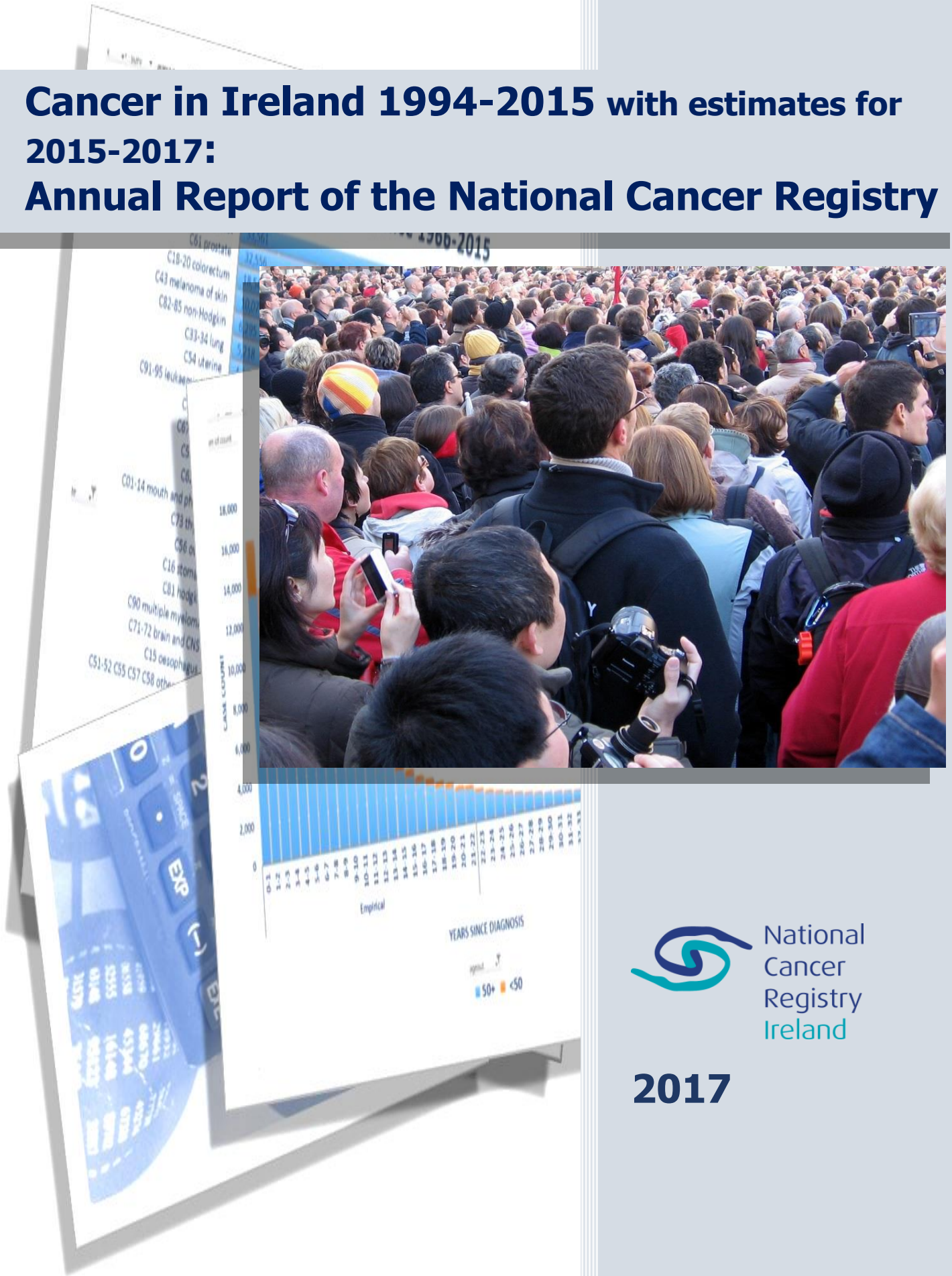
Cancer in Ireland 1994-2015 with estimates for 2015-2017:
Annual Report of the National Cancer Registry



National Cancer Registry Ireland

2017

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

This report should be cited as:
National Cancer Registry (2017)
Cancer in Ireland 1994-2015 with estimates for 2015-2017: Annual Report of the National Cancer Registry. NCR, Cork, Ireland.

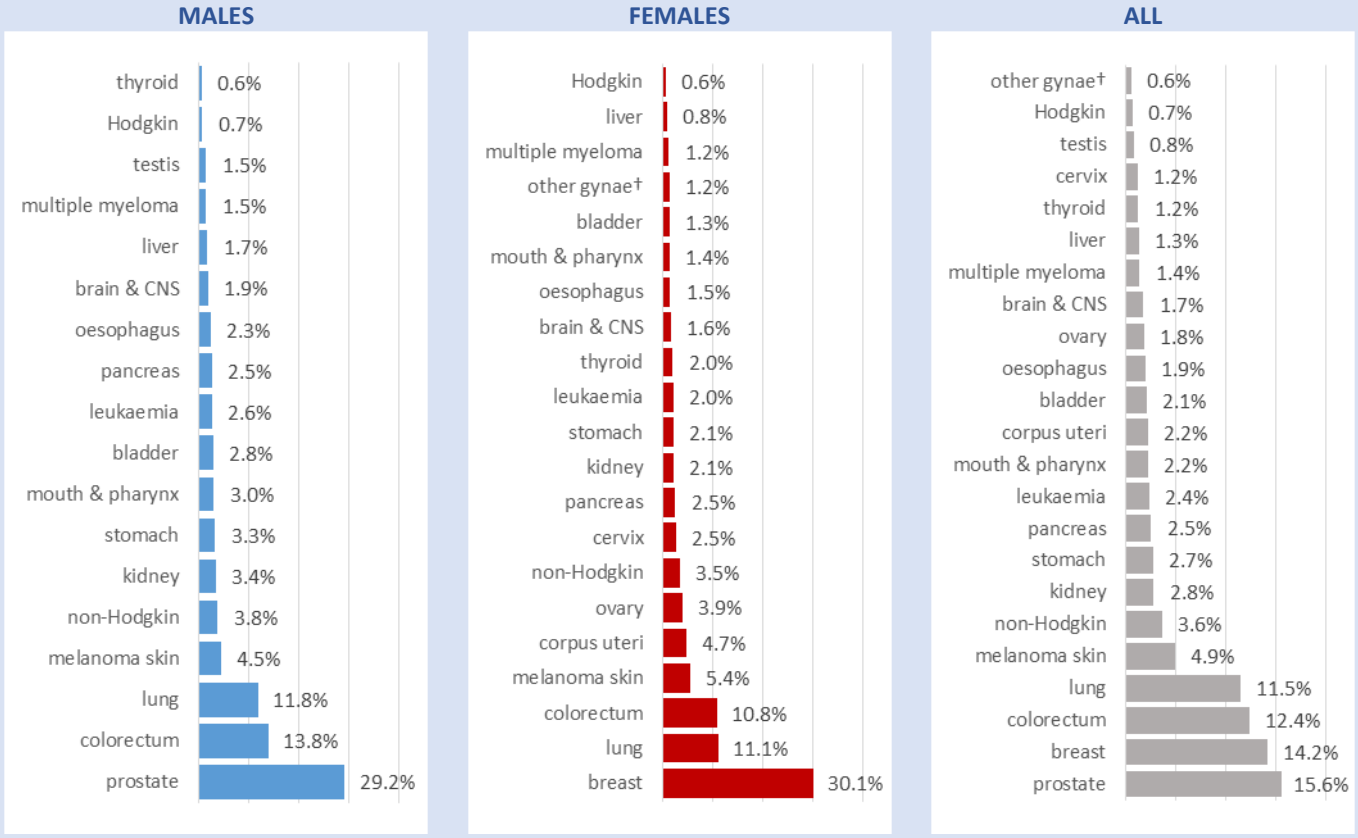
SUMMARY

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.
- 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.

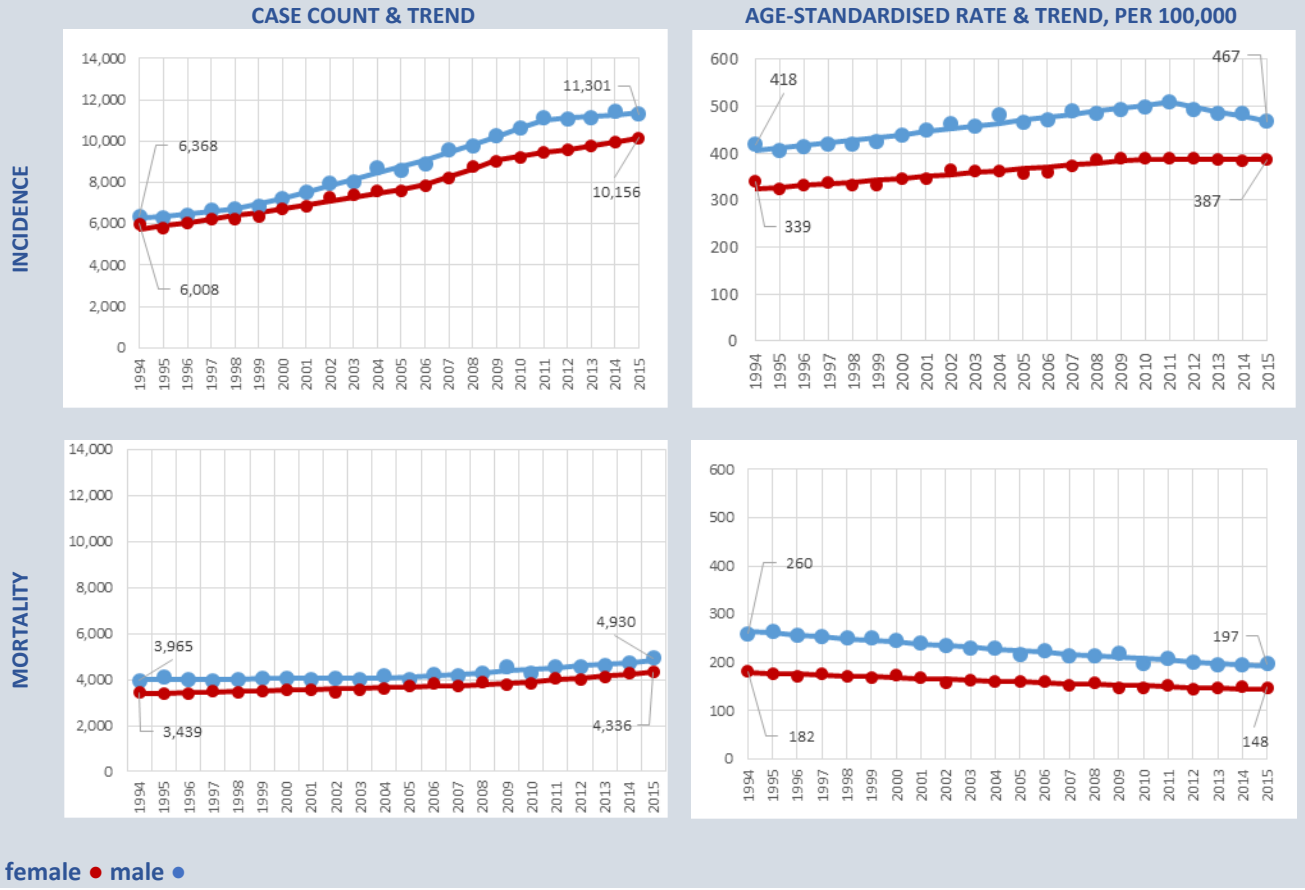
Summary Table 1. Summary of incidence and mortality rate trends, by sex and cancer type.
Trends shown are for 1994-2015 unless otherwise indicated and are for age-standardised rates – see *Summary Figure 2* and *Figures 4-1 to 4-28* for trends in case numbers and deaths

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.

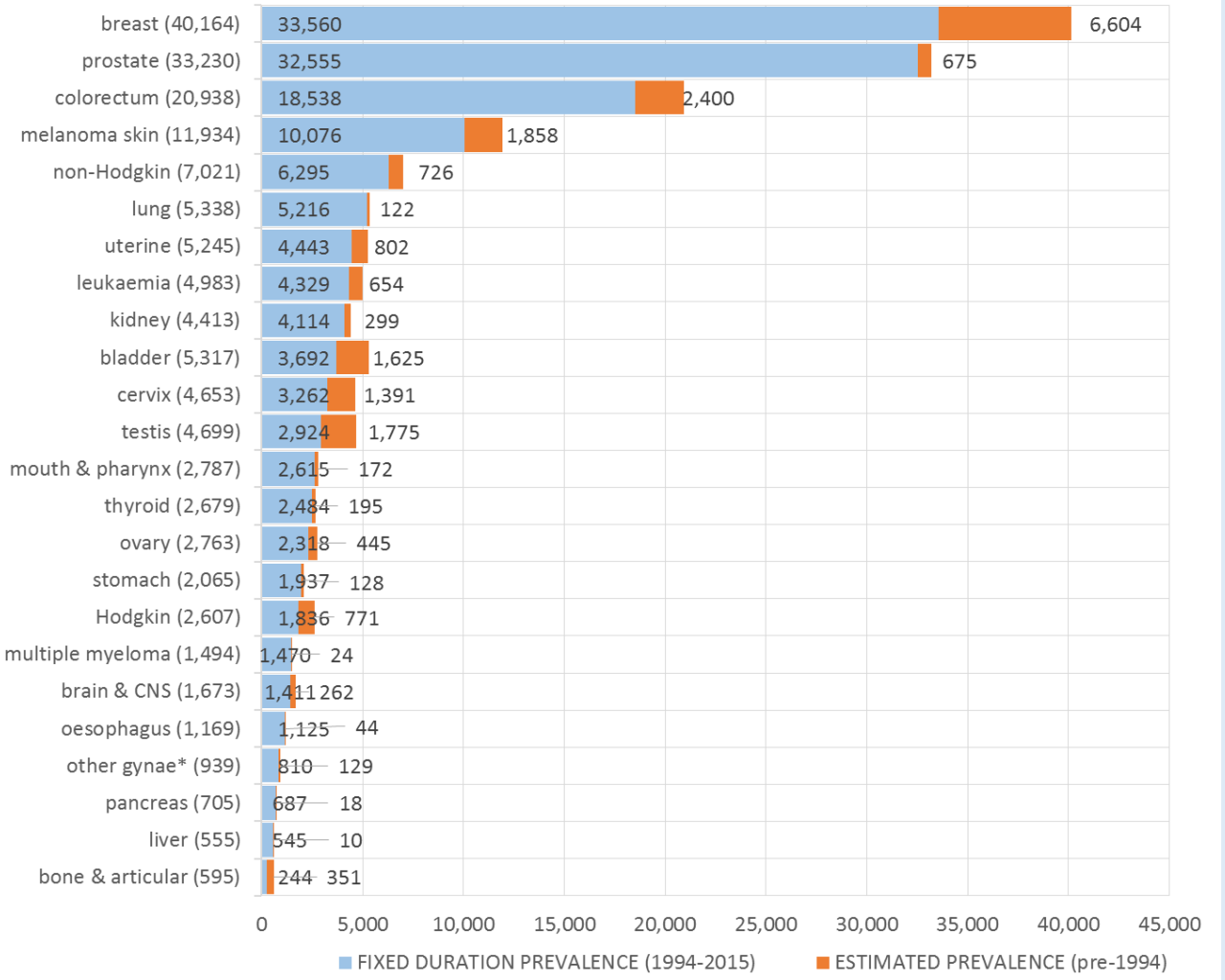
Summary Figure 2. Trend in incidence and mortality by sex: All invasive cancers, excluding NMSC



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).
[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

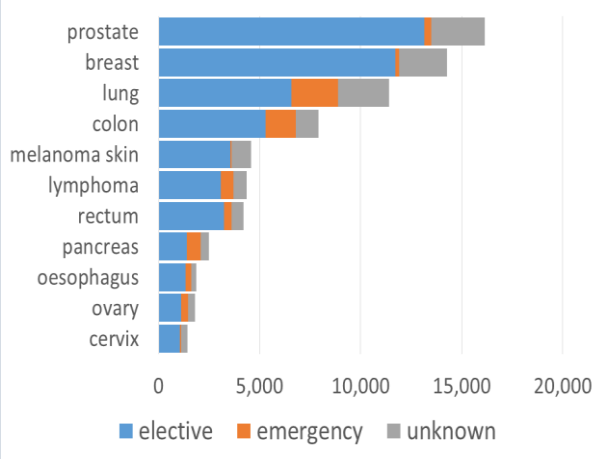
- Emergency presentation with cancer can result from lack of awareness of symptoms in patients and is generally associated with more advanced stage, limited treatment options and poorer survival outcomes.
- The number and proportion of patients first diagnosed during an emergency presentation in a hospital (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

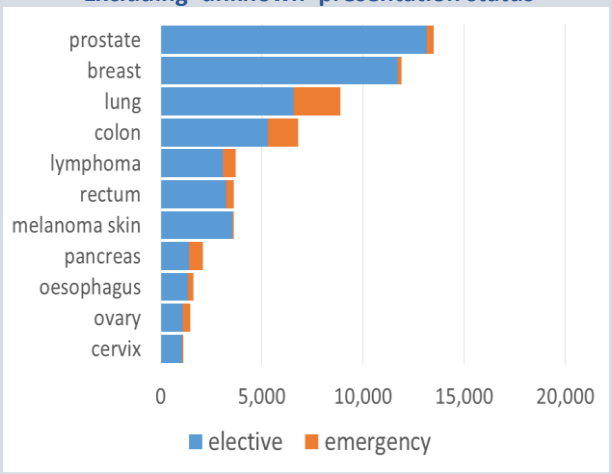


graph sorted in descending order

	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' %)

Excluding 'unknown' presentation status



graph sorted in descending order

	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%

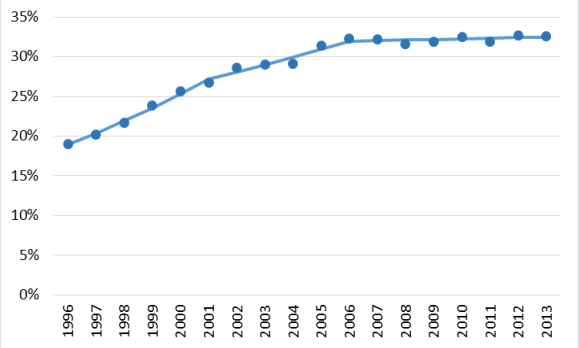
*excluding NMSC
‡sorted in ascending order of % presenting emergently
↑↓ greater/less than **15.1%** ('all invasive' %)

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%)	↔