7,5.4]	↑
	2007-2015	0.7	[-1.4,2.7]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	3.2	[2.4,4.0]	↑
FEMALE	1994-2015	2.4	[1.4,3.4]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	0.5	[-0.3,1.4]	↔
FEMALE	1994-2015	0.3	[-0.7,1.3]	↔

Males:

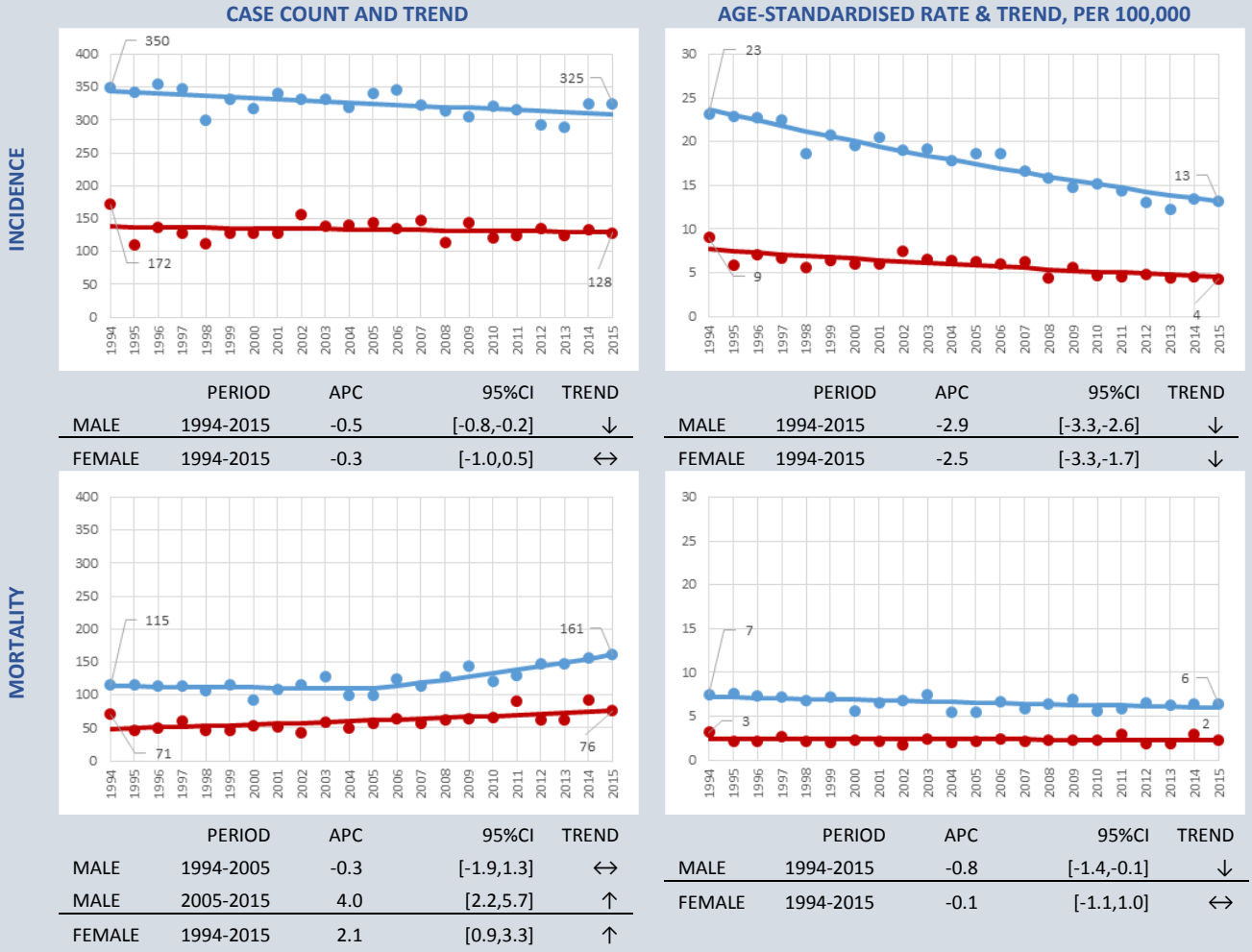
- Cases increased significantly during the period 1994-2012, followed by a marginal decline during 2012-2015.
- The incidence rate increased significantly during 1994-2012, followed by a non-significant decline during 2012-2015.
- Deaths increased significantly over the full period 1994-2015.
- The mortality rate was static (or showed a marginal increase) over the same period.

Females:

- Cases increased significantly during the period 1994-2012, followed by a marginal decline during 2012-2015.
- The incidence rate increased significantly during 1994-2012, followed by a non-significant decline during 2012-2015.
- Deaths increased significantly during the full period 1994-2015.
- The mortality rate was static (or showed a marginal increase) over the same period.

- There is strong evidence internationally that smoking and being overweight or obese increase the risk of kidney cancer.

Figure 4-20. Trend in incidence and mortality by sex: C67 Bladder cancer



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.5	[-0.8,-0.2]	↓
FEMALE	1994-2015	-0.3	[-1.0,0.5]	↔

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-2.9	[-3.3,-2.6]	↓
FEMALE	1994-2015	-2.5	[-3.3,-1.7]	↓

	PERIOD	APC	95%CI	TREND
MALE	1994-2005	-0.3	[-1.9,1.3]	↔
MALE	2005-2015	4.0	[2.2,5.7]	↑
FEMALE	1994-2015	2.1	[0.9,3.3]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.8	[-1.4,-0.1]	↓
FEMALE	1994-2015	-0.1	[-1.1,1.0]	↔

Males:

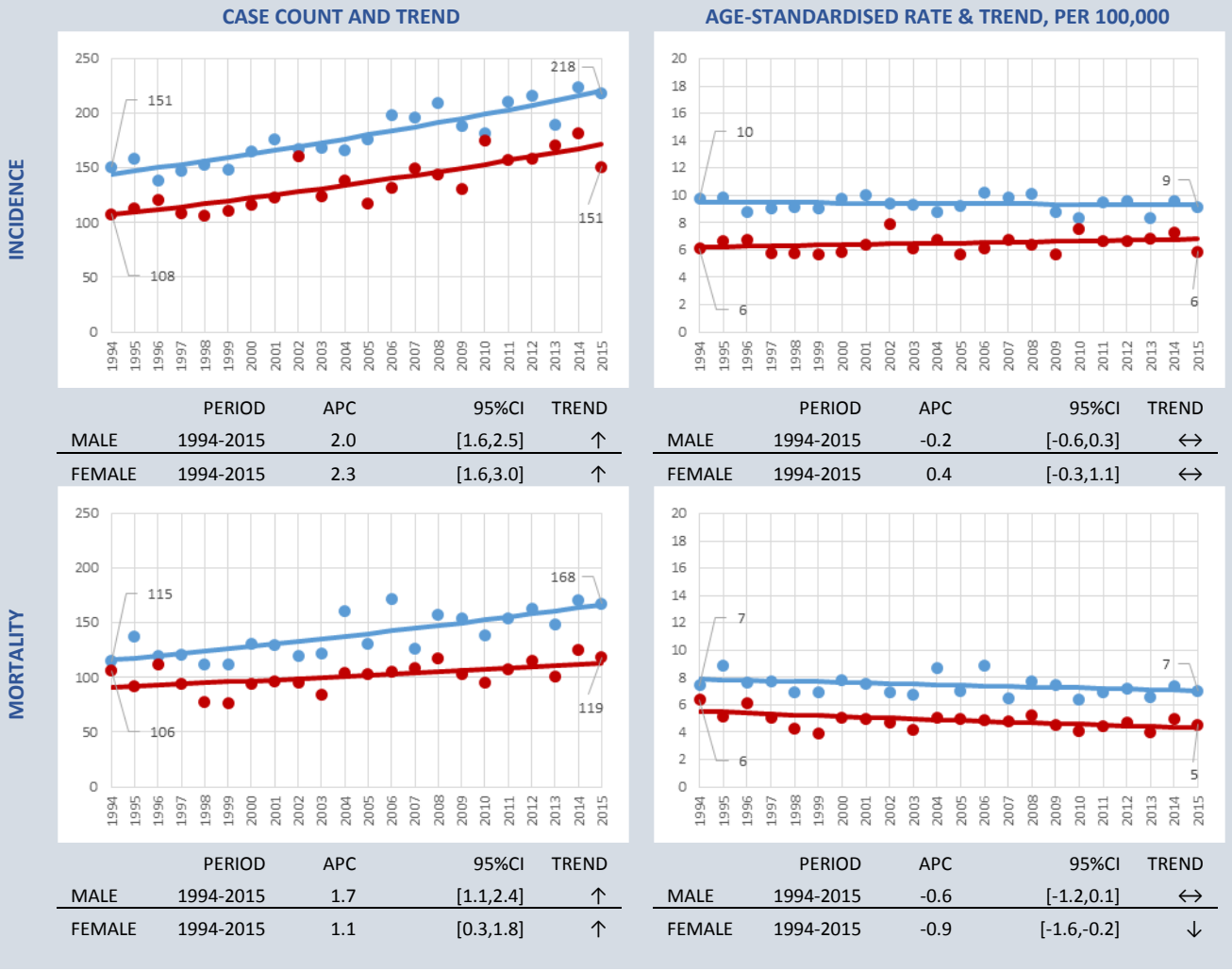
- Cases declined significantly during the full period 1994-2015.
- The incidence rate declined significantly over the same period.
- Deaths increased significantly over the period 2005-2015.
- The mortality rate declined marginally but significantly over the full period 1994-2015.

Females:

- Cases declined very modestly during the full period 1994-2015.
- The incidence rate declined steadily and significantly over the same period.
- Deaths increased significantly overall during the full period 1994-2015.
- The mortality rate was static during the same period.

- An important caution regarding interpretation of bladder cancer trends is that, for both sexes, the downward trend in incidence rates is probably exaggerated by changes in diagnosis or coding (in particular, a higher proportion of bladder tumours may have been coded as non-invasive in more recent years. True changes in the underlying risk of invasive bladder cancer, and the possible influence of smoking (the most important risk factor for bladder cancer) on the trends seen, are thus difficult to assess.

Figure 4-21. Trend in incidence and mortality by sex: C70-72 Meninges, brain & central nervous system cancer



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.0	[1.6,2.5]	↑
FEMALE	1994-2015	2.3	[1.6,3.0]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.2	[-0.6,0.3]	↔
FEMALE	1994-2015	0.4	[-0.3,1.1]	↔

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	1.7	[1.1,2.4]	↑
FEMALE	1994-2015	1.1	[0.3,1.8]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.6	[-1.2,0.1]	↔
FEMALE	1994-2015	-0.9	[-1.6,-0.2]	↓

Males:

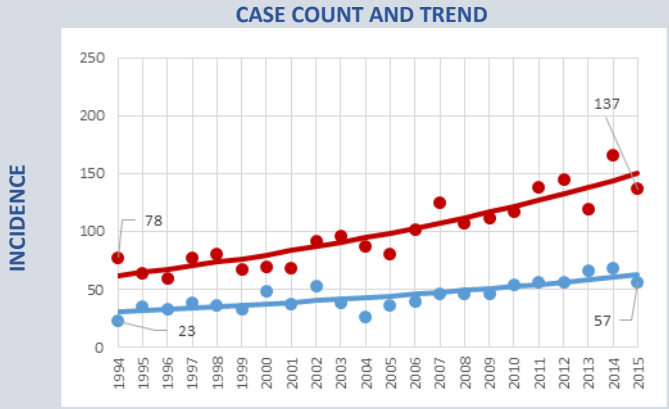
- Cases of invasive brain / CNS cancer increased significantly during the full period 1994-2015.
- The incidence rate was static over the same period.
- Deaths increased significantly over the full period 1994-2015.
- The mortality rate was static (or declined marginally) over the same period.

Females:

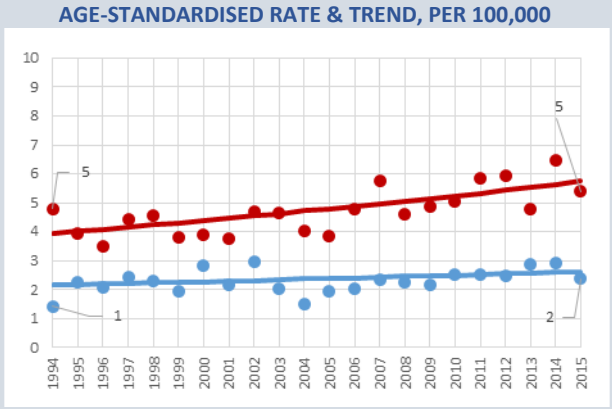
- Cases increased significantly during the full period 1994-2015.
- The incidence rate was static over the same period.
- Numbers of deaths were increased significantly during the full period 1994-2015.
- The mortality rate declined significantly during the same period.

- Most brain tumours are not linked with any known risk factors and have no obvious cause. The only environmental risk factor for brain tumours is radiation exposure, e.g. in people who received radiation to the brain as children as part of their treatment for leukaemia. Most people with brain tumours do not have a family history of the disease, but in rare cases brain and spinal cord cancers are associated with familial-linked conditions.

Figure 4-22. Trend in incidence by sex: D32-33 Benign tumours of brain & central nervous system



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	3.4	[2.3,4.6]	↑
FEMALE	1994-2015	4.3	[3.4,5.2]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	1.2	[0.0,2.3]	↑
FEMALE	1994-2015	1.9	[1.1,2.8]	↑

Males:

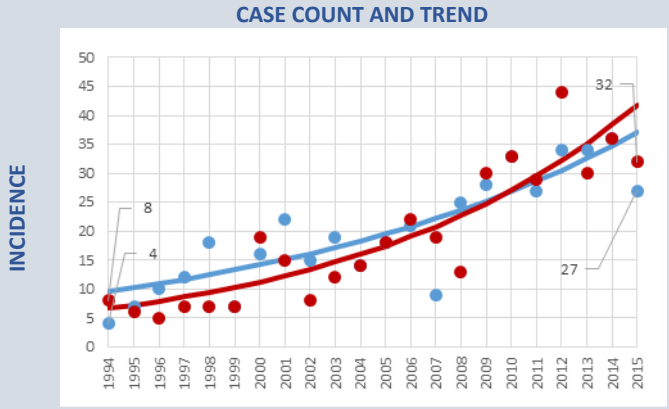
- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased marginally but non-significantly over the same period.

Females:

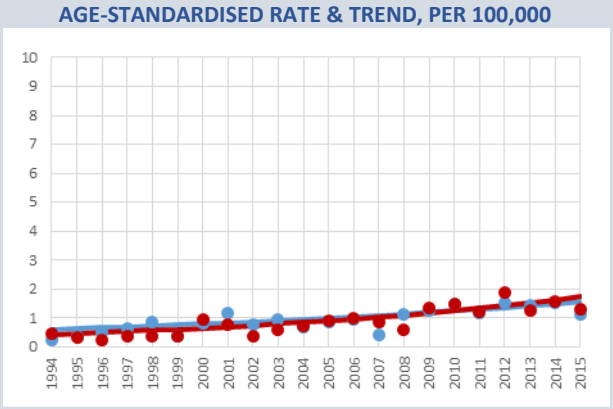
- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.

- While *invasive* malignant brain & CNS tumours were more frequent in men (Fig 4-21), *benign* brain and CNS tumours (which can also be fatal) were more common in women (Fig 4-22).

Figure 4-23. Trend in incidence by sex: D42-43 Tumours of uncertain behaviour of brain, meninges & CNS



SEX	PERIOD	APC	95%CI	TREND
MALE	1994-2015	6.6	[4.5,8.7]	↑
FEMALE	1994-2015	9.1	[6.8,11.4]	↑



SEX	PERIOD	APC	95%CI	TREND
MALE	1994-2015	5.2	[3.2,7.3]	↑
FEMALE	1994-2015	7.4	[5.2,9.8]	↑

Males:

- Cases increased significantly during the full period 1994-2015, albeit with low numbers.
- The incidence rate increased significantly over the same period.

Females:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.

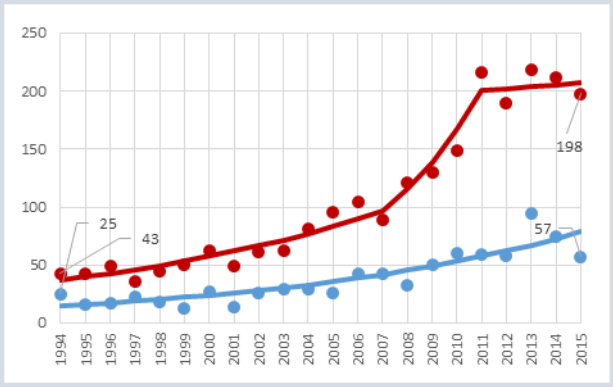
- Tumours of uncertain morphology for the brain, meninges and CNS are very rare, but there was a significant annual increase over the period 1994-2014. This could be an artefact of coding or diagnosis changes: for example, a proportion of brain/CNS tumours that would previously have been coded as malignant or as benign might now be appearing in the 'uncertain' category.

Figure 4-24. Trend in incidence and mortality by sex: C73 Thyroid cancer

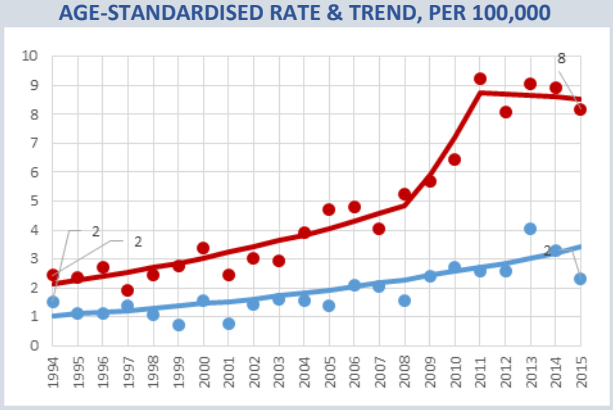
CASE COUNT AND TREND

AGE-STANDARDISED RATE & TREND, PER 100,000

INCIDENCE

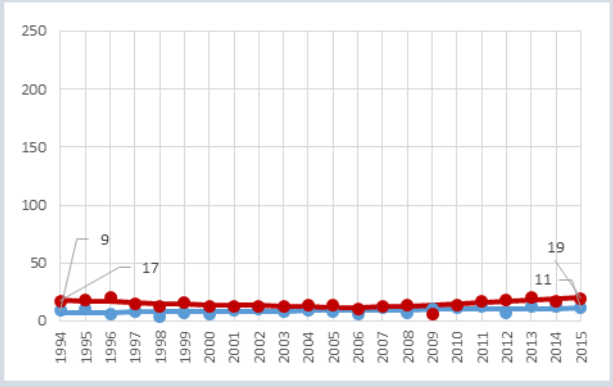


	PERIOD	APC	95%CI	TREND
MALE	1994-2015	8.3	[6.4,10.2]	↑
FEMALE	1994-2007	7.7	[5.3,10.0]	↑
	2007-2011	20.1	[4.3,38.3]	↑
	2011-2015	0.8	[-6.3,8.6]	↔

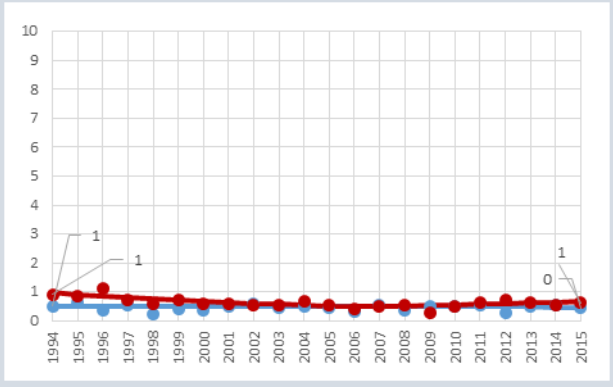


	PERIOD	APC	95%CI	TREND
MALE	1994-2015	5.9	[4.0,7.7]	↑
FEMALE	1994-2008	6.1	[3.9,8.4]	↑
	2008-2011	21.8	[-9.6,64.2]	↔
	2011-2015	-0.4	[-8.0,7.8]	↔

MORTALITY



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.0	[0.5,3.6]	↑
FEMALE	1994-2006	-3.7	[-6.6,-0.7]	↓
	2006-2015	6.5	[1.5,11.8]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-0.1	[-1.6,1.4]	↔
FEMALE	1994-2006	-5.6	[-8.3,-2.7]	↓
	2006-2015	3.5	[-1.2,8.4]	↔

Males:

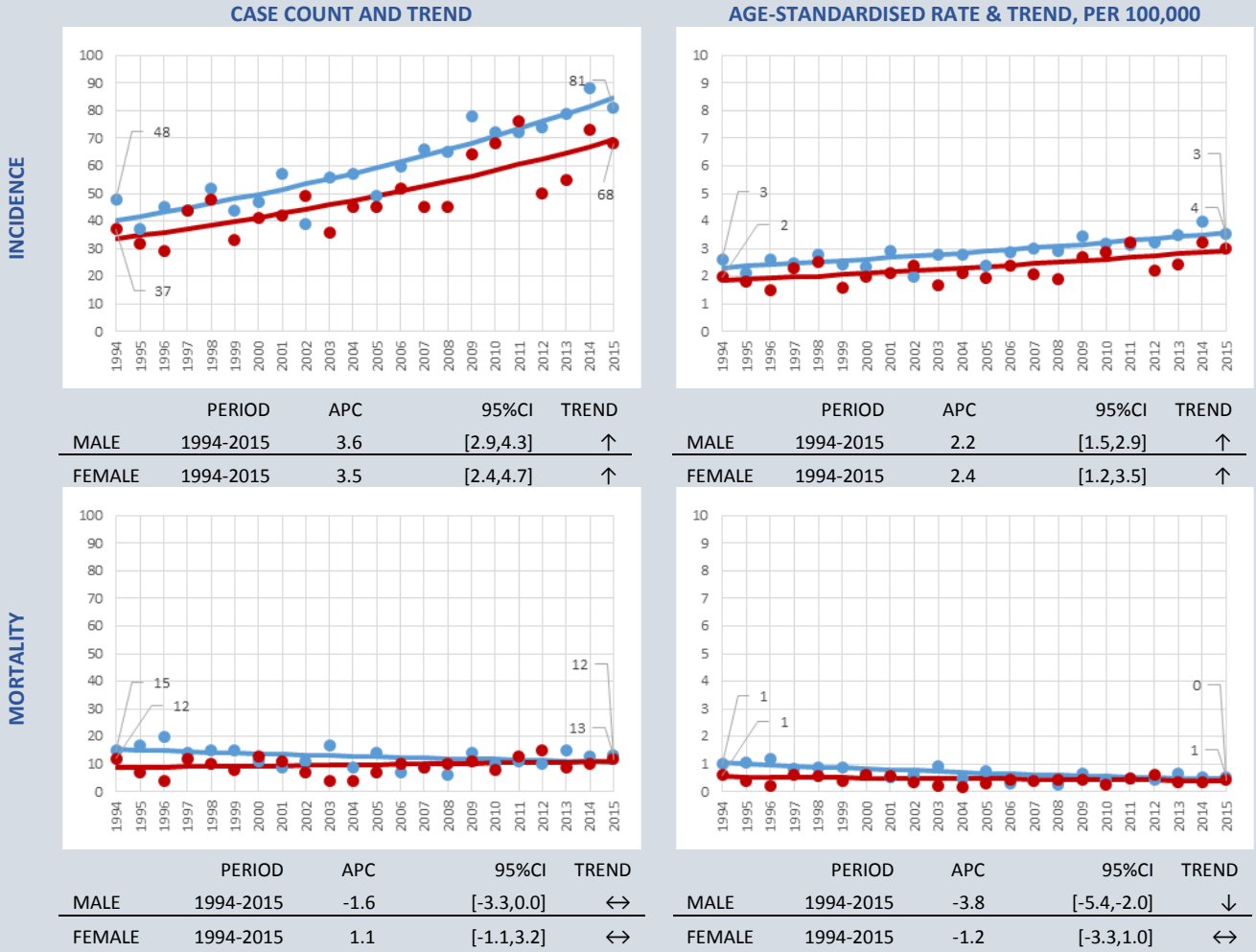
- Cases increased steeply during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased over the full period 1994-2015, albeit from a low base of only 9 deaths per year.
- The mortality rate was static over the full period 1994-2015.

Females:

- Cases increased significantly during 1994-2007, and then more steeply during 2007-2011, followed by a static period during 2011-2015. There were 2-3 times more cases overall in females relative to males.
- The incidence rate increased significantly during 1994-2008, and then more steeply during 2008-2011, followed by a static period during 2011-2015.
- Deaths increased significantly over the period 2006-2015 after an earlier period of decline.
- The mortality rate showed a marginal increase during 2006-2015 after an earlier period of decrease since 1994.

- Incidence trends for this cancer are likely to reflect an increase in 'incidental' detection of cancers during investigations for other thyroid-related conditions. The trend seems to have plateaued in females since from 2011.
- Radiation exposure and having a first-degree relative (parent, brother, sister, or child) with thyroid cancer are known risk factors for thyroid cancer.

Figure 4-25. Trend in incidence and mortality by sex: C81 Hodgkin lymphoma



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	3.6	[2.9,4.3]	↑
FEMALE	1994-2015	3.5	[2.4,4.7]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.2	[1.5,2.9]	↑
FEMALE	1994-2015	2.4	[1.2,3.5]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.6	[-3.3,0.0]	↔
FEMALE	1994-2015	1.1	[-1.1,3.2]	↔

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-3.8	[-5.4,-2.0]	↓
FEMALE	1994-2015	-1.2	[-3.3,1.0]	↔

Lymphomas are a heterogeneous group of cancers of the haematopoietic system, and can broadly be classified into Hodgkin and non-Hodgkin lymphomas based on histological appearance.

Males:

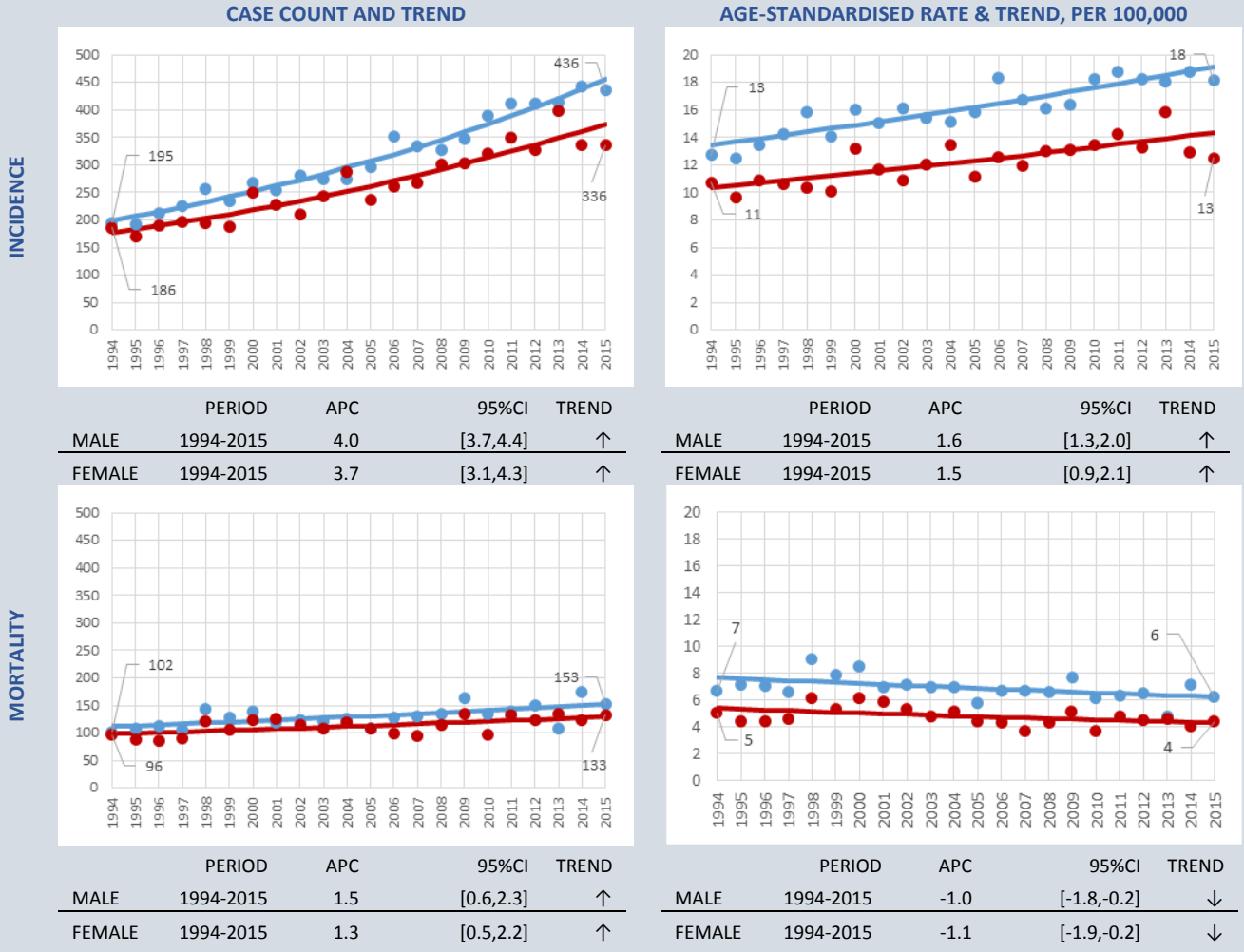
- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths declined marginally during 1994-2013 from a low base of only 15 in 1994.
- The mortality rate decreased significantly over the full period 1994-2015.

Females:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Numbers of deaths were static during the full period 1994-2015.
- The mortality rate was static over the same period.

- In general, the risk factors for Hodgkin lymphoma are poorly known, but risk is higher among people who have had infectious mononucleosis, an infection caused by Epstein-Barr virus. Higher risk of HL among populations with higher socioeconomic status might be associated with children from more affluent families being exposed to some type of infection (such as Epstein-Barr virus) later in life than children from less affluent families.

Figure 4-26. Trend in incidence and mortality by sex: C82-85 All non-Hodgkin lymphoma



	PERIOD	APC	95%CI	TREND
MALE	1994-2015	4.0	[3.7,4.4]	↑
FEMALE	1994-2015	3.7	[3.1,4.3]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	1.6	[1.3,2.0]	↑
FEMALE	1994-2015	1.5	[0.9,2.1]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	1.5	[0.6,2.3]	↑
FEMALE	1994-2015	1.3	[0.5,2.2]	↑

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.0	[-1.8,-0.2]	↓
FEMALE	1994-2015	-1.1	[-1.9,-0.2]	↓

Males:

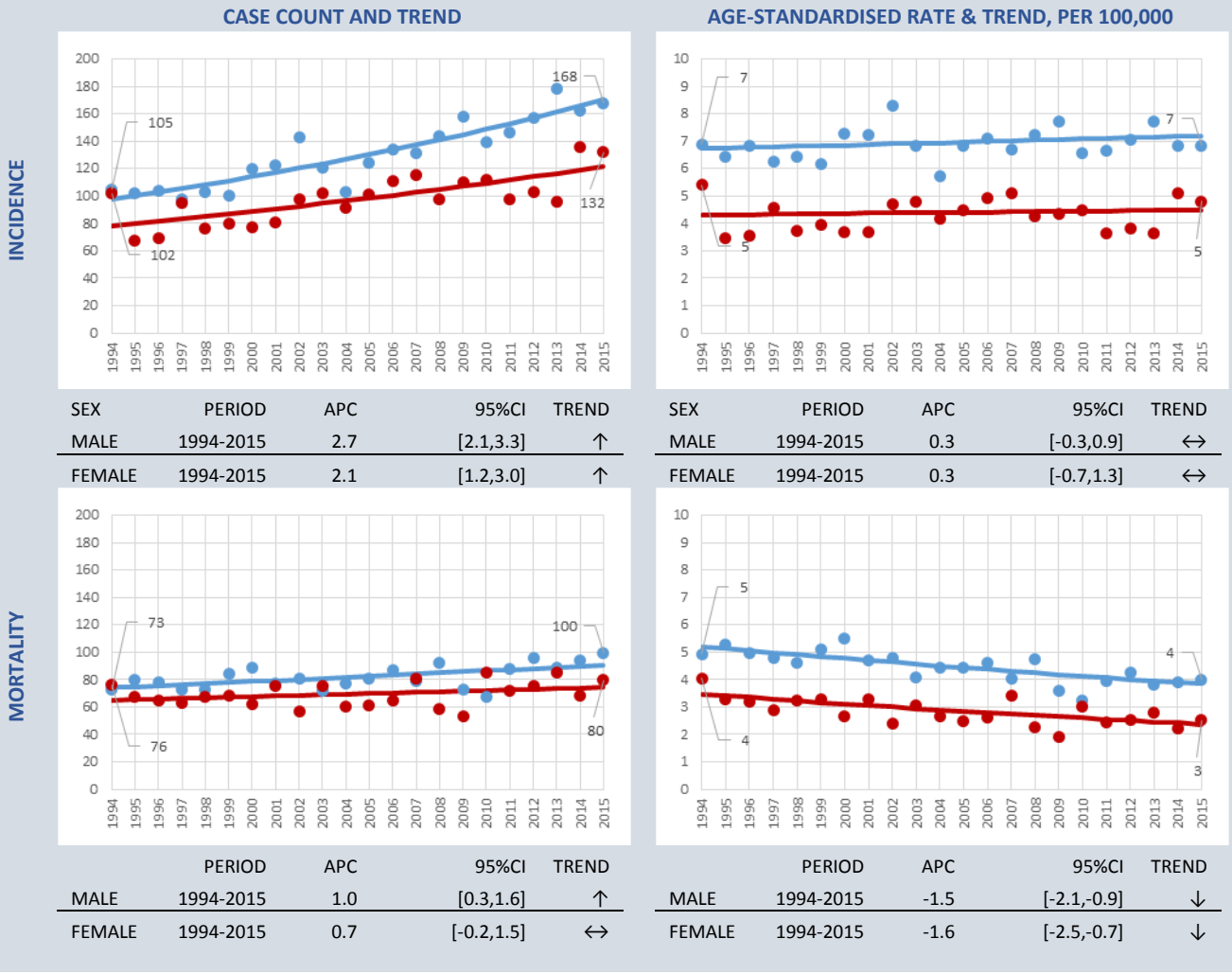
- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased significantly during the full period 1994-2015.
- The mortality rate declined significantly over the same period.

Females:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate increased significantly over the same period.
- Deaths increased over the full period 1994-2015.
- The mortality rate was static or showed a marginal decline over the same period.

- As with Hodgkin lymphoma, risk factors for NHL have not been well established, but some types of infection seem to increase the risk.

Figure 4-27. Trend in incidence and mortality by sex: C90 Multiple myeloma & malignant plasma cell neoplasms



SEX	PERIOD	APC	95%CI	TREND
MALE	1994-2015	2.7	[2.1,3.3]	↑
FEMALE	1994-2015	2.1	[1.2,3.0]	↑

SEX	PERIOD	APC	95%CI	TREND
MALE	1994-2015	0.3	[-0.3,0.9]	↔
FEMALE	1994-2015	0.3	[-0.7,1.3]	↔

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	1.0	[0.3,1.6]	↑
FEMALE	1994-2015	0.7	[-0.2,1.5]	↔

	PERIOD	APC	95%CI	TREND
MALE	1994-2015	-1.5	[-2.1,-0.9]	↓
FEMALE	1994-2015	-1.6	[-2.5,-0.7]	↓

Multiple myeloma is a cancer of plasma cells (immunoglobulin-producing B-lymphocytes), where abnormal plasma cells accumulate in the bone marrow and interfere with haematopoiesis (blood formation).

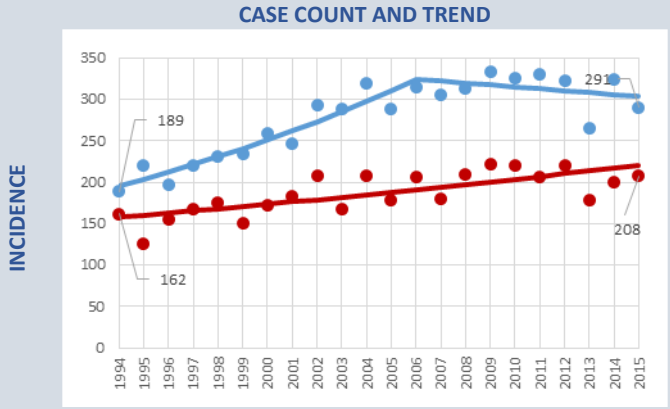
Males:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate was static over the same period.
- Deaths increased significantly during the full period 1994-2015.
- The mortality rate declined significantly over the same period.

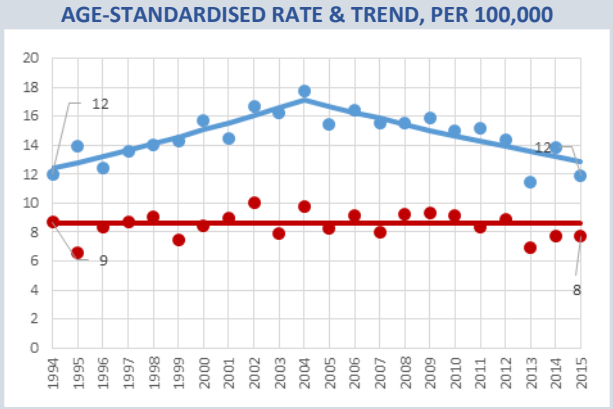
Females:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate was static over the same period.
- Deaths increased marginally over the full period 1994-2015.
- The mortality rate declined significantly over the same period.

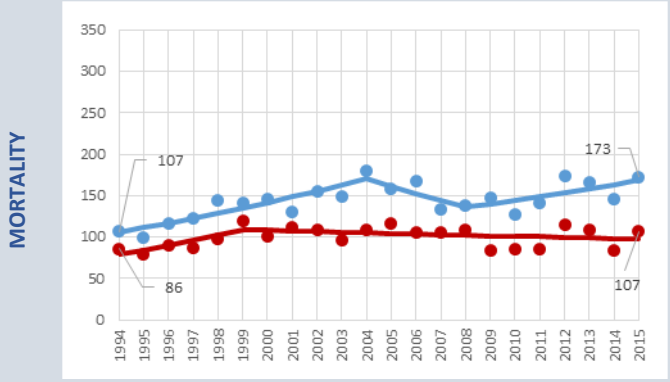
Figure 4-28. Trend in incidence and mortality by sex: C91-95 Leukaemia (all sub-classifications combined)



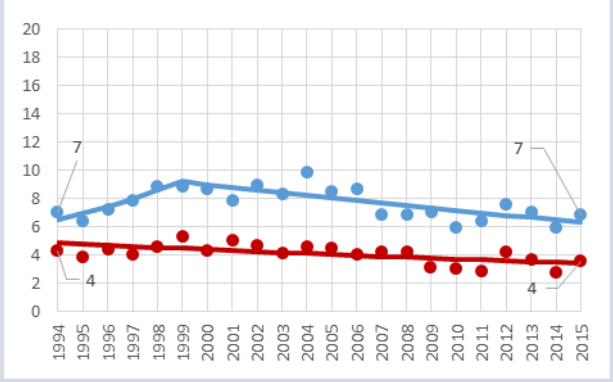
	PERIOD	APC	95%CI	TREND
MALE	1994-2006	4.3	[3.1,5.6]	↑
	2006-2015	-0.7	[-2.4,1.0]	↔
FEMALE	1994-2015	1.6	[0.9,2.3]	↑



	PERIOD	APC	95%CI	TREND
MALE	1994-2004	3.4	[1.8,5.1]	↑
	2004-2015	-2.7	[-3.9,-1.5]	↓
FEMALE	1994-2015	-0.2	[-0.9,0.6]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-2004	4.9	[2.5,7.3]	↑
	2004-2008	-5.6	[-17.5,8.1]	↔
	2008-2015	3.1	[-0.5,6.8]	↔
FEMALE	1994-1999	6.7	[-0.7,14.8]	↔
	1999-2015	-0.7	[-1.8,0.5]	↔



	PERIOD	APC	95%CI	TREND
MALE	1994-1999	7.2	[-0.4,15.5]	↔
	1999-2015	-2.3	[-3.3,-1.2]	↓
FEMALE	1994-2015	-1.7	[-2.6,-0.7]	↓

Males:

- The case count increased significantly during 1994-2006, thereafter it declined non-significantly during 2006-2015.
- The incidence rate increased during 1994-2004 and then declined significantly during 2004-2015.
- Deaths showed a complex trend (significant increase 1994-2004 then periods of non-significant decline and increase).
- The mortality rate increased significantly during 1994-1999, followed by a significant decline during 1999-2015.

Females:

- Cases increased significantly during the full period 1994-2015.
- The incidence rate was static (or showed a marginal decline) over the period 1994-2015.
- Deaths increased marginally during 1994-1999 followed by a marginal decline during 1999-2015.
- The mortality rate declined significantly during 1994-2015.

- Risk factors for leukaemia are poorly understood, but some of the strongest evidence is for an influence of smoking and exposure to certain chemicals (e.g. benzene) on risk of acute myeloid leukaemia.
- Trends in mortality rates showed some similarities to those in incidence rates, but possible artefactual influences on the leukaemia incidence trends were discussed in last year's annual report [12].

5. PREVALENCE: NUMBER OF CANCER SURVIVORS

Complete cancer prevalence is defined as the number of persons surviving with cancer for a given population at a particular point in time, the index date. For a cancer registry, *fixed-duration prevalence* is the number of cancer survivors from observed data collected by the cancer registry since it was established. The NCRI began national collation of cancer registration in 1994 and it currently holds 22 years of complete or near-complete incidence and follow-up information on cancer cases, up to the end of 2015 (case number, and matching of cases to death certificates, are not yet complete for 2016 or 2017). However, there remains a subset of cancer patients alive at the end of 2015 who are not included in NCRI data because they were diagnosed *before* 1994. The size of this hidden subset was estimated using methods described in chapter 8. The sum of the fixed-duration cancer survivor population (1994-2015) and estimated numbers of survivors from the hidden cancer subset (pre-1994) gives an estimate of *complete prevalence*, presented below for the first time for Ireland.

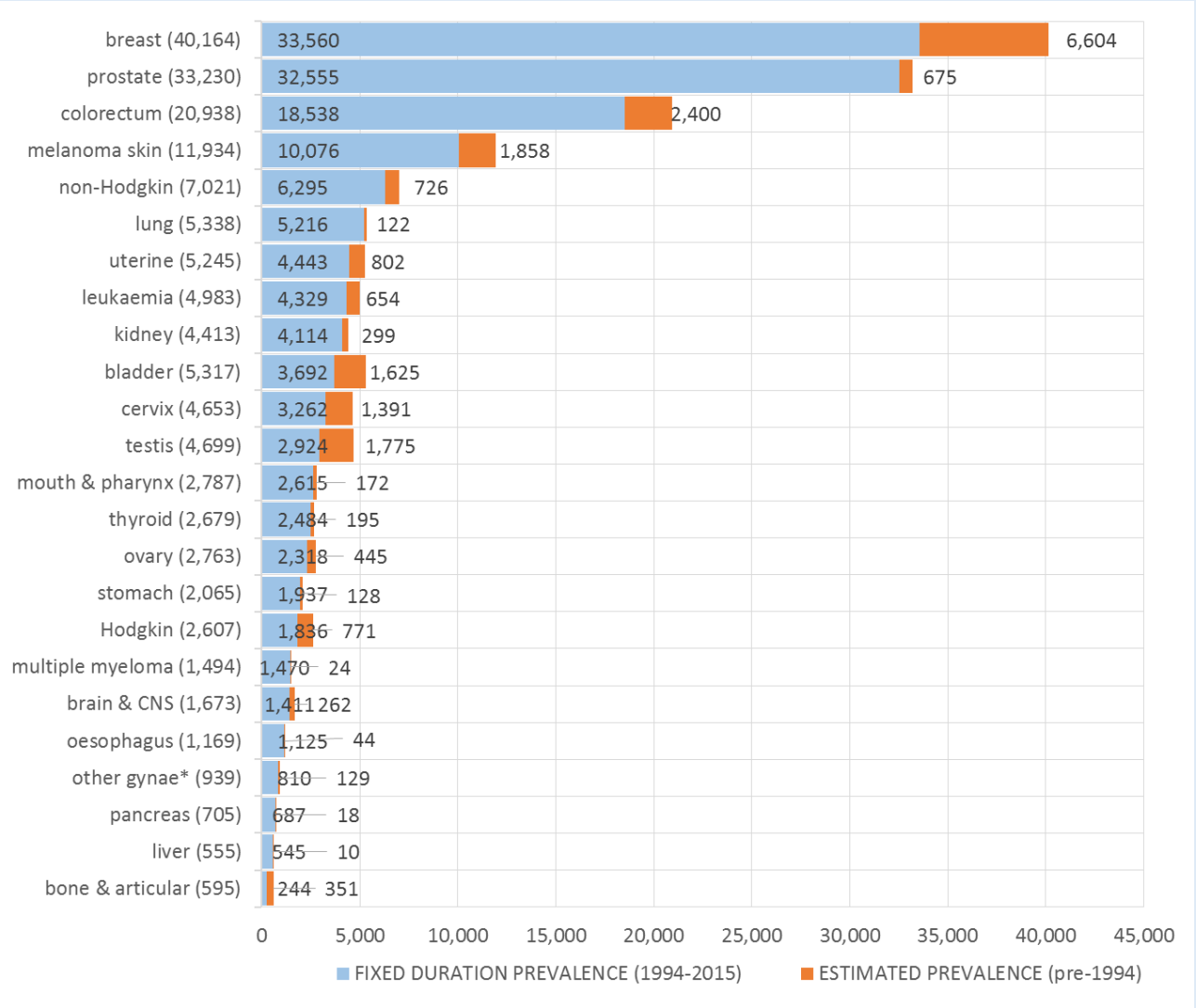
Table 5-1
Fixed-duration and estimated complete prevalence by sex and age: numbers of cancer survivors* at 31/12/2015, by age and sex

SEX	AGE‡	FIXED-DURATION (1994-2015)	%	%	COMPLETE PREVALENCE	%	%
ALL		**148,443**	**100.0%**	**100%**	**167,715**	**100%**	**100%**
	<50	21,194	14.3%		22,755	13.6%	
	50+	127,249	85.7%		144,960	86.4%	
MALES		**72,864**	**100.0%**	**49.1%**	**77,878**	**100%**	**46.4%**
	<50	8,324	11.4%		9,231	11.9%	
	50+	64,540	88.6%		68,647	88.1%	
FEMALES		**75,579**	**100.0%**	**50.9%**	**89,837**	**100%**	**53.6%**
	<50	12,870	17.0%		13,524	15.1%	
	50+	62,709	83.0%		76,313	84.9%	

*Survivors of any invasive cancer, other than non-melanoma skin cancer, counting only the first invasive cancer per patient and ignoring any subsequent cancers in other body site
‡age on 31/12/2015

- The figure reported for *fixed-duration prevalence* (up to 31/12/2014) in last year's annual report was 139,526 [12]. For this report (up to 31/12/2015) the same figure was estimated to be 148,443 (Table 5-1), an increment of almost 9,000 patients.
- This represents 46% of all females (163,344) and 41% of all males (179,095) diagnosed with cancer during 1994-2015 inclusive, or c.3.2% of the total Irish population in 2015.
- If the estimate for the unknown or 'hidden' patients whose diagnosis occurred prior to 1994 was included, *complete prevalence* in Ireland was estimated to be 167,715 cancer survivors in Ireland (c.3.6% of the Irish population in 2015) (Table 5-1).
- These figures include patients still undergoing active treatment or palliative treatment at the end of 2015, in addition to longer-term survivors (either cured or potentially at risk of recurrence or relapse).

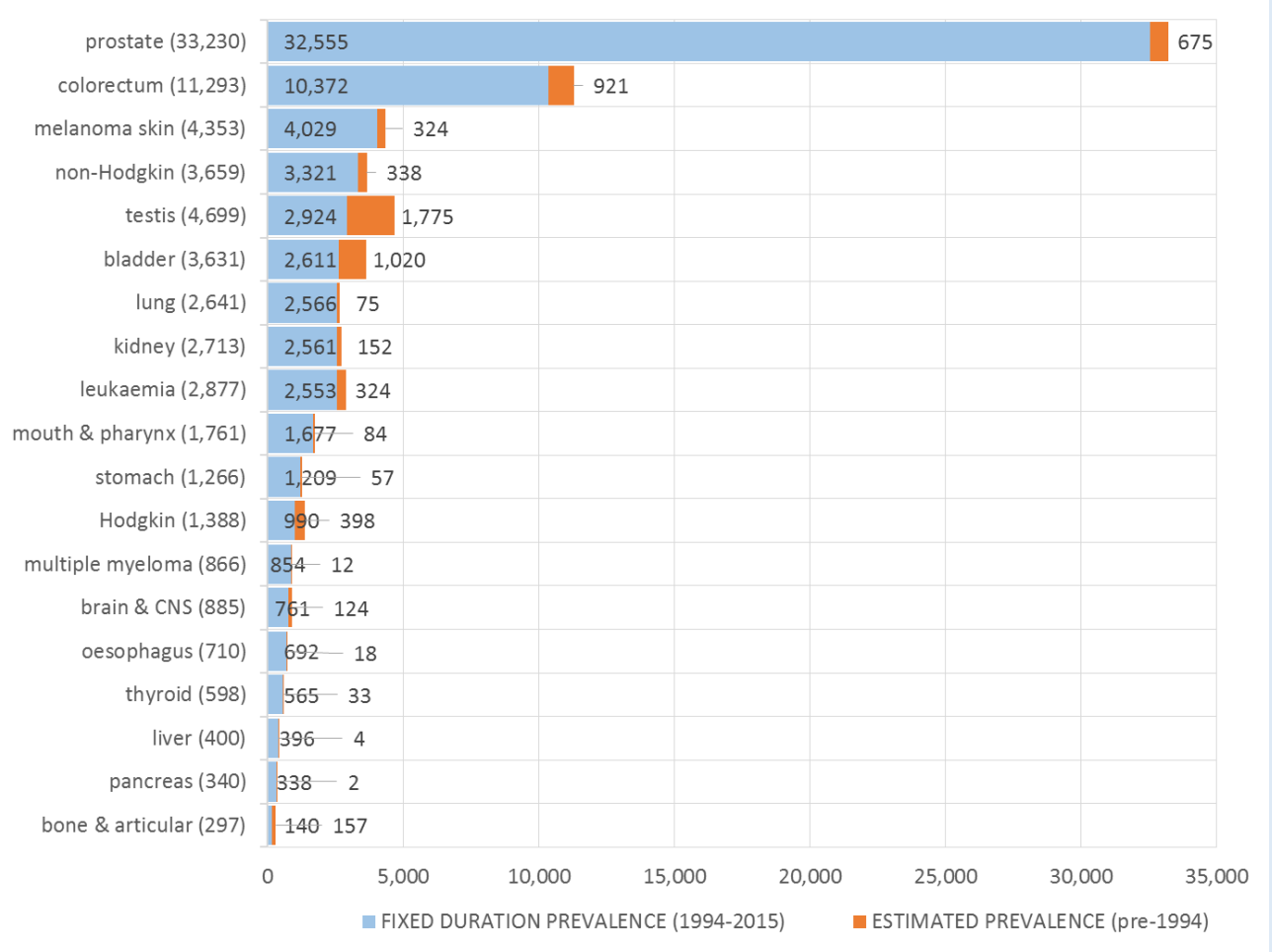
Figure 5-1
Fixed-duration and estimated complete prevalence by cancer type, in declining order of frequency: male and female survivors combined



The height of the bars represent the numbers surviving with a particular cancer on 31/12/2015. The figures in brackets are the estimated **complete prevalence** for each cancer type, i.e. the sum of survivors from 1994-2015 cancers and pre-1994 cancers. Only the most common individual cancer sites are shown.
*Other gynae: vulva, vagina, uterus (NOS) and placenta.

- The number of survivors of a given cancer type is related to its incidence rate, median age at diagnosis and survival prospects. Rare, high-fatality cancers diagnosed in elderly patients comprise only a small proportion of cancer survivors. Conversely, common cancers with good survival prospects diagnosed in younger persons will tend to predominate in the prevalent cancer population. Overall, the top most common cancers in the prevalent cancer population were: breast cancer (24% of all cancer survivors), prostate cancer (20%), colorectal cancer (13%) and skin melanoma (7%) (Figure 5-1). These percentages are not mutually exclusive (i.e. add up to >100%), as some cancer survivors had more than one type of cancer.
- Lung cancer (a common but high-fatality) cancer accounted for only 3% of survivors, and less common, high-fatality cancers such as liver, pancreatic, oesophageal and stomach cancers and multiple myeloma together comprise only 3% of the cancer survivors.

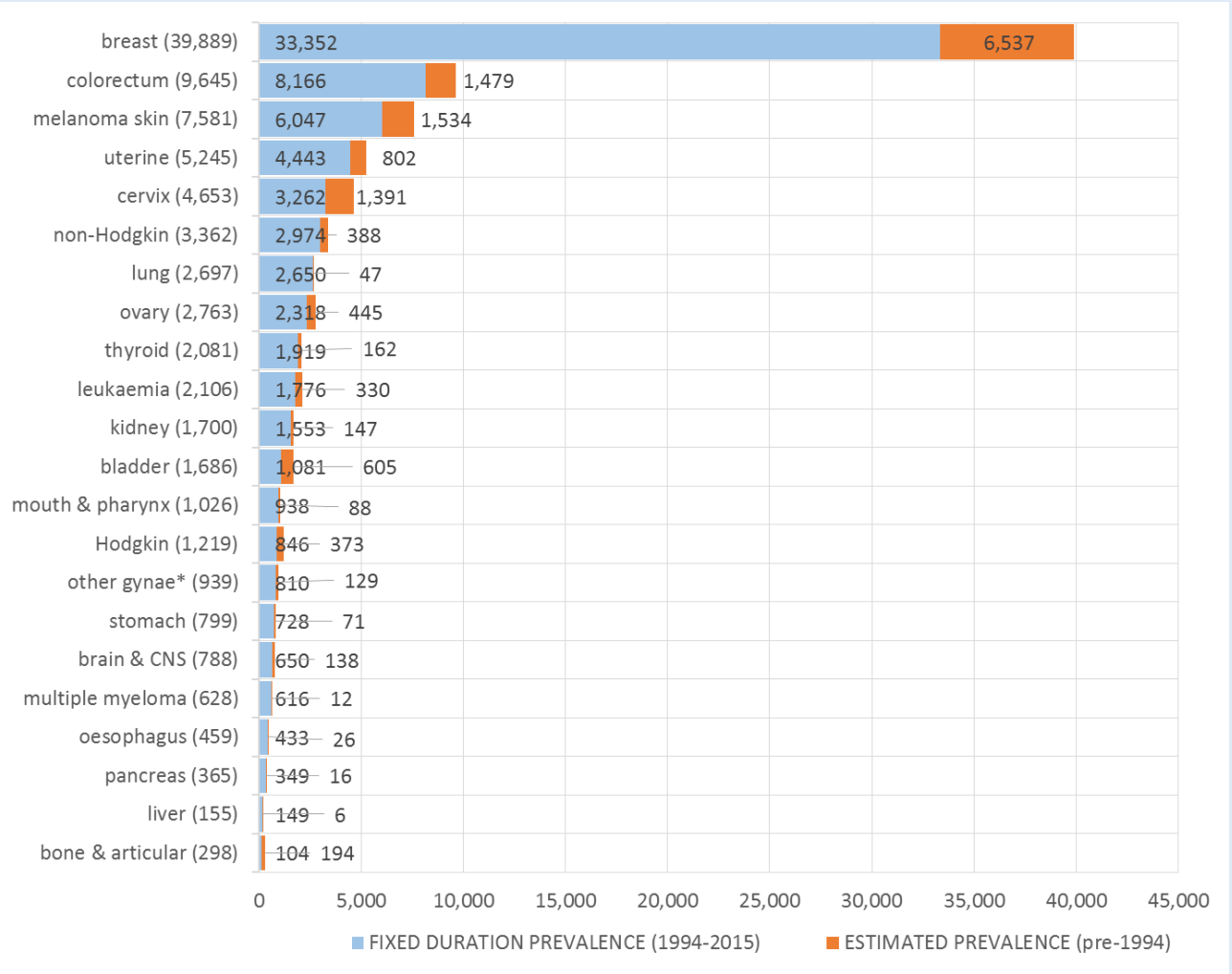
Figure 5-2
Fixed-duration and estimated complete prevalence, in declining order of frequency: male survivors



The height of the bars represent the numbers surviving with a particular cancer on 31/12/2015. The figures in brackets are the estimated **complete prevalence** for each distinct cancer type; i.e. the sum of survivors from 1994-2015 cancers and pre-1994 cancers. Only the most common individual cancer sites are shown

- The top five most common prevalent cancers in males were prostate cancer (43% of all male cancer survivors), colorectal cancer (15%), skin melanoma (6%), non-Hodgkin lymphoma (5%) and testicular cancer (6%).
- Certain cancers with good survival prospects, often diagnosed at early stage in younger patients, tended to predominate in the estimated prevalence for the period prior to 1994 (orange sections of bars). This was most apparent for cancer of the testis where it was estimated that 1,775 patients (38% of all surviving testicular cancer patients) were diagnosed before 1994.
- Conversely, for cancers with very poor survival, it was estimated that there was hardly any survivors still alive who had been diagnosed before 1994 (e.g. cancers of the pancreas and liver).

Figure 5-3
Fixed-duration and estimated complete prevalence, in declining order of frequency: female survivors



The height of the bars represent the numbers surviving with a particular cancer on 31/12/2015. The figures in brackets are the estimated **complete prevalence** for each distinct cancer type; i.e. the sum of survivors from 1994-2015 cancers and pre-1994 cancers. Only the most common individual cancer sites are shown
other gynae*: vulva, vagina, uterus (NOS) and placenta

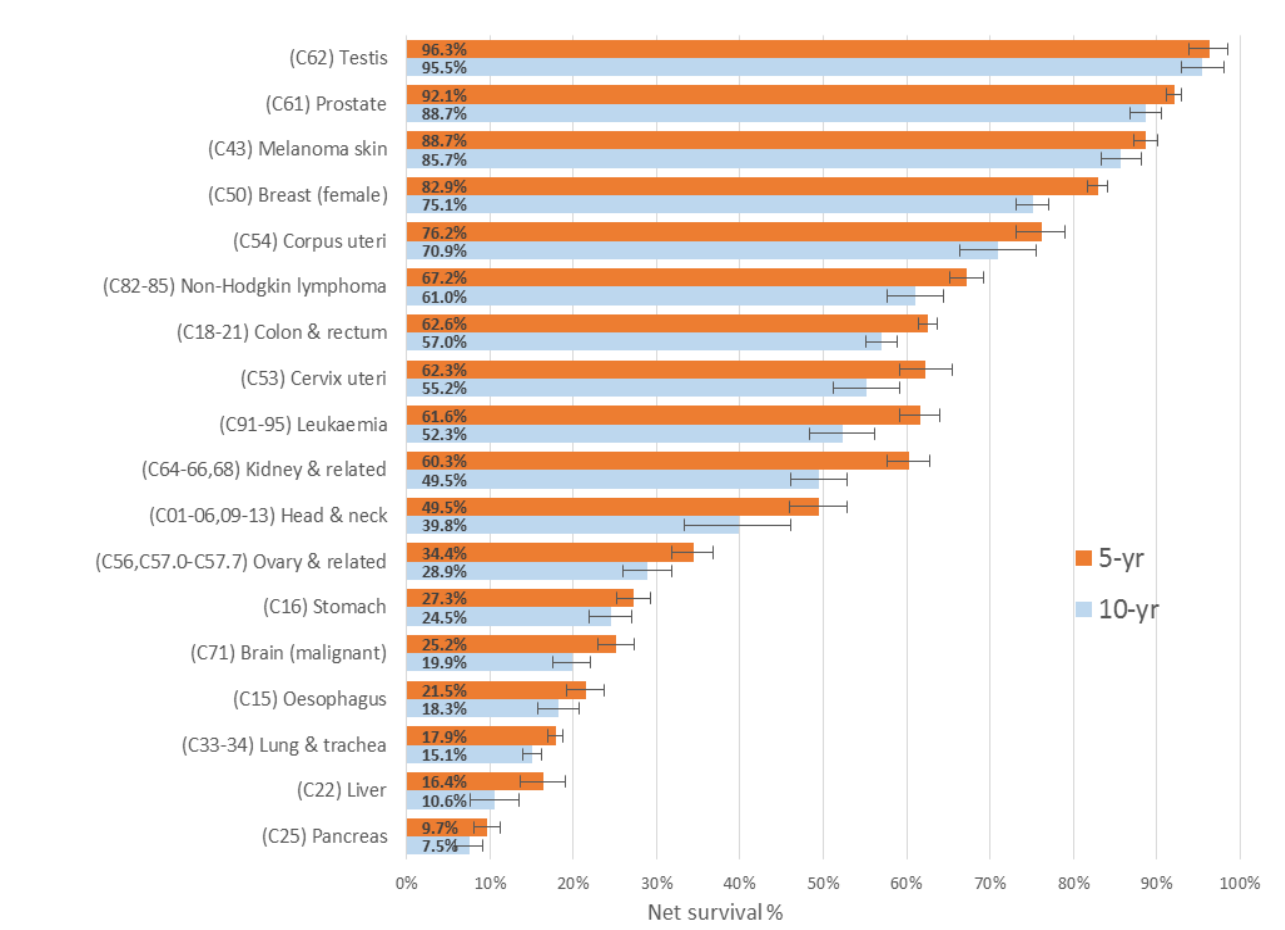
- The top five most common prevalent cancers in females were: breast cancer (44% of all female cancer survivors), colorectal cancer (11%), skin melanoma (8%), uterine (6%) and cervical cancer (5%). Again, it should be noted that these percentages are not mutually exclusive, as some cancer survivors had survived (and were counted for) more than one type of cancer.

6. SURVIVAL

Survival by cancer type and period

Figure 6-1 summarises the most recent estimates of net survival of Irish patients with the most commonly diagnosed cancers. *Net survival* is the expected survival in the hypothetical situation in which cancer is the only cause of death, thus it will be close to actual survival in younger patients but higher than actual survival in older patients.

Figure 6-1. Estimates of 5-year and 10-year net survival (age-standardised) for invasive cancers in Ireland, 2010-2014



'Hybrid' estimates are presented here for the follow-up period 2010-2014, representing survival of one-year to five-year survival for cases diagnosed in 2013 back to 2009 supplemented by longer-term follow-up survival estimates of patients diagnosed pre-2009 using methods of Dickman *et al.* [13].

Survival for all ages 15-99 is standardised to the standard populations recommended by Corazziari et al. (2004); the age-groups used differ for prostate cancer, and greater weighting is given to younger patients for melanoma, reflecting differences in typical age-structure of patient populations for these cancers) [14]. 95% confidence intervals are shown

Table 6-1 (overleaf) summarises five-year net survival by diagnosis or follow-up period for major cancers, highlighting ongoing increases in survival for most cancer types.

For a subset of these cancers, a more detailed analysis of survival by stage is presented in the following subsection.

- Five-year *net survival* (i.e. survival that would be expected in the absence of other causes of death) has improved markedly for cancers as a whole and for most major cancer types since the mid-1990s (*Table 6-1*).
- For invasive cancers (excluding the less generally less serious non-melanoma skin cancers), overall five-year net survival has increased from 44% for patients diagnosed during 1994-1998 to 61% for those diagnosed during 2009-2013.
- Over the same 20 years, five-year survival for colorectal cancer has increased from 50% to 63%, for lung cancer from 9% to 18%, for female breast cancer from 72% to 81%, for prostate cancer from 66% to 92%, and by substantial amounts for many other cancer types.
- Despite improvements, five-year survival remains very low for some cancers, notable pancreatic cancer (still <10%).

Table 6-1. Five-year average net survival of Irish cancer patients (age 15-99) by diagnosis period (cohorts 1994-1998 to 2009-2013) and for the most recent, cross-sectional follow-up period (2010-2014). All estimates are age-standardized[a], and include all stages combined (invasive cancers only with the exception of bladder tumours).

	5-year net survival (with 95% confidence intervals)				
Cancer & ICD-10 code	**1994-1998 *cohort**	**1999-2003 cohort**	**2004-2008 cohort**	**2009-2013 cohort**	**2010-2014 *hybrid**
All cancers (excl. NMSC[b]) - both sexes C00-C97 ex C44	44.2% (43.7-44.6%)	50.7% (50.2-51.0%)	56.9% (56.5-57.3%)	61.1% (60.6-61.5%)	61.1% (60.7-61.5%)
All cancers (excl. NMSC) - males C00-C97 ex C44	40.0% (39.3-40.6%)	48.8% (48.2-49.4%)	57.5% (56.9-58.0%)	61.3% (60.6-61.9%)	61.7% (61.1-62.2%)
All cancers (excl. NMSC) - females C00-C97 ex C44	48.0% (47.3-48.6%)	51.7% (51.1-52.3%)	55.5% (54.9-56.0%)	59.8% (59.1-60.4%)	59.5% (58.9-60.0%)
Oral cavity & pharynx (excl. lip) C01-C14	40.1% (36.9-43.5%)	39.9% (36.6-43.4%)	46.0% (43.0-49.2%)	49.9% (46.5-53.5%)	49.6% (46.5-52.8%)
Oesophageal cancer C15	11.4% (9.77-13.2%)	12.7% (11.1-14.5%)	14.9% (13.2-16.6%)	22.6% (20.1-25.2%)	21.5% (19.3-23.8%)
Stomach cancer C16	17.4% (15.7-19.1%)	17.3% (15.6-19.0%)	23.2% (21.3-25.0%)	27.4% (25.1-29.8%)	27.3% (25.3-29.4%)
Colorectal cancer C18-C21	49.9% (48.5-51.3%)	52.1% (50.8-53.4%)	57.9% (56.7-59.0%)	62.6% (61.2-63.9%)	62.6% (61.4-63.6%)
Liver cancer C22	4.5% (2.9-7.0%)	11.0% (8.5-14.1%)	12.0% (9.8-14.6%)	17.0% (14.2-20.3%)	16.4% (13.8-19.3%)
Pancreatic cancer C25	5.6% (4.5-6.9%)	6.0% (4.9-7.3%)	7.0% (5.9-8.3%)	8.2% (6.6-10.1%)	9.7% (8.2-11.4%)
Laryngeal cancer C32	63.5% (58.2-69.2%)	52.0% (47.7-56.7%)	58.9% (54.5-63.7%)	62.0% (56.4-68.0%)	63.2% (58.6-68.1%)
Lung & tracheal cancer C33-34	9.0% (8.2-9.8%)	9.9% (9.2-10.7%)	12.4% (11.6-13.1%)	17.9% (16.8-18.9%)	17.9% (16.9-18.9%)
Bone sarcoma C41-C42	48.9% (40.3-59.1%)	47.3% (38.8-57.7%)	56.6% (48.1-66.5%)	56.9% (47.8-67.5%)	54.8% (45.9-65.2%)
Melanoma of skin C43	82.7% (80.4-85.1%)	85.5% (83.5-87.4%)	85.3% (83.6-86.8%)	89.3% (87.5-91.0%)	88.7% (87.3-90.1%)
Female breast cancer C50	71.6% (70.0-73.1%)	77.3% (75.9-78.6%)	80.8% (79.6-82.0%)	80.8% (79.6-82.0%)	82.9% (81.7-84.1%)
Cervical cancer C53	56.3% (52.4-60.5%)	62.1% (58.6-65.6%)	58.3% (55.0-61.6%)	61.0% (57.6-64.6%)	62.3% (59.2-65.5%)
Uterine cancer (age 20-99) C54	73.7% (70.0-77.6%)	72.0% (68.6-75.4%)	72.2% (69.2-75.3%)	77.7% (74.6-80.9%)	76.2% (73.3-79.1%)
Ovarian & related cancer C56, C57.0-57.4, C57.7	30.3% (27.8-32.9%)	28.7% (26.5-30.9%)	30.9% (28.8-33.1%)	35.1% (32.2-38.1%)	34.4% (31.9-36.8%)
Prostate cancer C61	65.8% (63.6-67.9%)	82.3% (81.0-83.6%)	91.0% (89.9-91.9%)	91.5% (90.3-92.6%)	92.1% (91.1-93.0%)

Cancer & ICD-10 code	5-year net survival (with 95% confidence intervals)				
	1994-1998 *cohort	1999-2003 cohort	2004-2008 cohort	2009-2013 cohort	2010-2014 *hybrid
Testicular cancer (age 15-64) C62	89.0% (85.0-93.2%)	95.3% (93.2-97.4%)	98.0% (96.9-99.0%)	95.8% (93.3-98.3%)	96.3% (93.9-98.6%)
Kidney & related cancer C64-C66 & C68	47.9% (44.8-51.2%)	48.2% (45.4-51.0%)	53.8% (51.3-56.3%)	60.4% (57.5-63.4%)	60.3% (57.8-62.7%)
Bladder tumours (all behaviours) C67/D09.0/D41.4	71.2% (68.7-73.7%)	73.1% (70.8-75.3%)	72.6% (70.5-74.7%)	74.1% (71.6-76.5%)	73.9% (71.8-75.9%)
Brain cancer (malignant) C71	19.6% (17.6-21.8%)	22.9% (20.8-24.9%)	20.8% (18.9-22.9%)	26.0% (23.7-28.4%)	25.2% (23.1-27.4%)
Thyroid cancer C73	70.7% (65.8-75.8%)	72.3% (67.7-77.1%)	82.1% (78.5-85.8%)	86.2% (83.1-89.2%)	86.3% (83.3-89.3%)
Hodgkin lymphoma C81	73.1% (68.9-77.4%)	77.9% (74.3-81.6%)	82.3% (78.9-85.7%)	82.5% (79.4-85.6%)	82.0% (79.1-84.9%)
Non-Hodgkin lymphoma C82-C85	47.0% (44.4-49.7%)	54.4% (52.0-56.8%)	62.2% (60.1-64.4%)	67.3% (64.8-69.7%)	67.2% (65.1-69.3%)
Leukaemia C91-C95	45.6% (42.8-48.6%)	53.3% (50.6-56.0%)	60.5% (58.1-62.9%)	60.7% (57.8-63.6%)	61.6% (59.1-64.1%)
Multiple myeloma C90.0	27.5% (24.4-30.8%)	31.1% (28.3-34.0%)	46.3% (43.3-49.5%)	49.6% (45.8-53.7%)	52.1% (48.9-55.4%)

*Cohort = by year of diagnosis.

**Hybrid = by year of follow-up (all patients alive at some point 2010-2013, or diagnosed in 2009, followed up to 31/12/2014).

[a]Survival for all ages 15-99 (20-99 for bone sarcomas, 15-64 for testicular cancers) is standardised to the standard populations recommended by Corazziari et al. (2004); the age-groups used differ for prostate cancer, and greater weighting is given to younger patients for some cancers (melanoma, cervix, testis, brain, thyroid), reflecting differences in typical age-structure of patient populations for these cancers) [14].

[b]NMSC = non-melanoma skin cancers.

Survival by stage

Cancer stage is, in general, the most important prognostic indicator when assessing the likely survival prospects of patients diagnosed with a specific cancer type. Stage is also crucial to planning of appropriate treatment, for example whether or not a patient would benefit from chemotherapy or radiotherapy, or more radical surgery compared with more limited surgery. NCRI collects detailed information on the 'TNM'components of both clinical stage (i.e. stage based on initial physical examination, imaging and biopsy) and pathological stage (i.e. after excision of the tumour) at the time of diagnosis. For the purposes of summarising stage distributions (the relative proportions of different stages) and survival in relation to stage, a combination of pathological and clinical stage information is used, with pathological stage being prioritised if available.

The most recent available estimates of *stage-specific five-year net survival* are presented below (overall and by age-group) for major cancers (invasive/malignant cases only). These are based on all patients diagnosed up to 2013, followed up during 2010-2014 (cross-sectional 'hybrid' estimates). Age-standardised overall estimates are presented where data allow, but for less common cancers this may not be possible (in which case, unstandardized survival is presented). Cases are categorised to TNM 5th-edition stage[15], on the assumption that cases lacking explicit information on nodal metastasis can be consided node-negative ("N0") and that cases lacking explicit information on distant metastasis can be considered "M0".

Although net survival compensates or allows for the likelihood of death from other causes, which increases with age, net survival can vary substantially with age for a given stage. Typically, for a given cancer type and stage, older patients are more likely to die from their cancer, for a number of possible (often interrelated) reasons. These may include poorer response to treatment, poorer general health resulting in greater likelihood of complications from the cancer or its treatment, lower use of treatment (particularly if patients have other serious conditions) and, perhaps, less complete staging information (where true stage may be

underestimated). However, the degree of age-related variation (or the age-groups for which a notable drop in survival is seen) varies somewhat by cancer type, as will be seen across the examples below.

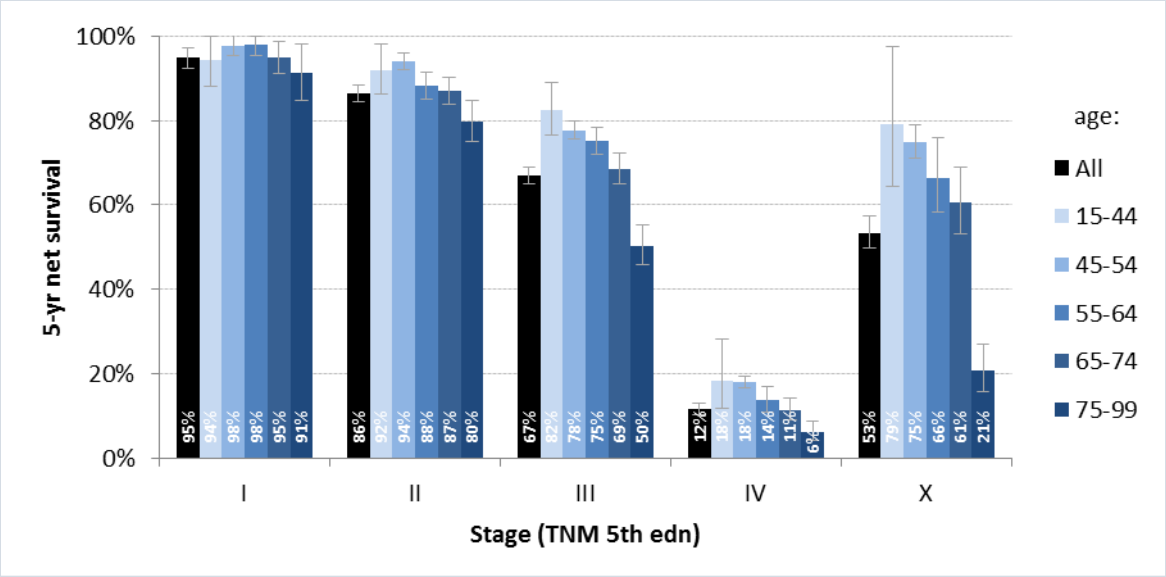
Figures are not presented for all cancers combined, as stage definitions, and survival outcomes by stage, can vary markedly between cancer types.

Table 6-2. Summary of five-year net survival by TNM 5th-edition stage for major cancers: all ages combined, 2010-2014. See Figs. 6-1 to 6-6 for fuller breakdown by age.

	5-year net survival by stage: overall and range by age-group				
Cancer	**Stage I**	**Stage II**	**Stage III**	**Stage IV**	**Unknown**
Colorectal cancer[a]	95% (91-98%)	86% (80-94%)	67% (50-82%)	12% (6-18%)	53% (21-79%)
Lung cancer[b]	43% (28-95%)	27% (13-59%)	9% (5-29%)	3% (2-18%)	8% (6-41%)
Melanoma of skin[b]	100% (98-100%)	85% (83-90%)	56% (40-72%)	18% (6-53%)	86% (66-93%)
Female breast cancer[a]	97% (95-99%)	89% (80-94%)	78% (53-85%)	26% (16-40%)	68% (53-84%)
Cervical cancer[b]	95% (85-97%)	69% (40-82%)	54% (26-62%)	19% (1-32%)	76% (55-88%)
Prostate cancer[b]	96% (81-98%)	<100% (87-100%)	99% (93-100%)	38% (18-64%)	81% (46-96%)

[a]Age-standardized
[b]Unstandardized (insufficient data for some age/stage combinations)
[c]Ages 15-44, 45-54, 55-64, 65-74 and 75+ (or 15-54, 55-64, 65-74, 75-84 and 85+ for prostate cancer)

Figure 6-2.
5-year net survival (with 95% confidence intervals) for colorectal cancer by stage at diagnosis, 2010-2014: overall (age-standardized) and by age-group



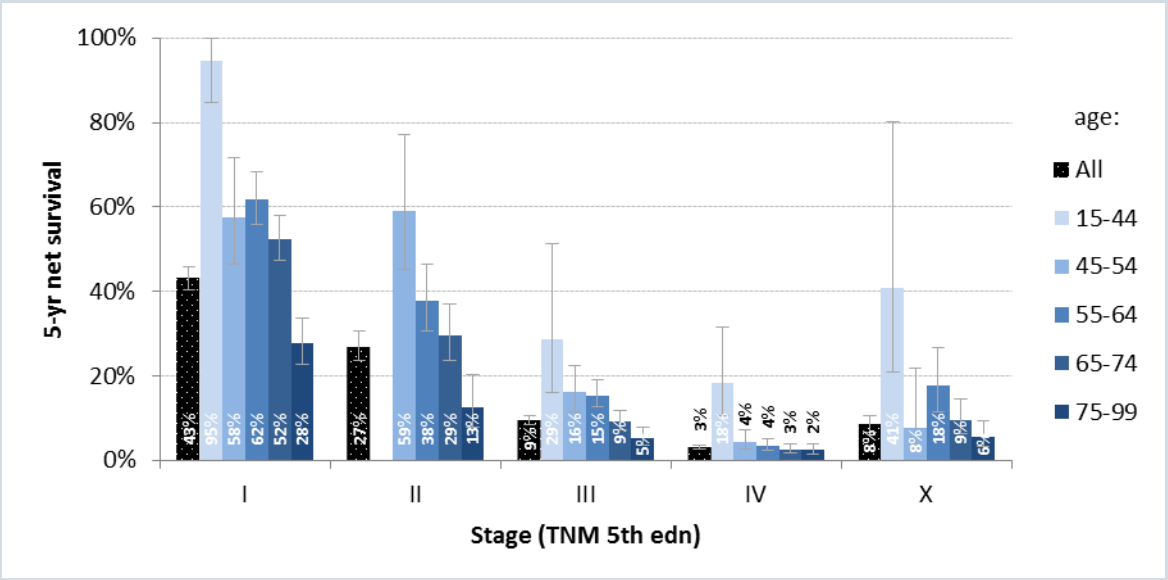
stage	I	II	III	IV	X
% of cases	14.4	25.0	28.9	20.9	10.9

stage X = unknown: the *tumour, node, metastasis* assessment was not sufficient to generate stage (I-IV)

- Five-year net survival from colorectal cancer was 80% or higher for stage I and II, regardless of age.
- However, for patients diagnosed at stage IV, where the the cancer had metastasized to distant sites, five-year survival was less than 20% in the youngest subset (<44 years); for the oldest subset (75+ years), five-year survival was only 6%.

Figure 6-3.
5-year net survival (with 95% confidence intervals) for lung cancer by stage at diagnosis, 2010-2014: overall (not age-standardized) and by age-group

LUNG CANCER



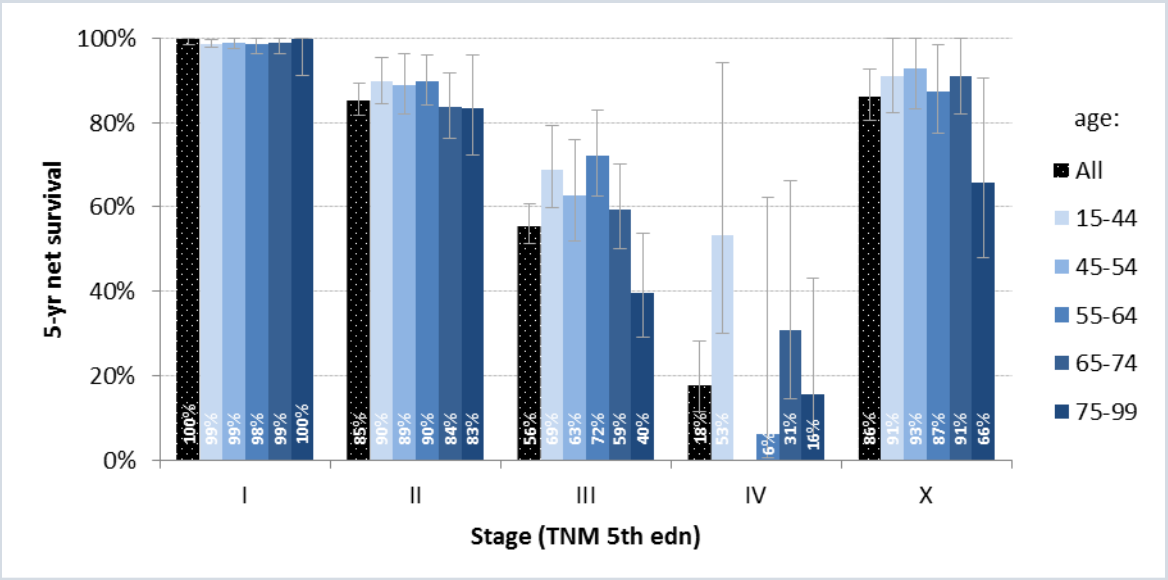
stage	I	II	III	IV	X
% of cases	17.9	7.3	25.2	37.2	12.5

There were too few cases in age-group 15-44 to allow estimation of stage II survival; this also prevented estimation of age-standardized survival for every stage (unstandardized survival presented here).

- Early-stage lung cancer patients had much better five-year survival than later-stage patients, although even stage I survival was only moderate for this cancer (43% overall, though as high as 95% for patients aged 45-54 years).
- There was a steep age gradient regardless of stage, with older patients having much poorer survival prospects.
- Most patients were diagnosed at stage III/IV and ages 65+; for these patients five-year net survival was very low (2-10%).

Figure 6-4.
5-year net survival (with 95% confidence intervals) for melanoma of skin by stage at diagnosis, 2010-2014: overall (not age-standardized) and by age-group

MELANOMA OF SKIN



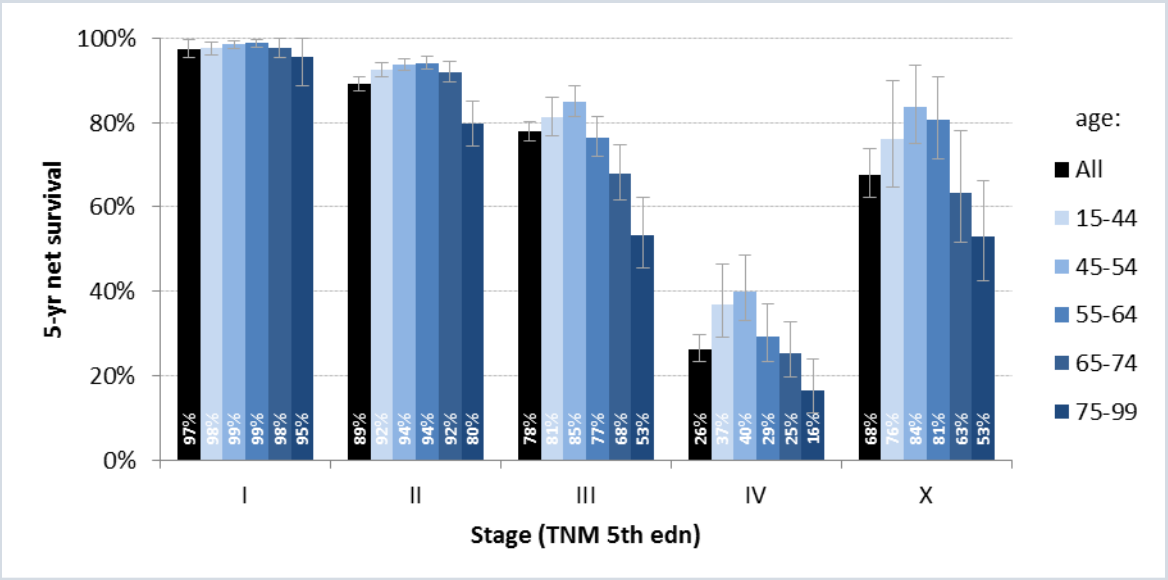
stage	I	II	III	IV	X
% of cases	58.1	16.4	15.6	1.9	8.1

There were too few cases in age-group 45-54 to allow estimation of stage IV survival; this also prevented estimation of age-standardized survival for every stage (unstandardized survival presented here).

- Most melanoma patients were diagnosed at stages I-II (75%), for which five-year net survival was >80% for all stage/age combinations.
- In contrast, for stage IV patients (c.2% of newly diagnosed cases), five-year survival was very poor (18% overall).

Figure 6-5.
5-year net survival (with 95% confidence intervals) for female breast cancer by stage at diagnosis, 2010-2014: overall (age-standardized) and by age-group

BREAST CANCER (FEMALE)

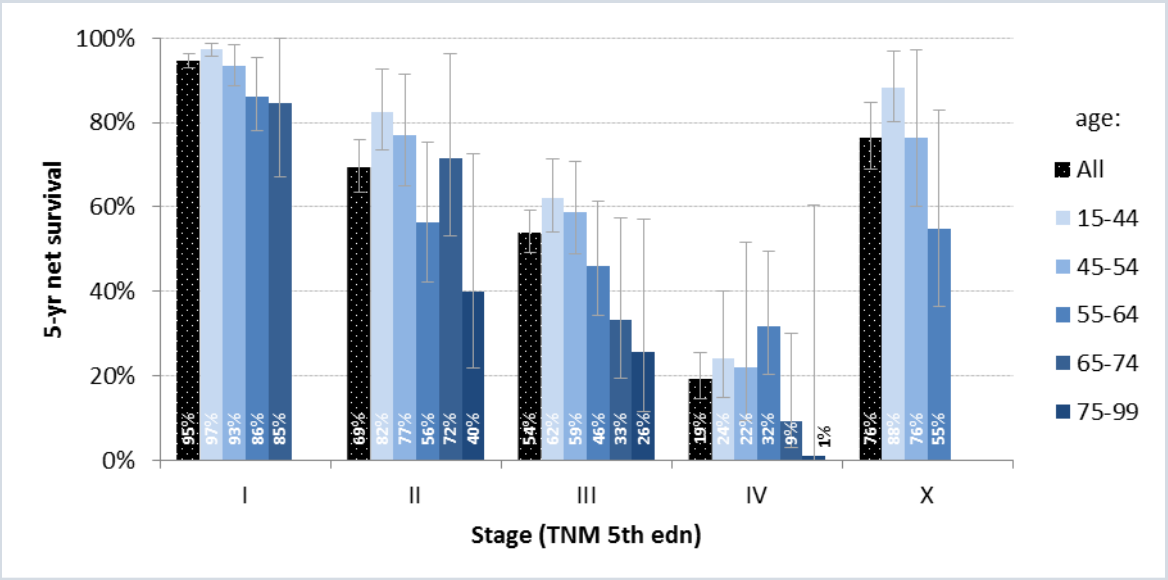


stage	I	II	III	IV	X
% of cases	33.1	44.4	12.0	6.6	3.9

- Five-year survival for breast cancer stages I-II (77% of all patients) averaged at least 80% for all stage/age combinations.
- For stage IV, five-year survival was 26% overall, and <40% at all ages (only 16% at ages 75+).

Figure 6-6.
5-year net survival (with 95% confidence intervals) for cervical cancer by stage at diagnosis, 2010-2014: overall (not age-standardized) and by age-group

CERVICAL CANCER

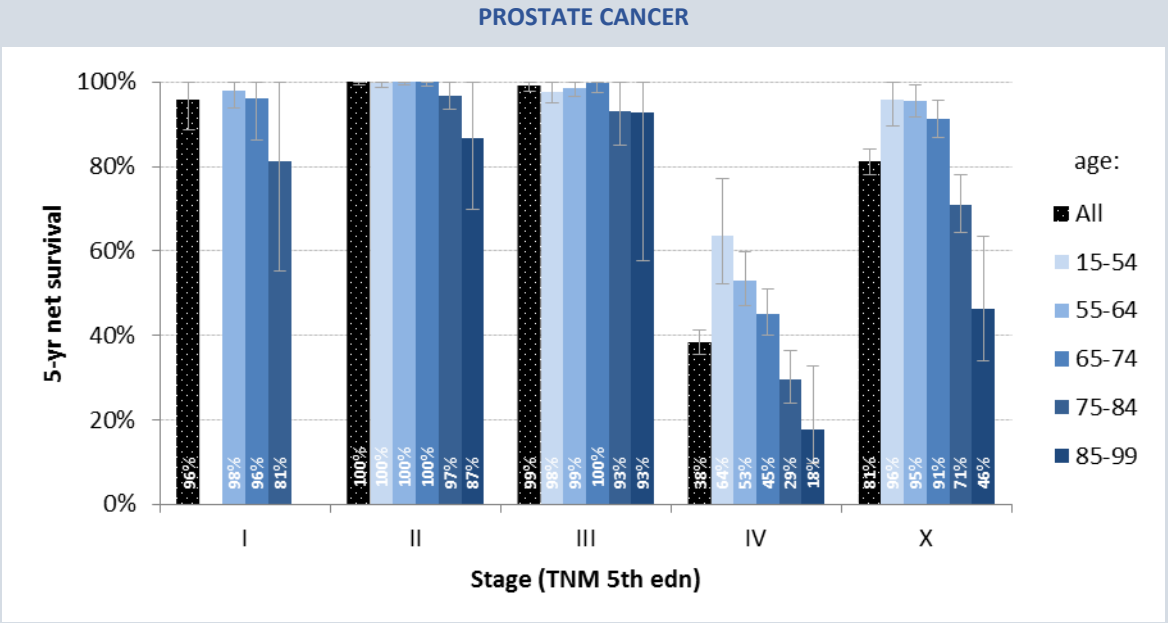


stage	I	II	III	IV	X
%	47.0	12.9	20.7	11.9	7.5

There were too few cases in age-group 75-99 to allow estimation of stage I survival. and too few in age-groups 65+ for unknown stage; this also prevented calculation of age-standardized survival for every stage (unstandardized survival presented here)

- For stage I cervical cancer patients, who comprise almost half of patients and are generally diagnosed through screening, five-year net survival was >80% at all ages.
- For stage II (13% of cases), five-year survival was 70-80% up to age 54 but fell to 40% at ages 75+.
- For stage III (21% of cases), there was a clear stepwise decline in five-year survival with each increment in age-band.
- For stage IV (12% of cases), five-year survival was 19% overall but fell to <10% at ages 65 and over.

Figure 6-7.
5-year net survival (with 95% confidence intervals) for prostate cancer by stage at diagnosis, 2010-2014: overall (not age-standardized) and by age-group.



stage	I	II	III	IV	X
%	0.7	67.8	14.8	8.9	7.7

Note: age-groups used for prostate cancer differ from other cancers, reflecting its older age-profile.
There were too few cases in age-groups 15-54 and 85-99 to allow estimation of stage I survival, and this also prevented calculation of age-standardized survival for every stage.

- Five-year net survival from prostate cancer was >80% for all age-groups for cases diagnosed at stage I-III (c.85% of cases), with no clear variation of survival across stages I-III.
- For stage IV patients (9% of cases), survival was much lower (38% overall, and <30% for ages 75+).

7. EMERGENCY PRESENTATION

Emergency presentation with cancer can result from lack of awareness of symptoms in patients and is generally associated with more advanced stage, limited treatment options and poorer survival outcomes. The number and proportion of cancer patients presenting emergently (i.e. first diagnosed as an emergency presentation) in a hospital was calculated for the period 2010-2014 inclusive. To this end, the sequential diagnosis/management/treatment schedule for each cancer patient was abstracted within the date limits of 4 weeks before, to 1 year after the formal diagnosis date. The first record (*'1st presentation'*) within these date limits was categorised for each patient by:

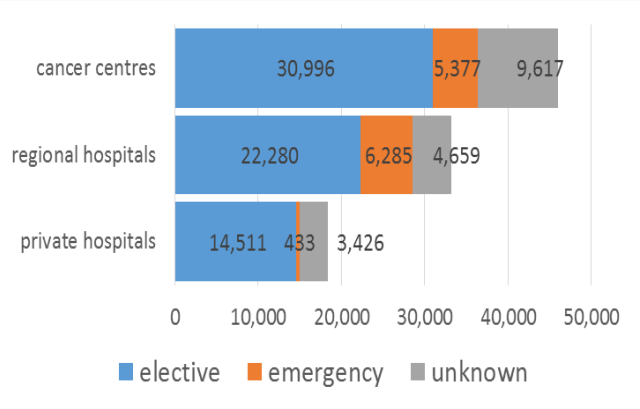
1) Cancer type
2) Presentation type (emergency/elective/unknown)
3) Stage of disease
4) Deprivation quintile of patient
5) Type of hospital (cancer centre/regional (or other public)/private hospital)

Cancers selected were those of the oesophagus, lung, colon, rectum, pancreas, breast, cervix, ovary and prostate, melanoma of skin, lymphoma and all invasive cancers combined (excl. non-melanoma skin [NMSC]). These includes the 'top 5' cancers in incidence or mortality terms for each sex (also cervical cancer). For the 'all invasive cancers' category, only the first invasive cancer was considered for each patient, excluding NMSC. Admission type and hospital was abstracted from the NCRI database. The National Cancer Control Program (NCCP) designated eight cancer centres (and one satellite centre) in 2009. Hospital of first presentation was categorised as: cancer centre, regional (or other public) hospital or private hospitals.

A preliminary summary of statistics on emergency presentation is given below (a fuller report is in preparation). Presentation status was not known for 18.1% of cancer cases and, pending fuller analyses, the figures discussed below relate to *emergency presentations as a % of cases whose mode of presentation was known* (i.e. the right-most panels of Figures 7-1/7-2 and Tables 7-2/7-4.

Summary statistics: emergency presentation overall and by hospital type

Figure 7-1.
Mode of first presentation, all invasive cancers excl. NMSC, by hospital type (2010-2014)



percentages including unknown presentation status

	elective	emergency	unknown
cancer centres	67.4%	11.7%	20.9%
regional centres	67.1%	18.9%	14.0%
private hospitals	79.0%	2.4%	18.6%
all	**69.5%**	**12.4%**	**18.1%**

percentages excluding unknown presentation status

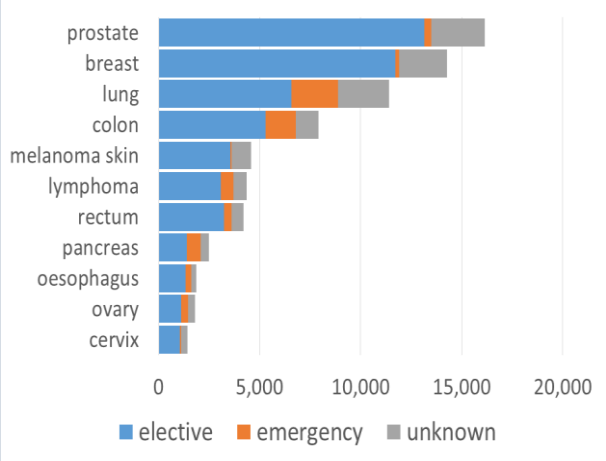
cancer centres	85.2%	14.8%	-
regional hospitals	78.0%	22.0%	-
private hospitals	97.1%	2.9%	-
all	**84.9%**	**15.1%**	-

- Most cancer cases first presented in one of the cancer centres (47%), followed by the regional hospitals (34%) and then the private hospitals (19%).
- The proportion of cancers that first presented as emergencies was 14.8% in the cancer centres, 22.0% in other public hospitals and only 2.9% in the private hospitals (Figure 7-1).

Summary statistics: emergency presentation by cancer type

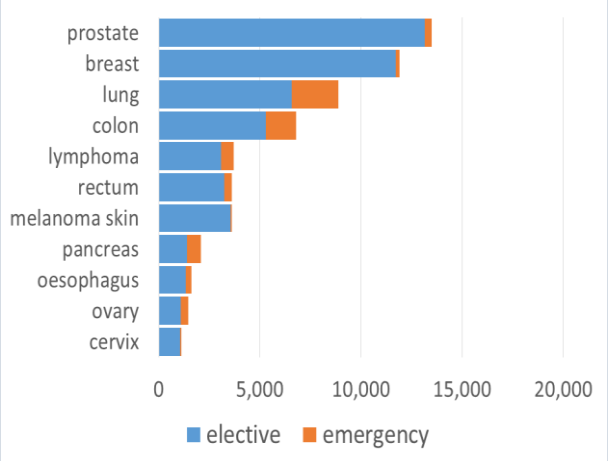
Figure 7-2. Type of presentation, by cancer type (2010-2014)

cases including 'unknown' presentation status



graph sorted in descending order

cases excluding 'unknown' presentation status



graph sorted in descending order

	elective	emergency‡	unknown
pancreas	55.6%	28.2%↑	16.1%
lung	57.6%	20.3%↑	22.1%
ovary	60.7%	19.4%↑	19.9%
colon	67.0%	19.1%↑	13.9%
oesophagus	71.5%	14.6%↑	13.9%
lymphoma	70.3%	14.6%↑	15.1%
rectum	77.3%	9.1%↓	13.6%
cervix	72.7%	4.6%↓	22.7%
prostate	81.6%	2.1%↓	16.3%
breast	82.2%	1.3%↓	16.4%
melanoma skin	77.6%	0.9%↓	21.5%
all invasive* 2010-2014	**69.5%**	**12.4%**	**18.1%**
2014	70.0%	13.1%	16.9%
2010-2013	69.3%	12.2%	18.5%

*excluding NMSC
‡sorted in ascending order of % presenting emergently
↑↓ greater/less than **12.4%** ('all cancer' figure)

	elective	emergency‡
pancreas	66.3%	33.7%↑
lung	74.0%	26.0%↑
ovary	75.8%	24.2%↑
colon	77.8%	22.2%↑
lymphoma	82.9%	17.1%↑
oesophagus	83.1%	16.9%↑
rectum	89.5%	10.5%↓
cervix	94.1%	5.9%↓
prostate	97.5%	2.5%↓
breast	98.4%	1.6%↓
melanoma skin	98.9%	1.1%↓
all invasive* 2010-2014	**84.9%**	**15.1%**
2014	84.3%	15.7%
2010-2013	85.0%	15.0%

*excluding NMSC
‡sorted in ascending order of % presenting emergently
↑↓ greater/less than **15.1%** ('all cancer' figure)

- For all invasive cancers (excl. NMSC) the proportion presenting emergently was 15.1% (of 'known' mode of presentation).
- The cancers with the highest proportion of emergency presentation were: pancreas (33.7%), lung (26.0%), ovary (24.2), colon (22.2%), lymphoma (17.1%) and oesophagus (16.9).
- The cancers with the lowest proportion of emergency presentation were: melanoma (1.1%), breast (1.6%), prostate (2.5%) and cervix (5.9%) (Figure 7-2).

A possible explanation of the above data might be that tumours originating in less accessible sites, such as the pancreas, lung, ovary or colon, can sometimes develop stealthily with vague and worsening symptoms before a medical crisis leads to emergency presentation after which the cancer diagnosis is made. In contrast, cancers of the rectum, breast, cervix, prostate and skin (melanoma) tend to be diagnosed sooner and treated electively after more obvious symptoms or initial detection through formal or opportunistic screening.

Summary statistics: cancer presentation type and deprivation

Table 7-1.
Deprivation distribution by cancer site (2010-2014)

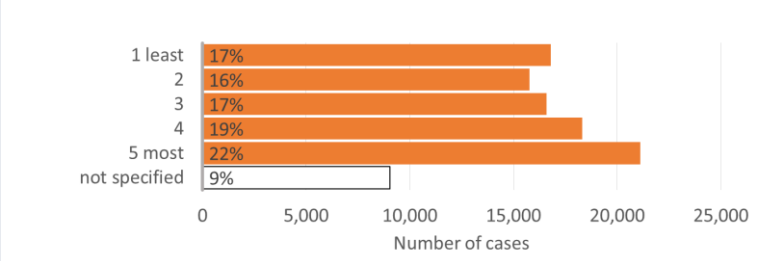
	1 least deprived	2	3	4	5 most deprived*	not specified
C00-43 C45-96 all invasive	**17.2%**	**16.1%**	**17.0%**	**18.8%**	**21.6%**	**9.3%**
lung	14.4%	14.4%	15.9%	19.5%	28.2%↑	7.6%
cervix	14.5%	15.4%	15.6%	17.6%	27.8%↑	9.2%
oesophagus	17.1%	15.5%	17.4%	19.9%	23.3%↑	6.8%
rectum	17.8%	15.9%	17.2%	18.9%	22.0%	8.3%
colon	17.9%	14.8%	17.4%	19.8%	21.8%	8.3%
ovary	17.5%	15.5%	17.1%	18.9%	21.6%	9.4%
pancreas	18.0%	15.0%	17.1%	19.6%	21.2%	9.0%
lymphoma	17.7%	16.8%	18.1%	17.6%	20.3%	9.5%
prostate	16.7%	16.6%	17.6%	19.2%	20.1%↓	9.9%
breast	19.5%	16.8%	16.5%	18.2%	18.7%↓	10.3%
melanoma of skin	21.2%	18.6%	17.3%	16.2%	17.5%↓	9.2%

* Sorted in ascending order on percentage deprivation quintile 5 (most) ↑/↓ greater/less than 21.6% ('all invasive' %)

Cancers with numbers of cases over-represented (in proportional terms) in areas of higher deprivation, relative to cancer as a whole, included lung, cervical and oesophageal cancer (Table 7-1). Cancers under-represented in areas of higher deprivation included skin melanoma and breast cancer and prostate cancers. The association of cancer incidence with socioeconomic indicators was more fully described in previous NCRI publications [16,17].

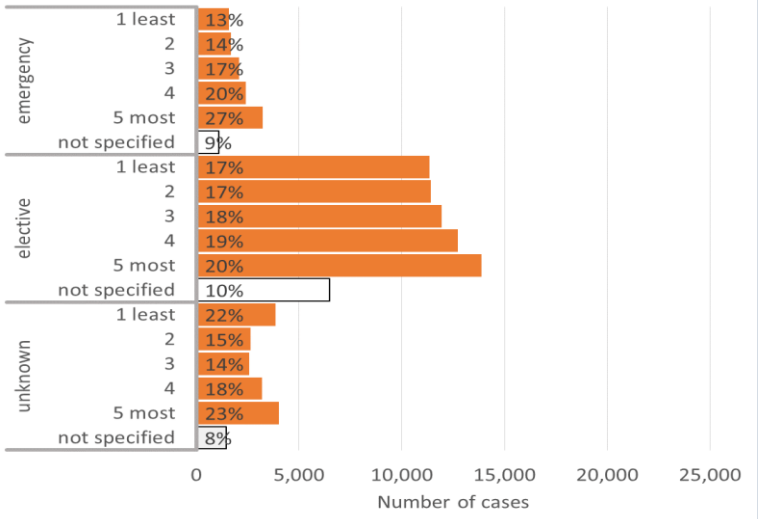
Figure 7-3.
Proportional distribution of all invasive cancers (excluding NMSC) by deprivation quintile, overall and stratified by mode of presentation (2010-2014)

overall



by mode of presentation

1. emergency
2. elective
3. unknown



- For all cancers combined, for cases presenting emergently, cases from the most deprived areas were more likely to first present as an emergency: 27% for the most deprived vs. 13% for the most deprived (Figure 7-3).
- Most cases presented electively and there was still a deprivation gradient (as for cancers as a whole), though not as marked as that of the emergency cases: e.g. 20% for the most deprived vs. 17% for the least deprived.
- For cases whose presentation type was unknown, the deprivation gradient was again quite similar to that of the overall population of cancer patients (upper panel, Figure 7-3).

Table 7-2. Proportions of cancers presenting emergently, 2010-2014, by deprivation quintile (least vs. most)

including 'unknown' presentation status					excluding 'unknown' presentation status				
	deprivation		difference			deprivation		difference	
	least	most	absolute	relative‡		least	most	absolute	relative‡
all invasive*	9.5%	15.3%	5.8%	61.5%	**all invasive***	12.3%	18.9%	6.6%	53.8%
pancreas	21.2%	35.9%	14.7%↑	69.7%↑	pancreas	27.1%	41.3%	14.1%↑	52.0%↓
colon	14.9%	22.9%	8.0%↑	53.7%↓	lung	20.9%	29.6%	8.7%↑	41.4%↓
oesophagus	9.4%	17.2%	7.8%↑	83.3%↑	colon	18.8%	26.9%	8.1%↑	43.1%↓
lung	15.1%	22.5%	7.4%↑	49.3%↓	oesophagus	11.7%	19.6%	7.9%↑	67.5%↑
ovary	15.5%	21.4%	5.9%↑	37.9%↓	ovary	20.1%	27.0%	7.0%↑	34.6%↓
lymphoma	14.1%	18.1%	4.0%↓	28.7%↓	lymphoma	17.2%	21.7%	4.4%↓	25.6%↓
rectum	8.6%	11.7%	3.1%↓	36.5%↓	rectum	10.5%	13.3%	2.9%↓	27.7%↓
prostate	1.8%	2.9%	1.1%↓	59.3%↓	cervix	6.7%	8.4%	1.7%↓	24.7%↓
cervix	5.3%	6.2%	1.0%↓	18.5%↓	prostate	2.3%	3.5%	1.2%↓	53.3%↓
breast	1.2%	2.0%	0.8%↓	67.1%↑	breast	1.5%	2.4%	0.9%↓	64.0%↑
melanoma	1.1%	1.5%	0.4%↓	32.2%↓	melanoma	1.5%	1.9%	0.4%↓	25.8%↓

‡ relative difference= (most/least-1) x100. *excluding NMSC. Sorted on absolute difference
both analyses excluded the c.9% of patients who were missing information on deprivation status
↑/↓ greater/less than figure for 'all invasive'

Table 7-2 examines the difference in proportions (or risk of) presenting emergently according to the area of residence of the patient and the type of cancer (most vs. least deprived areas, ignoring intermediate deprivation quintiles 2-4). The right-most panel of the table (excluding 'unknown' presentation status) is summarised below.

- For all invasive cancers combined, 19% of patients from the most deprived populations first presented as emergencies, compared to 12% of patients from the least deprived populations, which equates to a +6.6% absolute difference or a +53.8% relative difference.
- For each individual cancer, to a greater or lesser extent, there was a risk difference where incident cases resident in the most deprived areas were consistently more likely to present emergently. The absolute risk difference was most apparent for pancreatic (14%), lung (9%), colon (8%), oesophageal (8%), and ovarian cancers (7%).
- The deprivation risk difference in absolute terms was lower for melanoma (0.4%), breast (0.9%), prostate (1.2%) and cervical cancer (1.7%), all of which are cancers with a low rate of emergency presentation irrespective of deprivation.

Summary statistics: cancer presentation type and stage of disease

Table 7-3. Stage distribution by cancer site (2010-2013)

	stage I	stage II	stage III	stage IV*	unstaged
C00-43 C45-96 all invasive cancers	19.2%	26.2%	15.9%	17.5%	21.1%
pancreas	7.0%	8.4%	10.0%	57.6%↑	17.0%
lung	17.8%	7.3%	25.0%	37.3%↑	12.5%
lymphoma	19.6%	20.3%	17.8%	29.0%↑	13.3%
oesophagus	6.6%	15.5%	19.0%	25.7%↑	33.2%
ovary	17.5%	9.1%	30.1%	25.3%↑	18.0%
colon	13.2%	28.2%	25.6%	22.1%↑	10.9%
rectum	16.4%	18.6%	35.2%	19.1%↑	10.7%
cervix	46.8%	12.9%	20.7%	12.2%↓	7.5%
prostate	0.7%	67.9%	14.8%	8.9%↓	7.7%
breast	33.0%	44.3%	12.1%	6.6%↓	4.0%
melanoma	57.7%	16.5%	15.8%	1.9%↓	8.1%

* Sorted in ascending order on percentage stage IV (metastatic). ↑/↓ greater/less than 17.5% (all cancer proportion)

For 2010-2013 cases, the 5th edition of TNM was used to classify stage [15], where cases coded as NX or MX (nodes and/or metastases cannot be assessed) were assumed to be N0 and M0 respectively. (Analysis of 7th-edition TNM data for 2014 is not yet complete.) Diagnosis at stage IV indicates that the tumour had spread systemically beyond the organ of origin or regional tissues.

- The cancer with highest proportion of stage IV diagnoses was pancreatic cancer (58%). Pancreatic cancer also had a high proportion of unstaged cancer (17%), perhaps due in part to short survival thus insufficient time (and requirement) for a full pathology work-up (Table 7-3).
- Other solid tumour sites with high stage IV proportions were lung (37%), oesophagus (26%) and ovary (25%), which also have relatively poor survival prospects.

Presentation at late stage lessens the possibility of curative treatment, and for some cancers such as colorectal, cervical and breast could indicate some patients failing to avail of screening programmes.

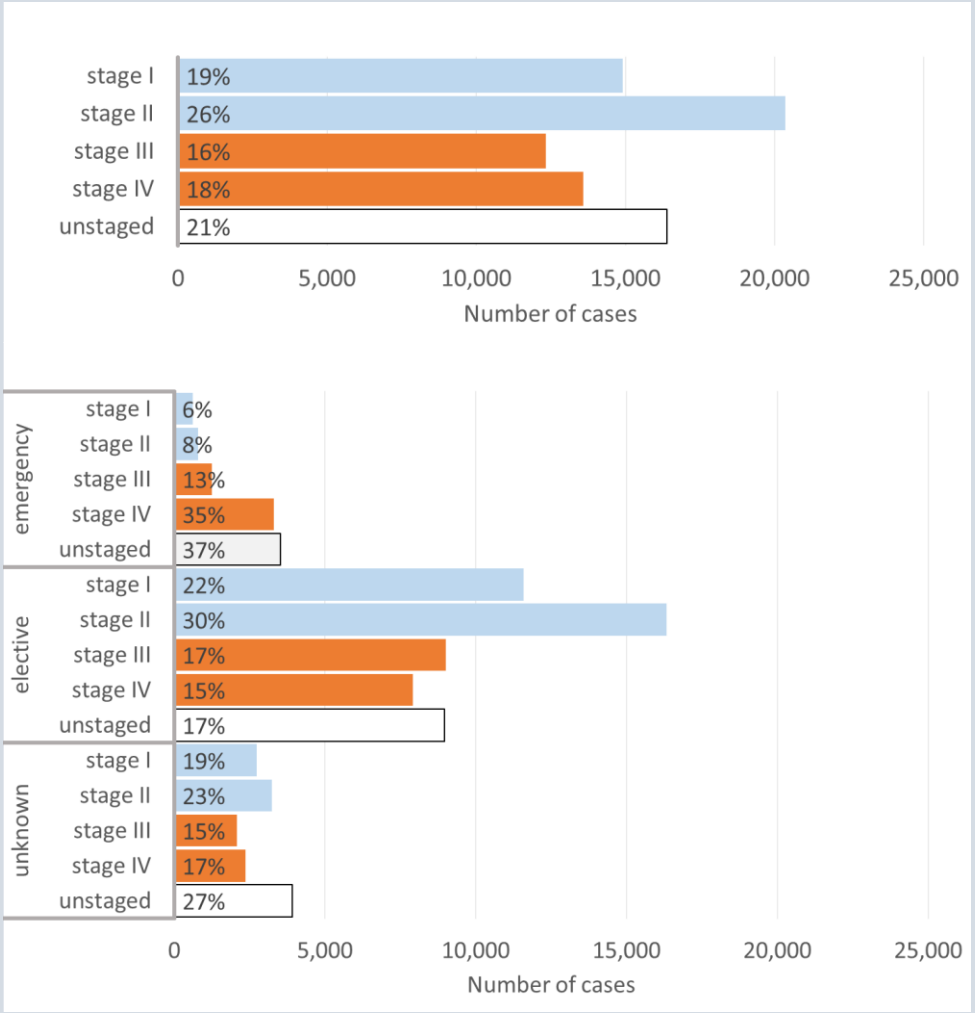
Besides uptake in screening programmes, there are other factors that affect the likelihood of a patient presenting with late-stage cancer. Socioeconomic factors (e.g. deprivation) can influence the likelihood of a person actually developing cancer, but are also associated with late stage at diagnosis [17]. The route by which patients first presented with cancer (elective/emergency) is explored in relation to stage below.

Figure 7-4.
Proportional distribution of all invasive cancers (excl. NMSC) by TNM 5th-edn stage, overall and stratified by mode of first presentation (2010-2013)

overall

by mode of presentation

1. emergency
2. elective
3. unknown



- For all invasive cancers (excl. NMSC) diagnosed during the period 2010-2013, most (c.45%) were diagnosed at early stages (I/II), fewer (c. 34%) at late stages (III/IV), while 21% were unstaged
- However, for patients that presented emergently the diagnosis was predominantly late-stage (48% III or IV) or unknown stage (37%).
- For patients presenting 'electively' (and presentation type 'unknown'), the pattern of stage distribution mirrored the overall stage distribution (upper panel, Figure 7-4).

Table 7-4. Proportion of cancers presenting emergently, 2010-2013, by stage (stage I/II vs. stage III/IV)

including unknown presentation status					excluding unknown presentation status				
	stage		difference			stage		difference	
	I/II	III/IV	absolute	relative‡		I/II	III/IV	absolute	relative‡
all invasive*	4.0%	17.6%	13.6%	342.5%	**all invasive***	4.8%	21.2%	16.4%	343.6%
melanoma	0.1%	2.1%	2.0%	2623.2%↑	melanoma	0.1%	2.5%	2.4%	2394.1%↑
breast	0.3%	5.0%	4.6%	1360.7%↑	breast	0.4%	6.1%	5.7%	1411.7%↑
prostate	0.4%	5.3%	4.8%	1121.8%↑	prostate	0.5%	6.3%	5.7%	1119.6%↑
cervix	1.3%	12.2%	10.9%	847.0%↑	cervix	1.6%	15.4%	13.7%	838.6%↑
oesophagus	7.0%	16.8%	9.8%	138.7%↓	oesophagus	7.9%	19.2%	11.3%	142.1%↓
ovary	10.9%	23.6%	12.7%	116.7%↓	ovary	13.4%	29.0%	15.6%	116.4%↓
rectum	5.2%	10.7%	5.5%	105.2%↓	rectum	6.1%	12.3%	6.2%	102.7%↓
lung	11.7%	23.9%	12.2%	103.8%↓	lung	15.4%	29.3%	13.9%	90.4%↓
colon	13.0%	22.4%	9.4%	72.0%↓	colon	15.2%	26.0%	10.8%	71.2%↓
lymphoma	11.0%	18.5%	7.6%	68.7%↓	lymphoma	12.6%	21.5%	8.8%	69.7%↓
pancreas	25.7%	30.1%	4.3%	16.9%↓	pancreas	30.6%	35.3%	4.7%	15.4%↓

‡ relative difference= (stage III&IV / stage I&II -1) x100. * excluding NMSC. Sorted on relative difference
both analyses exclude 21% of patients who were missing information on stage
↑/↓ greater/less than figure for 'all invasive'

Table 7-4 examines the difference in proportions (or risk of) presenting emergently according to stage at diagnosis (stage I/II vs. stage II/IV) and the type of cancer. The right-most panel of the table (excluding 'unknown' presentation status) is discussed below.

- It was not unexpected that late-stage cancers would predominate in the subset of emergency presentations, i.e. the proportion of late-stage cancers presenting emergently was consistently greater than the proportion of early stage, with large variation between cancer types (Table 7-4).
- The cancers with the lowest proportions of both of late-stage *and* emergency presentation included: *melanoma, breast, prostate and cervical cancer* (Table 7-3 and Figure 7-2). The latter three cancers were subject to screening, either formal (cervix and breast) or opportunistic (prostate).
- Nevertheless, the relative risk differential of emergency presentation between early and late stage was greatest for these cancers, i.e. in general, on the rare occasions when these patients presented emergently, they were much more likely to be late-stage presenters. It is possible that these were patients who did not present for screening, or neglected to seek advice from their doctor until symptoms had become serious enough to lead to an emergency presentation.
- In contrast, pancreatic, lymphoma, colon, lung, rectum and ovarian cancers had much higher proportions of emergency presentation, almost irrespective of stage, and had lower relative risk differentials of emergency presentation between early and late stage.
- In the most extreme example, for pancreatic cancer the proportions presenting emergently was very high both at early and late stage (31% and 35% respectively) giving a low relative risk differential (15%).

8. TRENDS IN CHEMOTHERAPY USE

Previous NCRI analyses have indicated that the use of chemotherapy for treatment of newly diagnosed cancer patients in Ireland has increased since the 1990s. A more detailed analysis is presented below (summary in Table 8-1 & Figure 8-1, details in Figures 8-2 to 8-20). This examines the timing and magnitude of trends in chemotherapy use across the diagnosis period 1996-2013, based on receipt of chemotherapy or cancer-directed immunotherapy within 12 months after (or 1 month before) date of diagnosis. Rates of annual change, and possible changes in trends, have been assessed for the first time using Joinpoint analysis [4,5]. Significant increases are indicated by upward arrows, significant decreases by downward arrows. Comparison of chemotherapy use is also made across diagnosis periods, ages and stages.

Table 8-1
Summary of proportions of cancer patients receiving chemotherapy within 12 months after diagnosis, by cancer type and diagnosis period

	Diagnosis period				Total
Cancer	**1996-2000**	**2001-2005**	**2006-2009**	**2010-2013**	**1996-2013**
All cancers (excluding NMSC*)	23.1%	29.3%	31.6%	31.8%	29.1%
Oral & pharyngeal cancer	9.1%	21.1%	33.0%	31.6%	24.3%
Oesophageal cancer	23.9%	37.1%	41.9%	46.6%	27.4%
Stomach cancer	12.0%	26.8%	36.1%	43.8%	29.0%
Colorectal cancer	29.2%	39.8%	42.9%	42.0%	38.5%
Liver cancer	7.1%	15.6%	25.8%	33.2%	23.4%
Pancreatic cancer	9.3%	21.2%	32.0%	34.6%	24.7%
Lung cancer	15.1%	25.2%	34.3%	34.6%	27.5%
Small-cell lung cancer	54.4%	58.3%	65.3%	65.7%	61.0%
Bone & cartilage cancer	46.4%	46.8%	47.8%	55.1%	48.9%
Female breast cancer	41.1%	50.5%	47.2%	48.2%	47.0%
Cervical cancer	18.0%	42.2%	41.4%	37.7%	35.5%
Uterine (corpus uteri) cancer	4.4%	7.7%	13.5%	18.0%	11.6%
Ovarian cancer	56.6%	58.2%	59.9%	66.8%	60.2%
Testicular cancer	34.7%	33.2%	37.5%	38.1%	36.1%
Kidney cancer	7.0%	11.8%	15.2%	15.1%	12.8%
Bladder cancer	7.7%	14.7%	23.6%	28.6%	17.4%
Malignant brain & CNS cancer	9.1%	17.1%	26.8%	38.2%	22.9%
Hodgkin lymphoma	72.3%	83.2%	84.9%	91.4%	83.5%
Non-Hodgkin lymphoma	61.3%	64.9%	67.3%	67.5%	65.6%
Leukaemia	58.1%	62.2%	66.2%	72.1%	64.7%

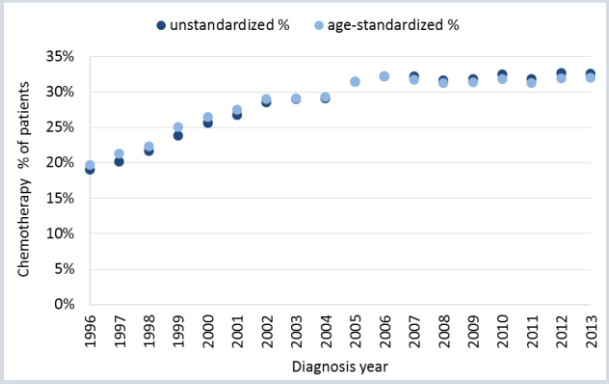
*NMSC = non-melanoma skin cancer

- The most common pattern was a major increase between the mid/late 1990s and the early 2000s in the proportion of patients receiving chemotherapy, followed by the rate of increase slowing down, stabilising or even falling slightly more recently – this was noted for all cancers combined and for oral/pharyngeal, oesophageal, colorectal, pancreatic, lung, breast, cervical and kidney cancers.
- The next most common pattern was a single trend of increasing chemotherapy use over the full period examined – this pattern was seen for liver, bone, uterine, ovarian, testicular and brain cancers, and for Hodgkin and non-Hodgkin lymphomas.
- Only leukaemia showed a recent increase in chemotherapy use following a period of little change.
- The overall proportion of patients receiving chemotherapy increased in relative terms by over 50% between 1996 and 2013, or by almost 40% between the 1996-2000 and 2010-2013 periods (but only +1% between 2006-2009 and 2010-2013).
- Of the individual cancer types examined, the highest relative change in chemotherapy use between the earliest and most recent periods was seen for liver (+370%), brain/CNS (+320%) and uterine cancer (+310%), and the lowest was for testicular cancer and non-Hodgkin lymphoma (both +10%). Between 2006-2009 and 2010-2013, the largest increase was seen for brain/CNS (+43%), uterine (+33%) and liver cancers (29%), but chemotherapy use apparently fell slightly for cervical (-9%), oral/pharyngeal (-4%) and colorectal cancer (-9%).

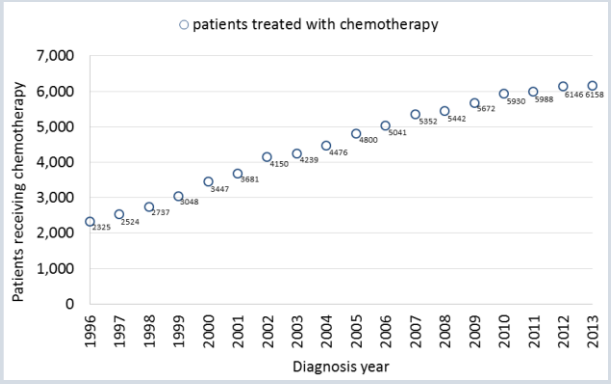
- There was much lower use of chemotherapy among older patients (particularly the age 75+ group), and the highest use was typically in patients <55 years.
- Chemotherapy use increased over time by the greatest amounts (relatively) for older and advanced-stage patients.
- The proportion of patients receiving chemotherapy was in general highest for stage III – for the period 2010-2013, this applied to cancers as a whole, and oesophageal, stomach, colorectal, pancreatic, lung, breast, cervival, uterine, ovarian, and testicular cancers – and it was generally also high for stage IV, and for some cancers, stage II.
- The overall time-trends seen did not appear to be influenced by possible changes in the age profile of patients (tested by comparing trends in age-standardised chemotherapy proportions for the more common cancers) (e.g. Figure 8-1a).
- However, changes in stage over time – e.g. through earlier detection of cancers for which screening is possible – may have influenced trends to some extent.
- Likewise, for the 'all cancer' group, and some cancer types such as leukaemia or lung cancer, changes in case-mix of different cancers or subtypes over time (e.g. because of changes in diagnostic methods) might also have had some influence.

Figure 8-1. Chemotherapy use in newly diagnosed Irish cancer patients (all cancers combined excluding NMSC*) within 12 months after diagnosis, by diagnosis year: comparison of crude (unstandardized) and age-standardized percentages, and numbers of patients treated**

a. Proportions of patients receiving chemotherapy



b. Numbers* of patients receiving chemotherapy

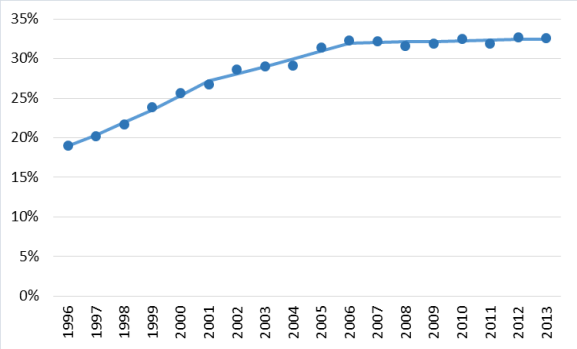


*NMSC: non-melanoma skin cancer ** age-standardized to the age breakdown (by 5-year group) for all patients 1996-2013 combined
***counting only chemotherapy received for the first cancer in each patient

- Apart from possible influences of age, stage or cancer type, the trends seen may reflect a balance between chemotherapy becoming more widely used as standard cancer treatment in Ireland, and improved targeting of chemotherapy (which in some cases can result in lower use of chemotherapy for patient subgroups less likely to benefit). It is also possible that the use of chemotherapy has 'plateaued' for some cancers pending further changes in guidelines or practice, or availability of new drugs, for patient subsets not currently treated.
- Although trends in the proportions of patients receiving chemotherapy indicate some slowing down or stabilisation more recently, in general the absolute numbers of patients treated within a year after diagnosis have continued to rise, or shown less marked indications of stabilisation, reflecting population increase and ageing (Figure 8-1b). Over 6,000 patients diagnosed in 2013 had chemotherapy within 12 months of their diagnosis, compared with ≤3,000 per year in the late 1990s.
- Trends based on chemotherapy first administered within 6 months after diagnosis were very similar to those within 12 months after diagnosis. This implies that, although data completeness was probably less complete for >6 months post-diagnosis in earlier years, the trends seen are likely to be genuine rather than biased by changes in data completeness. (However, 1994 and 1995 data were excluded from these analyses because data were likely to be incomplete >4 months from diagnosis.)
- Reliable data are not yet available to allow assessment of national trends in proportions or numbers of patients receiving chemotherapy >12 months after diagnosis, typically for recurrences or relapses.

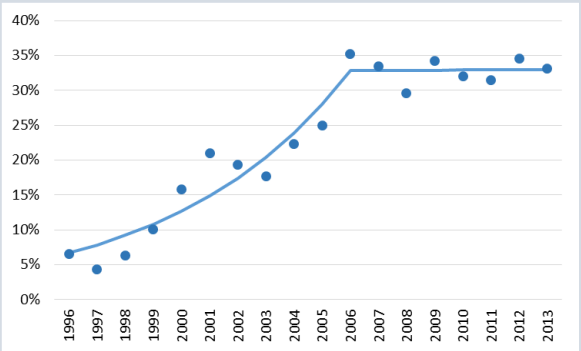
Figures 8-2 & 8-3. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-2. ALL CANCERS EXCLUDING NMSC (C00-C43,C45-C96))



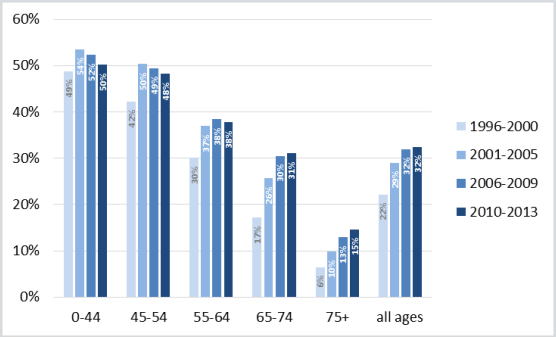
Period	APC*	95% CI	Trend
1996-2001	+7.5%	(+6.0%, +9.1%)	↑
2001-2006	+3.3%	(+1.7%, +4.8%)	↑
2006-2013	+0.2%	(-0.3%, +0.8%)	↔

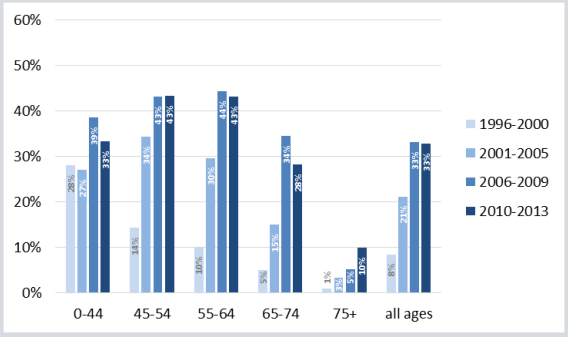
8-3. ORAL & PHARYNGEAL CANCER (C00-C14)

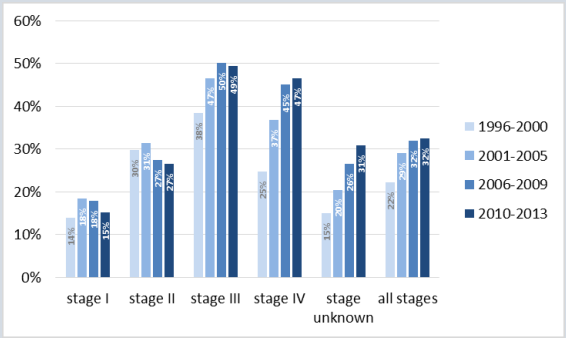


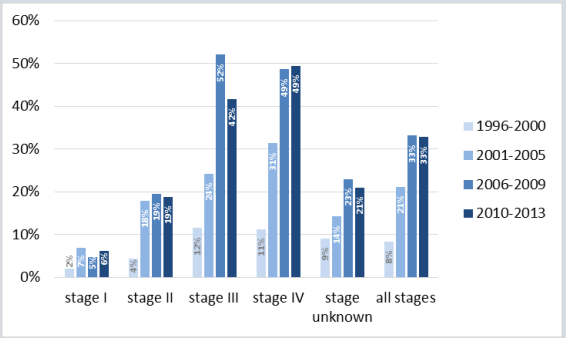
Period	APC*	95% CI	Trend
1996-2006	+17.3%	(+11%, +23%)	↑
2006-2013	+0.1%	(-3.8%, +4.1%)	↔

*APC = average annual percentage change







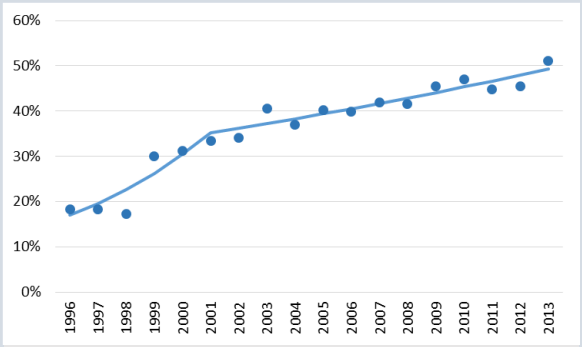


- For the '**all cancer'** group, the patterns and trends in chemotherapy use over time broadly reflect those seen for many individual cancer types, i.e. steeper increase in earlier years, followed by stabilisation or slower increase, and higher use of chemotherapy among younger patients and for advanced-stage cancers.
- The biggest increases in chemotherapy between the 1996-2000 and 2010-2013 periods were for ages 75+ (+130% relative) and 65-74 (+81%), and stages IV (+88%) and III (+28%). Chemotherapy use fell for stage II (-11%).

- For **oral and pharyngeal cancer**, chemotherapy use increased steeply and significantly up to 2006, then stabilised.
- Chemotherapy use was highest in age-groups 55-64 and 65-74, and for stages III and IV.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+1000% relative change) and 65-74 (+460%), and stages II (+130%) and IV (+140%).

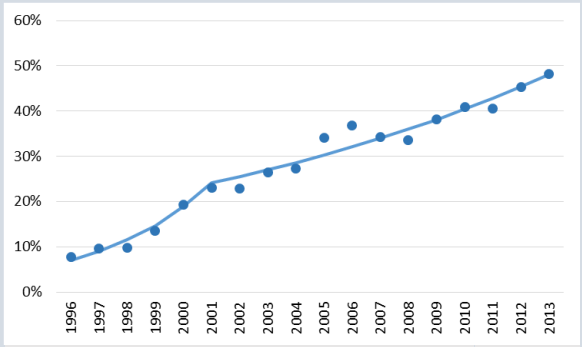
Figures 8-4 & 8-5. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-4. OESOPHAGEAL CANCER (C15)

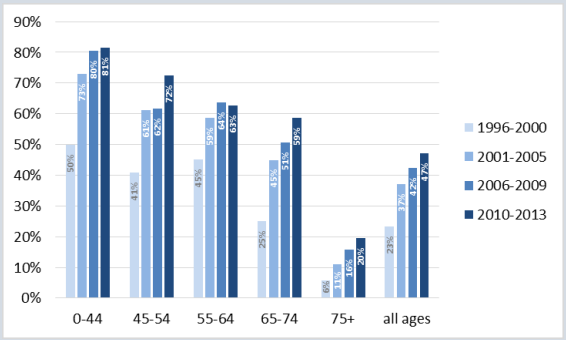


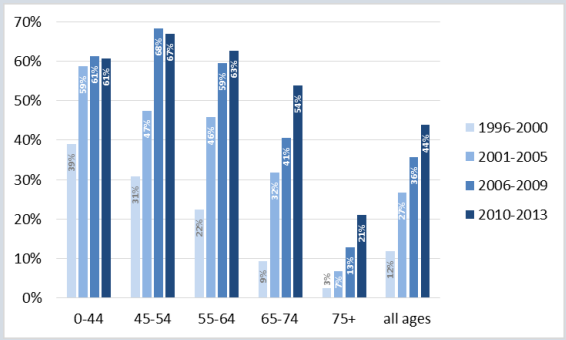
Period	APC	95% CI	Trend
1996-2001	+15.7%	(+7.9%, +24%)	↑
2001-2013	+2.9%	(+1.7%, +4.0%)	↑

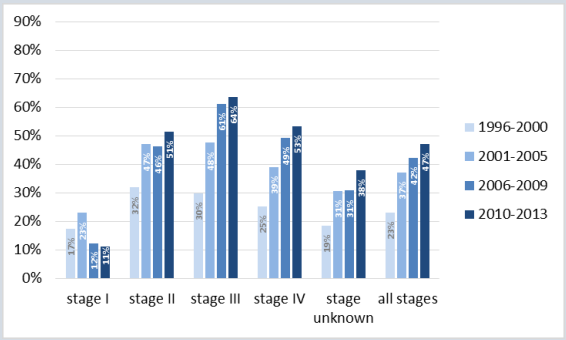
8-5. STOMACH CANCER (C16)

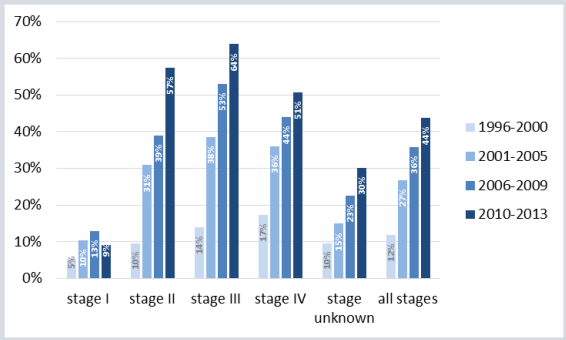


Period	APC	95% CI	Trend
1996-2001	+27.9%	(+17%, +40%)	↑
2001-2013	+5.9%	(+4.7%, +7.2%)	↑







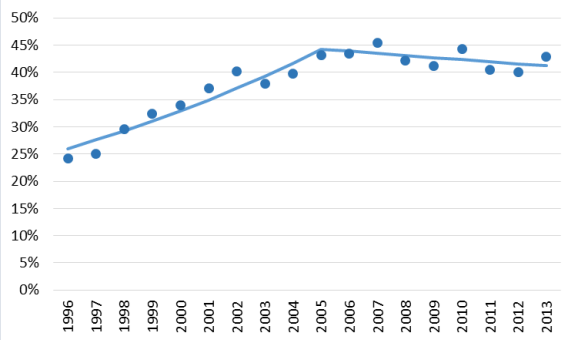


- For **oesophageal cancer**, chemotherapy use increased most markedly between 1996 and 2001, with a slower but still significant increase subsequently.
- Chemotherapy use was highest at ages <75 (especially <45) and for stage III and to a lesser extent stage II and IV cases.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+240% relative change) and 65-74 (+130%), and stages III and IV (+110%).

- For **stomach cancer**, chemotherapy use showed quite a similar pattern to oesophageal cancer, with a steep increase up to 2001 and a slower but still significant increase thereafter.
- Chemotherapy use peaked at ages 45-54 and for stage III cases.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+730% relative change) and 65-74 (+470%), and stages II (+500%) and III (+360%).

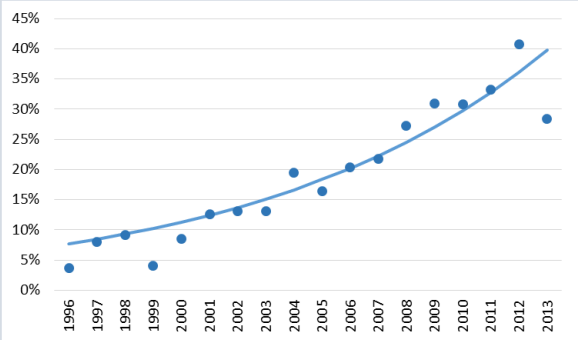
Figures 8-6 & 8-7. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-6. COLORECTAL CANCER (C18-C20)

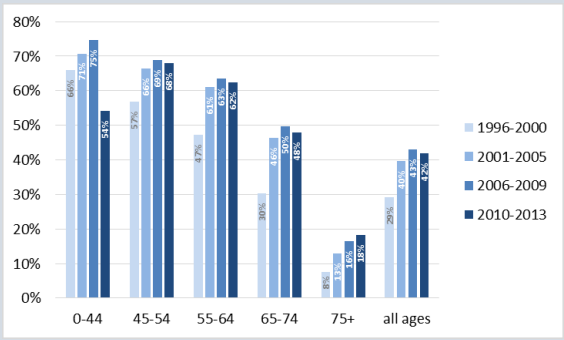


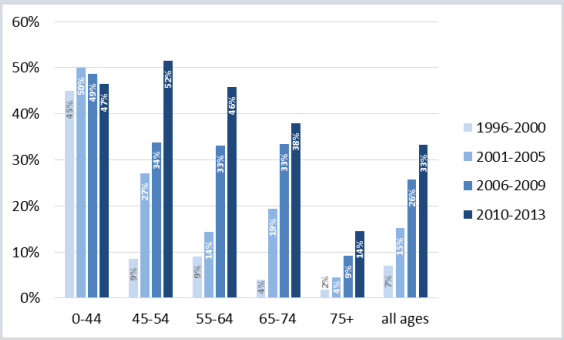
Period	APC	95% CI	Trend
1996-2005	+6.1%	(+4.2%, +8.0%)	↑
2002-2013	-0.9%	(-2.4%, +0.6%)	↔

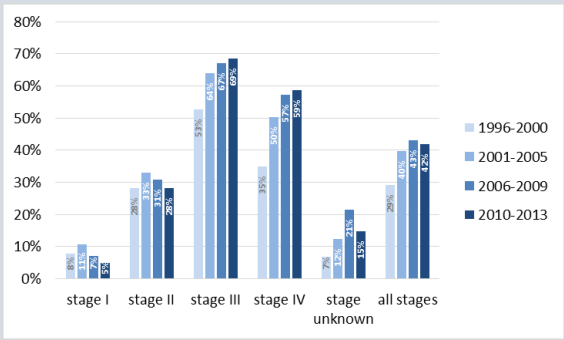
8-7. LIVER CANCER (C22)

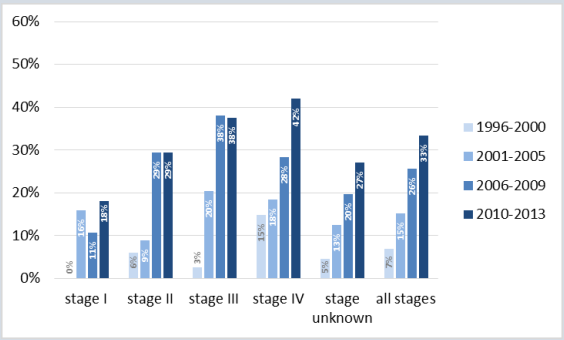


Period	APC	95% CI	Trend
1996-2013	+10.2%	(+7.5%, +13%)	↑







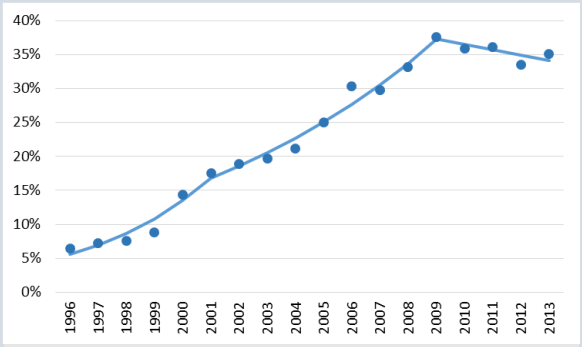


- For **colorectal cancer**, chemotherapy use increased significantly and quite steeply up to 2005, but then stabilised or fell slowly (non-significantly).
- Chemotherapy use was highest for age-groups <65 and for stage III and to a lesser extent stage IV cases.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+140% relative change) and 65-74 (+58%), and stage IV (+68%) and III (+30%). Chemotherapy use fell for ages <45 (-18%) and stage I (-36%).

- For primary **liver cancer**, chemotherapy use increase steeply and significantly throughout 1996-2013.
- Chemotherapy use was highest at ages <75 and for stages II-IV.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 65-74 (+840% relative change) and 75+ (+730%), and stages III (+1370%) and I (from 0% baseline).

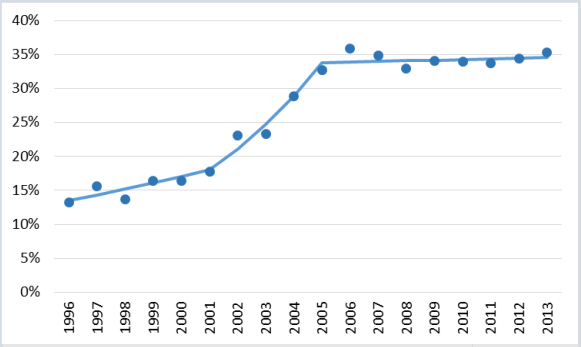
Figures 8-8 & 8-9. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-8. PANCREATIC CANCER (C25)

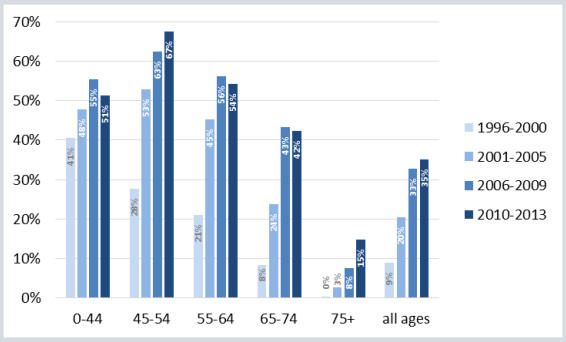


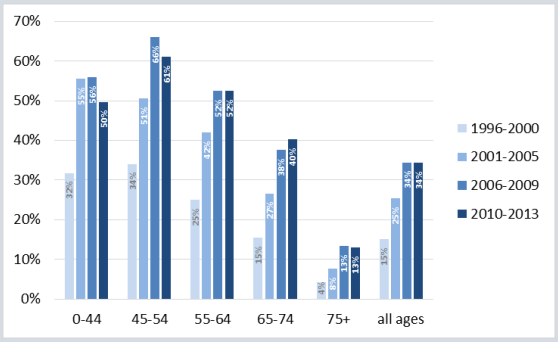
Period	APC	95% CI	Trend
1996-2001	+24.8%	(+14%, +36%)	↑
2001-2009	+10.4%	(+7.5%, +14%)	↑
2009-2013	-2.1%	(-6.5%, +2.5%)	↔

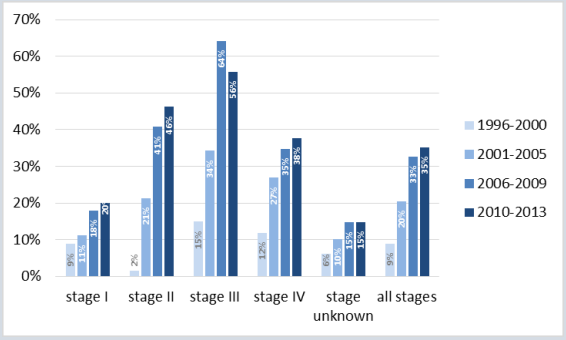
8-9. LUNG & TRACHEAL CANCER (C33-C34)

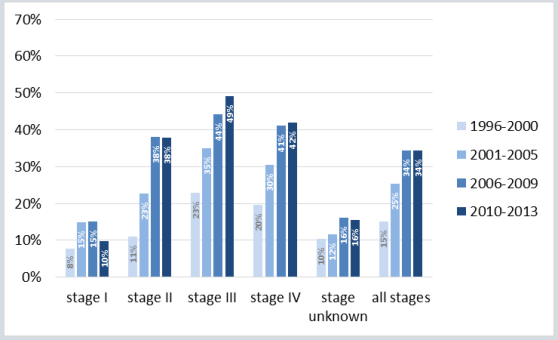


Period	APC	95% CI	Trend
1996-2001	+5.9%	(+0.7%, +112%)	↑
2001-2005	+17%	(+8.3%, +26%)	↑
2005-2013	+0.3%	(-1.0%, +1.5%)	↔







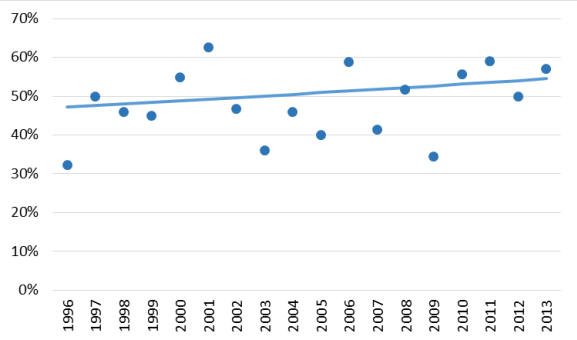


- For **pancreatic cancer**, chemotherapy use increased significantly up to 2009 (especially during 1996-2001), then stabilised or fell slightly.
- Chemotherapy use was highest for ages 45-64 and stage III.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+3700% relative change) and 65-74 (+410%), and stage II (+2900%) and III (+270%).

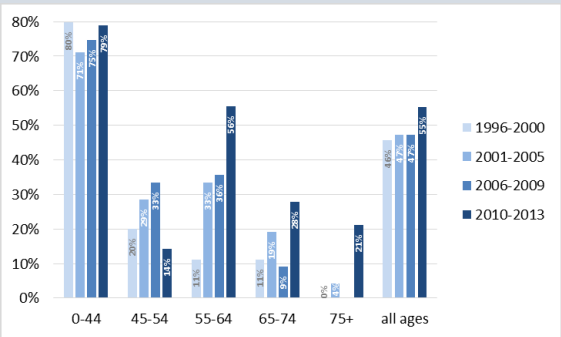
- For **lung cancer** as a whole, the trend involved two earlier periods of increase (especially 2001 to 2005), mainly reflecting chemotherapy use for non-small-cell cancers, followed by little change after 2005.
- For small-cell carcinoma (SCC) of the lung (not presented in detail), overall use of chemotherapy was much higher (50-70% of patients) than for lung cancer as a whole. SCC showed a significant decline in chemotherapy use 1996-2000, a non-significant increase 2000-2004, then little change 2004-2013.
- Chemotherapy use was highest for ages 45-54 and stage III, and to a lesser extent stages II and IV.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+200% relative change) and 65-74 (+160%), and stages II (+240%) and III-IV (+110%).

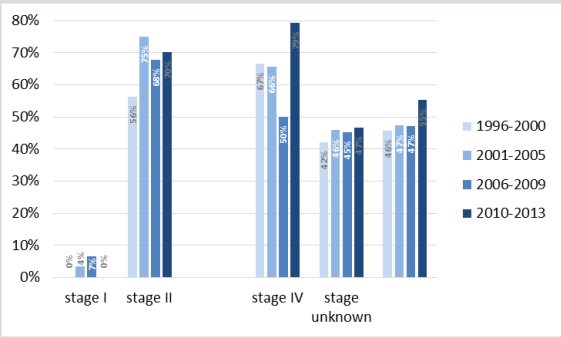
Figures 8-10 & 8-11. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-10. BONE & CARTILAGE CANCER (C40-C41)

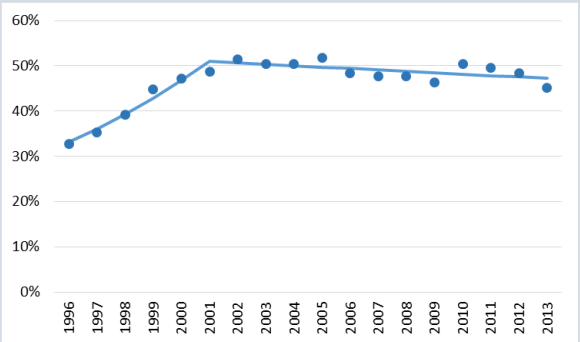


Period	APC	95% CI	Trend
1996-2013	+1.1%	(-0.8%, +3.0%)	↔

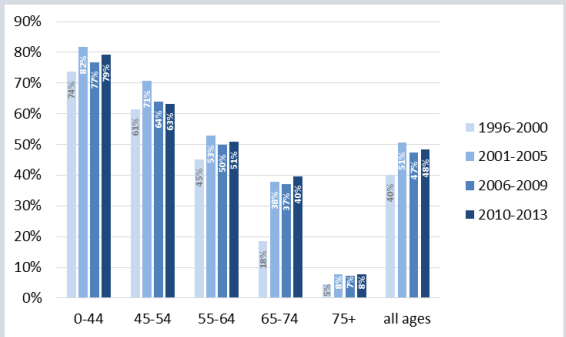


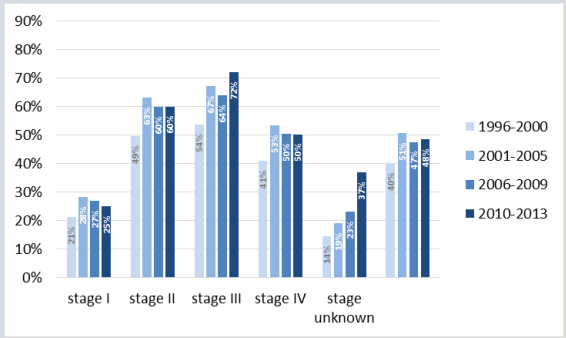


8-11. FEMALE BREAST CANCER (C50)



Period	APC	95% CI	Trend
1996-2001	+9.0%	(+5.7%, +12%)	↑
2001-2013	-0.6%	(-1.2%, -0.1%)	↓



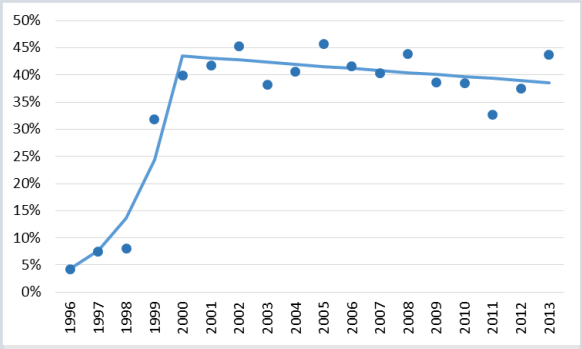


- For **bone and cartilage cancer**, there was no significant trend in chemotherapy use, or only limited evidence of an increase.
- Chemotherapy use was much higher in the youngest age-group, and generally very low in the oldest group; and very low in stage I compared with stages II and IV (no stage III is defined for bone cancers in the 5th edition of TNM staging).
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 55-64+ (+400% relative change) and 75+ (from 0%).

- For **female breast cancer**, chemotherapy use increased steeply between 1996 and 2001 but levelled off and fell slowly (but significantly) thereafter.
- Chemotherapy use fell steeply with age, and was highest for stage III cancers (and to a lesser extent stages II and IV).
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 diagnosis periods were seen for ages 65-74 (+116% relative change) and stage III (+34%).

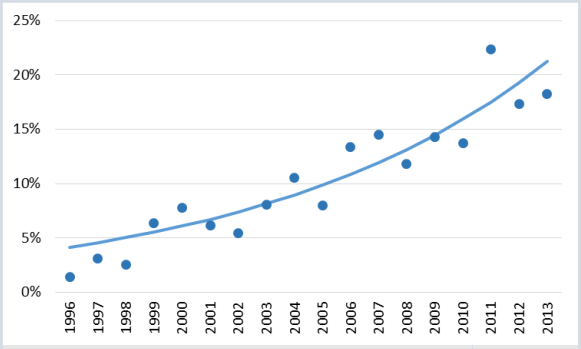
Figures 8-12 & 8-13. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-12. CERVICAL CANCER (C53)

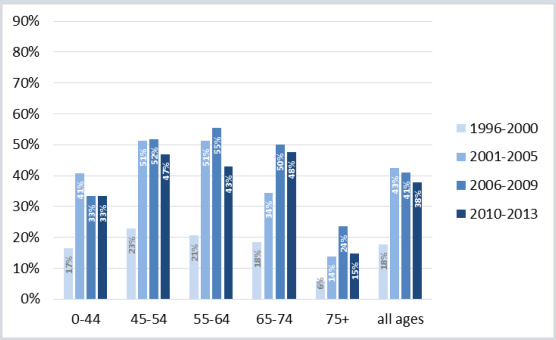


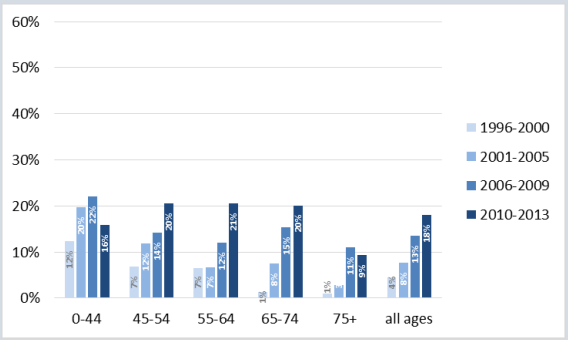
Period	APC	95% CI	Trend
1996-2000	+78%	(+37%, +132%)	↑
2000-2013	-0.9%	(-2.5%, +0.7%)	↔

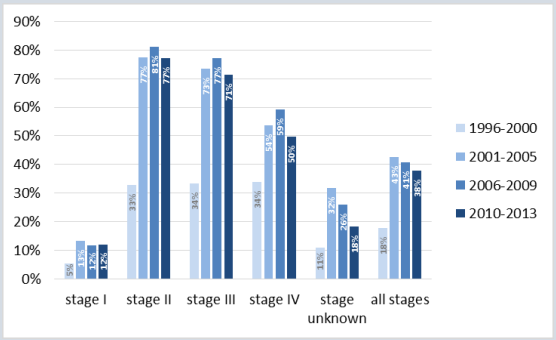
8-13. UTERINE CANCER (C54)

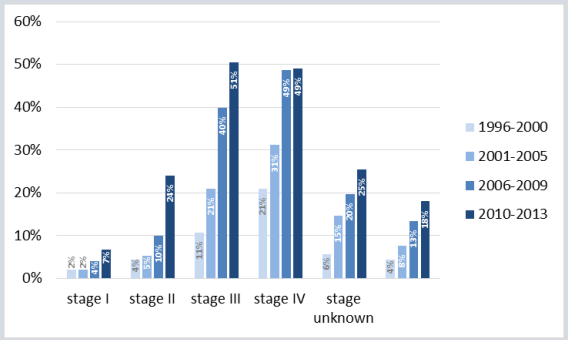


Period	APC	95% CI	Trend
1996-2013	+9.7%	(+6.4%, +13%)	↑







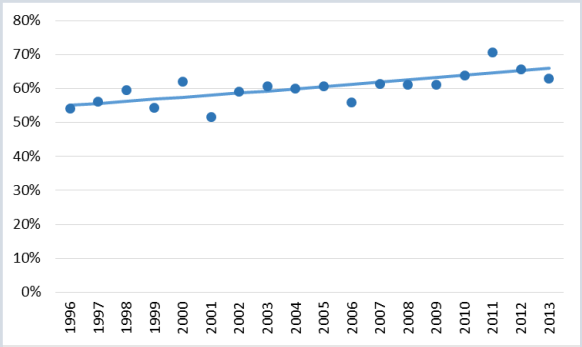


- For **cervical cancer**, chemotherapy use increased sharply up to 2000 but stabilised or fell slowly (not significantly) thereafter.
- Chemotherapy use was highest at ages 45-74 and for stage II and III cases.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 65-74 (+160% relative change) and 75+ (+140%), and stages II (+135%) and I (+120%).

- For **uterine cancer**, chemotherapy use increased steeply and significantly throughout 1996-2013.
- Chemotherapy use was highest at ages <75 and for stage III and IV cases.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 65-74 (+1500% relative change) and 75+ (+900%), and stages II (+450%) and III (+370%).

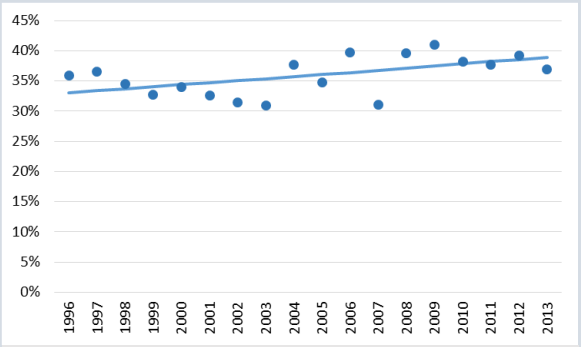
Figures 8-14 & 8-15. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-14. OVARIAN CANCER (C56)

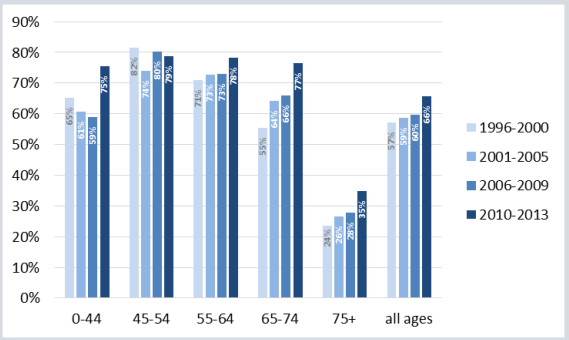


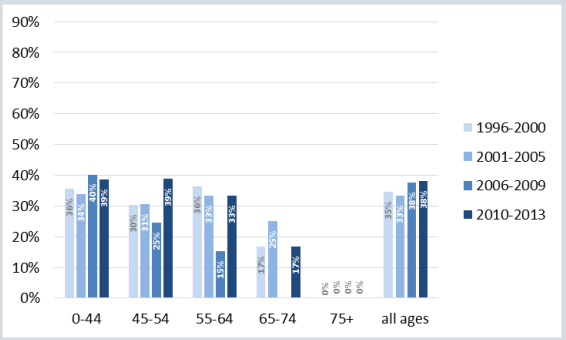
Period	APC	95% CI	Trend
1996-2013	+1.1%	(+0.5%, +1.6%)	↑

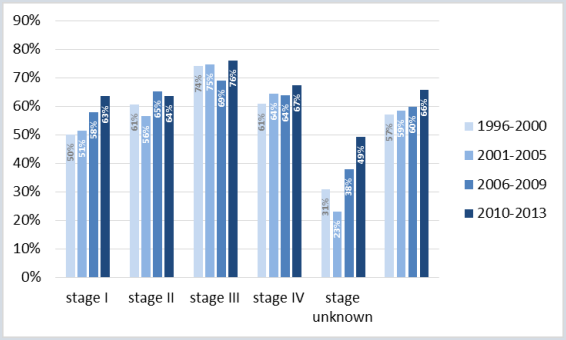
8-15. TESTICULAR CANCER (C62)

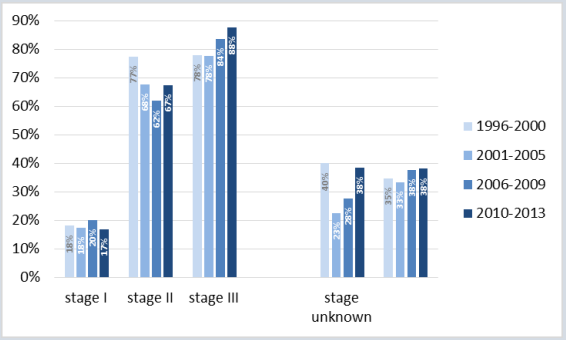


Period	APC	95% CI	Trend
1996-2013	+1.0%	(+0.1%, +1.8%)	↑







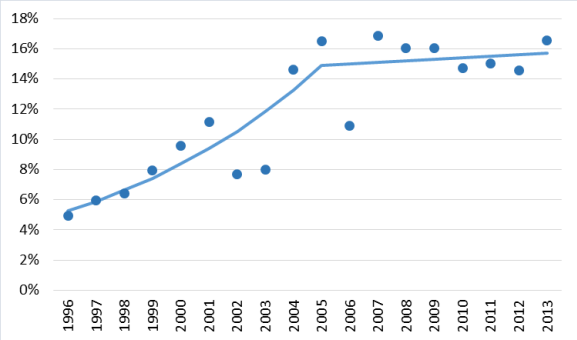


- For **ovarian cancer**, there was a slow but significant increase in chemotherapy use over the period 1996-2013.
- Chemotherapy use was high (≥50% of patients) in all age-groups except 75+ years, and for all stages (but highest for stage III).
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 diagnosis periods were seen for ages 75+ (+47% relative change) and 65-74 (+38%), and stage I (+27%).

- For **testicular cancer**, chemotherapy use also showed a slow but significant increase throughout 1996-2013.
- Chemotherapy use was highest in <65 age-groups and in stage III and to a lesser extent stage II cases.
- The main increases in chemotherapy use between the 1996-2000 and 2010-2013 diagnosis periods were seen for ages 45-54 (+29% relative change) and stage III (+13%), but increases were small compared with most other solid cancers and chemotherapy use appeared to fall for some age or stage groups.

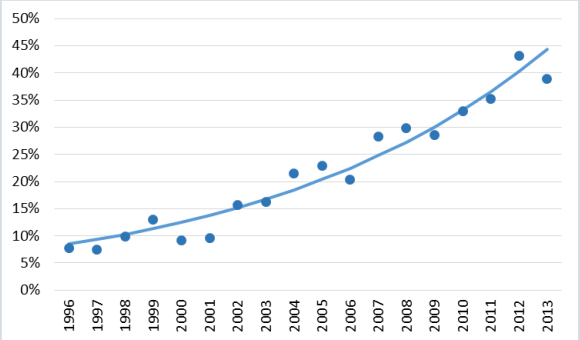
Figures 8-16 & 8-17. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-16. KIDNEY CANCER (C64)

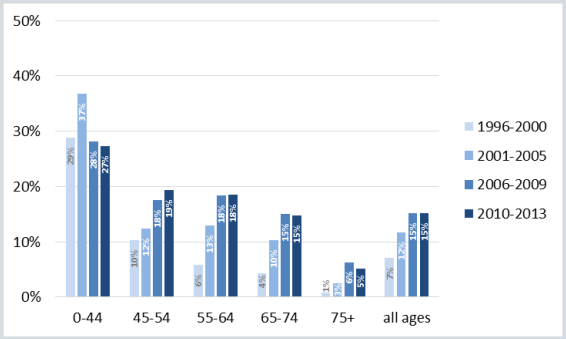


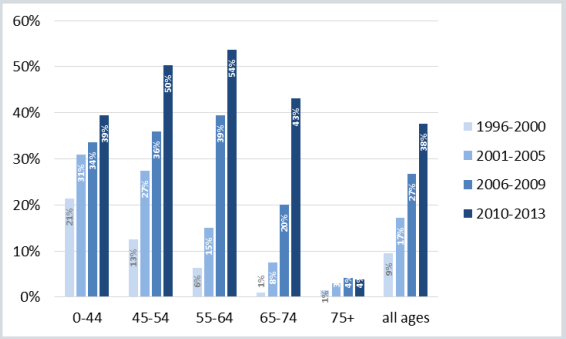
Period	APC	95% CI	Trend
1996-2005	+12.3%	(+5.5%, +20%)	↑
2005-2013	+0.6%	(-3.5%, +5.0%)	↔

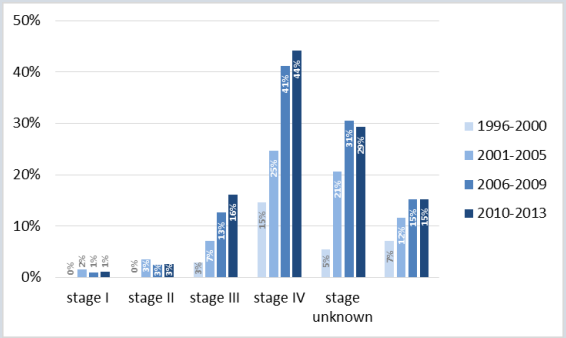
8-17. MALIGNANT BRAIN & CNS CANCER (C71-C72)



Period	APC	95% CI	Trend
1996-2013	+10.2%	(+8.8%, +12%)	↑





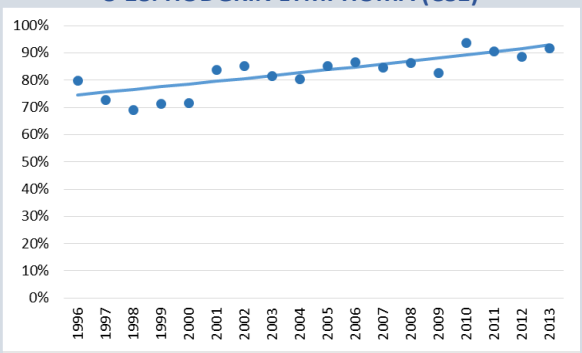


- For **kidney cancer**, chemotherapy use increased significantly up to 2005 but was relatively stable thereafter.
- Chemotherapy use peaked in the <45 age-group and, very markedly, in stage IV cases.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+500% relative change) and 65-74 (+240%), and stages III (+440%) and II (from 0% baseline).

- For **brain and other central nervous system (CNS) cancers**, chemotherapy use increased steeply and significantly throughout the period 1996-2013.
- Chemotherapy use was highest at ages 45-64 in recent years.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 diagnosis periods were seen for ages 65-74 (+4000% relative change) and 55-64 (+760%).

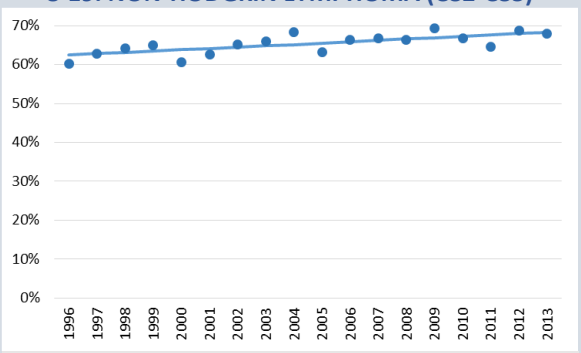
Figures 8-18 & 8-19. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period

8-18. HODGKIN LYMPHOMA (C81)

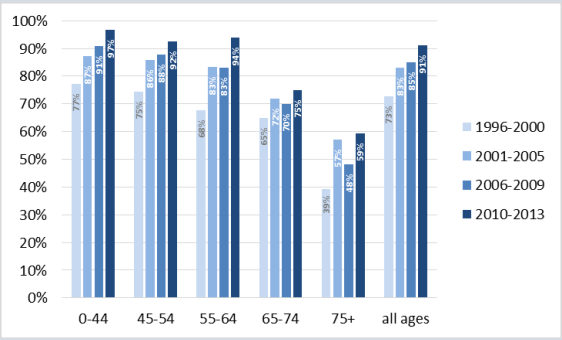


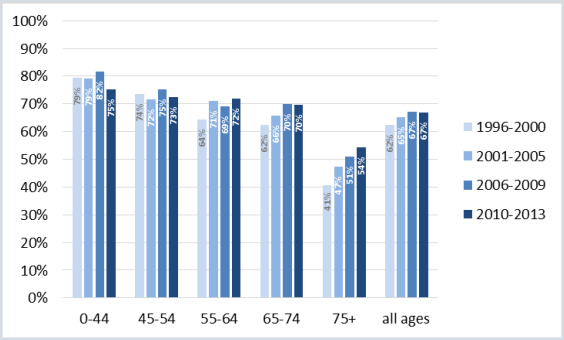
Period	APC	95% CI	Trend
1996-2013	+1.3%	(+0.8%, +1.8%)	↑

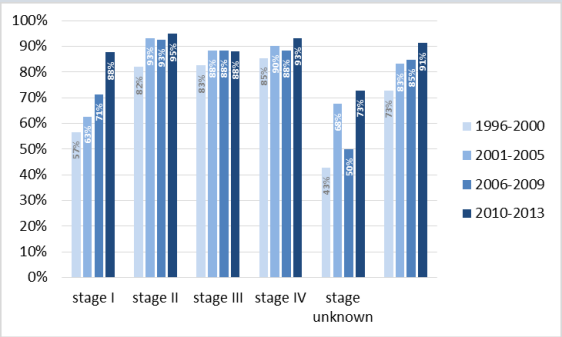
8-19. NON-HODGKIN LYMPHOMA (C82-C85)

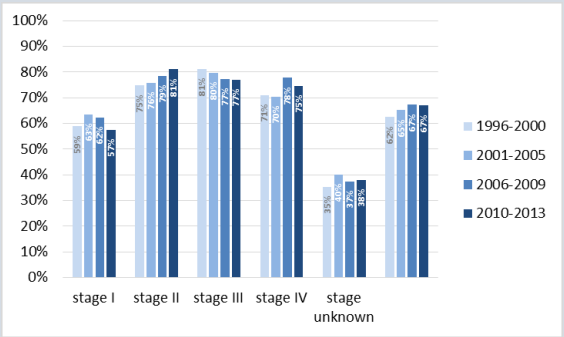


Period	APC	95% CI	Trend
1996-2013	+0.5%	(+0.3%, +0.8%)	↑





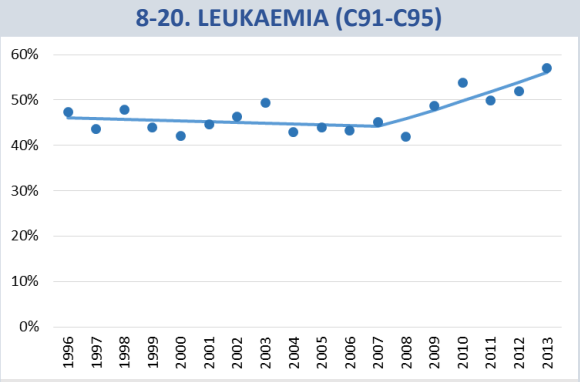




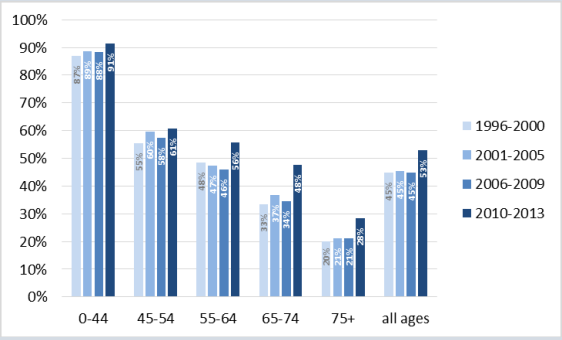
- For **Hodgkin lymphoma**, chemotherapy use increased significantly throughout 1996-2013.
- Chemotherapy use was highest at ages <64 and, in most years, stages II-IV.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 periods were seen for ages 75+ (+51% relative change) and 55-64 (+39%), and stage I (+55%).

- For **non-Hodgkin lymphomas**, chemotherapy use likewise increased significantly throughout 1996-2013.
- Chemotherapy use fell more gradually with age than for most other cancers examined.
- The main increases in chemotherapy use between the 1996-2000 and 2010-2013 diagnosis periods were seen for ages 75+ (+34% relative change) and stage II (+8%).

Figure 8-20. Trends (and average annual % change) in use of chemotherapy within 1 year of diagnosis, 1996-2013, and comparison of chemotherapy use (% of patients) by age, stage and diagnosis period



Period	APC	95% CI	Trend
1996-2006	-0.4%	(-1.7%, +0.9%)	↔
2006-2013	+4.1%	(+1.2%, +7.0%)	↑



- For **leukaemias**, chemotherapy use was stable during 1996-2006 but increased significantly post-2006.
- Chemotherapy use was highest in the <45 years group, and fell markedly with increasing age.
- The biggest increases in chemotherapy use between the 1996-2000 and 2010-2013 diagnosis periods were seen for ages 65-74 (+43% relative change) and 75+ (41%).
- These trends do not take account of possible changes in case-mix (e.g. the balance between acute and chronic leukaemias, reflecting changes in diagnostic techniques) over time.

9. METHODS

The registry and incidence data

The National Cancer Registry was established by the Minister for Health in 1991. It has been collecting comprehensive cancer information for the Republic of Ireland since 1994. The information collected is used in research into the causes of cancer, in education and information programmes, and in the planning of cancer services to deliver the best cancer care to the whole population. Completeness of case ascertainment at five years after diagnosis is estimated to be at least 98% [18].

Incidence data are collected and coded by the NCR according to the ICDO3 classification (including translation from ICDO2 codes for older data) [19]. For convenience, cancer types are specified or grouped in this report under ICD10-type codes, but these do not correspond to 'strict' ICD10 codes as some neoplasms classed as non-invasive / non-malignant under ICD10 (e.g. myelodysplastic syndrome, ICD10 D46) are now considered fully malignant under ICDO3. For such cases, the nearest equivalent malignant ICD10 code or subheading is used (thus polycythaemia, myelodysplastic syndromes and chronic myeloproliferative diseases have been included under C96, rather than D45-47).

For Table 1-1 and Appendices I and II, annual average age-specific specific rates for the period 2012-2015 were applied to the population estimates for the years 2015, 2016 and 2017 to estimate annual average case counts for 2015-2017. Therefore, the incidence rates quoted for 2015-2017 simply mirror the rates for 2012-2015.

Mortality data

Age-, sex- and cause-specific deaths attributable to cancer by year of death were obtained from the central statistics office (CSO). At the time of compilation of this report, deaths for 2015 were not available, so the number of deaths for 2015 was estimated by applying annual average age-specific rates for 2012-2014 to the population estimate for 2015. The estimated mortality count and rate for 2015 was used in Joinpoint trend analyses to match the year range (1994-2015) shown for *incidence* in Figures 4-1 to 4-30.

Calculation of rates

The age-standardised (ASR) rate is the annual rate of newly diagnosed cases (or deaths) in a given population (and year), expressed per 100,000 persons (usually males and females separately), weighted by the age-structure of a defined 'standard' population, to allow meaningful comparisons between different countries over time [20]. By convention for European cancer registries, age-standardised rates for incidence and mortality were weighted by the European standard population (ESP) as defined in 1976 [21]. However, this report also presents incidence rates weighted by the 2013 ESP proposed by EUROSTAT to more accurately reflect the demographic age shift in the European population since 1976 [22]. The 2013 ESP is a better reflection of the current population structure than the ESP of 1976. The 2013 ESP gives older ages a greater weight than the 1976 ESP and also, while the 1976 ESP has only one upper age band of 85+ years, the 2013 ESP contains age bands of 85-89, 90-94 and 95+. Like most cancer registries, by convention the NCR pools case-counts and population weights for age categories '<1 year' and '01-04 years' (Table 9-1).

Table 9-1.
Comparison of the 1976 ESP and the 2013 ESP population structures

1976 ESP		2013 ESP	
age band	**weight per 100,000**	**age band**	**weight per 100,000**
<1	1600	<1	1000
01-04	6400	01-04	4000
05-09	7000	05-09	5500
10-14	7000	10-14	5500
15-19	7000	15-19	5500
20-24	7000	20-24	6000
25-29	7000	25-29	6000
30-34	7000	30-34	6500
35-39	7000	35-39	7000
40-44	7000	40-44	7000
45-49	7000	45-49	7000
50-54	7000	50-54	7000
55-59	6000	55-59	6500
60-64	5000	60-64	6000
65-69	4000	65-69	5500
70-74	3000	70-74	5000
75-79	2000	75-79	4000
80-84	1000	80-84	2500
85+	1000	85-89	1500
		90-94	800
		95+	200
Total	**100,000**	**Total**	**100,000**

Source: EUROSTAT [22]

Calculation of trends

Annual percentage changes (APC) of incidence/mortality over time were estimated with the Joinpoint regression program, using annual age-standardised rates and their standard errors as inputs [4][5]. The same break point constraints for trend were applied to rates calculated using the 1976 ESP and 2013 ESP. Default constraints were used with Joinpoint; a maximum of three trend break points where allowed over the 22 year period from 1994 to 2015, and only after four consecutive years inclusive, and four years from either end of the year range (inclusive).

Estimation of complete cancer prevalence

Complete prevalence is defined as the total number of persons surviving with cancer at a given population at a particular point in time, the index date. For a cancer registry, *fixed-duration prevalence* is the number of cancer survivors from observed data collected by the cancer registry since it was established (1994 for the NCRI, or 22 years of data; 1994-2015). It has been estimated that a cancer registry must be in existence for about 50 years before *fixed-duration prevalence* approximates to *complete prevalence* [23]. Complete prevalence can be estimated in various ways [23,24]. We have adapted a log-linear regression method to extend fixed-duration prevalence to estimate complete prevalence [25]. This is considered a pragmatic approach which considers prevalence as an isolated statistic. However, prevalence is not an isolated measure, but depends on the dynamic interactions between historic incidence and survival data. This is the first annual report where *complete prevalence* has been estimated and presented for Ireland. Different method(s) may be used in future reports.

With the index date set at 31st December, 2015, the available cancer registry data provided 22 years of prevalence data for Ireland. The number of cancer patients alive on the index date (31/12/2015) was stratified by cancer site, sex and age group (<50 years, 50+ years on the index date). To extend the fixed-duration prevalence for complete prevalence estimate, negative binomial regression models with a log link function were constructed for all cancers combined (C00-43, C45-96, excl. NMSC) and selected common cancers, taking the first incident cancer for each person. For each strata, the prevalence count on the index date was the model response variable, and the predictor variable was number of years since diagnosis in those patients alive on 31/12/2015 (0-1, 1-2, 2-3…, 99-100 years, etc.). The models provided estimates for the period not covered by the registry (1993 back to 1916, or 23-24, 24-25…, 99-100 years). For the purposes of this registry study, a relatively small number of patients (n=109) whose calculated age exceeded 104 years on 31/12/2015 were excluded from the dataset and thereby from the complete prevalence count.

Survival analyses

Survival figures presented in this report use net survival, an 'improved' version of relative survival taking better account of competing mortality risks and allowing greater comparability between different populations or age-groups. Net survival represents the cumulative probability of a patient surviving a given time in the hypothetical situation in which the disease of interest is the only possible cause of death, i.e. survival having controlled for other possible cause of death [13]. (This involves comparison of observed

survival with the expected survival of persons of the same age and gender in the general population, as for relative survival). Net survival was calculated using the 'strs' command in STATA with an adjustment to obtain the Pohar-Perme estimate. All survival estimates were age-standardised to the International Cancer Survival Standards (ICSS) [14].

Stage

Stage data presented in this report are based on 5th-edition TNM stage criteria [15], and overall stage (I, II, III, IV or unknown) was 'mapped' from clinical or pathological T, N and M categories of stage collected by the registry, preferentially using pathological data where available. This applied to cases diagnosed up to 2013. Cases with N category unknown were assumed to be N0 ('node-negative'); cases with M category unknown were assumed to be M0 ('no distant metastases'). For cases from diagnosed 2014 onwards, 7th-edition TNM criteria were applied by the registry during data-collection, but comprehensive mapping to overall stage was not yet completed at the time of compilation of this report.

Emergency presentation

The number and proportion of cancer patients presenting emergently (i.e. first diagnosed as an emergency presentation) in a hospital was calculated for the period 2010-2014 inclusive. To this end, the sequential diagnosis/management/treatment schedule for each cancer patient was abstracted within the date limits of 4 weeks before, to 1 year after the formal diagnosis date. The first record (*'1st presentation'*) within these date limits was categorised for each patient by:
1) Cancer type
2) Presentation type (emergency/elective/unknown)
3) Stage of disease
4) Deprivation quintile of patient
5) Type of hospital (cancer centre/regional (or other public)/private hospital)

Cancers selected were those of the oesophagus, lung, colon, rectum, pancreas, breast, cervix, ovary and prostate, melanoma of skin, lymphoma and all invasive cancers combined (excl. non-melanoma skin [NMSC]). These includes the 'top 5' cancers in incidence or mortality terms for each sex (also cervical cancer). For the 'all invasive cancers' category, only the first invasive cancer was considered for each patient, excluding NMSC. Admission type and hospital was abstracted from the NCRI database. Stage of disease was presented in summary form (TNM5 [15], I-IV, unknown) with small numbers of 'stage 0' pooled with 'stage I' for cancers of the colorectum, prostate, cervix and lung. The level of deprivation (population quintiles 1/least to 5/most, unknown) was determined from patients' place of residence using the Pobal deprivation index derived from census returns from each electoral division in 2011 [26]. The National Cancer Control Program (NCCP) designated eight cancer centres (and one satellite centre) in 2009. Hospital of first presentation was categorised as: cancer centre, regional (or other public) hospital or private hospitals.

A preliminary summary of statistics on emergency presentation is given (a fuller report is in preparation). Presentation status was not known for 18.1% of cancer cases and, pending fuller analyses with imputation of presentation status for such cases, the main figures discussed in this report relate to *emergency presentations as a % of cases whose mode of presentation is known* (i.e. the right-most panels of Figures 7-1 & 7-2 and Tables 7-2 & 7-4).

Chemotherapy trends

All treatments defined as cancer-directed chemotherapy or immunotherapy (summarised as just 'chemotherapy'), administered between 1 month before and 12 months after diagnosis date, were extracted for invasive cancers other than non-melanoma skin cancer. For cancer as a whole, and for all major cancer types for which chemotherapy or immunotherapy are important treatments, the proportion of incident cases receiving chemotherapy was calculated for each diagnosis year, counting only the first cancer

of each type in a given patient. Annual percentage changes (APC) in proportional use of chemotherapy over time, and possible significant changes in trend over time, were estimated with the Joinpoint regression program, using total annual numbers of cases and the number of those cases receiving chemotherapy as inputs [4][5]. The same break point constraints for trend were applied as for calculation of incidence and mortality trends (described above).

10. ACKNOWLEDGMENTS

The main analysis and report-compilation tasks were undertaken by Joe McDevitt (overall) and, for sections 6 and 8, Paul Walsh, using (for section 8) results of chemotherapy trend analyses undertaken at NCRI by an MPH candidate student, Zhiyan Yu. Other members of the Cancer Intelligence team at NCRI (Sandra Deady, Katie O'Brien and Eamonn O'Leary) contributed detailed comments and proof-reading of drafts, and are thanked along with other NCRI staff who helped compile and quality-assure the extensive data summarised in this report. Analyses of data on emergency presentations of cancer in relation to deprivation and stage (preliminary results presented here) were funded by the Irish Cancer Society.

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APPENDIX I: INCIDENT CANCER CASES: ANNUAL AVERAGE 2012-2014 & ESTIMATES FOR 2015-2017

INCIDENT CANCER CASES N# annual average for 3 year interval	2012-2014 MALE N#	 FEMALE N#	 ALL N#	2015-2017 (estimate) ‡ MALE N#	 FEMALE N#	 ALL N#	Cumulative risk to age 75y (2015-2017) MALE %	 FEMALE %
C00-96 all invasive cancers *	16,757	14,138	30,895	18,008	15,171	33,179	43.89	35.36
C00-43 C45-96 all invasive cancers excluding NMSC	11,222	9,778	21,000	11,894	10,427	22,321	32.96	26.82
C00-D48 all registered tumours	18,484	19,430	37,914	19,941	20,633	40,574	47.22	45.13
D00-48 all non-invasive tumours **	1,727	5,291	7,018	1,933	5,461	7,394	5.93	15.11
C00 neoplasm of lip	18	5	23	20	4	24	0.07	0.00
C01 neoplasm of base of tongue	29	8	37	31	8	39	0.11	0.03
C02 neoplasm of other and unspecified parts of tongue	46	27	73	58	34	92	0.22	0.12
C03 neoplasm of gum	13	6	19	12	11	23	0.05	0.03
C04 neoplasm of floor of mouth	28	7	35	33	7	40	0.12	0.02
C05 neoplasm of palate	14	7	21	16	8	24	0.06	0.03
C06 neoplasm of other and unspecified parts of mouth	14	14	28	18	14	32	0.06	0.04
C07 neoplasm of parotid gland	23	12	35	31	14	45	0.08	0.04
C08 neoplasm of other and unspecified major salivary glands	4	3	7	8	4	12	0.04	0.01
C09 neoplasm of tonsil	43	13	56	52	19	71	0.20	0.07
C10 neoplasm of oropharynx	20	5	25	20	3	23	0.07	0.01
C11 neoplasm of nasopharynx	11	5	16	14	5	19	0.05	0.02
C12 neoplasm of pyriform sinus	26	4	30	24	5	29	0.10	0.02
C13 neoplasm of hypopharynx	16	4	20	14	4	18	0.05	0.01
C14 neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx	11	4	15	10	3	13	0.03	0.01
C01-14 mouth & pharynx	298	119	417	339	138	477	1.22	0.44
C00-14 lip oral cavity and pharynx	316	124	440	359	142	501	1.29	0.44
C00-14, C30-32 all head and neck	468	165	633	523	184	707	1.86	0.59
C15 neoplasm of oesophagus	251	136	387	275	155	430	0.89	0.36
C00-15, C32 lip oral pharynx larynx oesophagus	705	286	991	781	327	1,108	2.68	0.90
C16 neoplasm of stomach	363	207	570	389	214	603	1.13	0.53
C17 neoplasm of small intestine	52	37	89	51	44	95	0.17	0.14
C18 neoplasm of colon	913	729	1,642	1,031	791	1,822	3.05	2.06
C19 neoplasm of rectosigmoid junction	108	62	170	123	70	193	0.42	0.20
C20 neoplasm of rectum	466	230	696	467	238	705	1.57	0.72
C21 neoplasm of anus and anal canal	20	30	50	24	31	55	0.07	0.09
C19-20 neoplasm of rectosigmoid junction and rectum	573	291	864	589	308	897	1.98	0.92
C19-21 rectum and anus	593	321	914	613	339	952	2.05	1.00
C18-20 neoplasm of colorectum	1,487	1,020	2,507	1,620	1,099	2,719	4.97	2.95
C18-21 neoplasm of colorectum and anus	1,507	1,050	2,557	1,644	1,131	2,775	5.04	3.04

INCIDENT CANCER CASES N# annual average for 3 year interval	2012-2014 MALE N#	 FEMALE N#	 ALL N#	2015-2017 (estimate) ‡ MALE N#	 FEMALE N#	 ALL N#	Cumulative risk to age 75y (2015-2017) MALE %	 FEMALE %
C17-21 intestine	1,558	1,087	2,645	1,695	1,175	2,870	5.20	3.17
C22 neoplasm of liver and intrahepatic bile ducts	192	73	265	202	83	285	0.64	0.21
C23 neoplasm of gallbladder	18	47	65	16	46	62	0.03	0.10
C24 neoplasm of other and unspecified parts of biliary tract	66	60	126	71	62	133	0.20	0.14
C23-24 gallbladder and biliary tract	83	108	191	87	108	195	0.23	0.24
C22-24 liver and biliary passages	276	181	457	289	191	480	0.86	0.45
C25 neoplasm of pancreas	270	254	524	302	262	564	0.93	0.66
C26 neoplasm of other and ill-defined digestive organs	16	19	35	22	22	44	0.07	0.04
C30 neoplasm of nasal cavity and middle ear	7	8	15	9	8	17	0.03	0.03
C31 neoplasm of accessory sinuses	7	6	13	9	5	14	0.03	0.02
C32 neoplasm of larynx	138	26	164	148	30	178	0.53	0.10
C33 neoplasm of trachea	2	1	3	2	0	2	0.00	0.00
C34 neoplasm of bronchus and lung	1,320	1,088	2,408	1,407	1,157	2,564	4.31	3.48
C33-34 neoplasm of lung and trachea	1,322	1,089	2,411	1,409	1,157	2,566	4.32	3.48
C37 neoplasm of thymus	4	6	10	4	6	10	0.01	0.02
C38 neoplasm of heart, mediastinum and pleura	8	3	11	7	7	14	0.02	0.02
C40 neoplasm of bone and articular cartilage of limbs	11	11	22	11	10	21	0.04	0.03
C41 neoplasm of bone and articular cartilage of other and unspecified sites	10	8	18	9	8	17	0.03	0.03
C40-41 bone and articular and unspecified	11	11	22	11	10	21	0.04	0.03
C43 melanoma of skin	470	506	976	530	562	1,092	1.63	1.69
C44 other neoplasms of skin	5,535	4,360	9,895	6,113	4,744	10,857	16.31	11.68
C45 mesothelioma	40	5	45	43	7	50	0.14	0.02
C46 Kaposi sarcoma	9	1	10	7	0	7	0.02	0.00
C47 neoplasm of peripheral nerves and autonomic nervous system	2	1	3	3	1	4	0.01	0.00
C48 neoplasm of retroperitoneum and peritoneum	6	18	24	10	24	34	0.03	0.08
C49 neoplasm of other connective and soft tissue	69	48	117	73	56	129	0.22	0.16
C50 neoplasm of breast	27	2,922	2,949	27	3,141	3,168	0.10	9.55
C51 neoplasm of vulva		51	51		59	59		0.16
C52 neoplasm of vagina		14	14		14	14		0.04
C53 neoplasm of cervix uteri		278	278		264	264		0.81
C54 neoplasm of corpus uteri		468	468		486	486		1.71
C55 neoplasm of uterus, part unspecified		20	20		25	25		0.06
C56 neoplasm of ovary		388	388		411	411		1.26
C57 neoplasm of other and unspecified female genital organs		15	15		29	29		0.10
C58 neoplasm of placenta		2	2		2	2		0.01
C51-52, C55, C57, C58 malignant gynaecological neoplasms		102	102		129	129		0.37
C60 neoplasm of penis	36		36	37		37	0.11	
C61 neoplasm of prostate	3,393		3,393	3,474		3,474	12.74	
C62 neoplasm of testis	173		173	176		176	0.56	

INCIDENT CANCER CASES N# annual average for 3 year interval	2012-2014 MALE N#	 FEMALE N#	 ALL N#	2015-2017 (estimate) ‡ MALE N#	 FEMALE N#	 ALL N#	Cumulative risk to age 75y (2015-2017) MALE %	 FEMALE %
C63 neoplasm of other and unspecified male genital organs	4		4	3		3	0.01	
C64 neoplasm of kidney, except renal pelvis	389	212	601	404	218	622	1.34	0.69
C65 neoplasm of renal pelvis	16	9	25	15	8	23	0.03	0.02
C66 neoplasm of ureter	16	8	24	16	9	25	0.05	0.02
C64-66 kidney incl. renal pelvis and ureter	421	229	650	435	235	670	1.42	0.73
C67 neoplasm of bladder	302	131	433	335	136	471	0.88	0.28
C68 neoplasm of other and unspecified urinary organs	3	2	5	4	2	6	0.02	0.00
C69 neoplasm of eye and adnexa	37	28	65	33	29	62	0.11	0.09
C70 neoplasm of meninges	3	5	8	3	6	9	0.01	0.01
C71 neoplasm of brain	201	157	358	214	154	368	0.73	0.48
C72 neoplasm of spinal cord, cranial nerves and other parts of CNS	7	9	16	5	7	12	0.01	0.02
C71-72 neoplasm of brain and spinal cord	207	165	372	220	161	381	0.74	0.50
C70-72 malignant meninges brain and spinal cord	210	171	381	223	167	390	0.76	0.52
C70-72, D32-33, D42-43, all registered meninges brain and CNS	308	351	659	317	349	666	1.05	1.05
C73 neoplasm of thyroid gland	76	207	283	69	207	276	0.23	0.67
C74 neoplasm of adrenal gland	8	9	17	8	11	19	0.03	0.04
C75 neoplasm of other endocrine glands and related structures	8	8	16	8	6	14	0.02	0.02
C76 neoplasm of other and ill-defined sites	9	16	25	7	19	26	0.03	0.04
C80 neoplasm without specification of site	189	208	397	206	215	421	0.53	0.42
C81 Hodgkin lymphoma	80	59	139	82	64	146	0.29	0.21
C82 follicular nodular non-Hodgkin lymphoma	90	107	197	89	111	200	0.33	0.38
C83 diffuse non-Hodgkin lymphoma	206	150	356	230	156	386	0.70	0.45
C84 peripheral and cutaneous T-cell lymphomas	41	25	66	40	24	64	0.13	0.09
C85 other and unspecified types of non-Hodgkin's lymphoma	86	72	158	93	71	164	0.29	0.20
C82-85 all non-Hodgkin lymphoma	423	354	777	452	362	814	1.44	1.11
C81-85 lymphoma (total)	503	414	917	534	426	960	1.72	1.32
C88 immunoproliferative diseases	11	4	15	12	7	19	0.04	0.02
C90 multiple myeloma and plasma cell neoplasms	166	112	278	177	128	305	0.57	0.35
C90, C88 multiple myeloma and immunoproliferative	176	115	291	189	135	324	0.61	0.37
C91 lymphoid leukaemia	178	106	284	186	110	296	0.58	0.32
C92 myeloid leukaemia	100	77	177	102	84	186	0.30	0.25
C93 monocytic leukaemia	2	1	3	4	2	6	0.01	0.01
C94 other leukaemias of specified cell type	7	3	10	5	3	8	0.01	0.01
C95 leukaemia of unspecified cell type	18	14	32	17	15	32	0.03	0.01
C91-95 leukaemia (total)	305	200	505	314	213	527	0.93	0.60
C96 other and unspecified neoplasms of lymphoid haematopoietic	189	138	327	210	150	360	0.57	0.42
D00 carcinoma in situ of oral cavity, oesophagus and stomach	11	8	19	17	10	27	0.06	0.03
D01 carcinoma in situ of other and unspecified digestive organs	18	14	32	14	11	25	0.04	0.03
D02 carcinoma in situ of middle ear and respiratory system	13	9	22	20	9	29	0.07	0.04

INCIDENT CANCER CASES N# annual average for 3 year interval	2012-2014 MALE N#	 FEMALE N#	 ALL N#	2015-2017 (estimate) ‡ MALE N#	 FEMALE N#	 ALL N#	Cumulative risk to age 75y (2015-2017) MALE %	 FEMALE %
D03 melanoma in situ	265	300	565	299	329	628	0.98	1.02
D04 carcinoma in situ of skin	745	1,057	1,802	869	1,171	2,040	2.64	2.94
D05 carcinoma in situ of breast	1	356	357	1	375	376	0.00	1.31
D06 carcinoma in situ of cervix uteri		2,940	2,940		2,927	2,927		8.61
D07 carcinoma in situ of other and unspecified genital organs	77	45	122	103	50	153	0.43	0.16
D09 carcinoma in situ of other and unspecified sites	56	17	73	57	17	74	0.18	0.05
D18 Haemangioma and lymphangioma, any site	2	3	5	2	3	5	0.01	0.01
D32 benign neoplasm of meninges	40	121	161	41	121	162	0.12	0.35
D33 benign neoplasm of brain and other parts of CNS	23	23	46	22	25	47	0.08	0.09
D32-33 benign neoplasm of meninges, brain & CNS	64	144	208	63	146	209	0.20	0.44
D35 benign neoplasm of other and unspecified endocrine glands	58	50	108	53	42	95	0.18	0.14
D37 neoplasm of uncertain or unknown behaviour of oral cavity and digestive organs	29	29	58	31	35	66	0.10	0.11
D38 neoplasm of uncertain or unknown behaviour of middle ear and respiratory and intrathoracic organs	5	4	9	6	6	12	0.02	0.01
D39 neoplasm of uncertain or unknown behaviour of female genital organs		86	86		91	91		0.31
D40 neoplasm of uncertain or unknown behaviour of male genital organs	2		2	2		2	0.01	
D41 neoplasm of uncertain or unknown behaviour of urinary organs	201	71	272	212	77	289	0.66	0.24
D42 neoplasm of uncertain or unknown behaviour of meninges	9	10	19	7	9	16	0.02	0.02
D43 neoplasm of uncertain or unknown behaviour of brain and CNS	26	27	53	25	27	52	0.08	0.08
D42-43 neoplasm of uncertain meninges, brain & CNS	35	37	72	32	35	67	0.10	0.10
D44 neoplasm of uncertain or unknown behaviour of endocrine glands	12	15	27	13	16	29	0.04	0.05
D47 other neoplasms of uncertain or unknown behaviour of lymphoid, haematopoietic and related tissue	72	63	135	67	61	128	0.19	0.18
D48 neoplasm of uncertain or unknown behaviour of other and unspecified sites	60	44	104	70	49	119	0.15	0.16
WHO Classification of Tumours of Haematopoietic and Lymphoid Tissue								
H01 Lymphoma NOS	13	13	26	23	18	41	0.08	0.04
H02 NH lymphoma NOS	71	60	131	69	54	123	0.20	0.16
H03 Composite Hodgkin & Non-Hodgkin	0	0	0	0	0	0		
H04 Hodgkin lymphoma nodular lymphocyte predominance	5	3	8	6	4	10	0.02	0.01
H05 Classical Hodgkin lymphoma	75	57	132	76	60	136	0.27	0.20
H06 Chronic lymphocytic leukaemia/Small lymphocytic lymphoma	142	70	212	154	81	235	0.48	0.22
H07 Immunoproliferative diseases	16	8	24	19	11	30	0.06	0.03
H08 Mantle cell/centrocytic lymphoma	26	10	36	25	11	36	0.06	0.03
H09 Follicular B lymphoma	76	84	160	75	89	164	0.28	0.31
H10 Diffuse B lymphoma	145	122	267	163	122	285	0.50	0.36
H11 Burkitt lymphoma	12	2	14	13	4	17	0.04	0.01
H12 Marginal zone lymphoma	15	25	40	16	23	39	0.06	0.07
H13 T lymphoma cutaneous	15	8	23	15	10	25	0.04	0.03
H14 Other T cell lymphomas	29	22	51	28	20	48	0.10	0.07
H15 Lymphoblastic lymphoma/Acute (precursor cell) lymphatic lymphoma	37	35	72	36	36	72	0.11	0.11

INCIDENT CANCER CASES N# annual average for 3 year interval	2012-2014 MALE N#	 FEMALE N#	 ALL N#	2015-2017 (estimate) ‡ MALE N#	 FEMALE N#	 ALL N#	Cumulative risk to age 75y (2015-2017) MALE %	 FEMALE %
H16 Plasma cell neoplasms	167	112	279	180	128	308	0.58	0.35
H18 Mature B cell leukaemia hairy cell	11	2	13	10	2	12	0.03	0.01
H19 Lymphatic leukaemia NOS	1	2	3	1	1	2	0.00	0.00
H20 Leukaemia NOS	18	14	32	17	15	32	0.03	0.01
H21 Myeloid leukaemia NOS	3	2	5	2	3	5	0.01	0.01
H22 Acute myeloid leukaemia	76	59	135	78	65	143	0.23	0.20
H23 Myeloproliferative neoplasms	95	78	173	112	91	203	0.36	0.29
H24 Myelodysplastic syndrome	102	68	170	110	69	179	0.25	0.16
H25 Myelodysplastic/Myeloproliferative neoplasm	17	9	26	14	9	23	0.04	0.02

*Incidence figures for C00-C96 where C96 presented in this report include polycythaemia vera, myelodysplastic syndromes and chronic myeloproliferative disease, considered malignant in ICDO3 but previously classed as uncertain behaviour (and previously coded under ICD10 codes D45-D47).

** D00-D48 tumours in this report exclude polycythaemia vera, myelodysplastic syndromes and chronic myeloproliferative disease (see note above).

‡ Average age-specific mortality rates for 2012-2015 were calculated and applied to population estimates for 2016 and 2017, to allow estimation of average annual age-standardised mortality rates for 2015-2017 presented in the table. These calculations assumed no difference in rates between the 2012-2015 period and 2016 and 2017. (2012-2014 not 2012-2015 rates are also presented.)

APPENDIX II: INCIDENT CANCER RATES: ANNUAL AVERAGE 2012-2014 & ESTIMATES FOR 2015-2017

INCIDENT CANCER RATES (annual average over 3 year period)	2012-2014				2015-2017 (estimates)‡			
ASR Age-standardised rate per 100,000-weighted by ESP 1976 and 2013	MALE		FEMALE		MALE		FEMALE	
ICD10 cancer sites	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013
C00-96 all invasive cancers	725.9	1,129.1	550.6	799.5	717.7	1,116.1	551.6	801.3
C00-43 C45-96 all invasive cancers excluding NMSC	488.5	739.5	387.2	545.1	477.6	721.9	386.9	544.0
C00-D48 all registered tumours	800.4	1,244.2	760.9	1,041.1	794.6	1,235.2	769.8	1,050.4
D00-48 all non-invasive tumours	74.5	115.1	210.4	241.6	76.8	119.0	218.2	249.1
C00 neoplasm of lip	0.8	1.2	0.2	0.3	0.8	1.3	0.1	0.2
C01 neoplasm of base of tongue	1.3	1.7	0.4	0.4	1.3	1.7	0.3	0.4
C02 neoplasm of other and unspecified parts of tongue	2.1	2.7	1.1	1.5	2.4	3.3	1.3	1.8
C03 neoplasm of gum	0.6	0.7	0.3	0.3	0.5	0.7	0.4	0.6
C04 neoplasm of floor of mouth	1.3	1.6	0.3	0.4	1.4	1.9	0.3	0.3
C05 neoplasm of palate	0.6	0.8	0.3	0.4	0.7	0.8	0.3	0.5
C06 neoplasm of other and unspecified parts of mouth	0.6	1.1	0.6	0.8	0.8	1.1	0.5	0.7
C07 neoplasm of parotid gland	1.0	1.6	0.5	0.6	1.2	2.1	0.5	0.7
C08 neoplasm of other and unspecified major salivary glands	0.2	0.2	0.1	0.1	0.3	0.5	0.2	0.2
C09 neoplasm of tonsil	1.9	2.3	0.5	0.7	2.2	2.7	0.8	1.0
C10 neoplasm of oropharynx	0.9	1.2	0.2	0.3	0.8	1.1	0.1	0.2
C11 neoplasm of nasopharynx	0.5	0.6	0.2	0.3	0.6	0.7	0.2	0.3
C12 neoplasm of pyriform sinus	1.2	1.6	0.2	0.2	1.0	1.4	0.2	0.2
C13 neoplasm of hypopharynx	0.7	1.0	0.2	0.3	0.6	0.8	0.2	0.2
C14 neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx	0.5	0.6	0.2	0.2	0.4	0.6	0.1	0.2
C01-14 mouth & pharynx	13.2	17.6	4.9	6.4	14.1	19.3	5.2	7.1
C00-14 lip oral cavity and pharynx	14.0	18.9	5.1	6.7	14.9	20.6	5.3	7.3
C00-14, C30-32 all head and neck	20.7	28.7	6.7	9.0	21.6	30.2	6.9	9.6
C15 neoplasm of oesophagus	11.0	17.2	4.9	8.2	11.1	17.1	5.1	8.7
C00-15, C32 lip oral pharynx larynx oesophagus	31.0	45.0	11.0	16.4	32.0	46.3	11.6	17.6
C16 neoplasm of stomach	15.6	25.3	7.6	12.2	15.2	24.9	7.3	11.7
C17 neoplasm of small intestine	2.3	3.4	1.4	2.1	2.0	3.0	1.6	2.3
C18 neoplasm of colon	39.3	64.8	27.0	43.0	40.7	66.3	27.5	43.2
C19 neoplasm of rectosigmoid junction	4.7	7.2	2.3	3.6	4.9	7.5	2.4	3.8
C20 neoplasm of rectum	20.3	31.0	9.1	13.1	18.7	28.3	8.8	12.6
C21 neoplasm of anus and anal canal	0.9	1.3	1.2	1.7	0.9	1.5	1.2	1.7
C19-20 neoplasm of rectosigmoid junction and rectum	25.0	38.1	11.4	16.7	23.5	35.8	11.3	16.4
C19-21 rectum and anus	25.8	39.4	12.5	18.3	24.5	37.3	12.4	18.1
C18-20 neoplasm of colorectum	64.3	103.0	38.3	59.6	64.2	102.1	38.8	59.6
C18-21 neoplasm of colorectum and anus	65.1	104.2	39.5	61.3	65.2	103.6	39.9	61.3
C17-21 intestine	67.4	107.6	40.9	63.4	67.2	106.6	41.5	63.6
C22 neoplasm of liver and intrahepatic bile ducts	8.3	12.9	2.7	4.3	8.1	12.5	2.9	4.5
C23 neoplasm of gallbladder	0.8	1.5	1.7	2.9	0.6	1.2	1.5	2.6
C24 neoplasm of other and unspecified parts of biliary tract	2.7	4.7	2.1	3.6	2.8	4.7	2.0	3.4
C23-24 gallbladder and biliary tract	3.5	6.1	3.8	6.5	3.4	5.9	3.5	6.0
C22-24 liver and biliary passages	11.8	19.0	6.5	10.8	11.4	18.3	6.4	10.6

INCIDENT CANCER RATES (annual average over 3 year period)	2012-2014				2015-2017 (estimates)‡			
ASR Age-standardised rate per 100,000-weighted by ESP 1976 and 2013	MALE		FEMALE		MALE		FEMALE	
ICD10 cancer sites	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013
C25 neoplasm of pancreas	11.6	19.3	9.2	15.4	11.9	19.7	8.7	14.6
C26 neoplasm of other and ill-defined digestive organs	0.7	1.2	0.6	1.1	0.9	1.5	0.7	1.2
C30 neoplasm of nasal cavity and middle ear	0.3	0.4	0.3	0.5	0.4	0.5	0.3	0.4
C31 neoplasm of accessory sinuses	0.3	0.5	0.3	0.3	0.4	0.5	0.2	0.2
C32 neoplasm of larynx	6.1	8.9	1.1	1.5	6.0	8.6	1.1	1.6
C33 neoplasm of trachea	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0
C34 neoplasm of bronchus and lung	56.8	93.1	41.6	65.4	55.3	90.5	41.0	64.4
C33-34 neoplasm of lung and trachea	56.9	93.2	41.6	65.4	55.3	90.6	41.0	64.4
C37 neoplasm of thymus	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3
C38 neoplasm of heart, mediastinum and pleura	0.3	0.6	0.1	0.2	0.3	0.5	0.3	0.4
C40 neoplasm of bone and articular cartilage of limbs	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5
C41 neoplasm of bone and articular cartilage of other and unspecified sites	0.4	0.6	0.3	0.4	0.4	0.5	0.3	0.4
C40-41 bone and articular and unspecified	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5
C43 melanoma of skin	20.3	30.0	20.1	26.8	21.4	31.6	21.2	28.2
C44 other neoplasms of skin	237.4	389.6	163.4	254.4	240.2	394.2	164.7	257.4
C45 mesothelioma	1.7	2.9	0.2	0.3	1.6	2.8	0.3	0.4
C46 Kaposi sarcoma	0.4	0.4	0.0	0.0	0.3	0.3	0.0	0.0
C47 neoplasm of peripheral nerves and autonomic nervous system	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.1
C48 neoplasm of retroperitoneum and peritoneum	0.3	0.4	0.7	1.0	0.4	0.5	0.9	1.3
C49 neoplasm of other connective and soft tissue	3.0	4.4	1.9	2.6	3.0	4.4	2.2	2.8
C50 neoplasm of breast	1.2	1.9	121.7	156.6	1.1	1.8	122.6	157.5
C51 neoplasm of vulva			2.0	2.9			2.1	3.1
C52 neoplasm of vagina			0.5	0.8			0.5	0.8
C53 neoplasm of cervix uteri			11.5	12.8			10.6	11.7
C54 neoplasm of corpus uteri			19.3	26.6			18.9	25.7
C55 neoplasm of uterus, part unspecified			0.8	1.2			0.9	1.3
C56 neoplasm of ovary			15.5	21.8			15.5	21.6
C57 neoplasm of other and unspecified female genital organs			0.6	0.8			1.1	1.6
C58 neoplasm of placenta			0.1	0.1			0.1	0.1
C51-52, C55, C57, C58 malignant gynaecological neoplasms			4.0	5.8			4.7	6.8
C60 neoplasm of penis	1.5	2.4			1.5	2.3		
C61 neoplasm of prostate	149.7	216.9			141.0	203.7		
C62 neoplasm of testis	7.4	7.1			7.8	7.4		
C63 neoplasm of other and unspecified male genital organs	0.2	0.3			0.1	0.2		
C64 neoplasm of kidney, except renal pelvis	17.0	24.3	8.4	12.0	16.4	23.3	8.1	11.5
C65 neoplasm of renal pelvis	0.6	1.1	0.4	0.6	0.6	1.0	0.3	0.4
C66 neoplasm of ureter	0.7	1.2	0.3	0.5	0.6	1.0	0.3	0.5
C64-66 kidney including renal pelvis and ureter	18.4	26.6	9.0	13.1	17.6	25.3	8.7	12.4
C67 neoplasm of bladder	12.9	22.9	4.5	7.9	13.0	23.1	4.4	7.7
C68 neoplasm of other and unspecified urinary organs	0.1	0.2	0.1	0.1	0.2	0.3	0.1	0.1
C69 neoplasm of eye and adnexa	1.6	2.2	1.1	1.4	1.4	1.9	1.1	1.4
C70 neoplasm of meninges	0.1	0.1	0.2	0.3	0.1	0.2	0.2	0.3
C71 neoplasm of brain	8.8	11.5	6.4	8.1	8.8	11.5	5.9	7.6
C72 neoplasm of spinal cord, cranial nerves and other parts of CNS	0.3	0.3	0.4	0.3	0.2	0.3	0.3	0.3

INCIDENT CANCER RATES (annual average over 3 year period)	2012-2014				2015-2017 (estimates)‡			
ASR Age-standardised rate per 100,000-weighted by ESP 1976 and 2013	MALE		FEMALE		MALE		FEMALE	
ICD10 cancer sites	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013
C71-72 neoplasm of brain and spinal cord	9.0	11.9	6.7	8.5	9.0	11.8	6.2	7.9
C70-72 malignant meninges brain and spinal cord	9.2	12.0	6.9	8.8	9.2	12.0	6.4	8.2
C70-72, D32-33, D42-43 all registered meninges brain and CNS	13.4	17.4	14.2	18.2	13.1	16.9	13.4	17.1
C73 neoplasm of thyroid gland	3.3	4.1	8.7	9.7	2.8	3.6	8.4	9.5
C74 neoplasm of adrenal gland	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5
C75 neoplasm of other endocrine glands and related structures	0.3	0.4	0.3	0.4	0.3	0.4	0.2	0.3
C76 neoplasm of other and ill-defined sites	0.4	0.6	0.6	0.9	0.3	0.5	0.6	1.0
C80 neoplasm without specification of site	8.1	14.2	7.1	12.6	8.1	14.5	6.8	12.1
C81 Hodgkin disease	3.6	3.9	2.6	2.7	3.6	3.9	2.8	3.0
C82 follicular nodular non-Hodgkin's lymphoma	4.0	5.2	4.5	6.0	3.6	4.9	4.2	5.8
C83 diffuse non-Hodgkin's lymphoma	8.9	13.3	5.8	8.6	9.2	13.7	5.6	8.4
C84 peripheral and cutaneous T-cell lymphomas	1.8	2.4	1.0	1.4	1.6	2.1	0.9	1.2
C85 other and unspecified types of non-Hodgkin's lymphoma	3.7	5.9	2.7	4.2	3.7	5.8	2.5	3.9
C82-85 all non-Hodgkin's lymphoma	18.4	26.8	14.0	20.2	18.2	26.7	13.3	19.3
C81-85 lymphoma (total)	21.9	30.7	16.6	23.0	21.8	30.5	16.0	22.3
C88 immunoproliferative diseases	0.5	0.8	0.1	0.2	0.4	0.8	0.2	0.4
C90 multiple myeloma and plasma cell neoplasms	7.2	11.4	4.2	6.6	7.0	11.1	4.5	7.0
C90,C88 multiple myeloma and immunoproliferative	7.7	12.1	4.3	6.8	7.5	11.8	4.7	7.4
C91 lymphoid leukaemia	7.7	11.1	4.3	5.4	7.5	10.7	4.1	5.4
C92 myeloid leukaemia	4.3	6.6	3.1	4.2	4.1	6.1	3.1	4.3
C93 monocytic leukaemia	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.1
C94 other leukaemias of specified cell type	0.3	0.4	0.1	0.2	0.2	0.3	0.1	0.1
C95 leukaemia of unspecified cell type	0.8	1.5	0.4	0.8	0.7	1.2	0.4	0.8
C91-95 leukaemia (total)	13.2	19.7	7.9	10.6	12.6	18.5	7.8	10.8
C96 other and unspecified neoplasms of lymphoid haematopoietic	8.2	13.3	5.3	8.0	8.3	13.5	5.3	8.1
D00 carcinoma in situ of oral cavity, oesophagus and stomach	0.5	0.7	0.3	0.5	0.7	1.0	0.4	0.6
D01 carcinoma in situ of other and unspecified digestive organs	0.8	1.1	0.6	0.7	0.5	0.8	0.4	0.6
D02 carcinoma in situ of middle ear and respiratory system	0.6	0.8	0.4	0.5	0.8	1.2	0.4	0.5
D03 melanoma in situ	11.5	17.1	12.1	16.6	12.0	17.9	12.4	17.0
D04 carcinoma in situ of skin	32.0	52.4	38.5	64.7	34.1	56.0	39.2	66.3
D05 carcinoma in situ of breast	0.0	0.1	15.9	18.1	0.0	0.0	15.8	18.0
D06 carcinoma in situ of cervix uteri			117.9	109.0			125.1	115.2
D07 carcinoma in situ of other and unspecified genital organs	3.4	4.5	1.9	2.1	4.3	5.6	2.0	2.3
D09 carcinoma in situ of other and unspecified sites	2.4	3.9	0.7	1.1	2.2	3.7	0.6	0.9
D18 Haemangioma and lymphangioma, any site	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
D32 benign neoplasm of meninges	1.7	2.7	4.8	6.7	1.6	2.5	4.5	6.2
D33 benign neoplasm of brain and other parts of CNS	1.0	1.2	0.9	1.2	0.9	1.0	1.0	1.2
D32-33 benign neoplasm of meninges, brain & CNS	2.8	3.9	5.7	7.8	2.6	3.6	5.5	7.4
D35 benign neoplasm of other and unspecified endocrine glands	2.5	3.2	2.1	2.4	2.2	2.8	1.7	1.9
D37 neoplasm of uncertain or unknown behaviour of oral cavity and digestive organs	1.3	1.8	1.2	1.5	1.3	1.8	1.3	1.8
D38 neoplasm of uncertain or unknown behaviour of middle ear and respiratory and intrathoracic organs	0.2	0.3	0.1	0.2	0.3	0.3	0.2	0.3
D39 neoplasm of uncertain or unknown behaviour of female genital organs			3.6	4.0			3.8	4.2
D40 neoplasm of uncertain or unknown behaviour of male genital organs	0.1	0.1			0.1	0.1		
D41 neoplasm of uncertain or unknown behaviour of urinary organs	8.7	13.7	2.8	4.0	8.4	13.2	2.9	4.1

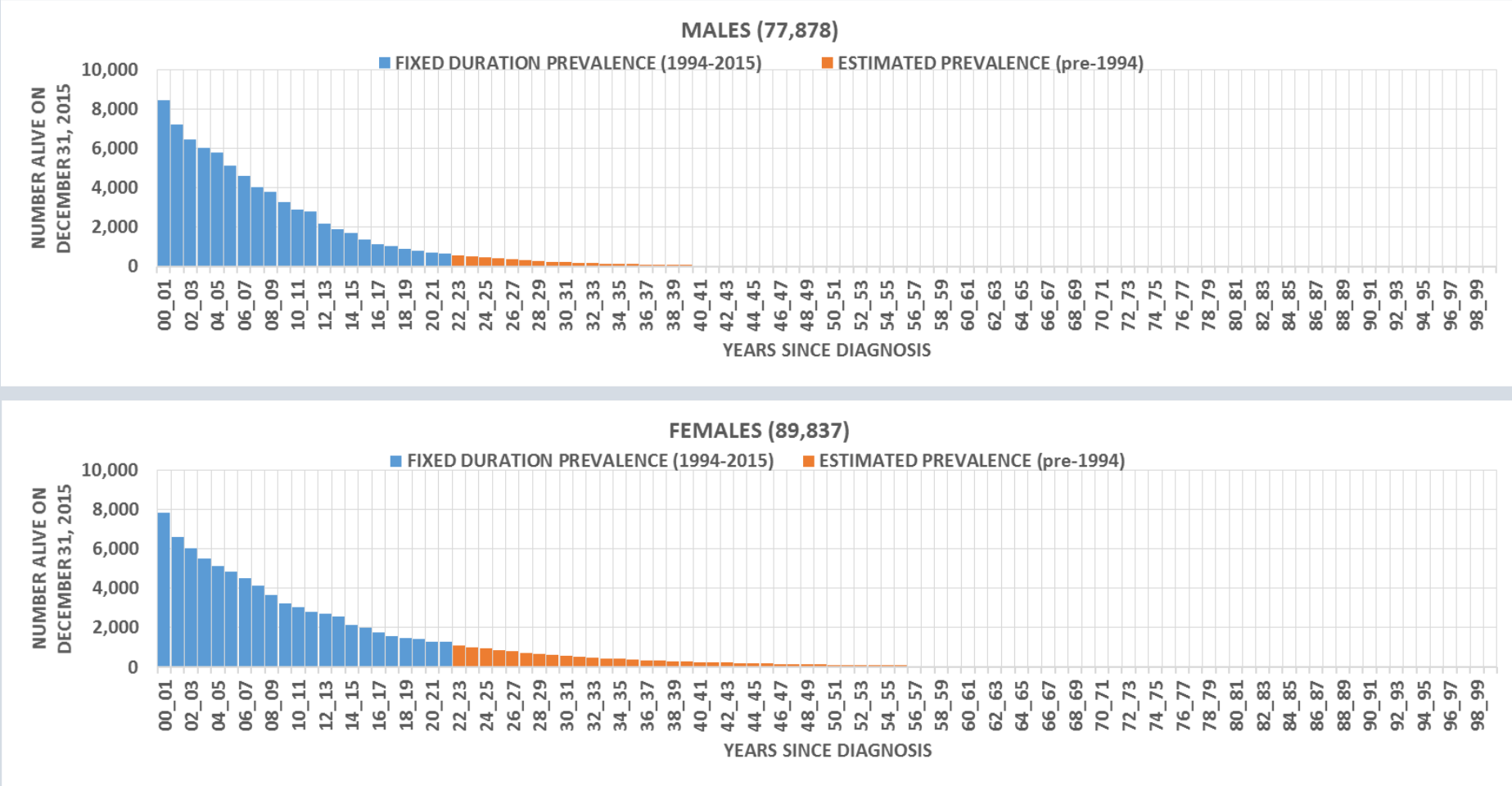
INCIDENT CANCER RATES (annual average over 3 year period)	2012-2014				2015-2017 (estimates)‡			
ASR Age-standardised rate per 100,000-weighted by ESP 1976 and 2013	MALE		FEMALE		MALE		FEMALE	
ICD10 cancer sites	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013
D42 neoplasm of uncertain or unknown behaviour of meninges	0.4	0.4	0.4	0.5	0.3	0.3	0.3	0.4
D43 neoplasm of uncertain or unknown behaviour of brain and CNS	1.1	1.1	1.2	1.1	1.0	1.1	1.1	1.1
D42-43 neoplasm of uncertain meninges, brain & CNS	1.5	1.6	1.6	1.6	1.3	1.4	1.4	1.5
D44 neoplasm of uncertain or unknown behaviour of endocrine glands	0.5	0.6	0.6	0.7	0.5	0.6	0.6	0.7
D47 other neoplasms of uncertain or unknown behaviour of lymphoid, haematopoietic	3.1	5.3	2.4	3.7	2.6	4.4	2.2	3.4
D48 neoplasm of uncertain or unknown behaviour of other and unspecified sites	2.6	4.0	1.9	2.0	2.7	4.4	2.1	2.2
WHO Classification of Tumours of Haematopoietic and Lymphoid Tissue								
H01 Lymphoma NOS	0.6	1.0	0.4	0.8	0.9	1.6	0.6	1.0
H02 NH lymphoma NOS	3.0	4.8	2.3	3.5	2.7	4.2	1.9	3.0
H03 Composite Hodgkin & Non-Hodgkin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H04 Hodgkin lymphoma nodular lymphocyte predominance	0.2	0.3	0.1	0.1	0.3	0.3	0.2	0.2
H05 Classical HL	3.3	3.7	2.5	2.6	3.3	3.6	2.6	2.8
H06 Chronic lymphocytic leukaemia/Small lymphocytic lymphoma	6.2	9.8	2.7	4.1	6.1	9.6	2.8	4.4
H07 Immunoproliferative diseases	0.7	1.1	0.3	0.5	0.7	1.2	0.4	0.6
H08 Mantle cell/ centrocytic lymphoma	1.1	1.8	0.4	0.6	1.0	1.5	0.4	0.6
H09 Follicular B lymphoma	3.4	4.3	3.5	4.6	3.1	4.1	3.5	4.7
H10 Diffuse B lymphoma	6.2	9.4	4.8	7.0	6.5	9.8	4.4	6.5
H11 Burkitt lymphoma	0.5	0.6	0.1	0.1	0.5	0.6	0.2	0.2
H12 Marginal zone lymphoma	0.6	0.9	1.0	1.4	0.6	1.0	0.9	1.3
H13 T lymphoma cutaneous	0.7	0.9	0.3	0.5	0.6	0.8	0.4	0.5
H14 Other T cell lymphomas	1.3	1.7	0.9	1.2	1.2	1.5	0.8	1.0
H15 Lymphoblastic lymphoma/Acute(precursor cell) lymphatic lymphoma	1.6	1.4	1.5	1.3	1.5	1.4	1.5	1.3
H16 Plasma cell neoplasms	7.3	11.5	4.2	6.6	7.1	11.2	4.5	7.1
H18 Mature B cell leukaemia hairy cell	0.5	0.7	0.1	0.1	0.4	0.6	0.1	0.1
H19 Lymphatic leukaemia NOS	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0
H20 Leukaemia NOS	0.8	1.5	0.4	0.8	0.7	1.2	0.4	0.8
H21 Myeloid leukaemia NOS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
H22 Acute myeloid leukaemia	3.2	5.0	2.4	3.2	3.1	4.7	2.4	3.4
H23 Myeloproliferative neoplasms	4.2	5.9	3.1	4.3	4.5	6.4	3.4	4.7
H24 Myelodysplastic syndrome	4.4	8.0	2.4	4.1	4.2	7.7	2.3	3.9
H25 Myelodysplastic/Myeloproliferative neoplasm	0.7	1.2	0.3	0.6	0.5	0.9	0.3	0.5

‡Average age-specific mortality rates for 2012-2015 were calculated and applied to population estimates for 2016 and 2017, to allow estimation of average annual age-standardised mortality rates for 2015-2017 presented in the table. These calculations assumed no difference in rates between the 2012-2015 period and 2016 and 2017. (2012-2014 not 2012-2015 rates are also presented.)

APPENDIX III: MORTALITY: ANNUAL AVERAGE 2012-2014

MORTALITY (annual average over 3 year period)	DEATHS			RATE/100,000				Cumulative risk to age 75y	
	MALE	FEMALE	ALL	MALE		FEMALE		MALE	FEMALE
ICD10 cancer sites				ASR ESP 1973	ASR ESP 2013	ASR ESP 1973	ASR ESP 2013	%	%
C00-96 all invasive cancers	4,629	4,137	8,766	199.0	351.4	148.5	246.0	12.39	10.10
C00-96 all invasive cancers bar lung (C33-34)	3,515	3,327	6,841	151.1	269.5	119.0	197.0	9.24	8.01
C00-14 lip oral cavity and pharynx	117	50	166	5.1	7.6	1.8	2.9	0.44	0.15
C00-15 C32 lip oral pharynx larynx oesophagus	427	184	611	18.7	29.6	6.5	11.1	1.50	0.47
C11 neoplasm of nasopharynx	6	3	9	0.3	0.4	0.1	0.2	0.02	0.01
C15 neoplasm of oesophagus	253	125	377	11.0	18.0	4.3	7.6	0.87	0.29
C16 neoplasm of stomach	199	128	327	8.5	14.8	4.4	7.7	0.56	0.27
C18 neoplasm of colon	287	235	522	12.4	22.8	7.7	14.3	0.77	0.45
C19-21 rectum and anus	289	190	479	12.4	21.6	6.7	11.3	0.85	0.46
C18-21 neoplasm of colorectum and anus	576	424	1,000	24.8	44.5	14.4	25.6	1.61	0.91
C17-21 intestine	589	437	1,027	25.4	45.5	14.9	26.4	1.65	0.94
C22 neoplasm of liver and intrahepatic bile ducts	172	118	289	7.4	12.5	4.0	7.2	0.52	0.25
C23-24 gallbladder and biliary tract	19	35	54	0.8	1.6	1.2	2.1	0.04	0.07
C22-24 liver and biliary passages	191	152	343	8.2	14.1	5.2	9.3	0.57	0.32
C25 neoplasm of pancreas	252	243	495	10.8	18.5	8.5	14.8	0.78	0.60
C32 neoplasm of larynx	58	10	67	2.5	4.0	0.4	0.6	0.19	0.03
C33-34 neoplasm of lung and trachea	1,070	786	1,855	46.0	77.9	28.9	47.5	3.38	2.25
C43 melanoma of skin	88	71	159	3.8	6.5	2.5	4.1	0.24	0.16
C45 mesothelioma	34	3	38	1.4	2.5	0.1	0.2	0.11	0.01
C50 neoplasm of breast	8	709	717	0.3	0.6	26.7	40.7	0.01	1.96
C53 neoplasm of cervix uteri		88	88			3.7	4.6		0.30
C54 neoplasm of corpus uteri		88	88			3.1	5.3		0.22
C56 neoplasm of ovary		272	272			10.3	16.1		0.80
C61 neoplasm of prostate	519		519	22.2	47.9			0.87	
C62 neoplasm of testis	7		7	0.3	0.3			0.02	
C64 neoplasm of kidney, except renal pelvis	143	77	220	6.2	10.0	2.8	4.7	0.45	0.20
C67 neoplasm of bladder	150	73	223	6.4	12.7	2.2	4.5	0.30	0.11
C70-72 malignant meninges brain and spinal cord	161	114	275	7.0	9.8	4.6	6.3	0.58	0.39
C73 neoplasm of thyroid gland	10	18	29	0.4	0.8	0.6	1.1	0.03	0.04
C81 Hodgkin disease	13	11	24	0.5	0.8	0.4	0.7	0.04	0.04
C82-85 all non-Hodgkin's lymphoma	144	127	271	6.2	10.8	4.4	7.8	0.38	0.31
C90, C88 multiple myeloma and immunoproliferative	97	78	176	4.2	7.8	2.6	4.8	0.25	0.15
C91-95 leukaemia (total)	162	102	264	6.9	12.5	3.6	6.1	0.43	0.25

APPENDIX IV: ESTIMATED COMPLETE PREVALENCE ON DECEMBER 31, 2015: ALL INVASIVE CANCER



C00-43, C45-96, all invasive cancers: the combined counts of all bars in the histograms sum to estimated complete prevelance on 31/12/2015, counting only the first invasive cancer in patients who had more than one cancer type

APPENDIX V: ESTIMATED COMPLETE PREVALENCE ON DECEMBER 31, 2015: BY AGE (<50, 50+)

	AGE	MALES				FEMALES				ALL			
	on 31/12/2015	FIXED DURATION	%	COMPLETE	%	FIXED DURATION	%	COMPLETE	%	FIXED DURATION	%	COMPLETE	%
all invasive cancers excl. NMSC		**72,864**	**100.0%**	**77,878**	**100.0%**	**75,579**	**100.0%**	**89,837**	**100.0%**	**148,443**	**100.0%**	**167,715**	**100.0%**
	<50	**8,324**	**11.4%**	**9,231**	**11.9%**	**12,870**	**17.0%**	**13,524**	**15.1%**	**21,194**	**14.3%**	**22,755**	**13.6%**
	50+	**64,540**	**88.6%**	**68,647**	**88.1%**	**62,709**	**83.0%**	**76,313**	**84.9%**	**127,249**	**85.7%**	**144,960**	**86.4%**
breast		208	100.0%	275	100.0%	33,352	100.0%	39,889	100.0%	33,560	100.0%	40,164	100.0%
	<50	11	5.3%	67	24.4%	3,974	11.9%	3,985	10.0%	3,985	11.9%	4,052	10.1%
	50+	197	94.7%	208	75.6%	29,378	88.1%	35,904	90.0%	29,575	88.1%	36,112	89.9%
prostate		32,555	100.0%	33,230	100.0%					32,555	100.0%	33,230	100.0%
	<50	228	0.7%	228	0.7%					228	0.7%	228	0.7%
	50+	32,327	99.3%	33,002	99.3%					32,327	99.3%	33,002	99.3%
colorectum		10,372	100.0%	11,293	100.0%	8,166	100.0%	9,645	100.0%	18,538	100.0%	20,938	100.0%
	<50	565	5.4%	579	5.1%	714	8.7%	801	8.3%	1,279	6.9%	1,380	6.6%
	50+	9,807	94.6%	10,714	94.9%	7,452	91.3%	8,844	91.7%	17,259	93.1%	19,558	93.4%
melanoma of skin		4,029	100.0%	4,353	100.0%	6,047	100.0%	7,581	100.0%	10,076	100.0%	11,934	100.0%
	<50	791	19.6%	840	19.3%	1,580	26.1%	1,716	22.6%	2,371	23.5%	2,556	21.4%
	50+	3,238	80.4%	3,513	80.7%	4,467	73.9%	5,865	77.4%	7,705	76.5%	9,378	78.6%
non-Hodgkin lymphoma		3,321	100.0%	3,659	100.0%	2,974	100.0%	3,362	100.0%	6,295	100.0%	7,021	100.0%
	<50	653	19.7%	731	20.0%	432	14.5%	490	14.6%	1,085	17.2%	1,221	17.4%
	50+	2,668	80.3%	2,928	80.0%	2,542	85.5%	2,872	85.4%	5,210	82.8%	5,800	82.6%
lung		2,566	100.0%	2,641	100.0%	2,650	100.0%	2,697	100.0%	5,216	100.0%	5,338	100.0%
	<50	113	4.4%	115	4.4%	133	5.0%	138	5.1%	246	4.7%	253	4.7%
	50+	2,453	95.6%	2,526	95.6%	2,517	95.0%	2,559	94.9%	4,970	95.3%	5,085	95.3%
bladder		2,611	100.0%	3,631	100.0%	1,081	100.0%	1,686	100.0%	3,692	100.0%	5,317	100.0%
	<50	75	2.9%	94	2.6%	36	3.3%	52	3.1%	111	3.0%	146	2.7%
	50+	2,536	97.1%	3,537	97.4%	1,045	96.7%	1,634	96.9%	3,581	97.0%	5,171	97.3%
uterine						4,443	100.0%	5,245	100.0%	4,443	100.0%	5,245	100.0%
	<50					183	4.1%	185	3.5%	183	4.1%	185	3.5%
	50+					4,260	95.9%	5,060	96.5%	4,260	95.9%	5,060	96.5%
leukaemia		2,553	100.0%	2,877	100.0%	1,776	100.0%	2,106	100.0%	4,329	100.0%	4,983	100.0%
	<50	688	26.9%	877	30.5%	615	34.6%	815	38.7%	1,303	30.1%	1,692	34.0%
	50+	1,865	73.1%	2,000	69.5%	1,161	65.4%	1,291	61.3%	3,026	69.9%	3,291	66.0%
testis		2,924	100.0%	4,699	100.0%					2,924	100.0%	4,699	100.0%
	<50	2,181	74.6%	2,526	53.8%					2,181	74.6%	2,526	53.8%
	50+	743	25.4%	2,173	46.2%					743	25.4%	2,173	46.2%
cervix						3,262	100.0%	4,653	100.0%	3,262	100.0%	4,653	100.0%
	<50					1,480	45.4%	1,505	32.3%	1,480	45.4%	1,505	32.3%
	50+					1,782	54.6%	3,148	67.7%	1,782	54.6%	3,148	67.7%
kidney		2,561	100.0%	2,713	100.0%	1,553	100.0%	1,700	100.0%	4,114	100.0%	4,413	100.0%
	<50	347	13.5%	353	13.0%	256	16.5%	273	16.1%	603	14.7%	626	14.2%
	50+	2,214	86.5%	2,360	87.0%	1,297	83.5%	1,427	83.9%	3,511	85.3%	3,787	85.8%
mouth & pharynx		1,677	100.0%	1,761	100.0%	938	100.0%	1,026	100.0%	2,615	100.0%	2,787	100.0%

	AGE	MALES				FEMALES				ALL			
	on 31/12/2015	FIXED DURATION	%	COMPLETE	%	FIXED DURATION	%	COMPLETE	%	FIXED DURATION	%	COMPLETE	%
	<50	217	12.9%	222	12.6%	163	17.4%	170	16.6%	380	14.5%	392	14.1%
	50+	1,460	87.1%	1,539	87.4%	775	82.6%	856	83.4%	2,235	85.5%	2,395	85.9%
ovary						2,318	100.0%	2,763	100.0%	2,318	100.0%	2,763	100.0%
	<50					403	17.4%	434	15.7%	403	17.4%	434	15.7%
	50+					1,915	82.6%	2,329	84.3%	1,915	82.6%	2,329	84.3%
thyroid		565	100.0%	598	100.0%	1,919	100.0%	2,081	100.0%	2,484	100.0%	2,679	100.0%
	<50	213	37.7%	218	36.5%	940	49.0%	971	46.7%	1,153	46.4%	1,189	44.4%
	50+	352	62.3%	380	63.5%	979	51.0%	1,110	53.3%	1,331	53.6%	1,490	55.6%
Hodgkin lymphoma		990	100.0%	1,388	100.0%	846	100.0%	1,219	100.0%	1,836	100.0%	2,607	100.0%
	<50	623	62.9%	781	56.3%	610	72.1%	782	64.2%	1,233	67.2%	1,563	60.0%
	50+	367	37.1%	607	43.7%	236	27.9%	437	35.8%	603	32.8%	1,044	40.0%
stomach		1,209	100.0%	1,266	100.0%	728	100.0%	799	100.0%	1,937	100.0%	2,065	100.0%
	<50	70	5.8%	71	5.6%	66	9.1%	66	8.3%	136	7.0%	137	6.6%
	50+	1,139	94.2%	1,195	94.4%	662	90.9%	733	91.7%	1,801	93.0%	1,928	93.4%
brain and spinal cord		761	100.0%	885	100.0%	650	100.0%	788	100.0%	1,411	100.0%	1,673	100.0%
	<50	451	59.3%	526	59.4%	409	62.9%	491	62.3%	860	60.9%	1,017	60.8%
	50+	310	40.7%	359	40.6%	241	37.1%	297	37.7%	551	39.1%	656	39.2%
multiple myeloma		854	100.0%	866	100.0%	616	100.0%	628	100.0%	1,470	100.0%	1,494	100.0%
	<50	54	6.3%	54	6.2%	31	5.0%	31	4.9%	85	5.8%	85	5.7%
	50+	800	93.7%	812	93.8%	585	95.0%	597	95.1%	1,385	94.2%	1,409	94.3%
oesophagus		692	100.0%	710	100.0%	433	100.0%	459	100.0%	1,125	100.0%	1,169	100.0%
	<50	30	4.3%	32	4.5%	14	3.2%	14	3.1%	44	3.9%	46	3.9%
	50+	662	95.7%	678	95.5%	419	96.8%	445	96.9%	1,081	96.1%	1,123	96.1%
other gynaecological						810	100.0%	939	100.0%	810	100.0%	939	100.0%
	<50					130	16.0%	136	14.5%	130	16.0%	136	14.5%
	50+					680	84.0%	803	85.5%	680	84.0%	803	85.5%
pancreas		338	100.0%	340	100.0%	349	100.0%	365	100.0%	687	100.0%	705	100.0%
	<50	30	8.9%	30	8.8%	30	8.6%	31	8.5%	60	8.7%	61	8.7%
	50+	308	91.1%	310	91.2%	319	91.4%	334	91.5%	627	91.3%	644	91.3%
bone and articular		140	100.0%	297	100.0%	104	100.0%	298	100.0%	244	100.0%	595	100.0%
	<50	100	71.4%	240	80.8%	68	65.4%	106	35.6%	168	68.9%	346	58.2%
	50+	40	28.6%	57	19.2%	36	34.6%	192	64.4%	76	31.1%	249	41.8%
liver		396	100.0%	400	100.0%	149	100.0%	155	100.0%	545	100.0%	555	100.0%
	<50	63	15.9%	67	16.8%	33	22.1%	37	23.9%	96	17.6%	104	18.7%
	50+	333	84.1%	333	83.3%	116	77.9%	118	76.1%	449	82.4%	451	81.3%