National Cancer Registry Ireland

UROLOGICAL CANCERS IN IRELAND 1994-2023

NATIONAL CANCER REGISTRY IRELAND

2026

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About the National Cancer Registry

The National Cancer Registry was established by the Minister for Health in 1991. It has been collecting comprehensive cancer information for the population of the Republic of Ireland since 1994. This information is used in research into the causes of cancer, in education and information programs, and in the planning and management of cancer services to deliver the best cancer care to the whole population.

The mission of the National Cancer Registry of Ireland (NCRI) is to capture data and communicate information on cancer patients nationally to support the improvement of cancer outcomes in Ireland.

We collect information from all hospitals in Ireland on the number of persons diagnosed with cancer and the types of cancer they have. We also follow up the numbers dying from their cancer or from other causes. All the patient's personal and private details are removed before summaries of this information are made available to public and health professionals through our annual cancer report and other reports on our website.

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Abbreviations	
APC	Annual Percentage Change
AAPC	Average Annual Percentage Change
CI	Confidence Interval
CSO	Central Statistics Office
EASR	European age-standardised rate (rates standardised to 2013 European Standard Population in this report)
EAU	European Association of Urology
EBRT	External Beam Radiation Therapy
ENCR	European Network of Cancer Registries
ESP	European Standard Population
EU	European Union
HPV	Human Papillomavirus
HSE	Health Service Executive
IARC	International Agency for Research on Cancer
ICD-10	International Statistical Classification of Diseases and Related Health Problems (10th edition)
ICD-O-3	The International Classification of Diseases for Oncology
ITSA	Interrupted Time Series Analysis
NA	Not Applicable
NCCP	National Cancer Control Programme
NCRI	National Cancer Registry Ireland
NMIBC	Non-muscle invasive bladder cancer
PSA	Prostate-specific antigen
RAPC	Rapid Access Prostate Clinic
SACT	Systemic Anti-Cancer Therapy
WW	Watchful Waiting

Glossary	
Age-standardisation	Age-standardisation adjusts cancer incidence rates to account for differences in age distribution across populations. It involves calculating age-specific incidence rates, then applying weights based on a standard population—such as the 2013 European Standard Population. These weights reflect the proportion of people in each age group in the standard population. By combining the age-specific rates using these weights, we obtain an overall rate that allows fair comparisons across regions or time periods, regardless of differences in age structure.
ICD-10	International Statistical Classification of Diseases and Related Health Problems (10th edition) (WHO 1992)
Incidence	Refers to the number of new cases of urological cancer diagnosed as a proportion of the population within a specific time period, typically expressed as a rate per 100,000 people per year. In this report, incidence relates to cancers newly diagnosed between 2018 and 2022, with rates presented separately for males and females.
Significant	Pertains to statistical significance unless otherwise noted; statistically significant at $P<0.05$ level (i.e. there is less than one in twenty probability that the difference seen is due to chance, although bias or confounding by factors that are unmeasured or inadequately allowed for cannot be ruled out). Note that lack of statistical significance does not exclude clinical significance or numerical difference and may simply reflect small sample sizes.
Stage	Cancer stage as defined using TNM 4th, 5th and 7th-edition criteria, for this report, based on the combination of T category (primary tumour), N category (regional nodal extension) and M (distant metastasis). Presented as early stage (stages I or II) and late stage (stages III or IV), excluding unknown stage.
Survival	In this report, 5-year net survival is a measure of cancer survival that estimates the probability of surviving at least five years after diagnosis, assuming cancer is the only possible cause of death. It adjusts for background mortality using an Irish population lifetable matched by sex, calendar year and attained age. In Stata, the *strs* command calculates net survival by comparing observed survival in cancer patients to expected survival from the lifetable, using the Pohar Perme estimator to account for competing risks and ensure unbiased estimates.
TNM	Tumour, node, metastasis (staging): TNM 7th-edition criteria used in this report, as well as TNM 4th and 5th editions for stage-standardised net survival estimates.

Plain Language Summary

Report - Urological Cancers in Ireland 1994-2023

Urological cancers include cancers of the prostate, testis, penis, kidney and bladder. They account for a substantial proportion of all cancers diagnosed in Ireland, particularly among men, with two in every five cancers in men being urological cancers. This report examines long-term trends in how often these cancers occur, the stage at which they are diagnosed, how they are treated, and how survival has changed over time. The picture painted by this comprerhensive analysis is a positive one of improved survival and new methods of diagnosis and treatment.

NCRI Data

The NCRI is the definitive source of cancer information in Ireland, collecting data on every new case of cancer since 1994. We gather information from all hospitals and cancer services across the country, public and private, and our data are used by government leaders, researchers and healthcare professionals to understand cancer in our communities and to plan services that reduce its impact.

For this report, we examined how many people were diagnosed with urological cancers, the stage at which these cancers were found, how many people died from them, and the treatments patients received within the first year after diagnosis. We also estimated net survival, which tells us the chance of surviving cancer itself after taking into account that people may die from other causes. In addition, we assessed how the introduction of Rapid Access Prostate Clinics influenced where and how prostate cancer was diagnosed.

What We Found

- Survival has improved across all five cancer types – prostate, testis, penis, kidney and bladder.
- Improved survival rates are due to advances in how these cancers are diagnosed, and advances in how these cancers are treated.
- More people are being diagnosed with urological cancers, but this is mainly due to Ireland's aging population. The underlying risk for most cancers is either stable or going down.
- There has been a modest increase in the incidence rate for penile cancer, and bladder cancer, even after adjusting for ageing.
- Treatments have shifted toward less invasive and more organ-preserving methods. Robotic-assisted surgery, kidney-sparing procedures, and conservative approaches for suitable prostate and penile cancers are now used more often, helping reduce side effects and improve recovery.
- Rapid Access Prostate Clinics have led to a clear shift in prostate cancer diagnosis toward designated cancer centres.

- Although an increase in early-stage prostate cancer diagnoses has been observed, a continued rise in Stage IV prostate cancer, was also seen.

Note on Rapid Access Prostate Clinics

- There are eight of these clinics across the country.
- Public-system diagnoses increasingly occur in these centres.
- Diagnosis patterns in private hospitals have shown little change.

Prostate Cancer

Prostate cancer is the most commonly diagnosed urological cancer in Ireland. Case numbers increased sharply from the mid-1990s due to widespread PSA testing, but incidence rates have remained stable in recent years. Survival is among the highest of any cancer type. Treatment has shifted toward robotic-assisted surgery and active surveillance for suitable low-risk cases.

RAPCs have centralised diagnosis within cancer centres, but Stage IV prostate cancer continues to rise, even after RAPCs were introduced, indicating that a proportion of men are still presenting with advanced disease.

Testicular Cancer

Testicular cancer primarily affects younger men. Incidence increased steadily until around 2007 and has since stabilised. Survival remains extremely high, with further improvements in recent years. Treatment continues to be largely surgical, with declining use of radiotherapy and systemic therapy in line with contemporary guidelines. Patterns remain stable across age groups, though small increases are seen in older men who still represent a minority of cases.

Penile and Other Male Genital Cancers

Although rare, penile and other male genital cancers have shown a consistent rise in age-standardised incidence rates, particularly among men aged 50–74 and in those under 50 where rates, although low, are increasing. Survival has improved over time. Treatment increasingly favours organ-preserving surgery, with greater use of local excision when clinically appropriate.

Kidney Cancer (including renal pelvis and ureter)

Kidney cancer incidence increased from the mid-1990s until around 2016 and has since levelled off. After adjusting for age, both incidence and mortality have shown small declines in more recent years. Survival has improved steadily across all groups. Treatment now features a strong shift toward kidney-sparing surgery, with partial nephrectomy increasing substantially over the study period. Rates of advanced-stage kidney cancer have remained broadly stable since 2014.

Bladder Cancer (invasive and NMIBC)

Bladder cancer case numbers have risen over time, and the age-standardised incidence rate has increased modestly. Case counts and crude rates are considerably higher in males than females, reflecting well-known sex differences in bladder cancer risk. More Stage I bladder cancers are now being recorded, while rates of later-stage disease have remained stable or declined slightly. Survival has remained relatively unchanged in recent years, with no meaningful improvement across the most recent diagnosis periods. Transurethral resection remains the main treatment, and the use of intravesical immunotherapy has increased.

1. Introduction

Globally, urological cancers are among the most diagnosed malignancies. In 2022 alone, there were an estimated 1.4 million new cases of prostate cancer, 614,000 cases of bladder cancer, and over 430,000 cases of kidney cancer worldwide (1).

Urological cancers constitute a substantial portion of the cancer burden in Ireland. These cancers collectively accounted for 39.5% of all invasive cancers diagnosed in males, 3.4% in females, and 22.7% of all invasive cancer cases overall between 2020 and 2022. Additionally, 16.8% of all non-malignant cancers in males during this period were attributable to non-muscle invasive bladder cancer (NMIBC), compared to 1.9% in females and 5.8% overall (2). For the purposes of this report, urological cancers are defined as malignancies of the urinary system—affecting both sexes (including bladder and kidney cancers)—and of the male reproductive system (including prostate, testicular, and penile cancers) (3).

Beyond incidence, urological cancers impose a considerable economic and personal burden. Bladder cancer alone cost the EU an estimated €4.9 billion in 2012, with €2.9 billion attributed to direct healthcare costs and the remainder due to productivity losses and informal care (4). These costs reflect the complexity of treatment, which often involves long-term surveillance, repeated interventions, and significant healthcare resource use. In Ireland, prostate cancer alone imposed an estimated healthcare cost burden of €45.6 million in 2010, driven by diagnosis, treatment, follow-up, and palliative care (5).

Urological cancers can significantly affect patients' quality of life across multiple domains. Prostate cancer often leads to urinary incontinence, sexual dysfunction, and fatigue, particularly following surgery or radiotherapy (6). Bladder cancer patients may experience frequent urination, urgency, and long-term catheter use, especially after invasive treatments such as cystectomy or repeated transurethral resections (7). Kidney cancer can result in chronic pain, fatigue, and reduced renal function, which may impair mobility, self-care, and the ability to carry out daily activities (8). Testicular cancer, though often curable, can cause psychological distress, body image concerns, and fertility issues in younger men (9). Penile cancer, while rare, is associated with profound physical and emotional consequences, including sexual dysfunction and stigma. These impacts underscore the need for holistic care approaches that address both physical and psychosocial wellbeing.

Given their high incidence, cost, and impact on patients, urological cancers warrant focused attention. This report aims to provide a comprehensive overview of these cancers in Ireland, offering insights into trends, treatment patterns, and outcomes to inform clinical practice and policy.

1.1. Advances in urological cancer treatments

Treatment strategies for urological cancers have evolved over the past decade, with increasing use of minimally invasive and organ-preserving techniques. In prostate cancer, robotic-assisted surgery has become the dominant surgical modality, while active surveillance and watchful waiting are now widely used for low-risk disease (10,11). For kidney cancer, partial nephrectomy has increased substantially, reflecting a shift toward nephron-sparing surgery (12). Bladder cancer management continues to centre on transurethral resection as the most frequently used treatment, with a gradual increase in the use of intravesical immunotherapy (13). For rarer cancers such as penile and testicular malignancies, there is growing emphasis on centralised referral pathways and conservative surgical approaches where clinically appropriate (14,15). These trends reflect a broader move toward risk-adapted, function-preserving care in urological oncology.

1.2. Diagnostic settings in the Irish healthcare system

In Ireland, individuals with suspected cancer may be assessed through one of three main healthcare settings: public hospitals, private hospitals, or cancer centres. Public hospitals, operated by the Health Service Executive (HSE), provide general diagnostic and outpatient services, though access to specialist care may be influenced by service demand and resource availability. Private hospitals offer diagnostic and treatment services, often with shorter waiting times, and are typically accessed through private health insurance or self-payment (16).

Cancer centres are public hospitals that have been enhanced to deliver comprehensive cancer care in line with national clinical guidelines. Their development was a key recommendation of the National Cancer Strategy 2006, which called for the centralisation of cancer services to improve quality and outcomes (17). In response, the National Cancer Control Programme (NCCP) was established in 2007, and by 2009, eight adult designated cancer centres had been identified and operationalised. These centres were selected based on their capacity to serve large populations and deliver multidisciplinary care, including surgery, radiotherapy, systemic therapy, and access to clinical trials (18).

Within these centres, the NCCP established Rapid Access Clinics for specific cancers such as prostate, breast and lung. These clinics are designed to provide structured, consultant-led diagnostic pathways that support timely assessment, promote consistency in clinical practice and enhance coordination within the public healthcare system.

1.3. Rapid Access Prostate Clinics

In 2009, the National Cancer Control Programme (NCCP) introduced Rapid Access Prostate Clinics (RAPCs) to improve the early diagnosis of prostate cancer in Ireland. These clinics were established in designated cancer centres to provide timely, specialist-led diagnostic assessment for men with suspected prostate cancer, particularly those aged 50 to 70 years, or younger if they had a family history (19).

Unlike traditional diagnostic pathways in public hospitals, RAPCs are embedded within cancer centres, ensuring access to consultant urologists, same-day imaging, and biopsy services. This centralised model enables more consistent diagnostic standards and facilitates multidisciplinary decision-making. Referrals are made electronically by GPs, allowing patients to bypass standard outpatient queues.

The introduction of RAPCs marked a shift from fragmented diagnostic services in public hospitals to a centralised, rapid-access model in cancer centres, aligning with national clinical guidelines and aiming to reduce diagnostic delays, improve staging at diagnosis, and enhance survival outcomes. However, not all prostate cancer patients are diagnosed through the RAPCs and the proportion of those seen in RAPCs is unknown. To date, there has been no evaluation of their impact trends and stage at diagnosis.

1.4. Aim

This report provides a comprehensive overview of urological cancer trends in Ireland from 1994 to 2023, drawing on population-based data from the National Cancer Registry Ireland (NCRI). It includes analyses of incidence, mortality, survival, and treatment patterns across major urological cancer sites. A particular focus is placed on prostate cancer and the effect of the introduction of RAPCs, introduced in 2009, on incidence and stage at diagnosis.

The following sections outline the epidemiological burden of each cancer type, describe changes in treatment modalities over time, and assess the influence of RAPCs on diagnostic patterns and staging. These findings aim to inform clinical practice, service planning, and policy development in the context of evolving cancer care in Ireland.

Specifically, we aim to:

1. Illustrate trends in incidence (1994-2023), mortality and survival (1994-2022) for urological cancers over time.
2. Characterise evolving treatment patterns using national data, to inform future planning of urological cancer services in Ireland.
3. Evaluate the impact of the introduction of RAPC on cancer incidence, stage at diagnosis and hospital type of diagnosis.

2. Methods

2.1. Cancer types for inclusion

Prostate cancer is defined using ICD-10 code C61, testis cancer using C62, and penile and other male genital cancers using codes C60 and C63. Kidney cancer, including cancers of the renal pelvis and ureter, is defined using codes C64 to C66.

Due to historical variations in coding practices at the NCRI, some bladder tumours with behaviour codes 1 (uncertain) and 2 (in situ) may have been recorded under the ICD-10 code C67 in the earlier years of cancer registration, which is typically reserved for malignant cases (behaviour 3). To account for this and ensure consistency in longitudinal analyses, this report adopts a broader definition of bladder cancer for examining incidence, survival, and treatment. Specifically, it includes malignant bladder cancer (C67), carcinoma in situ (D09.0, behaviour 2), and neoplasms of uncertain behaviour (D41.4, behaviour 1), collectively encompassing both muscle-invasive and non-muscle invasive bladder cancer (NMIBC).

2.2. TNM staging considerations

Since 2014, the NCRI has recorded tumour stage using the TNM7 classification system. Prior to this, staging was based on earlier versions, TNM4 and TNM5.

For prostate cancer, summary stage for cases diagnosed between 1994 and 2013 were retrospectively recoded to TNM7 criteria (20) using available clinical T, N, and M values to enable consistent comparisons over time for incidence, mortality, survival and treatment.

TNM4 & TNM5 summary stage values were used in the estimation of stage-standardised net-survival for penile and other male genital cancers, as well as stage-standardised and age-stage-standardised net-survival for kidney cancer including cancers of the renal pelvis and ureter.

2.3. Incidence & mortality

We used data from the National Cancer Registry Ireland (NCRI), and mortality data from the Central Statistics Office (CSO). Incidence and mortality rates were estimated by dividing the number of cases (including all age groups) by the total mid-year population and expressed as number of cases per 100,000 population (crude rate). Rates are reported separately for males and females. Mortality rates for bladder cancer are restricted to invasive bladder cancer (C67), as CSO mortality data do not capture tumour morphology or behaviour codes.

To account for differences in the age distribution of the population over time, these rates were standardised using the 2013 European Standard Population (ESP) (21) Age-standardisation is a key method for ensuring comparability, as crude rates or case counts can be misleading when comparing cancer patterns across countries, regions, or time periods due to demographic variation.

Trends in incidence and mortality were assessed using Joinpoint regression (22). Joinpoint regression determines inflection points where trends significantly change. The trend or slope between the inflection points was estimated using linear models and expressed as annual percentage change (APC). Age-standardised rates were plotted by year (1994–2023) and by sex where applicable. To provide context, case counts and crude rates per 100,000 population are presented alongside the age-standardised rates.

Age-specific trends are reported for all urological cancer sites for age groups <50, 50-64, 65-74 and 75+. Stage-specific incidence is also reported for prostate cancer (C61) from 1994 to 2020, kidney cancer including renal pelvis and ureter (C64–C66) from 2014 to 2020, and bladder cancer (C67) from 2014 to 2020.

Stage-specific incidence is presented for C67 bladder cancer. Incidence and treatment trends for C67 bladder cancer are provided separately alongside D09.0 & D41.4 NMIBC in Appendices 3 and 4.

2.4. Survival

Net survival estimates probability of a patient surviving a given time (from date of diagnosis to date of death / date the patient is last known to be alive) considering the mortality experience of the general population (estimated using an underlying population life table). It is the expected survival in the hypothetical situation in which cancer is the only possible cause of death that is adjusted for other causes of death using a lifetable. It measures the effect of the excess mortality associated with a cancer diagnosis. For this report, the lifetable for the Republic of Ireland provided by the CSO (23) was used.

Five-year survival probabilities for cases diagnosed in 1994-1998, 1999-2003, 2004-2008, 2009-2013 and 2014-2018 were estimated using cohort analysis, whereas period analysis was used to estimate survival for 2019-2022. Cohort survival represents the survival rates of individuals diagnosed in the period and followed up for the next 5-years. Period survival estimates the survival of patients diagnosed in the most recent period, even though they have not yet completed five-years follow-up. Period survival can be likened to life expectancy, where the projected lifespan of people born in a particular year is based on the mortality risk for that year. Similarly, period survival predicts the survival rates of patients diagnosed between 2019 and 2022.

Net survival is presented as unstandardised and standardised estimates

- Unstandardised net survival: crude estimates for all cases.
- Age-standardised net survival: adjusted for age distribution using International Cancer Survival Standard (ICSS) weights to allow comparison across time periods and populations (24).
- Stage-standardised net survival: adjusted for stage distribution to account for differences in case mix (25).
- Age-stage-standardised net survival: adjusted for both age and stage simultaneously for the most comparable estimates.

Unstandardised survival shows the overall improvement without adjustment, while age-standardisation accounts for changes in the age profile of patients over time. Stage-standardisation adjusts for shifts in stage at diagnosis.

Age- and stage- standardisation could not be done or are limited for testicular and penile cancers due to the relatively small number of incident cases for these sites. Stage-standardised survival could not be estimated for bladder cancers and NIMBC as only invasive cancers are staged.

Calculations used the 'strs' command in Stata with 'Pohar' option and estimates have been constrained so that net survival does not exceed 100% in any follow-up interval (26).

2.5. Treatments

All tumour-directed treatments were identified from the NCRI tumour management records from 2010 to 2022, along with records of active surveillance and watchful waiting (non-tumour-directed management) for prostate cancer. Only treatments recorded within 365 days of diagnosis were retained for analysis.

Each treatment modality reported was categorised into clinically relevant treatment categories. Each treatment type was assigned to one of these categories based on review and advice of clinical experts. The trends in treatments are presented in summary graphs showing the number of patients receiving medical oncology, radiotherapy, or surgery within one year of diagnosis. A patient may have received more than one treatment in the year following diagnosis. For prostate cancer, treatment categories were also presented by stage at diagnosis and age group at diagnosis.

2.6. Impact of rapid access prostate clinics

To explore the effect of RAPCs on prostate cancer diagnosis, the numbers of patients with prostate cancer (aged 50-70) were aggregated by calendar quarter of diagnosis to create a time series. The counts, rates and trend in the pre-implementation period (2000-2008) were described and compared to those observed after the RAPCs were established (2009-2019, implementation period).

A comparative interrupted time series analysis (ITSA) was carried out using negative binomial regression applied to the quarterly number of patients diagnosed with prostate cancer (27). The Irish male population (aged 50-70) was included as an offset. The model fitted separate log-link segments to the pre- and post-implementation trends allowing estimation of the change in trends. We have not included 2020 and later years in our analysis, as these years were impacted by the Covid-19 pandemic, and including them would obscure the results.

The analysis was then repeated to estimate the effect of RAPCs on the stage of prostate cancer diagnosis and on hospital type at diagnosis. Two separate models were fitted: one including a three-way interaction between time, period, and stage at diagnosis, and another including a three-way interaction between time, period, and hospital type of diagnosis. This allowed for the estimation of both the immediate change in diagnosis

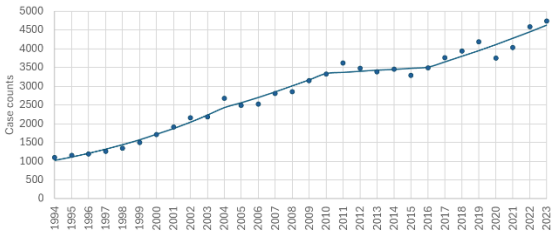
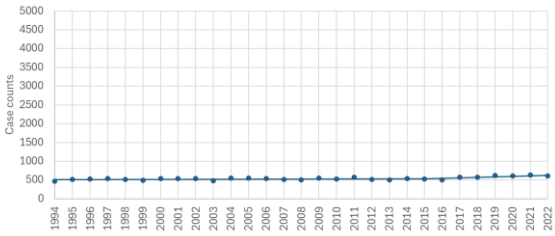
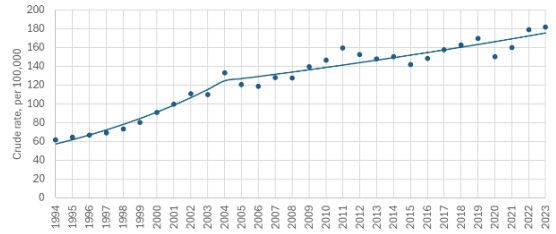
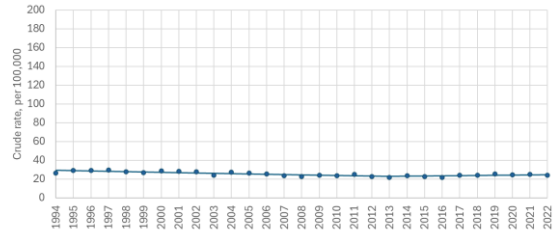
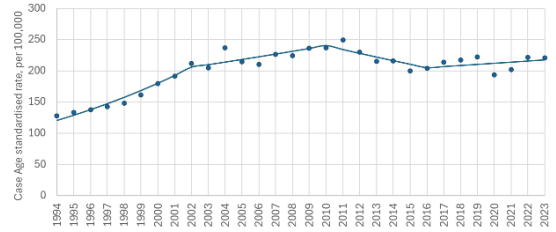
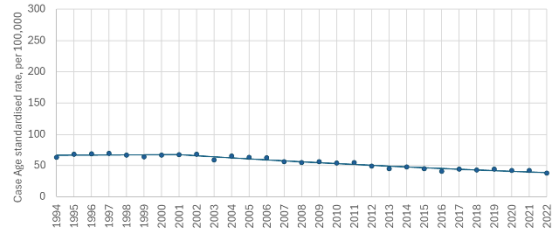
rates when RAPCs were introduced and any change in trend over time, as well as the migration of diagnoses in the Irish health system.

To contextualise the impact of RAPCs in the target age group, we conducted a sensitivity analysis including male prostate cancer patients of all ages at diagnosis, using the same ITS approach. Results were compared to see if the effects were more pronounced in the RAPC target group.

3. Results – Prostate Cancer C61

3.1. Incidence & Mortality

Figure 3.1.
Prostate cancer (C61) trends: case counts, crude rate and age -standardised rate 1994-2023 (1994-2022 for mortality)

	Incidence	Mortality
Cases		
	Sex / Period / APC% / 95% CI / Trend M 1994-2004 9.1 7.5, 10.6 up M 2004-2010 5.5 2.3, 8.7 up M 2010-2016 0.8 -1.9, 3.6 flat M 2016-2023 4 2.5, 5.6 up	**Sex / Period / APC% / 95% CI / Trend** M 1994-2015 0.2 -0.1, 0.6 flat M 2015-2022 2.2 0.8, 3.7 up
Crude rate per 100,000		
	Sex / Period / APC% / 95% CI / Trend M 1994-2004 8.1 6.2, 10.0 up M 2004-2023 1.8 1.4, 2.3 up	**Sex / Period / APC% / 95% CI / Trend** M 1994-2013 -1.3 -1.8, -0.9 down M 2013-2022 0.8 -0.2, 1.9 flat
Age standardised Rate per 100,000		
	Sex / Period / APC% / 95% CI / Trend M 1994-2002 6.9 4.5, 9.3 up M 2002-2010 2 0.0, 4.0 flat M 2010-2016 -2.6 -5.3, 0.2 flat M 2016-2023 0.8 -0.7, 2.4 flat	**Sex / Period / APC% / 95% CI / Trend** M 1994-2001 0.2 -1.7, 2.1 flat M 2001-2022 -2.6 -2.9, -2.3 down

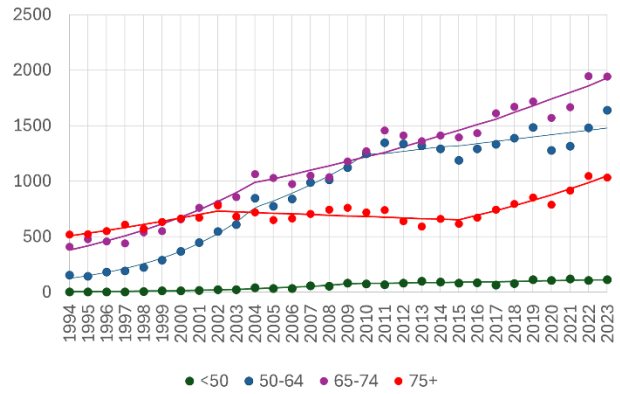
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

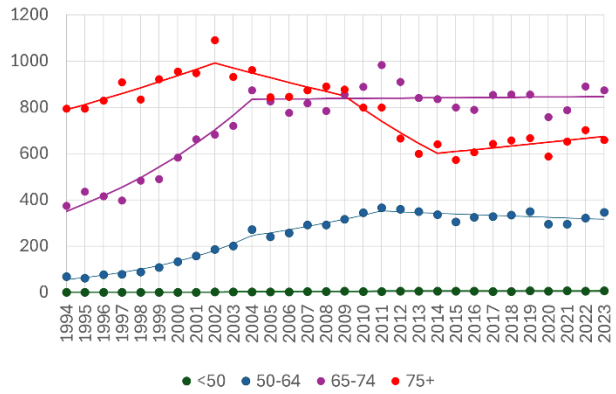
Figure 3.1 presents the number of cases, crude rates per 100,000, and age-standardised rates per 100,000 for C61 prostate cancer incidence (1994–2023) and mortality (1994–2022). The crude incidence rate rose steadily from 1994 to 2023, with an average annual percentage change (APC) of 8.1% from 1994–2004 and 1.8% from 2004–2023. However, when adjusted for age using the 2013 European Standard Population, this upward trend flattens from 2002 onwards. In contrast, the age-standardised mortality rate has declined between 2001 and 2022.

3.2. Incidence by age group

Figure 3.2

Prostate cancer (C61) trends: case counts and age specific incidence rate by age group (1994-2023)





Age Group	Case Counts				Age specific incidence per 100,000			
<50	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2009	19.3	16.2,26.0	up	1994-2009	17.6	14.4,24.1	up
	2009-2023	2.8	0.9,4.4	up	2009-2023	2.4	0.6,4.1	up
	AAPC% (95% CI) = 11.0 (9.9, 13.3)				AAPC% (95% CI) = 10.0 (8.8, 12.3)			
50-64	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2004	19.7	17.2,25.9	up	1994-2004	16.1	13.8,21.1	up
	2004-2010	8.5	3.9,13.9	up	2004-2011	5.3	2.3,8.9	up
	2010-2023	1.4	0.1,2.2	up	2011-2023	-0.9	-2.1,-0.1	down
	AAPC% (95% CI) = 8.9 (8.3, 9.8)				AAPC% (95% CI) = 6.2 (5.7, 7.1)			
65-74	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2004	10	8.0,13.7	up	1994-2004	9.1	7.0,12.4	up
	2004-2023	3.6	2.9,4.1	up	2004-2023	0.1	-0.6,0.6	flat
	AAPC% (95% CI) = 5.7 (5.3, 6.5)				AAPC% (95% CI) = 3.1 (2.6, 3.8)			
75+	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2002	4.6	2.7,8.2	up	1994-2002	2.9	0.5,6.6	up
	2002-2015	-0.9	-3.8,0.1	flat	2002-2009	-2.2	-5.4,3.6	flat
	2015-2023	6.1	4.2,9.5	up	2009-2014	-6.7	-8.5,-0.8	down
					2014-2023	1.3	-0.1,4.0	flat
	AAPC% (95% CI) = 2.5 (2.1, 3.1)				AAPC% (95% CI) = -0.5 (-0.9, -0.0)			

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Prostate cancer case counts have increased substantially over time (Figure 3.2). For men aged 50–64, case counts rose sharply between 1994 and 2004 (APC: +19.7%, 95% CI: 17.2–25.9), followed by slower growth thereafter. Similar upward trends were observed in the 65–74 and 75+ age groups, though the rate of increase moderated in recent years. The fastest long-term rise occurred in men under 50, with an average annual percentage change (AAPC) of +11.0% (95% CI: 9.9, 13.3) for case counts. This

translates to 5 men diagnosed in 1994, increasing to 115 men in 2023 in the under 50 age group.

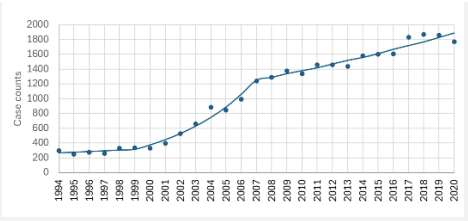
Prostate cancer crude incidence rates have shown marked changes over time, with the fastest increases occurring before 2010 and more recent stabilization or decline in older age groups. For men under 50, rates rose sharply from 1994, with an AAPC of +10.0% (95% CI: 8.8, 12.3), reflecting sustained growth across the entire period. Among men aged 50–64, incidence increased significantly until 2004 (APC +16.1%), slowed thereafter, and declined after 2011, resulting in an overall AAPC of +2.6% (95% CI: 2.5, 7.1). For ages 65–74, rates rose until 2004 (APC +9.1%) but then flattened, giving an AAPC of +0.3% (95% CI: –1.2, 6.8).

In contrast, crude incidence rates in men aged 75+ declined, with an AAPC of –0.5% (95% CI: –1.9, 0.0), despite modest increases in case counts. These patterns suggest that while prostate cancer detection surged in younger and middle-aged men during the PSA testing era, incidence rates have stabilised or fallen in older men.

3.3. Incidence by stage

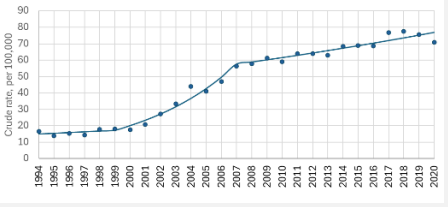
Figure 3.3
Prostate cancer (C61) 1994-2020: trends in case counts, crude rate and age standardised rate, by stage

stage I



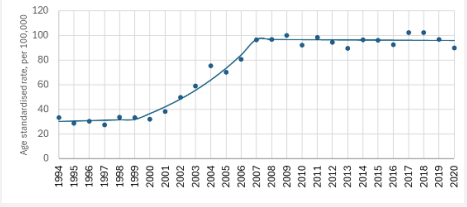
Period	APC%	95% CI	Trend
1994-1999	3.4	-4.6,12.3	flat
1999-2007	18.9	15.5,26.4	up
2007-2020	3.2	2.2,4.2	up

AAPC% (95% CI) = 7.8 (7.1, 9.2)



Period	APC%	95% CI	Trend
1994-1999	2.9	-4.9,10.9	flat
1999-2007	16.3	13.0,22.6	up
2007-2020	2.3	1.2,3.2	up

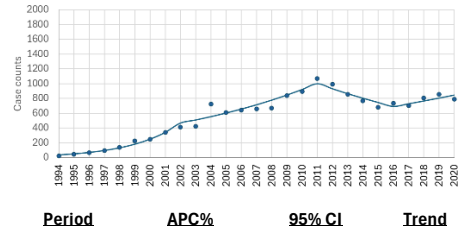
AAPC% (95% CI) = 6.5 (5.8, 7.7)



Period	APC%	95% CI	Trend
1994-1999	1.1	-6.2,8.6	flat
1999-2007	14.8	11.7,21.0	up
2007-2020	-0.1	-1.0,0.8	flat

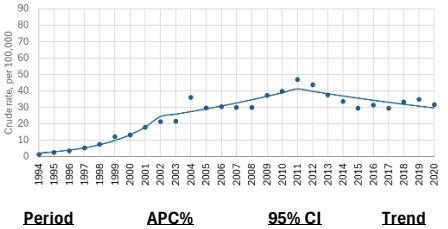
AAPC% (95% CI) = 4.5 (3.8, 5.7)

stage II



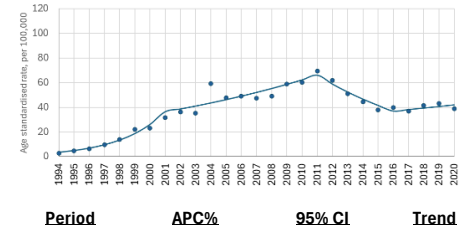
Period	APC%	95% CI	Trend
1994-2002	36.9	28.9,61.0	up
2002-2011	8.8	6.5,17.4	up
2011-2016	-7.1	-10.6,5.4	flat
2016-2020	5.1	-2.7,11.2	flat

AAPC% (95% CI) = 12.7 (11.1, 16.0)



Period	APC%	95% CI	Trend
1994-2002	35.6	26.5,62.0	up
2002-2011	6	2.7,12.2	up
2011-2020	-3.6	-8.3,-1.3	down

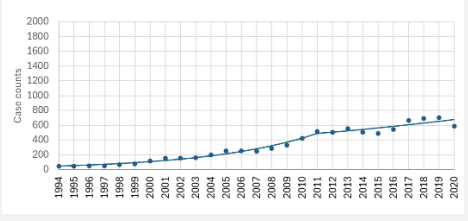
AAPC% (95% CI) = 10.6 (8.9, 14.5)



Period	APC%	95% CI	Trend
1994-2001	39.4	28.2,71.0	up
2001-2011	6.1	3.8,10.8	up
2011-2016	-10.9	-14.2,-5.7	down
2016-2020	3.2	-4.2,9.3	flat

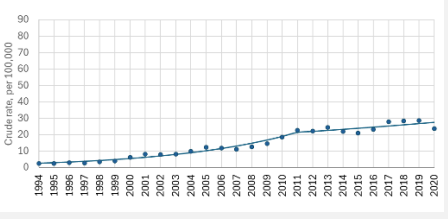
AAPC% (95% CI) = 10.0 (8.1, 13.2)

stage III



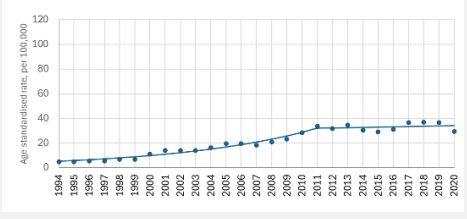
Period	APC%	95% CI	Trend
1994-2011	14.8	13.0,18.7	up
2011-2020	3.7	0.3,6.3	up

AAPC% (95% CI) = 10.8 (9.9, 12.7)



Period	APC%	95% CI	Trend
1994-2011	13	11.2,17.5	up
2011-2020	2.8	-1.2,5.7	flat

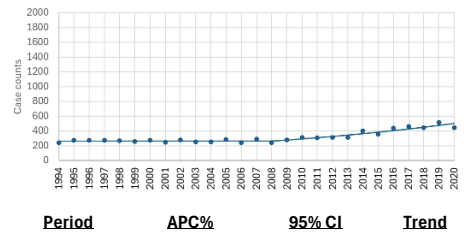
AAPC% (95% CI) = 9.4 (8.4, 11.4)



Period	APC%	95% CI	Trend
1994-2011	11.4	9.7,15.1	up
2011-2020	0.7	-2.5,3.2	flat

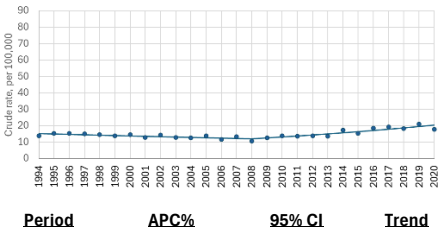
AAPC% (95% CI) = 7.6 (6.7, 9.3)

stage IV



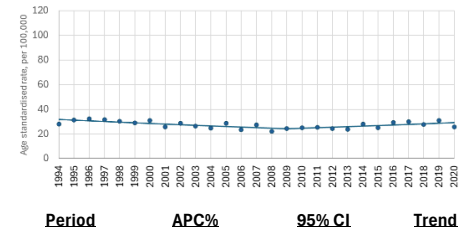
Period	APC%	95% CI	Trend
1994-2008	0	-2.3,1.3	flat
2008-2020	5.4	4.0,8.1	up

AAPC% (95% CI) = 2.5 (1.9, 3.1)



Period	APC%	95% CI	Trend
1994-2008	-1.6	-4.5,-0.2	down
2008-2020	4.4	2.7,7.7	up

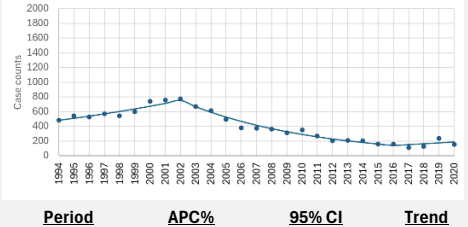
AAPC% (95% CI) = 1.1 (0.5, 1.8)



Period	APC%	95% CI	Trend
1994-2009	-1.8	-6.3,-0.5	down
2009-2020	1.7	0.1,6.2	up

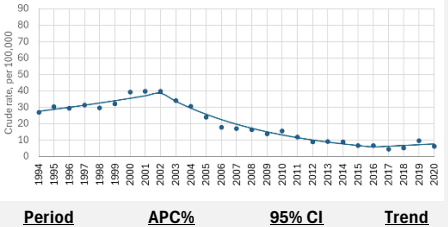
AAPC% (95% CI) = -0.3 (-1.0, 0.3)

stage X



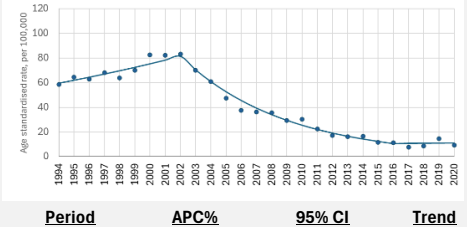
Period	APC%	95% CI	Trend
1994-2002	5.7	2.8,9.7	up
2002-2016	-11.2	-15.7,-9.9	down
2016-2020	7.3	-6.6,15.3	flat

AAPC% (95% CI) = -3.5 (-5.1, -2.6)



Period	APC%	95% CI	Trend
1994-2002	4.3	1.3,8.4	up
2002-2016	-12.6	-17.1,-11.3	down
2016-2020	7	-7.7,15.4	flat

AAPC% (95% CI) = -4.8 (-6.4, -3.8)



Period	APC%	95% CI	Trend
1994-2002	4	1.5,7.1	up
2002-2016	-13.5	-16.4,-12.4	down
2016-2020	0.9	-9.5,7.8	flat

AAPC% (95% CI) = -6.3 (-7.4, -5.5)

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.

Figure 3.3 illustrates long-term trends in prostate cancer incidence in Ireland by stage at diagnosis (I–IV and unstaged), using three metrics: case counts, crude rates per 100,000 population, and age-standardised rates per 100,000 population.

Stage I shows a marked and sustained increase in crude rates from 1999–2007 (APC 16.3%, 95% CI: 13.0–22.6), followed by a slower rise. Age-standardised rates rose sharply until around 2007, after which they stabilized. The difference in the crude and age-standardised rates reflects population aging.

Stage II crude rate rose steeply from 1994–2002 (APC 35.6%, 95% CI: 26.5–62.0), then declined between 2011–2020 (APC –3.6%, 95% CI: –8.3 to -1.3).

Stage III and Stage IV both exhibit steady increases in case counts and crude rates over the study period. For stage III, age-standardised rates remained relatively flat, while stage IV showed a slight upward trend, suggesting that the rise in crude rates may be largely attributable to population aging. There has been a persistent increase in the number of men presenting with Stage IV prostate cancer from 2008-2020 (APC 5.4%, 95% CI: 4.0 to 8.1).

The proportion of unstaged cases (Stage X) dropped significantly from 2002–2016 (APC –11.2%, 95% CI: –15.7 to –9.9). This trend suggests improvement in data quality.

3.4. Survival

Figure 3.4
Prostate cancer (C61): 5-year net survival (%) over six consecutive diagnosis periods

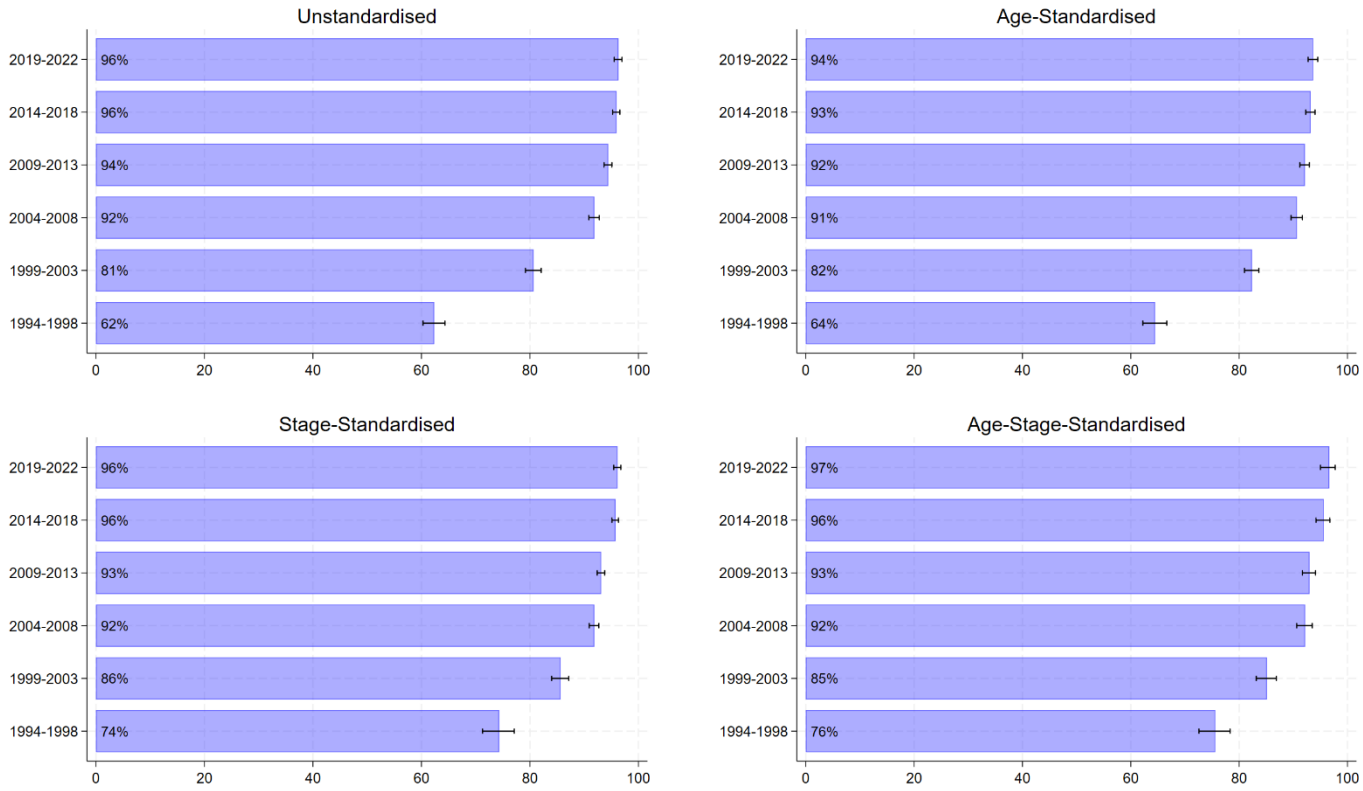


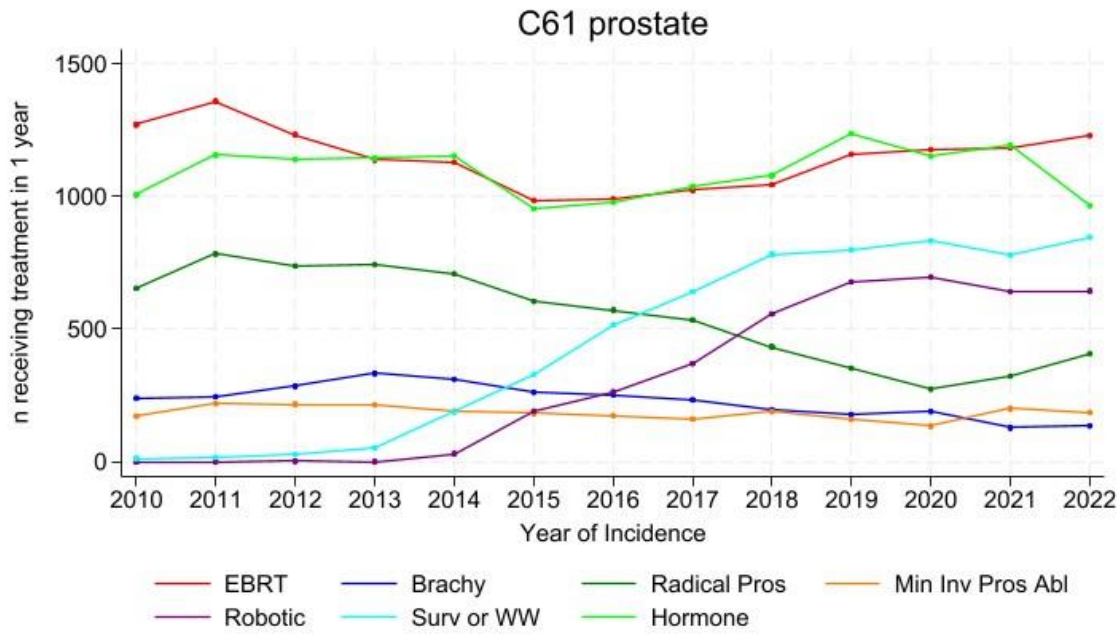
Figure 3.4 shows a clear improvement in 5-year net survival for prostate cancer in Ireland across six diagnosis periods (1994- 2022) before and after adjustment for age and stage distributions in the population.

Across all measures, survival increased substantially, with age-stage-standardised survival rising from 76% in 1994–1998 to 97% in 2019–2022, with the largest gains occurring between the first two periods (76% to 85%) and continuing steadily thereafter.

3.5. Treatment (2010-2022)

Figure 3.5
Prostate (C61): Treatment – All Stage (2010-2022)

Detailed



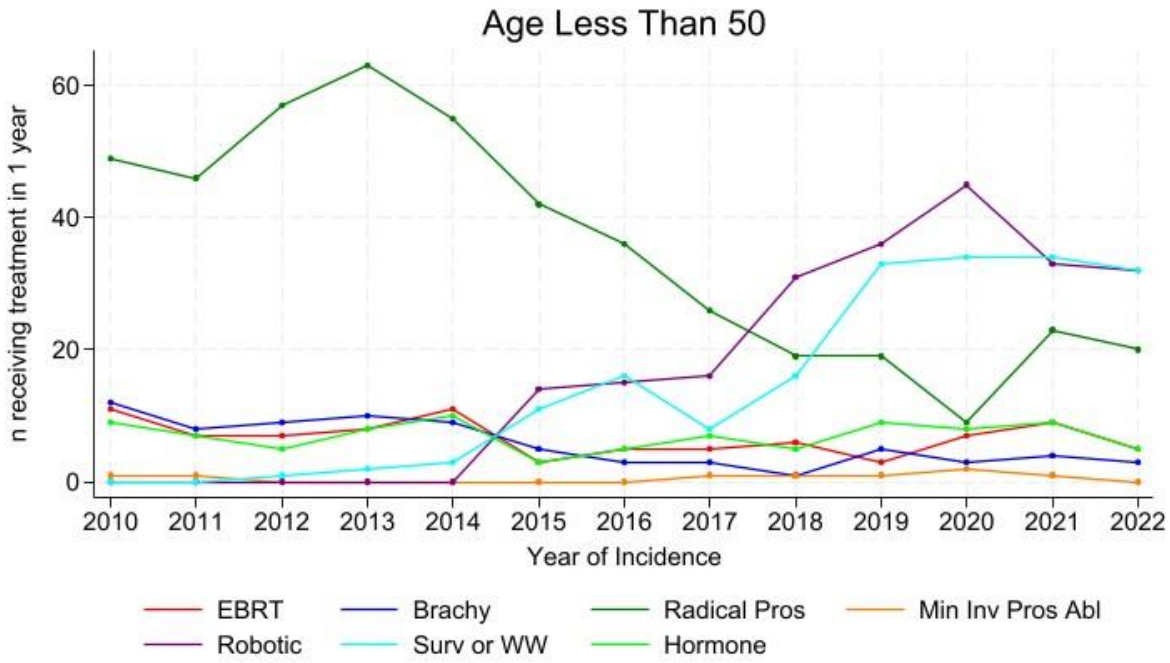
- EBRT = External Beam Radiation Therapy
- Brachy = Brachytherapy
- Radical Pros = Open Radical Prostatectomy
- Min Inv Pros Abl = Minimally Invasive Prostate Ablation
- Robotic = Robotic Assisted Radical Prostatectomy
- Surv or WW = Surveillance or Watchful Waiting

EBRT remains the most common treatment modality, with a gradual drop and recovery observed. This coincides with an increase in watchful waiting/active surveillance, from just 12 cases in 2010 to 848 in 2022, reflecting a shift toward conservative management for low-risk disease. Robotic assisted radical prostatectomy has rapidly increased since 2013, becoming the dominant surgical modality by 2022. Open radical prostatectomy volumes have declined over time, from 783 cases in 2011 to 407 in 2022, possibly due to increased use of robotic techniques and active surveillance/watchful waiting. Hormone therapy remains consistently used across all years (figure 3.5).

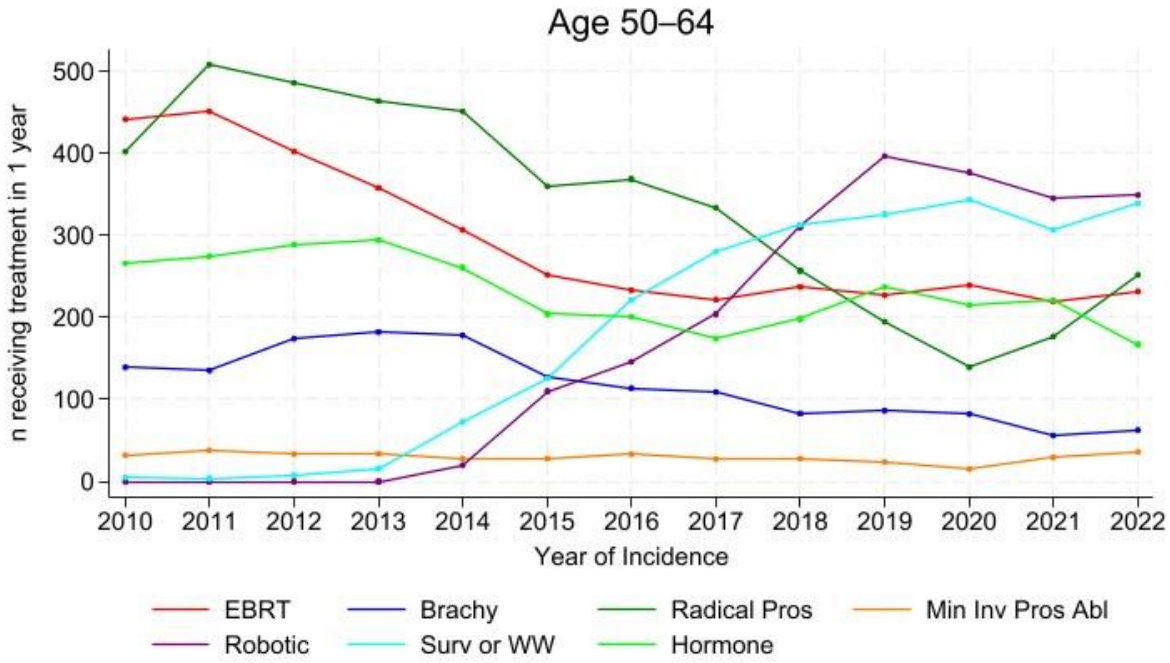
3.6. Treatment by age group (2010-2022)

Figure 3.6
Prostate (C61): Treatment – By age group (2010-2020)

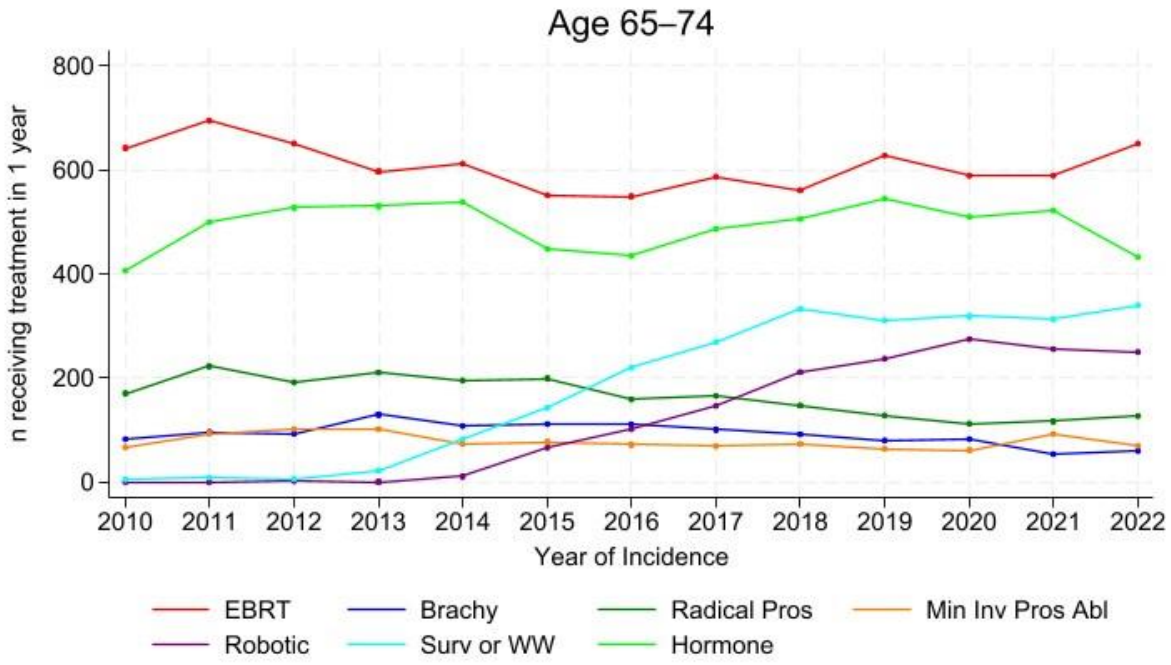
<50



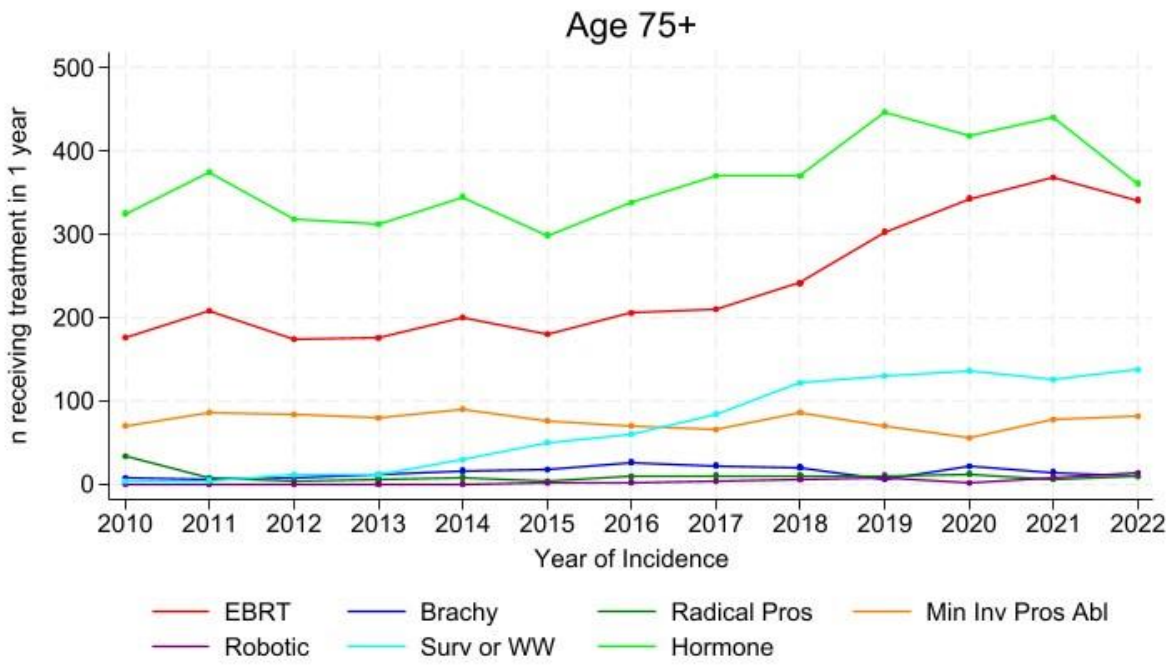
50-64



65-74



75+



- EBRT = External Beam Radiation Therapy
- Brachy = Brachytherapy
- Radical Pros = Open Radical Prostatectomy
- Min Inv Pros Abl = Minimally Invasive Prostate Ablation
- Robotic = Robotic Assisted Radical Prostatectomy
- Surv or WW = Surveillance or Watchful Waiting

Treatment patterns for prostate cancer between 2010 and 2022 varied considerably by age (Figure 3.6). In men under 50, open radical prostatectomy peaked in 2013 but declined sharply thereafter, with robotic assisted radical prostatectomy and active surveillance/watchful waiting becoming more common.

A similar downward trend in open radical prostatectomy was observed in the 50–64 age group, accompanied by a gradual rise in robotic assisted radical prostatectomy and active surveillance/watchful waiting.

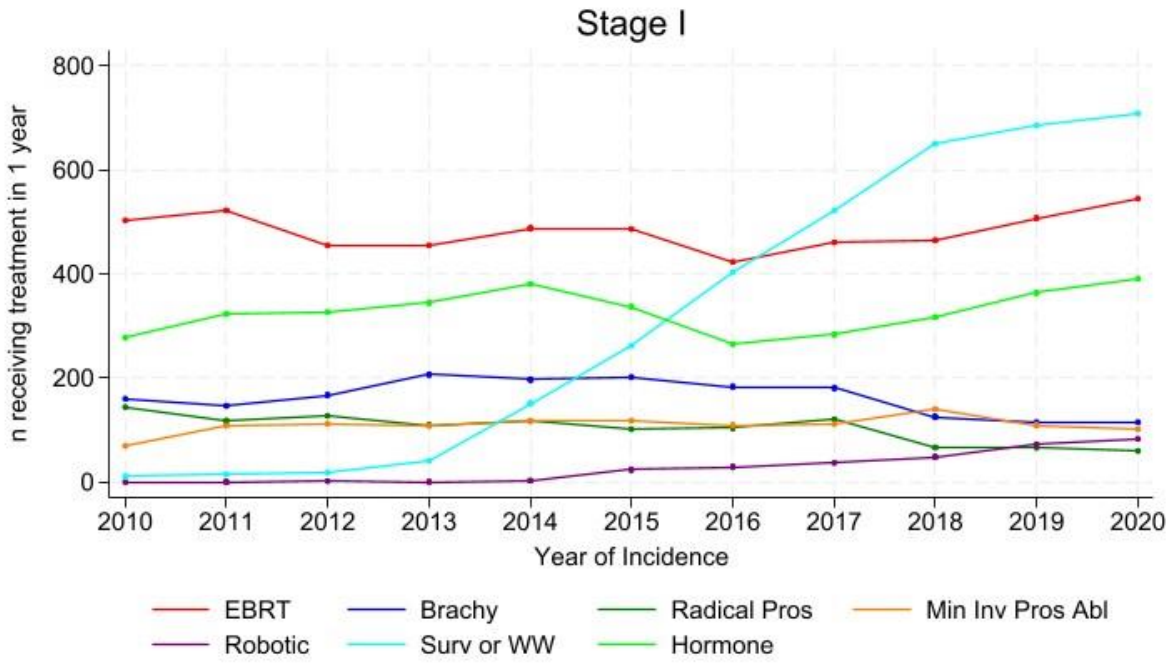
Among men aged 65–74, EBRT remained the predominant treatment throughout (consistently over 500 cases per year), while hormone therapy was also frequently used; robotic assisted radical prostatectomy and active surveillance/watchful waiting showed modest increases.

In the oldest group (75+), EBRT and hormone therapy were the main treatments, with EBRT increasing from 176 to 341 cases and hormone therapy consistently exceeding 130 cases annually, while surgical interventions were rare. Although active surveillance/watchful waiting increased among men aged 75+, the growth was modest relative to younger cohorts.

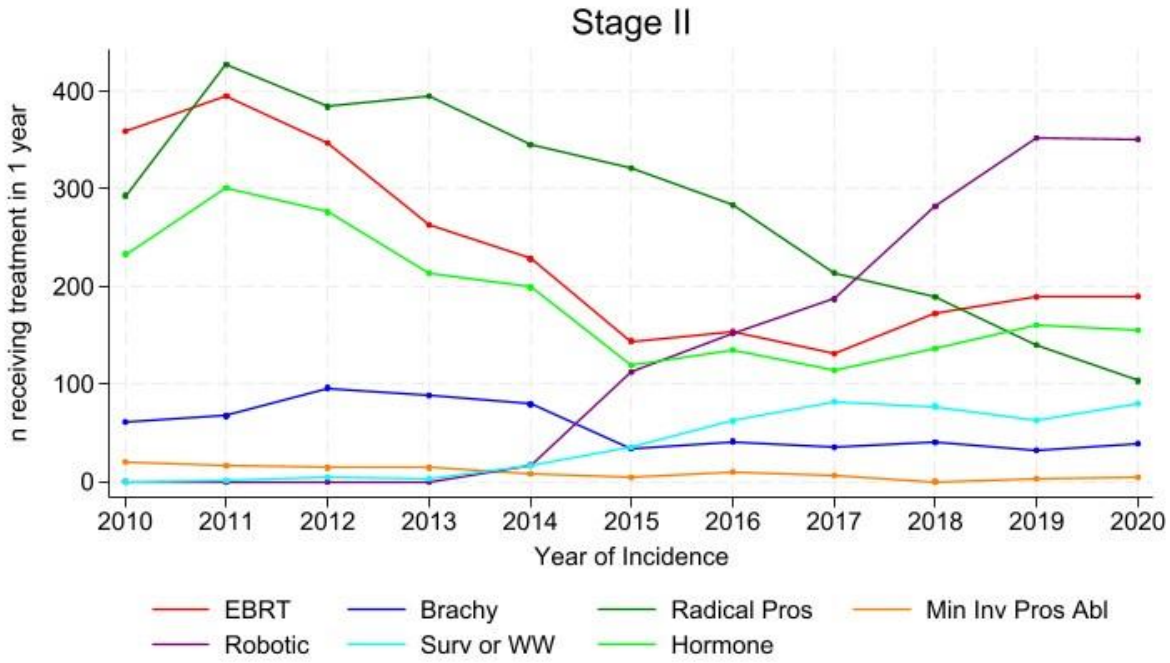
3.7. Treatment by stage (2010-2020)

Figure 3.7
Prostate (C61): Treatment – By Stage (2010-2020)

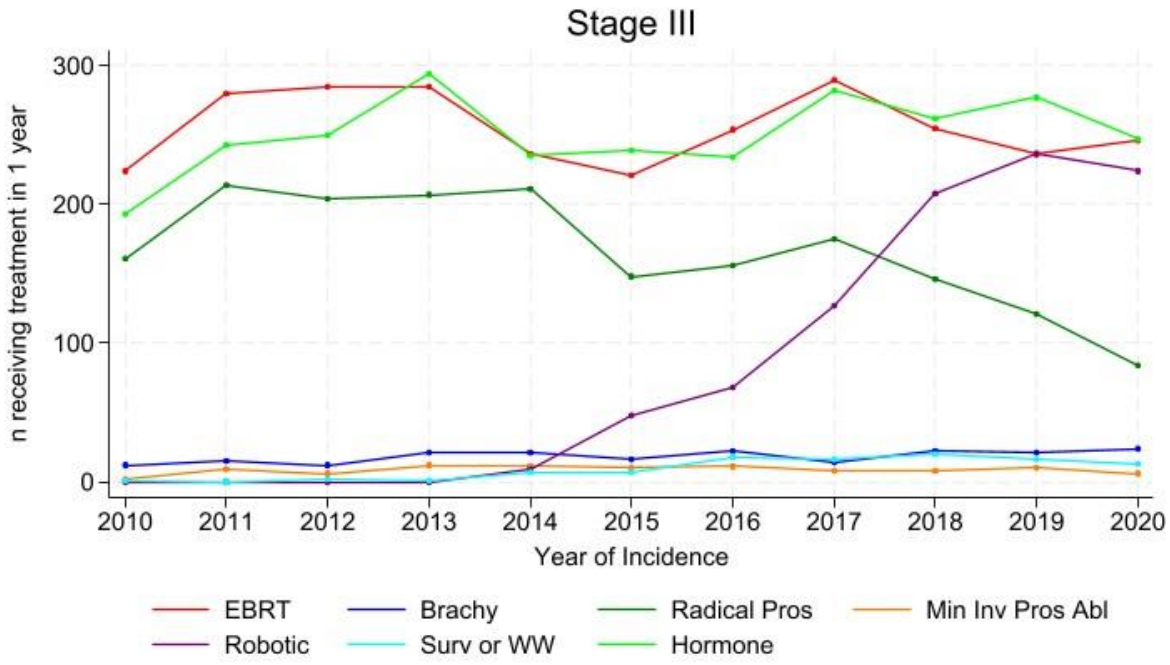
Stage I



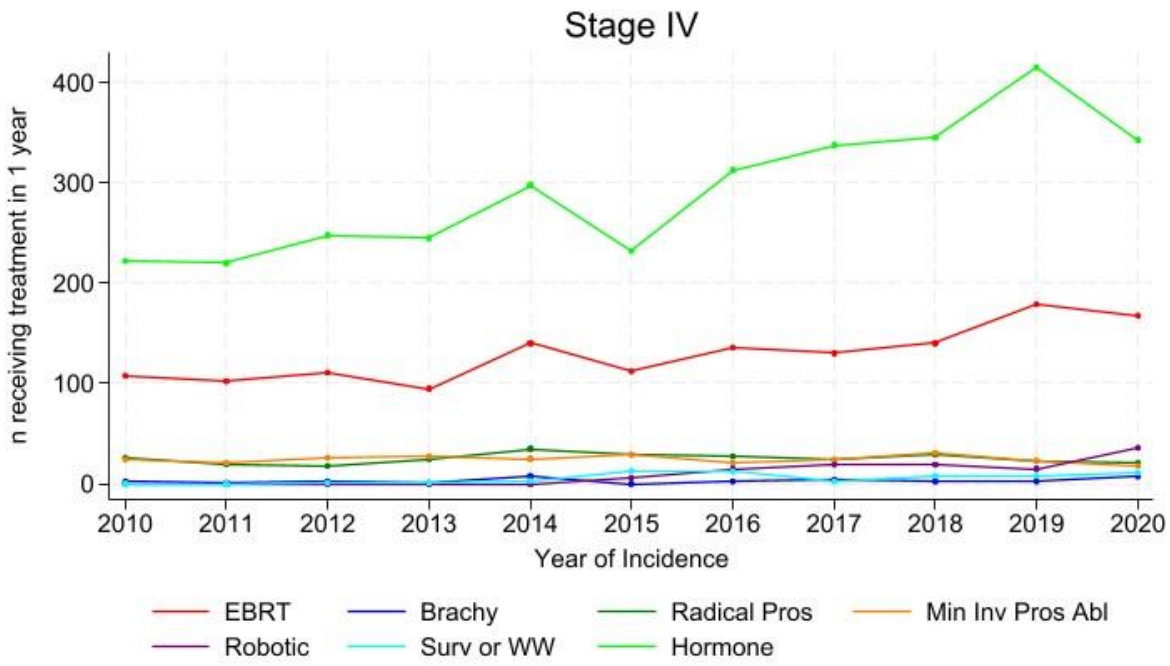
Stage II



Stage III



Stage IV



- EBRT = External Beam Radiation Therapy
- Brachy = Brachytherapy
- Radical Pros = Open Radical Prostatectomy
- Min Inv Pros Abl = Minimally Invasive Prostate Ablation
- Robotic = Robotic Assisted Radical Prostatectomy
- Surv or WW = Surveillance or Watchful Waiting

Figure 3.7 illustrates treatment patterns for prostate cancer across stages. For Stage I, the use of active surveillance/watchful waiting as a method of monitoring disease progression has steadily increased, surpassing EBRT in 2017.

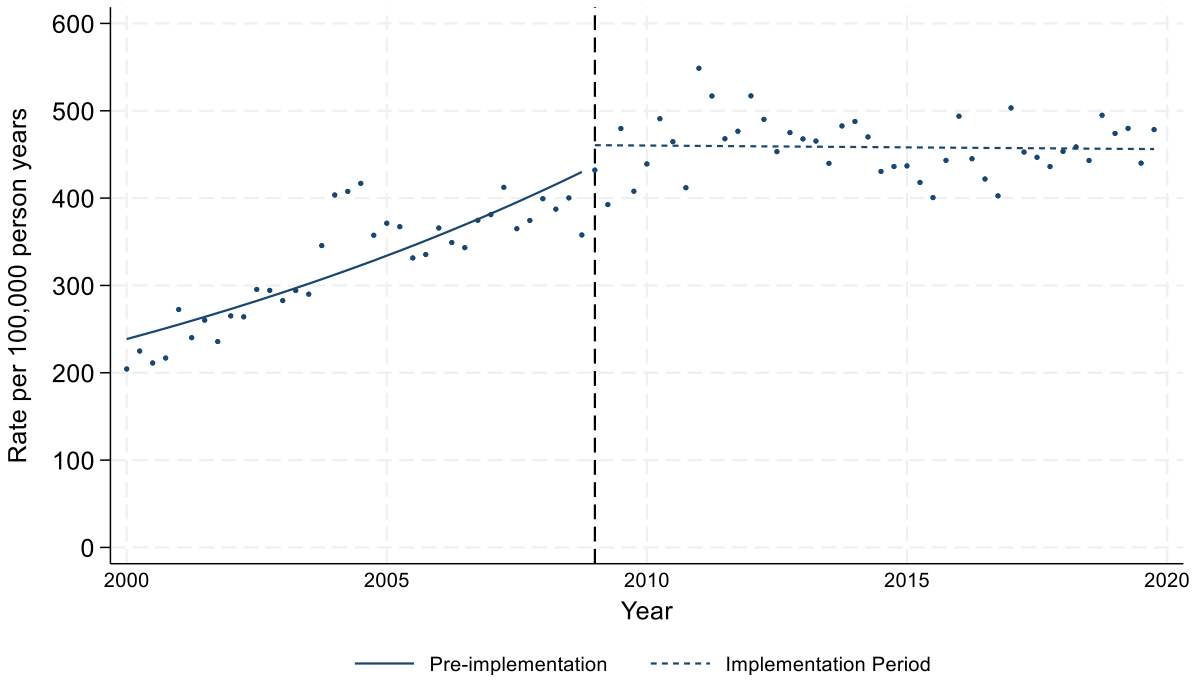
In Stage II, open radical prostatectomy has declined, with robotic assisted radical prostatectomy emerging as the dominant tumour-directed surgical approach. EBRT and hormone therapy peaked around 2011 and have since decreased in usage.

A similar shift is observed in Stage III, where robotic assisted radical prostatectomy has increased while open radical prostatectomy has declined, placing it alongside EBRT and hormone therapy as the most frequently administered treatments. For Stage IV disease, hormone therapy remains the most used treatment modality.

3.8. Impact of RAPCs on Prostate Cancer Diagnosis - aged 50-70

Figure 3.8:
Prostate (C61): Impact of Rapid Access Clinics on diagnosis (aged 50-70)

All Stage



Case numbers and crude incidence rates pre- and post-implementation

	Case numbers		Crude Incidence Rates*	
	mean (range)		mean (range)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
All Stage	321 (179-435)	570 (437-669)	325.0 (204.4-416.9)	458.4 (392.6-548.7)
*Quarterly rates per 100,000 person years across the period				

Relative trend in incidence rates (slope IRR) pre- and post-implementation:

	Percentage change in incidence rate per quarter (95% CI)		Slope IRR (95% CI)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
All Stage	1.7% (1.4%, 2.0%)	0.0% (-0.2%, 0.2%)	1.017 (1.014, 1.020)	1.000 (0.998, 1.002)

Figure 3.8 presents model estimates from an interrupted time series analysis examining changes in prostate cancer diagnoses in men aged 50-70 following the introduction of RAPCs in Ireland.

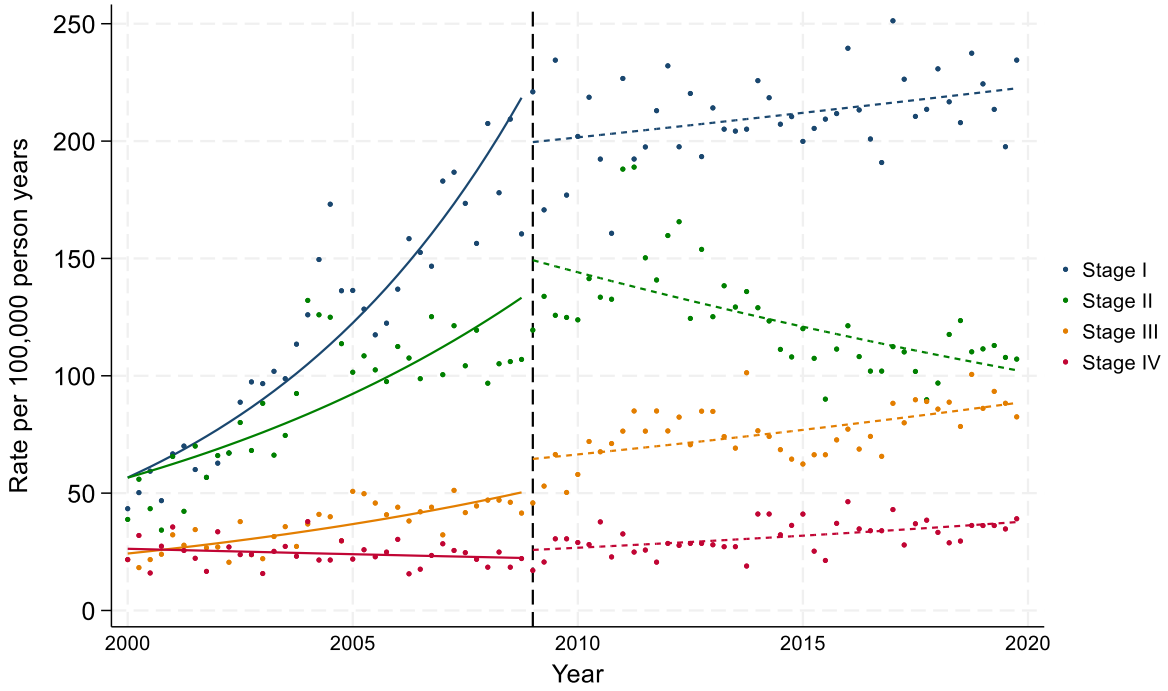
More cases were diagnosed quarterly during the implementation period (mean=570) than before RAPCs were implemented (mean=321), with wide variability in the number of cases observed between quarters in both periods. Between the two periods, crude incidence rates increased from a quarterly average of 325.0 per 100,000 person years pre-implementation to 458.4 per 100,000 person years post-implementation.

On the relative scale, incidence rates were increasing prior to implementation (slope IRR = 1.017; 1.7% increase per quarter). During the implementation period, the estimated trend was stable (slope IRR = 1.000), corresponding to no meaningful quarterly increase. Although the number of diagnoses was higher during implementation, the underlying rate of change over time flattened, with quarterly incidence remaining steady following the introduction of RAPCs.

3.9. Impact of RAPCs on Stage at Prostate Cancer Diagnosis (Stage) - aged 50-70

Figure 3.9:
Prostate (C61): Impact of Rapid Access Clinics on stage at diagnosis (aged 50-70)

Stage I-IV



Case numbers and crude incidence rates pre- and post-implementation

	Case numbers		Crude Incidence Rates*	
	mean (range)		mean (range)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Stage I	120 (38-227)	263 (183-333)	120.0 (43.4-209.4)	210.8 (160.7-251.3)
Stage II	89 (30-129)	154 (114-220)	89.5 (34.2-132.1)	124.4 (89.8-188.9)
Stage III	35 (16-54)	95 (51-136)	35.7 (18.3-51.2)	75.9 (45.8-101.3)
Stage IV	24 (14-37)	39 (19-60)	24.3 (15.6-37.9)	31.4 (17.1-46.4)

*Quarterly rates per 100,000 person years across the period

Relative trend in incidence rates (slope IRR) pre- and post-implementation:

	Percentage change in incidence rate per quarter (95% CI)		Slope IRR (95% CI)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Stage I	3.9% (3.4%, 4.5%)	0.3% (0.0%, 0.5%)	1.039 (1.034, 1.045)	1.003 (1.000, 1.005)
Stage II	2.5% (1.8%, 3.2%)	-0.9% (-1.2%, -0.6%)	1.025 (1.018, 1.032)	0.991 (0.988, 0.994)
Stage III	2.1% (1.6%, 2.6%)	0.7% (0.4%, 1.0%)	1.021 (1.016, 1.026)	1.007 (1.004, 1.010)
Stage IV	-0.5% (-1.1%, 0.2%)	0.9% (0.5%, 1.3%)	0.995 (0.989, 1.002)	1.009 (1.005, 1.013)

Figure 3.9 presents the results of an interrupted time series analysis examining how the distribution of prostate cancer stage at diagnosis among men aged 50–70 years changed before and during the implementation of RAPCs.

Across all stages, both case numbers and incidence rates were higher during the implementation period compared to the pre-implementation period. Stage I cancers showed the largest absolute increase in mean quarterly diagnoses (+143, from 120 to 263), whereas Stage III had the greatest proportional rise (+171.4%). Stage IV cancers experienced the smallest change (+15, from 24 to 39). Crude incidence rates followed the same pattern, rising across all stages during the implementation period.

On the relative scale, there were distinct differences in quarterly trends by stage. Before implementation, incidence rates were increasing for Stages I–III, with quarterly percentage changes of 3.9%, 2.5%, and 2.1%, respectively (slope IRRs 1.039, 1.025, and 1.021). Stage IV incidence showed a slight decline prior to implementation (–0.5%; slope IRR 0.995), with confidence intervals consistent with a relatively flat trend.

During the implementation period, quarterly trends shifted in different directions depending on stage. For Stage I cancers, the positive pre-implementation trend flattened to 0.3% per quarter (slope IRR 1.003). In Stage II, the quarterly trend changed from a positive to a negative direction, with incidence rates decreasing by 0.9% per quarter (slope IRR 0.991). For Stages III and IV, upward trends were observed during the implementation period, with increases of 0.7% and 0.9% per quarter (slope IRRs 1.007 and 1.009).

These findings are mirrored in the sensitivity analysis (Appendix 4, Figures 15.1–15.3), where patients of all ages diagnosed with prostate cancer show similar stage-specific trends. Importantly, there was no evidence of a reduction in late-stage (Stage III and IV) prostate cancer diagnoses following RAPC implementation in the 50-70 cohort or in the unrestricted age group.

3.10. Impact of RAPCs on Prostate Cancer Diagnosis (Hospital Type) - aged 50-

Figure 3.10:
Prostate (C61): Impact of Rapid Access Clinics on hospital type of diagnosis (aged 50-70)

All Stage

Case numbers and crude incidence rates pre- and post-implementation

	Case numbers		Crude Incidence Rates*	
	mean (range)		mean (range)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Cancer Centres	93 (37-146)	275 (142-386)	92.8 (41.1-134.7)	220.1 (127.6-279.4)
Public	137 (72-182)	110 (61-172)	139.3 (82.2-186.4)	90.0 (44.2-154.5)
Private	92 (49-147)	185 (117-239)	92.8 (55.6-135.6)	148.3 (105.1-178.5)

*Quarterly rates per 100,000 person years across the period

Relative trend in incidence rates (slope IRR) pre- and post-implementation:

	Percentage change in incidence rate per quarter (95% CI)		Slope IRR (95% CI)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Cancer Centres	3.1% (2.6%, 3.7%)	0.7% (0.4%, 1.1%)	1.031 (1.026, 1.037)	1.007 (1.004, 1.011)
Public	0.7% (0.1%, 1.2%)	-2.3% (-2.6%, -2.0%)	1.007 (1.001, 1.012)	0.977 (0.974, 0.980)
Private	1.8% (1.5%, 2.2%)	0.3% (-0.0%, 0.5%)	1.018 (1.015, 1.022)	1.003 (1.000, 1.005)

Figure 3.10 summarises changes in prostate cancer diagnoses among men aged 50–70 years by hospital type before and during the implementation of RAPCs.

Across settings, case numbers and crude incidence rates varied substantially between the pre- and implementation periods. Cancer centres experienced the largest increases, with mean quarterly diagnoses rising from 93 to 275, and crude incidence rates increasing from 92.8 to 220.1 per 100,000 person-years. Private hospitals also saw higher activity during the implementation period, with mean case numbers increasing from 92 to 185, and crude rates increasing from 92.8 to 148.3 per 100,000 person-years. In contrast, public hospitals reported lower case numbers during implementation (137 to 110) and a corresponding decrease in crude incidence rates (139.3 to 90.0).

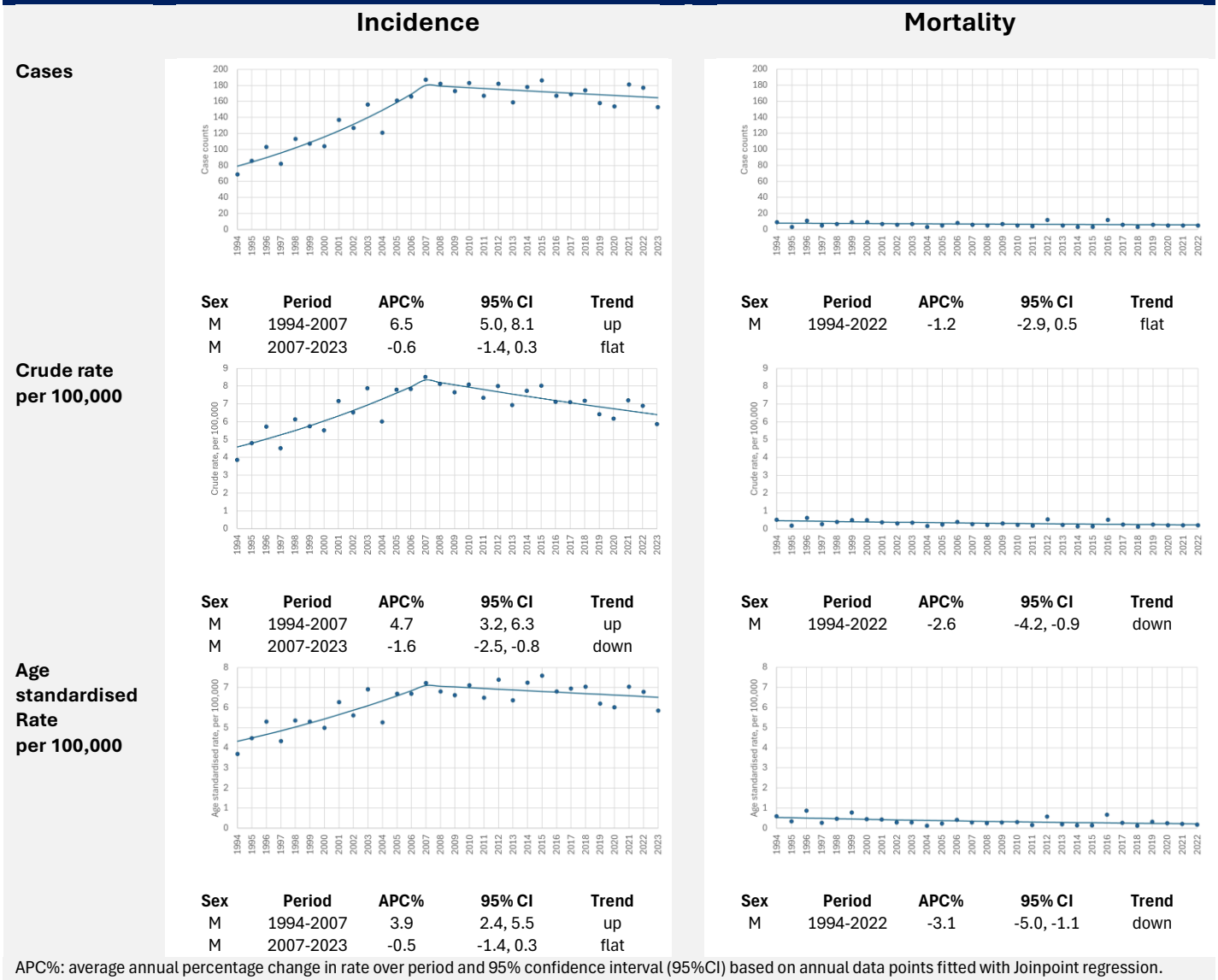
Relative trends in incidence rates differed considerably across hospital types. Prior to implementation, incidence rates were increasing in all settings, with quarterly percentage increases of 3.1% in cancer centres, 0.7% in public hospitals, and 1.8% in private hospitals (slope IRRs 1.031, 1.007, and 1.018, respectively). During the implementation period, the direction and magnitude of these trends changed. Cancer centres continued to show an upward trend, but at a slower rate (0.7% per quarter; slope IRR 1.007). Private hospitals exhibited a similarly modest increase (0.3% per quarter; slope IRR 1.003). In contrast, public hospitals displayed a pronounced downward trend during implementation, with incidence rates decreasing by 2.3% per quarter (slope IRR 0.977).

RAPC implementation coincided with a substantial redistribution of diagnostic activity across hospital types. Increased diagnosis volumes and rising incidence rates in cancer centres and private hospitals contrasted with declining trends in public hospitals, consistent with a shift in where patients were being diagnosed during the implementation period.

4. Results – Testis Cancer C62

4.1. Incidence & Mortality

Figure 4.1
Testis (C62) trends: case counts, crude rate and age -standardised rate for prostate cancer 1994-2023 (1994-2022 for mortality)



Incidence

Sex	Period	APC%	95% CI	Trend
M	1994-2007	6.5	5.0, 8.1	up
M	2007-2023	-0.6	-1.4, 0.3	flat

Sex	Period	APC%	95% CI	Trend
M	1994-2007	4.7	3.2, 6.3	up
M	2007-2023	-1.6	-2.5, -0.8	down

Sex	Period	APC%	95% CI	Trend
M	1994-2007	3.9	2.4, 5.5	up
M	2007-2023	-0.5	-1.4, 0.3	flat

Mortality

Sex	Period	APC%	95% CI	Trend
M	1994-2022	-1.2	-2.9, 0.5	flat

Sex	Period	APC%	95% CI	Trend
M	1994-2022	-2.6	-4.2, -0.9	down

Sex	Period	APC%	95% CI	Trend
M	1994-2022	-3.1	-5.0, -1.1	down

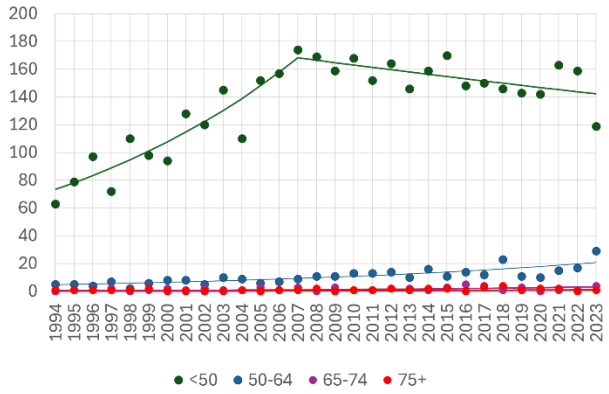
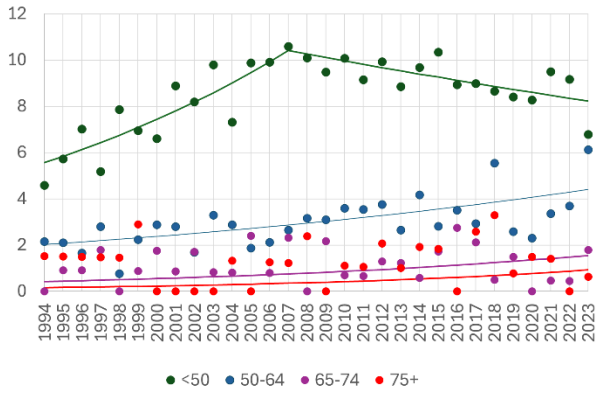
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Figure 4.1 shows the case counts, crude rates per 100,000 and age standardised rates per 100,000 of testicular cancer incidence (1994-2023) and mortality (1994-2022). The crude incidence rate has decreased steadily from 2007-2023, following a gradual increase from 1994-2007. When adjusted for age using the European Standard Population (2013), this downward trend from 2007-2023 is not significant. While the case counts of mortality have remained steady from 1994-2022, the crude mortality rate and age standardised mortality rate have decreased during the period.

4.2. Incidence by age group

Figure 4.2

Testis (C62) trends: case counts and age specific incidence rate by age group (1994-2023)

Age Group	Case Counts	Age specific incidence per 100,000
		

	Case Counts				Age specific incidence per 100,000			
	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
<50	1994-2007	6.6	5.1,8.8	up	1994-2007	4.9	3.3,7.7	up
	2007-2023	-1	-2.2,-0.1	down	2007-2023	-1.5	-2.8,-0.5	down
	AAPC% (95% CI) = 2.3 (1.8, 3.0)				AAPC% (95% CI) = 1.4 (0.8, 2.1)			
50-64	1994-2023	5.1	3.8,7.1	up	1994-2023	2.7	1.5,4.6	up
	AAPC% (95% CI) = 5.1 (3.8, 7.1)				AAPC% (95% CI) = 2.7 (1.5, 4.6)			
65-74	1994-2023	7.5	-1.8,20.6	flat	1994-2023	4.6	-4.0,16.5	flat
	AAPC% (95% CI) = 7.5 (-1.8, 20.6)				AAPC% (95% CI) = 4.6 (-4.0, 16.5)			
75+	1994-2023	8.9	-3.2,25.6	flat	1994-2023	6.3	-5.7,22.7	flat
	AAPC% (95% CI) = 8.9 (-3.2, 25.6)				AAPC% (95% CI) = 6.3 (-5.7, 22.7)			

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Testicular cancer crude incidence rates have shown distinct patterns across age groups from 1994 to 2023 (Figure 4.2). Among men under 50, rates increased significantly until 2007 (APC +4.9%) but declined thereafter (APC –1.5%), resulting in an overall AAPC of +1.4% (95% CI: –0.8, 2.1), indicating near stability over the full period. For ages 50–64, incidence rose steadily throughout the period, with an AAPC of +2.7% (95% CI: 1.5, 4.6), reflecting consistent growth. In men aged 65–74, rates increased markedly (APC +4.6%) and maintained an overall AAPC of +4.6% (95% CI: 4.0, 16.5), suggesting a notable upward trend despite relatively low absolute rates. For those aged 75+, incidence remained flat overall, with an AAPC of +6.3% (95% CI: –5.7, 22.7), though this estimate is imprecise due to small case numbers. While testicular cancer remains predominantly a disease of younger men, incidence is growing in the 50-64 age group.

4.3. Survival

Figure 4.3
Testis (C62): 5-year net survival (%) over six consecutive diagnosis periods

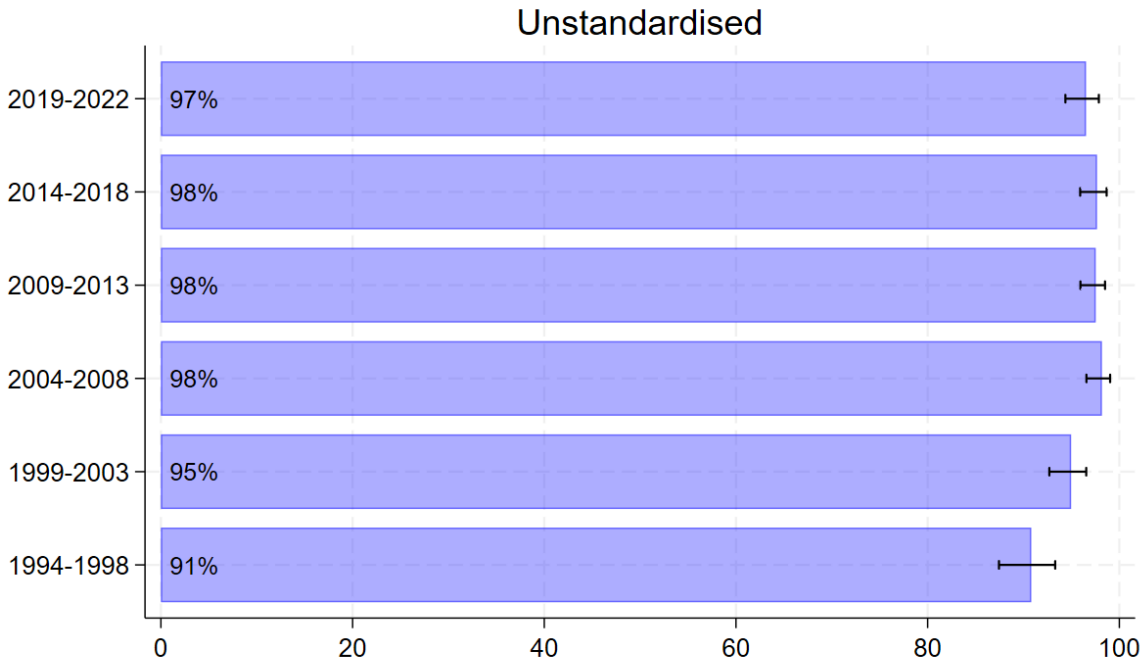
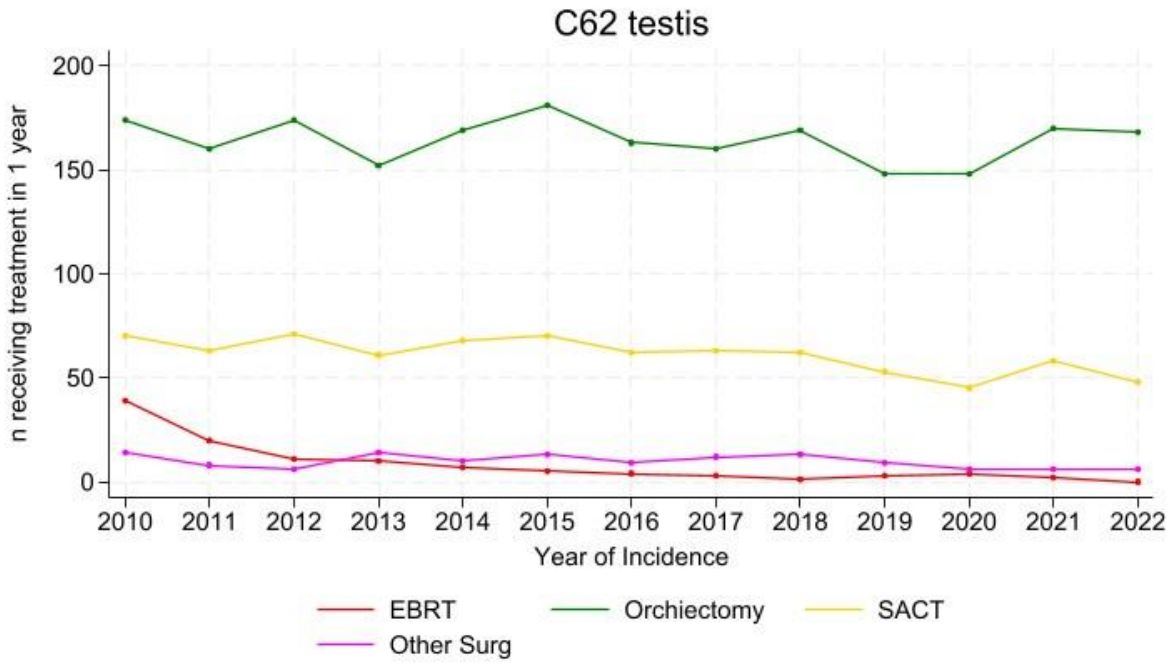


Figure 4.3 shows unstandardised 5-year net survival for testicular cancer in Ireland across six diagnosis periods from 1994 to 2022. Survival improved from 91% in 1994–1998 to 97% in 2019–2022. As the number of deaths within individual age groups is low or zero, age-standardised rates unstable and only unstandardised survival is shown.

4.4. Treatment

Figure 4.4
Testis (C62): Treatment – All Stage (2010-2022)

Detailed



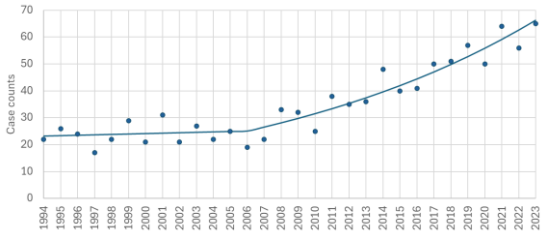
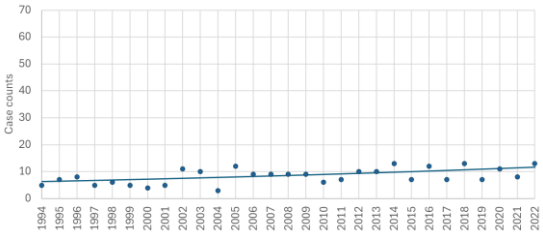
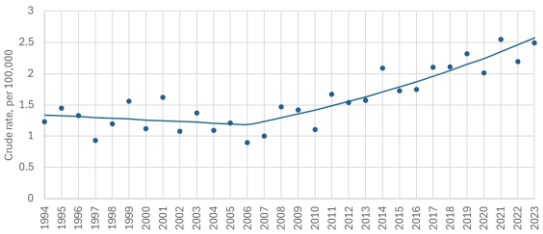
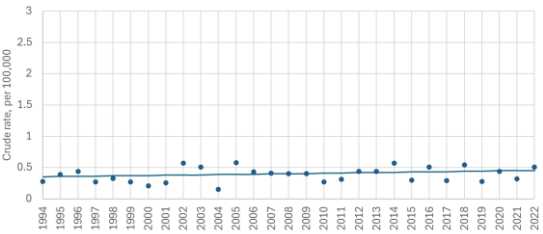
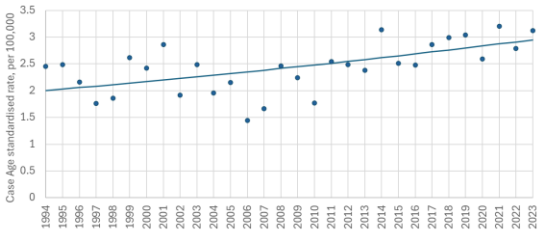
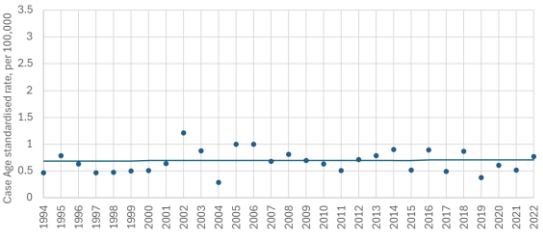
- EBRT = External Beam Radiation Therapy
- SACT = Systemic Anti-Cancer Therapy
- Other Surg = Other Surgery

The removal or one or both testicles (orchiectomy) has consistently been the primary treatment for testicular cancer, with stable annual rates. Systemic Anti-Cancer Therapy (SACT, e.g. chemotherapy) usage shows a gradual decline over time, from 70 cases in 2010 to 48 in 2022. EBRT has nearly disappeared from use, dropping from 39 cases in 2010 to zero by 2022 (Figure 4.4).

5. Results – Penis and other male genital organs C60, C63

5.1. Incidence & Mortality

Figure 5.1
Penis and other male genital organs (C60, C63) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)

	Incidence	Mortality
Cases		
	Sex **Period** **APC%** **95% CI** **Trend** M 1994-2006 0.6 -2.1, 3.4 flat M 2006-2023 5.9 4.6, 7.2 up	**Sex** **Period** **APC%** **95% CI** **Trend** M 1994-2022 2.2 0.9, 3.5 up
Crude rate per 100,000		
	Sex **Period** **APC%** **95% CI** **Trend** M 1994-2006 -1 -3.7, 1.7 flat M 2006-2023 4.7 3.4, 6.0 up	**Sex** **Period** **APC%** **95% CI** **Trend** M 1994-2022 0.9 -0.4, 2.1 flat
Age standardised Rate per 100,000		
	Sex **Period** **APC%** **95% CI** **Trend** M 1994-2023 1.4 0.7, 2.0 up	**Sex** **Period** **APC%** **95% CI** **Trend** M 1994-2022 0.1 -1.2, 1.4 flat

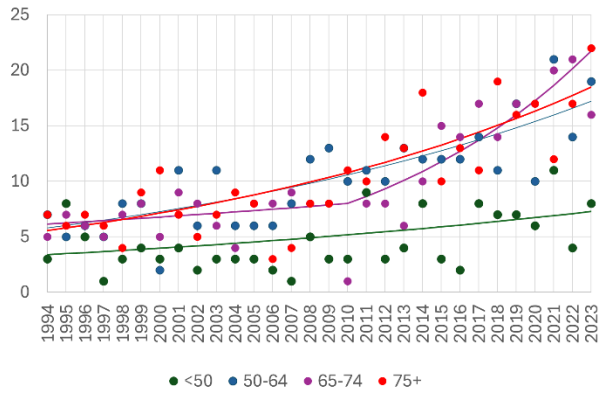
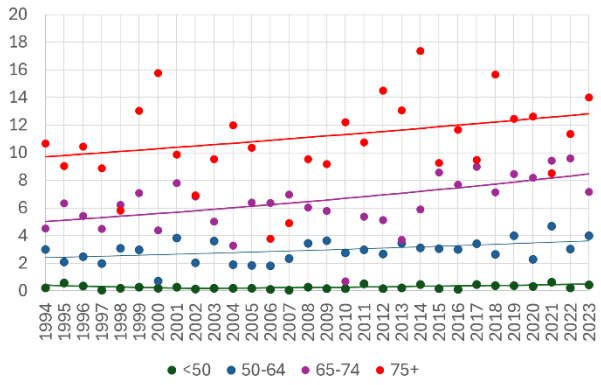
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression. Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

The incidence of cancers of the penis and other male genital organs has increased in Ireland over recent decades, with a sustained rise in age-standardised incidence rates since the mid-1990s. In contrast, mortality has remained stable over the same period, with no significant change in age-standardised mortality rates between 1994 and 2022 (Figure 5.1).

5.2. Incidence by age group

Figure 5.2

Penis and other male genital organs (C60, C63) trends: case counts and age specific incidence rate by age group (1994-2023)

Age Group	Case Counts	Age specific incidence per 100,000
		
<50	**Period** **APC%** **95% CI** **Trend** 1994-2023 2.7 0.7,5.4 up AAPC% (95% CI) = 2.7 (0.7, 5.4)	**Period** **APC%** **95% CI** **Trend** 1994-2002 -9.9 -31.1,1.1 flat 2002-2023 4.8 2.1,20.2 up AAPC% (95% CI) = 0.5 (-1.8, 3.8)
50-64	**Period** **APC%** **95% CI** **Trend** 1994-2023 3.8 2.7,5.4 up AAPC% (95% CI) = 3.8 (2.7, 5.4)	**Period** **APC%** **95% CI** **Trend** 1994-2023 1.4 0.3,3.0 up AAPC% (95% CI) = 1.4 (0.3, 3.0)
65-74	**Period** **APC%** **95% CI** **Trend** 1994-2010 1.7 -9.2,4.7 flat 2010-2023 8 5.2,17.6 up AAPC% (95% CI) = 4.5 (3.0, 6.0)	**Period** **APC%** **95% CI** **Trend** 1994-2023 1.8 0.9,3.2 up AAPC% (95% CI) = 1.8 (0.9, 3.2)
75+	**Period** **APC%** **95% CI** **Trend** 1994-2023 4.2 3.1,5.9 up AAPC% (95% CI) = 4.2 (3.1, 5.9)	**Period** **APC%** **95% CI** **Trend** 1994-2023 1 -0.1,2.4 flat AAPC% (95% CI) = 1.0 (-0.1, 2.4)

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Figure 5.2 demonstrates increasing case counts across all age groups over the study period, with the most pronounced rises observed in men aged 50–64 years (AAPC +3.8%, 95% CI: 2.7–5.4) and 65–74 years (AAPC +4.5%, 95% CI: 3.0–6.0). A marked inflection is evident in the 65–74-year age group from 2010 onwards, with a sharp increase in cases (APC +8.0%, 95% CI 5.2–17.6), indicating a true rise in disease burden beyond demographic ageing alone.

Crude incidence rates for cancers of the penis and other male genital organs have shown gradual increases across most age groups from 1994 to 2023. Among men under 50, rates were largely stable early on (APC –9.9%) but rose modestly after 2002 (APC +4.8%), resulting in an overall AAPC of +0.5% (95% CI: –1.8, 3.8), indicating near stability over the full period. For ages 50–64, incidence increased steadily throughout the period,

with an AAPC of +1.4% (95% CI: 0.3, 3.0), reflecting consistent growth. Men aged 65–74 experienced a similar pattern, with an overall AAPC of +1.8% (95% CI: 0.9, 3.2), while those aged 75+ showed only a slight increase (AAPC +1.0%, 95% CI: –0.1, 2.4). These trends suggest that while absolute rates remain low, incidence has risen most notably in older age groups.

5.3. Survival

Figure 5.3
Penis and other male genital organs (C60, C63): 5-year net survival (%) over six consecutive diagnosis periods

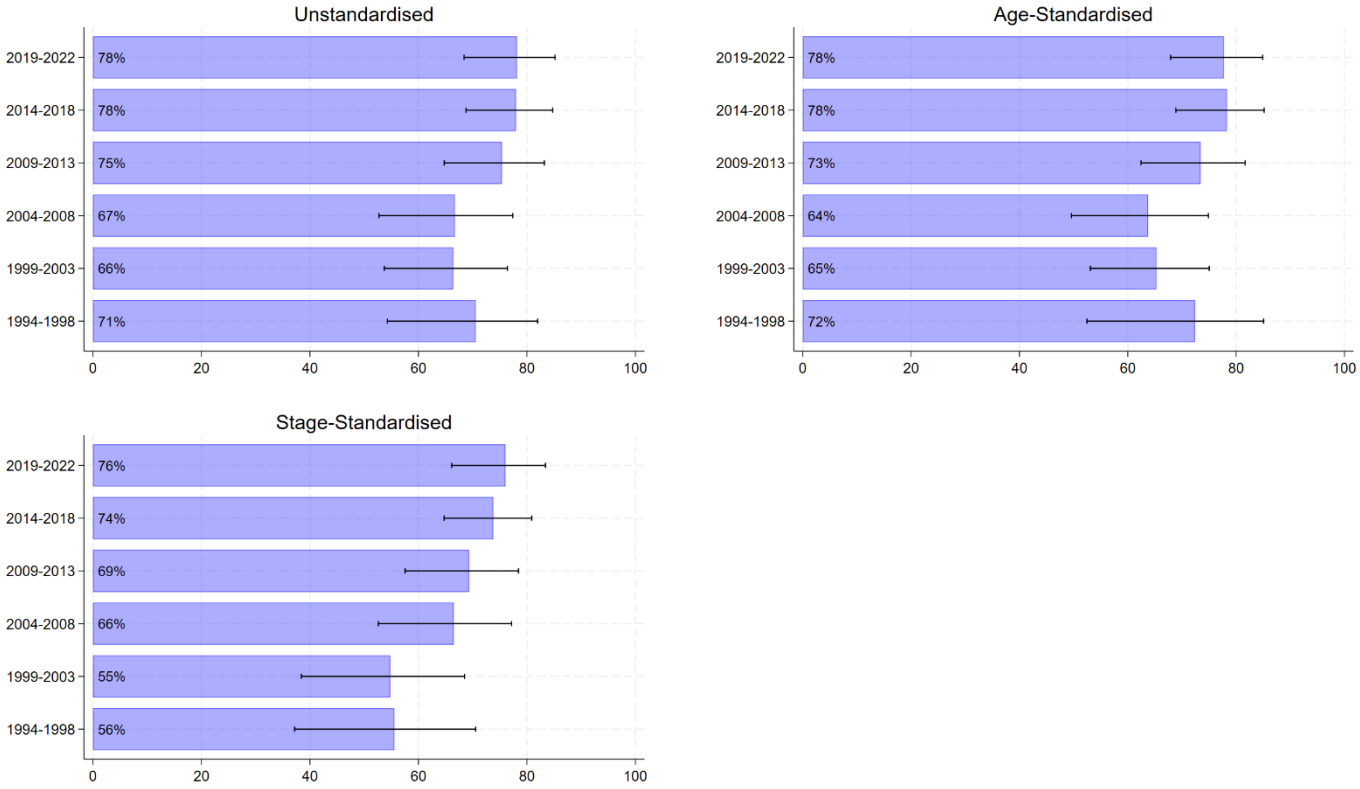


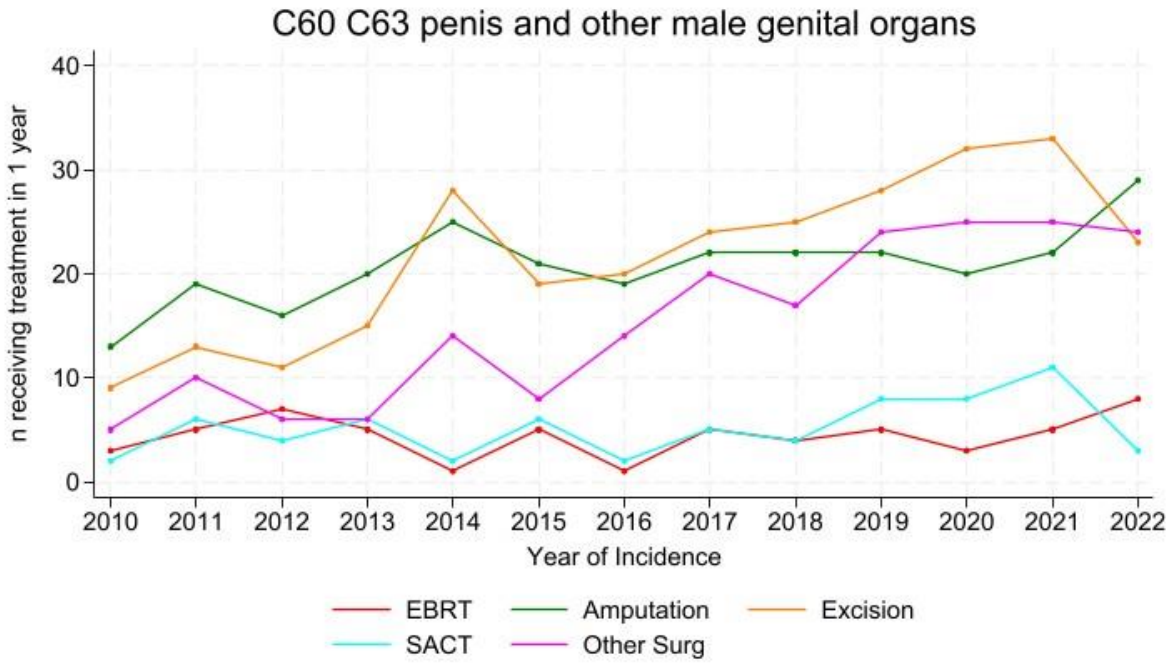
Figure 5.3 presents 5-year net survival for cancers of the penis and other male genital organs across six diagnosis periods (1994–2022) using three approaches: unstandardised, age-standardised, and stage-standardised survival.

Unstandardised 5-year net survival improved from 71% in 1994–1998 to 78% in 2019–2022. Age-standardised and stage-standardised estimates are also provided to account for changes in population structure and stage distribution. The close alignment between unstandardised and age-standardised trends indicates that age distribution has not changed substantially through time, while stage-standardised estimates suggest that earlier stage at diagnosis has contributed to survival gains, although improvements persist beyond stage effects alone.

5.4. Treatment

Figure 5.4
Penis and other male genital organs (C60, C63): Treatment – All Stage (2010-2022)

Detailed



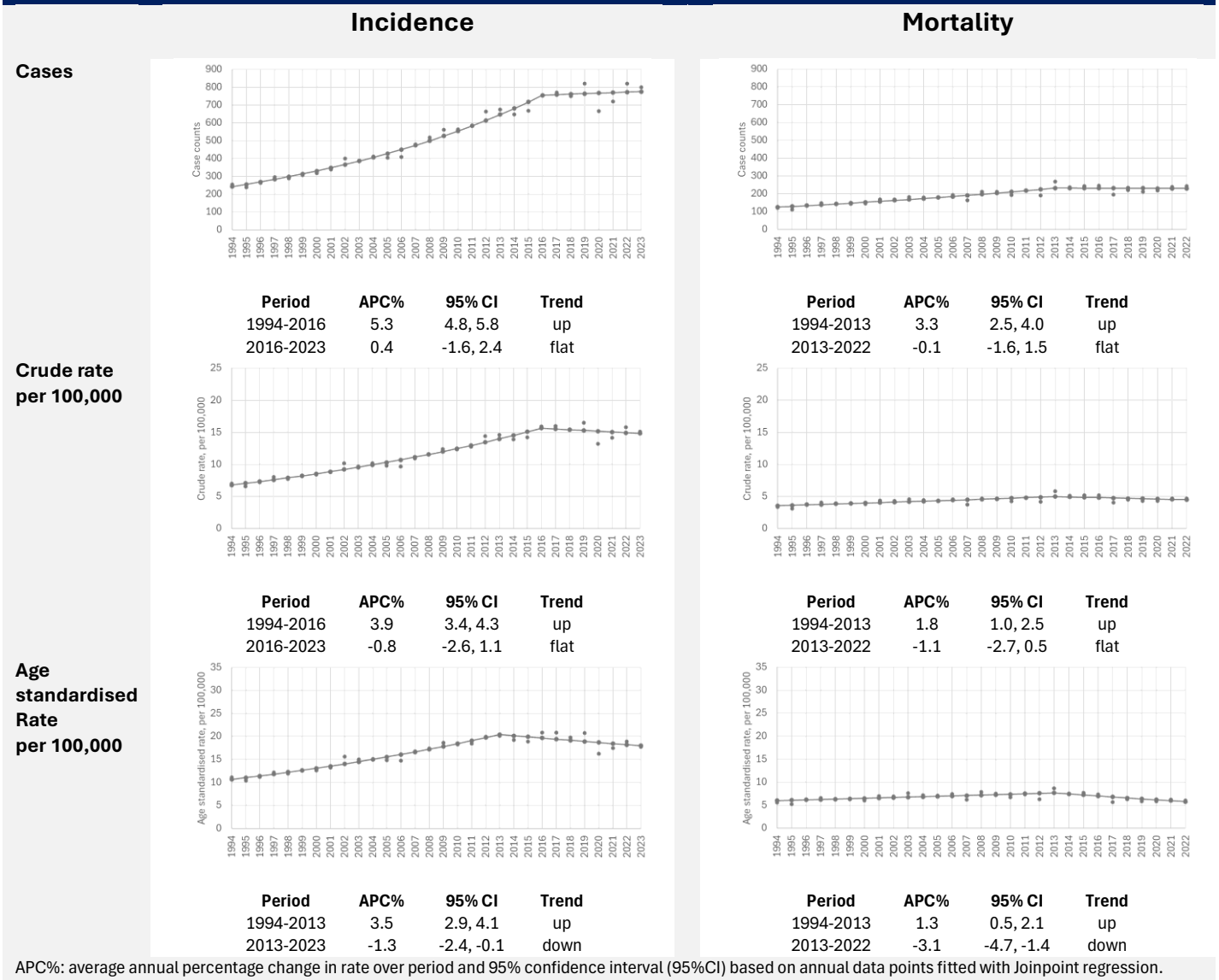
- EBRT = External Beam Radiation Therapy
- Amputation = Complete or Partial Amputation
- Excision = Local Excision
- SACT = Systemic Anti-Cancer Therapy
- Other Surg = Other Surgery

Complete or Partial Amputation remains the most consistently used treatment, reflecting its central role in managing locally advanced disease. Local Excision has gradually increased, peaking at 33 cases in 2021, suggesting a growing preference for organ-preserving approaches. Systemic therapies and EBRT are used infrequently, indicating their limited role in localised penile cancer management (Figure 5.4).

6. Results - Kidney, incl. renal pelvis and ureter C64-66

6.1. Incidence & Mortality - Overall

Figure 6.1: Overall
Kidney, incl. renal pelvis and ureter (C64-66) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)



Incidence	Period	APC%	95% CI	Trend
Cases	1994-2016	5.3	4.8, 5.8	up
	2016-2023	0.4	-1.6, 2.4	flat
Crude rate per 100,000	1994-2016	3.9	3.4, 4.3	up
	2016-2023	-0.8	-2.6, 1.1	flat
Age standardised Rate per 100,000	1994-2013	3.5	2.9, 4.1	up
	2013-2023	-1.3	-2.4, -0.1	down

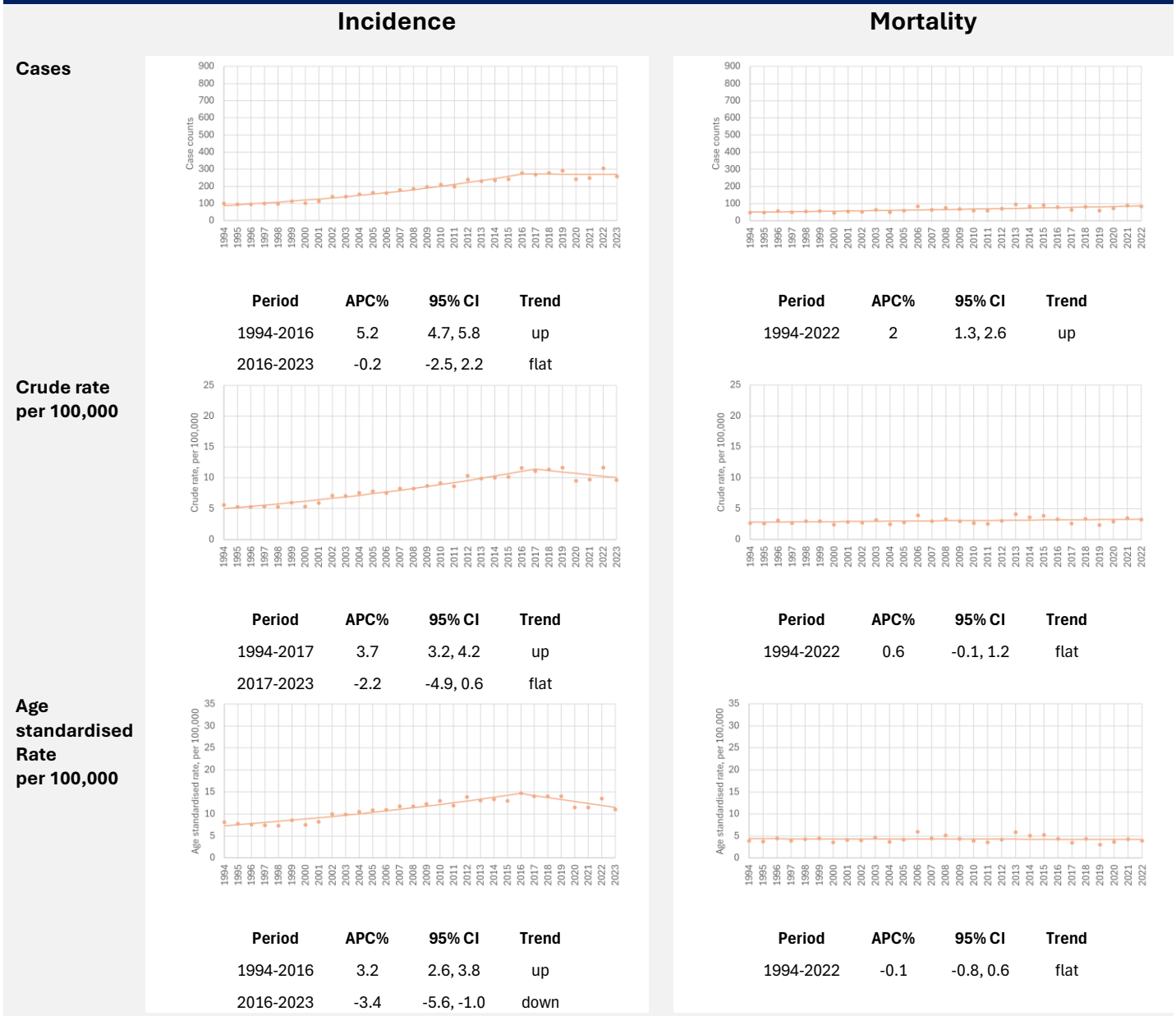
Mortality	Period	APC%	95% CI	Trend
Cases	1994-2013	3.3	2.5, 4.0	up
	2013-2022	-0.1	-1.6, 1.5	flat
Crude rate per 100,000	1994-2013	1.8	1.0, 2.5	up
	2013-2022	-1.1	-2.7, 0.5	flat
Age standardised Rate per 100,000	1994-2013	1.3	0.5, 2.1	up
	2013-2022	-3.1	-4.7, -1.4	down

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Kidney cancer has experienced a rise in incidence from 1994 to 2016, followed by a plateau until 2023. The age standardised incidence rate for C64-C66 kidney including renal pelvis (overall) has decreased from 2013-2023, following an increase from 1994-2013. The age standardised mortality rate has decreased from 2013-2022 (Figure 6.1).

6.2. Incidence & Mortality - Females

Figure 6.2: Females
Kidney, incl. renal pelvis and ureter (C64-66) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)



Incidence	Period	APC%	95% CI	Trend
Cases	1994-2016	5.2	4.7, 5.8	up
	2016-2023	-0.2	-2.5, 2.2	flat
Crude rate per 100,000	1994-2017	3.7	3.2, 4.2	up
	2017-2023	-2.2	-4.9, 0.6	flat
Age standardised Rate per 100,000	1994-2016	3.2	2.6, 3.8	up
	2016-2023	-3.4	-5.6, -1.0	down

Mortality	Period	APC%	95% CI	Trend
Cases	1994-2022	2	1.3, 2.6	up
Crude rate per 100,000	1994-2022	0.6	-0.1, 1.2	flat
Age standardised Rate per 100,000	1994-2022	-0.1	-0.8, 0.6	flat

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

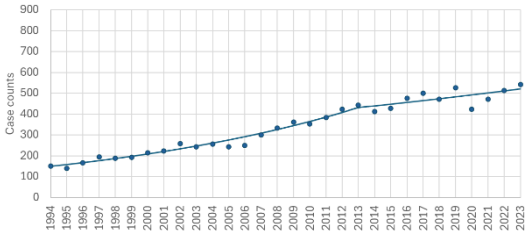
The age standardised incidence rate for kidney cancer including renal pelvis in females has decreased from 2016-2023, following a steady increase from 1994-2016. The age standardised mortality rate has remained constant in this period (Figure 6.2).

6.3. Incidence & Mortality - Males

Figure 6.3: Males
Kidney, incl. renal pelvis and ureter (C64-66) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)

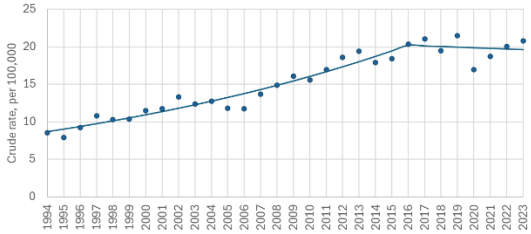
Incidence

Cases



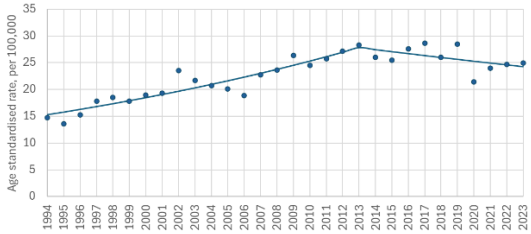
Period	APC%	95% CI	Trend
1994-2013	5.7	5.0, 6.5	up
2013-2023	1.9	0.5, 3.3	up

Crude rate per 100,000



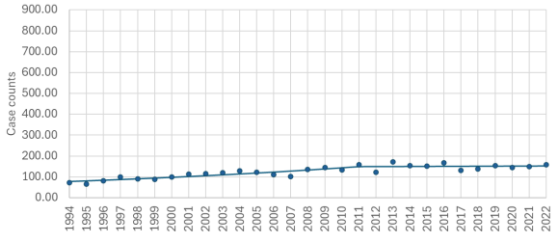
Period	APC%	95% CI	Trend
1994-2016	3.9	3.3, 4.5	up
2016-2023	-0.4	-2.7, 1.9	flat

Age standardised Rate per 100,000

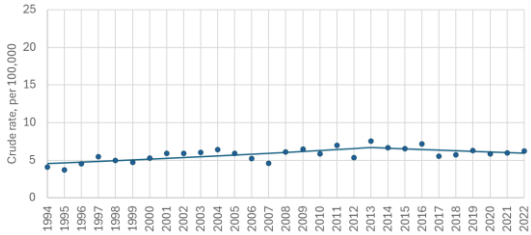


Period	APC%	95% CI	Trend
1994-2013	3.2	2.4, 4.0	up
2013-2023	-1.4	-2.8, 0.1	flat

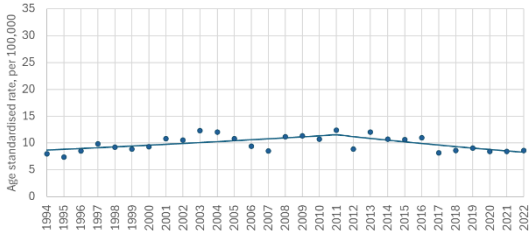
Mortality



Period	APC%	95% CI	Trend
1994-2011	3.9	2.7, 5.1	up
2011-2022	0.2	-1.4, 1.8	flat



Period	APC%	95% CI	Trend
1994-2013	2.1	1.1, 3.1	up
2013-2022	-1.3	-3.4, 0.8	flat



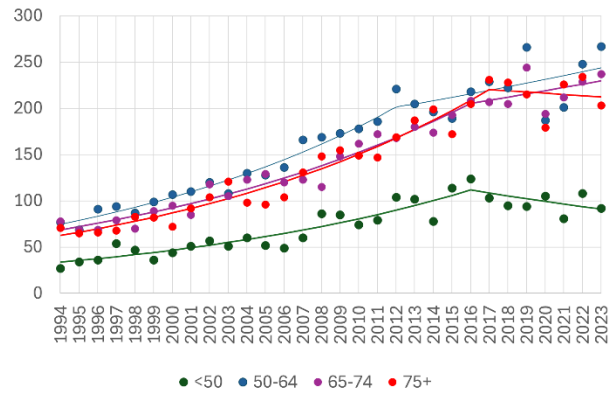
Period	APC%	95% CI	Trend
1994-2011	1.6	0.4, 2.9	up
2011-2022	-2.9	-4.5, -1.3	down

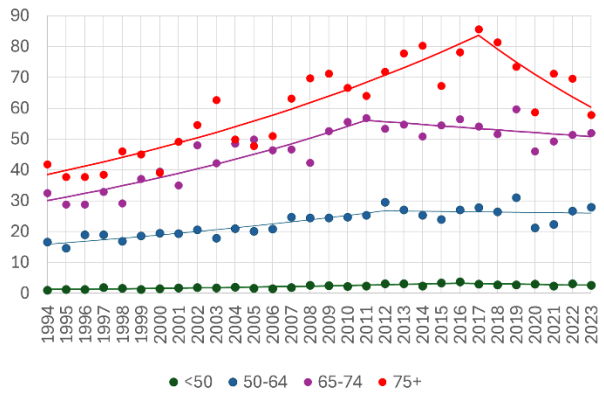
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

The age standardised incidence rate for C64-C66 kidney including renal pelvis in males has decreased from 2013-2023, following an increase from 1994-2013. Case counts and crude rates were stable in the last 10 years, accompanied by a decrease in the age standardised mortality rate from 2011 to 2022 (Figure 6.3).

6.4. Incidence by age group

Figure 6.4
Kidney, incl. renal pelvis and ureter (C64-66) trends: case counts and age specific incidence rate by age group (1994-2023)





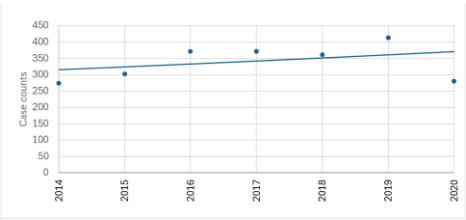
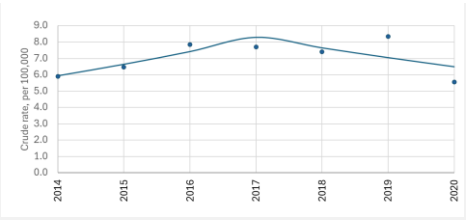
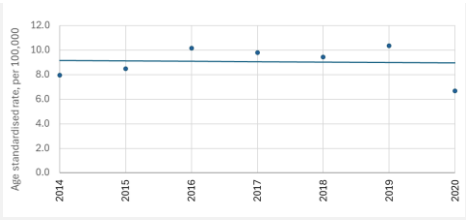
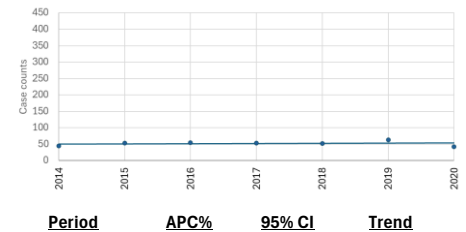
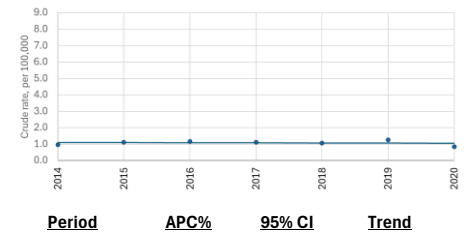
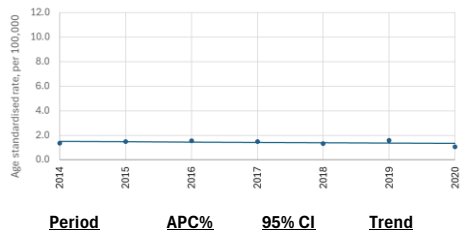
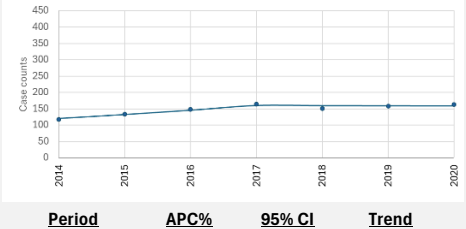
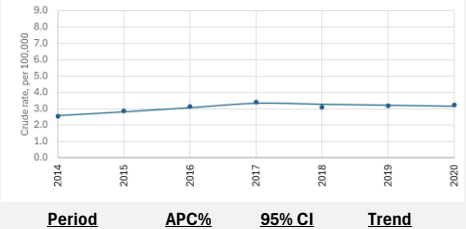
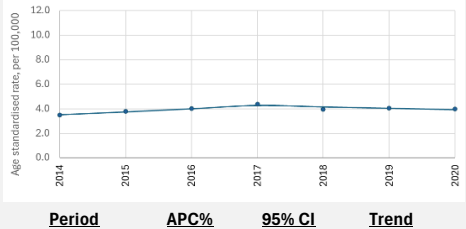
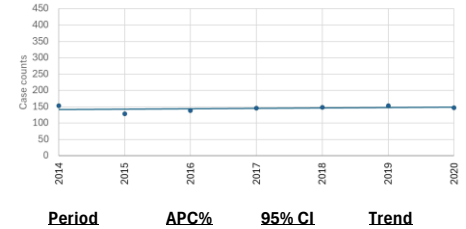
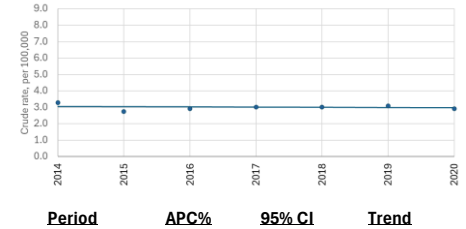
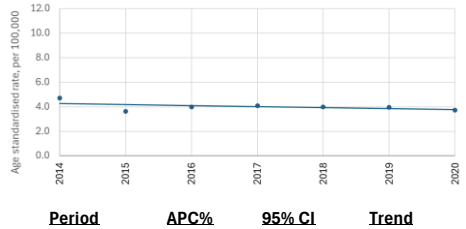
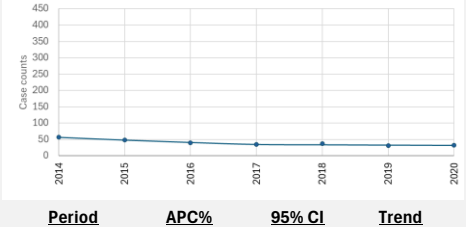
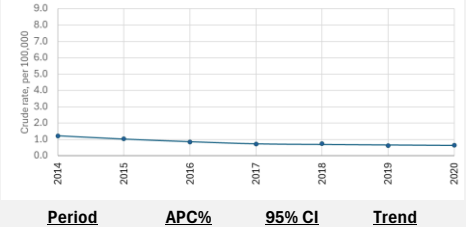
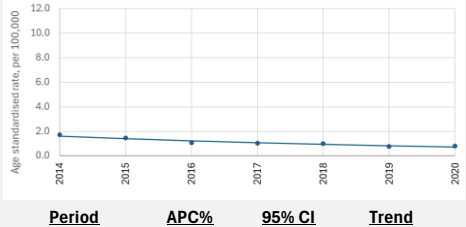
Age Group	Case Counts				Age specific incidence per 100,000			
	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
<50	1994-2016	5.6	4.7,8.3	up	1994-2016	4.5	3.7,7.6	up
	2016-2023	-2.9	-11.1,1.8	flat	2016-2023	-3.2	-11.3,1.4	flat
	AAPC% (95% CI) = 3.5 (2.4, 4.8)				AAPC% (95% CI) = 2.6 (1.6, 4.1)			
50-64	1994-2012	5.7	4.8,7.6	up	1994-2012	2.9	2.1,5.7	up
	2012-2023	1.8	-0.8,3.1	flat	2012-2023	-0.2	-3.4,1.1	flat
	AAPC% (95% CI) = 4.2 (3.7, 4.9)				AAPC% (95% CI) = 1.7 (1.2, 2.5)			
65-74	1994-2016	5.1	4.6,7.4	up	1994-2011	3.7	2.8,5.2	up
	2016-2023	1.6	-2.3,3.9	flat	2011-2023	-0.8	-2.5,0.3	flat
	AAPC% (95% CI) = 4.3 (3.8, 5.0)				AAPC% (95% CI) = 1.8 (1.4, 2.4)			
75+	1994-2017	5.6	5.1,6.8	up	1994-2017	3.4	2.8,4.4	up
	2017-2023	-0.6	-5.9,2.6	flat	2017-2023	-5.3	-10.2,-2.1	down
	AAPC% (95% CI) = 4.3 (3.7, 5.1)				AAPC% (95% CI) = 1.6 (1.0, 2.2)			

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Case counts and age specific incidence rates for kidney cancer have increased substantially since 1994 with recent trends varying by age group (Figure 6.4). Among individuals under 50, rates rose significantly until 2016 (APC +4.5%) but then stabilized, resulting in an overall AAPC of +2.6% (95% CI: 1.6, 4.1). For ages 50–64, incidence increased early (APC +2.9%) and remained flat after 2012, giving an overall AAPC of +1.7% (95% CI: 1.2, 2.5). Individuals aged 65–74 also experienced a long-term rise in crude incidence rates, with an AAPC of +1.8% (95% CI: 1.4, 2.4), despite a decline after 2011 (APC –2.0%). In contrast, rates for the aged 75+ group increased until 2017 (APC +3.4%) but then fell (APC –1.0%), producing an overall AAPC of +1.6% (95% CI: 1.0, 2.1). Patterns in kidney cancer by sex were consistent with the overall population trends throughout the study period (Appendix 1).

6.5. Incidence by stage

Figure 6.5
Kidney, incl. renal pelvis and ureter (C64-C66): trends in case counts, crude rate and age standardised rate, by stage at diagnosis (2014-2020)

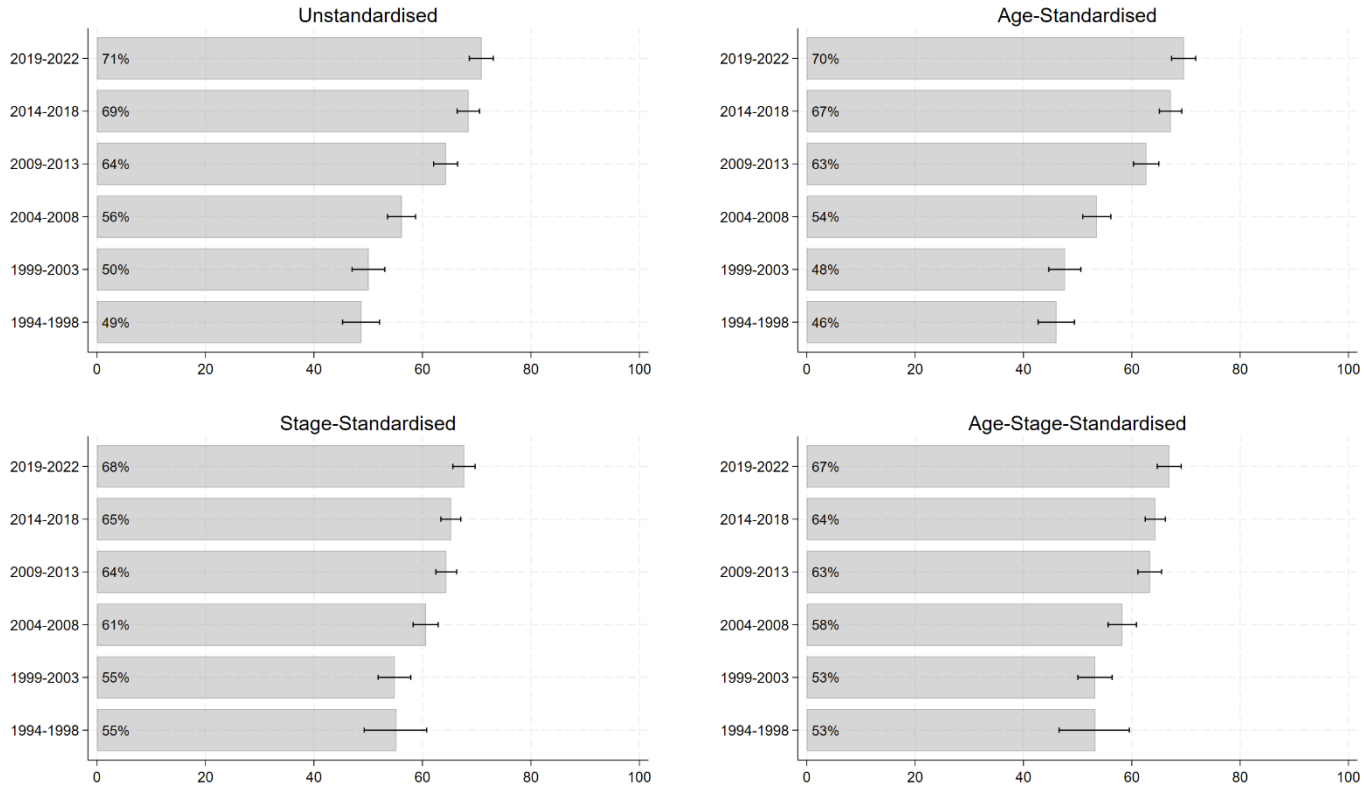
	case counts	crude rate, per 100,000	age-standardised rate, per 100,000
stage I			
	Period APC% 95% CI Trend 2014-2020 2.8 -4.9,11.9 flat AAPC% (95% CI) = 2.8 (-4.9, 11.9)	Period APC% 95% CI Trend 2014-2017 11.8 -0.7,28.0 flat 2017-2020 -7.9 -18.8,3.5 flat AAPC% (95% CI) = 1.5 (-3.9, 7.7)	Period APC% 95% CI Trend 2014-2020 -0.4 -8.9,10.1 flat AAPC% (95% CI) = -0.4 (-8.9, 10.1)
stage II			
	Period APC% 95% CI Trend 2014-2020 0.9 -4.4,6.5 flat AAPC% (95% CI) = 0.9 (-4.4, 6.5)	Period APC% 95% CI Trend 2014-2020 -0.5 -5.7,5.1 flat AAPC% (95% CI) = -0.5 (-5.7, 5.1)	Period APC% 95% CI Trend 2014-2020 -2.2 -8.5,5.0 flat AAPC% (95% CI) = -2.2 (-8.5, 5.0)
stage III			
	Period APC% 95% CI Trend 2014-2017 10.1 7.0,13.6 up 2017-2020 -0.3 -3.0,2.4 flat AAPC% (95% CI) = 4.8 (3.5, 6.2)	Period APC% 95% CI Trend 2014-2017 8.8 5.5,12.7 up 2017-2020 -1.8 -4.7,1.1 flat AAPC% (95% CI) = 3.4 (2.0, 5.0)	Period APC% 95% CI Trend 2014-2017 6.7 4.1,9.7 up 2017-2020 -2.8 -5.2,-0.5 down AAPC% (95% CI) = 1.8 (0.7, 3.1)
stage IV			
	Period APC% 95% CI Trend 2014-2020 0.9 -1.7,3.6 flat AAPC% (95% CI) = 0.9 (-1.7, 3.6)	Period APC% 95% CI Trend 2014-2020 -0.5 -2.7,2.0 flat AAPC% (95% CI) = -0.5 (-2.7, 2.0)	Period APC% 95% CI Trend 2014-2020 -2 -4.9,1.0 flat AAPC% (95% CI) = -2.0 (-4.9, 1.0)
Stage X			
	Period APC% 95% CI Trend 2014-2017 -14.7 -17.7,-11.8 down 2017-2020 -2.8 -6.7,1.2 flat AAPC% (95% CI) = -8.9 (-10.5, -7.4)	Period APC% 95% CI Trend 2014-2017 -15.7 -18.8,-12.7 down 2017-2020 -4.3 -8.2,-0.3 down AAPC% (95% CI) = -10.2 (-11.8, -8.7)	Period APC% 95% CI Trend 2014-2020 -12.4 -16.0,-9.1 down AAPC% (95% CI) = -12.4 (-16.0, -9.1)

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Stage-specific incidence trends (Figure 6.5) showed that the number of Stage III diagnoses increased significantly from 2014 to 2017 (APC 10.1%, 95% CI: 7.0–13.6), then plateaued, likely reflecting a broader shift in diagnostic practice rather than true changes in disease burden. Stage I, II and IV remained flat during the same period for case counts, crude rates and standardised rates.

6.6. Survival - Overall

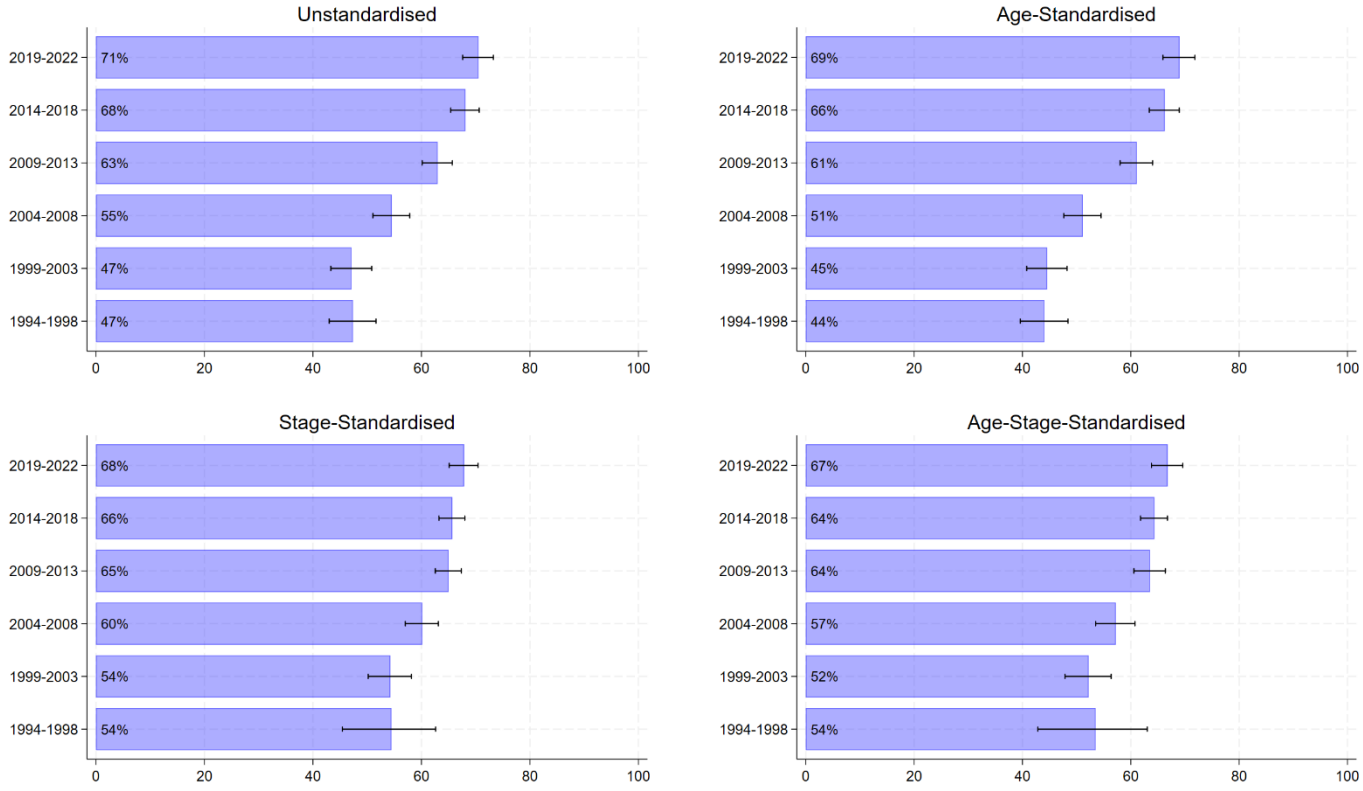
Figure 6.6: Total
Kidney, incl. renal pelvis and ureter (C64-66): 5-year net survival (%) over six consecutive diagnosis periods



Five-year net survival for kidney cancer (including renal pelvis and ureter) improved steadily across all standardisation methods over six diagnosis periods. Survival rose from 46% in 1994–1998 to 70% (age-standardised) in 2019–2022. Stage-standardised and age-stage-standardised estimates also increased, reaching 68% and 67%, respectively, in the most recent period (Figure 6.6).

6.7. Survival - Males

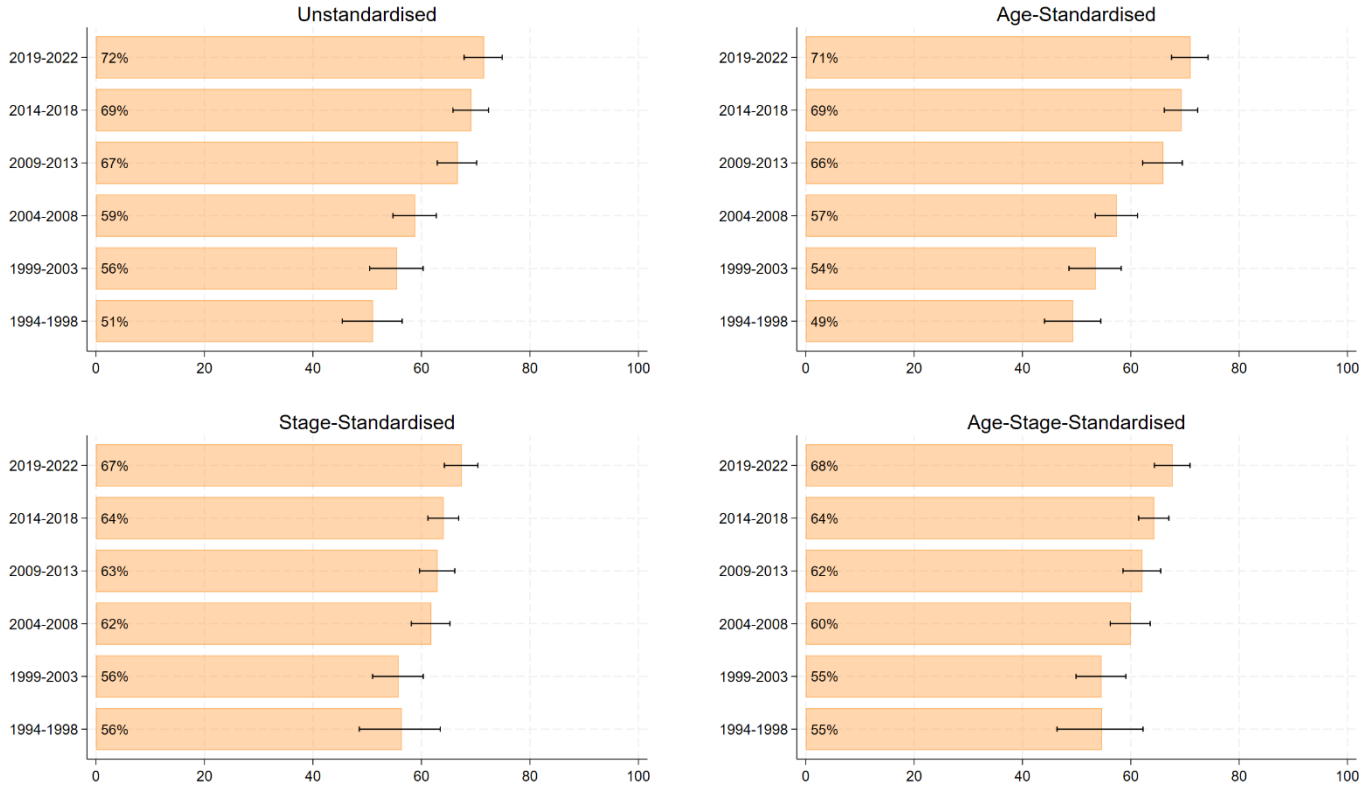
Figure 6.7: Male
Kidney, incl. renal pelvis and ureter (C64-66): 5-year net survival (%) over six consecutive diagnosis periods



Five-year net survival for males with kidney cancer (including renal pelvis and ureter) improved markedly over time (Figure 6.7). Unstandardised survival increased from 47% in 1994–1998 to 71% in 2019–2022. Similar increase was seen when the rates were standardised for age, with survival rising from 44% to 69% over the same period. Stage-standardised and age-stage-standardised estimates also showed steady gains, reaching 68% and 67%, respectively, in the most recent period. This indicates significant progress in outcomes for men diagnosed with kidney cancer.

6.8. Survival - Females

Figure 6.8: Female
Kidney, incl. renal pelvis and ureter (C64-66): 5-year net survival (%) over six consecutive diagnosis periods

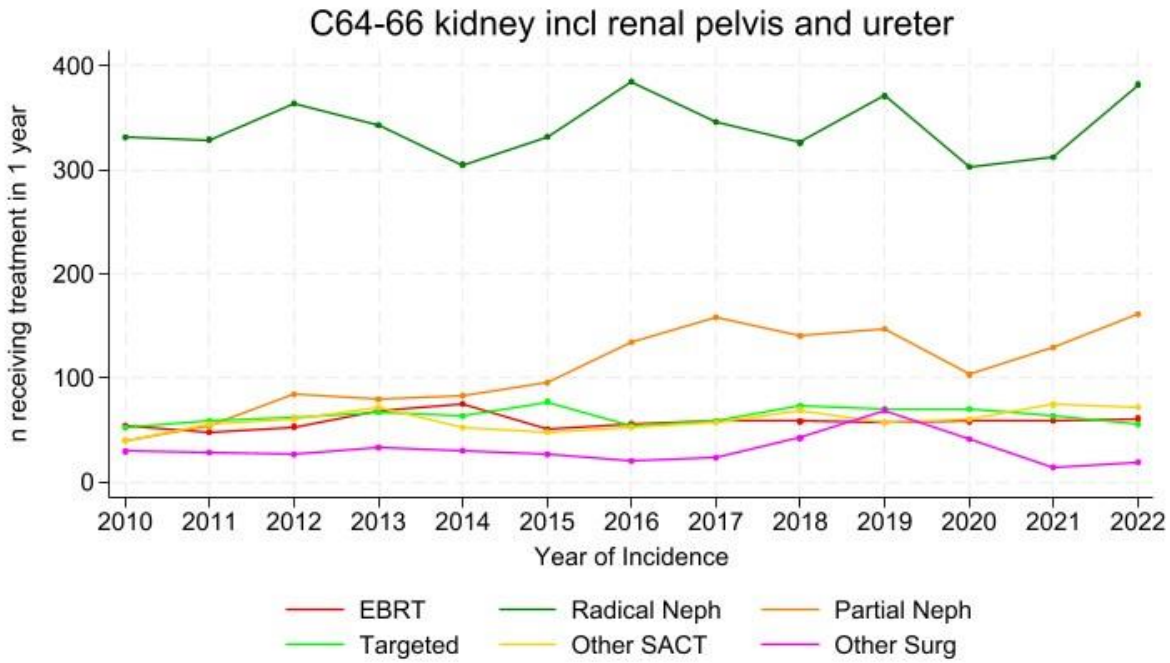


Five-year net survival for females with kidney cancer (including renal pelvis and ureter) improved consistently through time (Figure 6.8). Unstandardised survival rose from 51% in 1994–1998 to 72% in 2019–2022. Similar increases in survival were observed after standardisation by age from 49% to 71%. Stage-standardised and age-stage-standardised estimates also showed steady increases, reaching 67% and 68%, respectively, in the most recent period.

6.9. Treatment

Figure 6.9
Kidney, incl. renal pelvis and ureter (C64-66) Treatment – All Stage (2010-2022)

Detailed



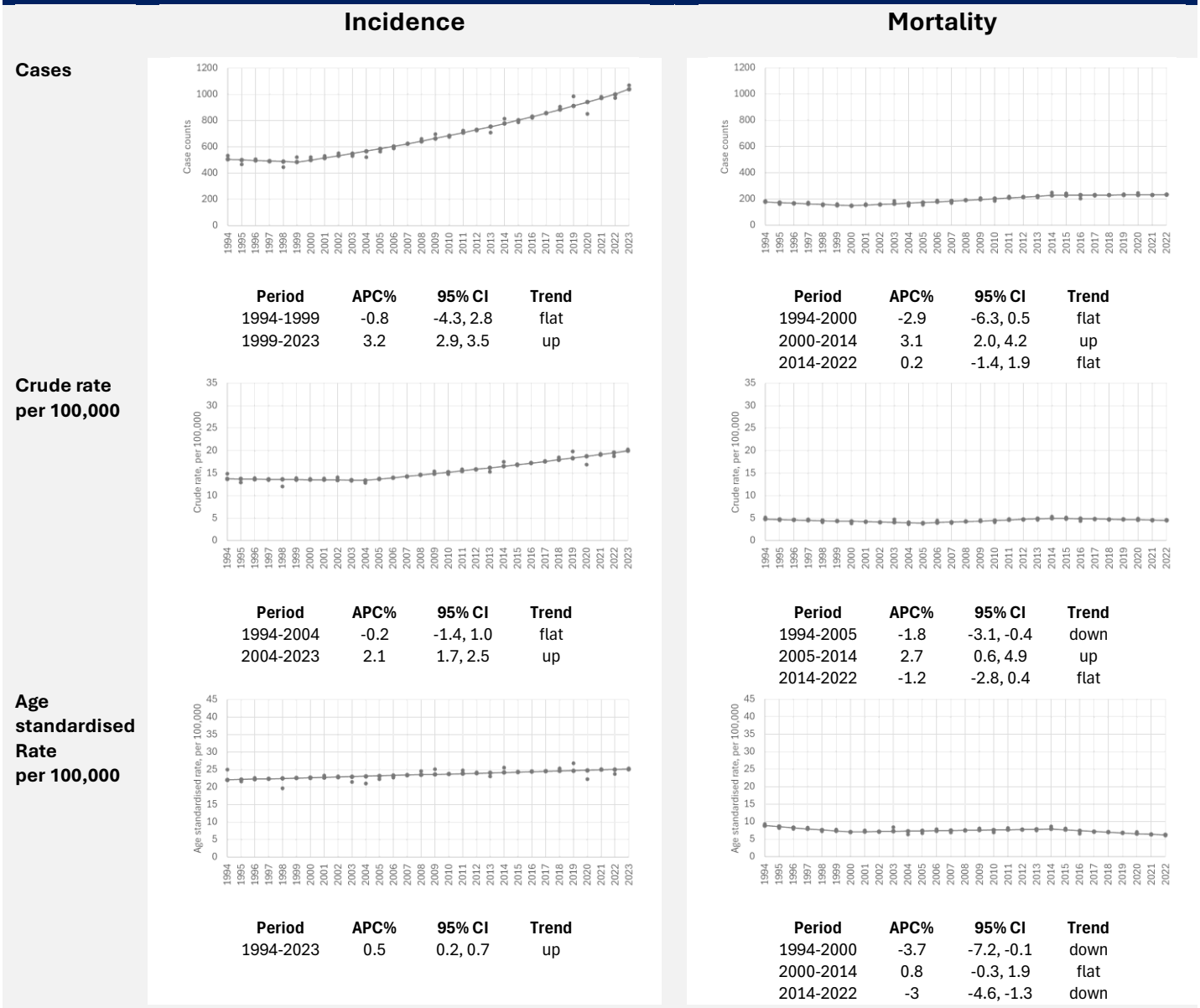
- EBRT = External Beam Radiation Therapy
- Radical Neph = Radical Nephrectomy and Nephroureterectomy
- Partial Neph = Partial Nephrectomy
- Targeted = Targeted Therapy
- Other SACT = Other Systemic Anti-Cancer Therapy
- Other Surg = Other Surgery

Radical nephrectomy (the removal of the kidney, adrenal glands, surrounding tissue, lymph nodes) and nephroureterectomy (nephrectomy including the removal of the ureter) consistently represent the most common treatment modality. Partial nephrectomy has increased substantially over time, rising from 40 cases in 2010 to 161 in 2022, suggesting a shift toward nephron-sparing surgery. Targeted therapy has remained relatively stable, while chemotherapy usage is low and flat, indicating limited reliance on traditional systemic treatments for kidney cancer (Figure 6.9).

7. Results - Invasive bladder & NMIBC C67, D09.0, D41.4

7.1. Incidence & Mortality - Overall

Figure 7.1: Total
Invasive bladder & NMIBC (C67, D09.0, D41.4) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)



Incidence

Cases	Period	APC%	95% CI	Trend
	1994-1999	-0.8	-4.3, 2.8	flat
	1999-2023	3.2	2.9, 3.5	up

Crude rate per 100,000	Period	APC%	95% CI	Trend
	1994-2004	-0.2	-1.4, 1.0	flat
	2004-2023	2.1	1.7, 2.5	up

Age standardised Rate per 100,000	Period	APC%	95% CI	Trend
	1994-2023	0.5	0.2, 0.7	up

Mortality

Cases	Period	APC%	95% CI	Trend
	1994-2000	-2.9	-6.3, 0.5	flat
	2000-2014	3.1	2.0, 4.2	up
	2014-2022	0.2	-1.4, 1.9	flat

Crude rate per 100,000	Period	APC%	95% CI	Trend
	1994-2005	-1.8	-3.1, -0.4	down
	2005-2014	2.7	0.6, 4.9	up
	2014-2022	-1.2	-2.8, 0.4	flat

Age standardised Rate per 100,000	Period	APC%	95% CI	Trend
	1994-2000	-3.7	-7.2, -0.1	down
	2000-2014	0.8	-0.3, 1.9	flat
	2014-2022	-3	-4.6, -1.3	down

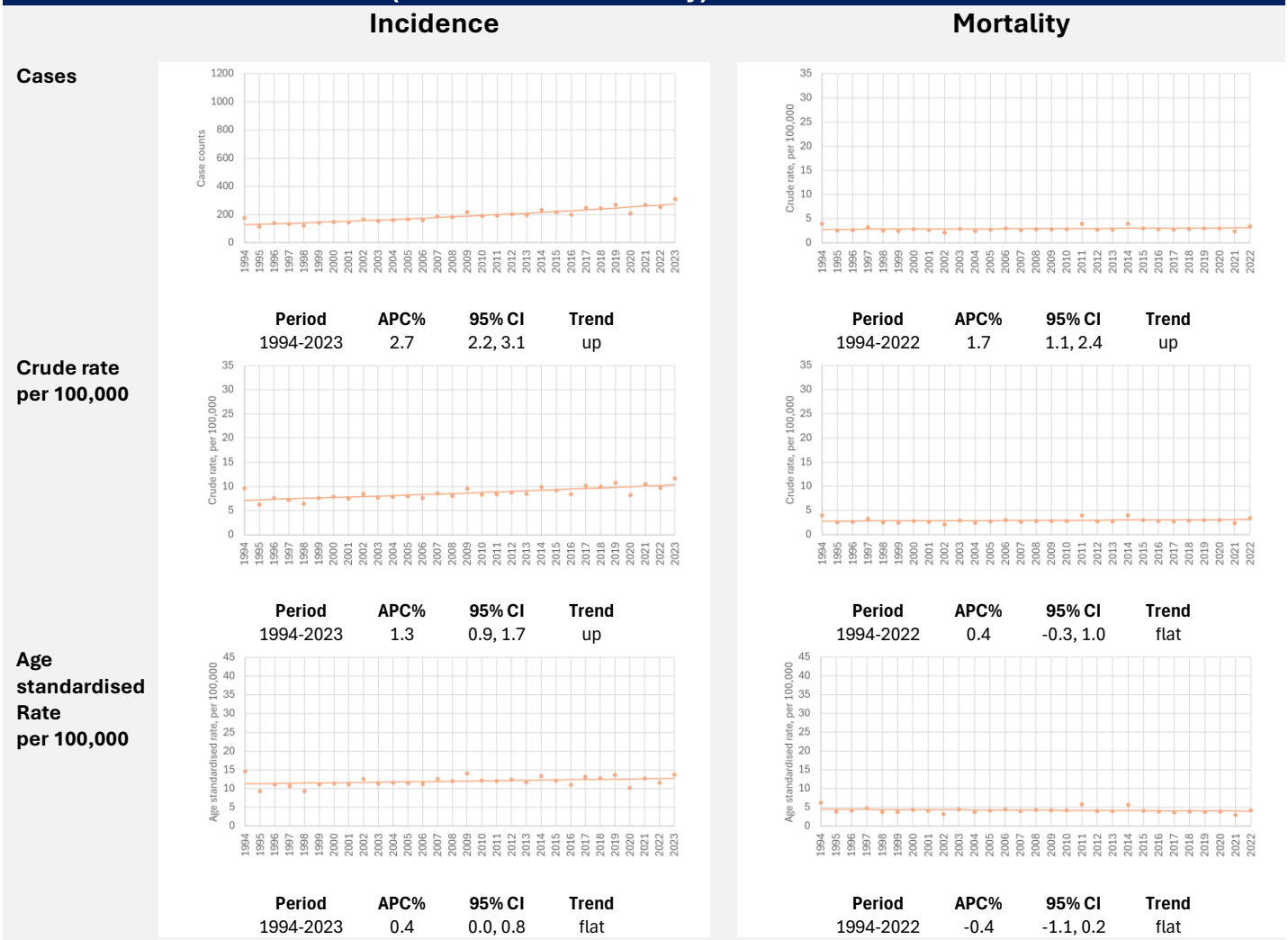
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Overall, the number of case and crude rates for bladder cancer increased in the past 20 years. The age standardised incidence rate increased marginally from 1994-2023. The age standardised mortality rate has decreased from 2014-2022 (Figure 7.1).

7.2. Incidence & Mortality - Female

Figure 7.2: Females

Invasive bladder & NMIBC (C67, D09.0, D41.4) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)



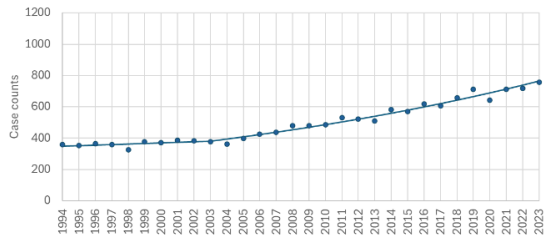
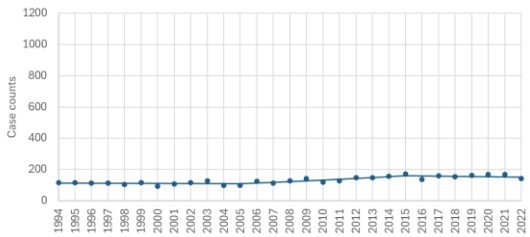
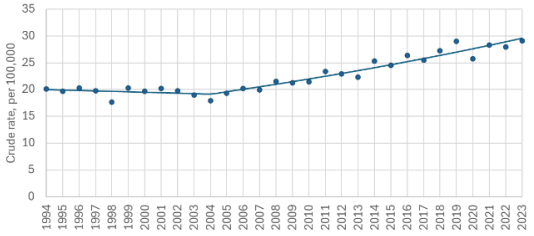
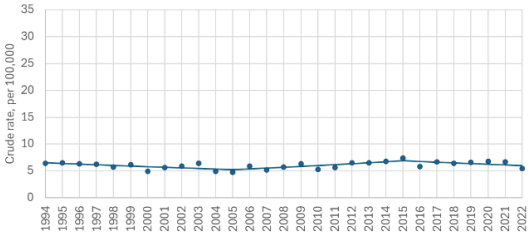
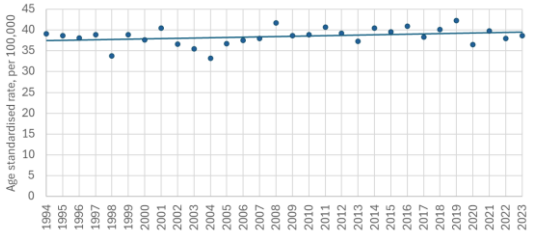
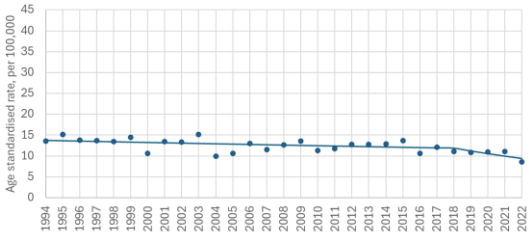
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

The number of cases and crude rate for bladder cancer in females slightly increased, but age standardised incidence rate for bladder cancer has remained flat from 1994-2023. Likewise, the crude and age standardised mortality rate has remained constant during this period (Figure 7.2).

7.3. Incidence & Mortality - Male

Figure 7.3: Males

Invasive bladder & NMIBC (C67, D09.0, D41.4) trends: case counts, crude rate and age - standardised rate 1994-2023 (1994-2022 for mortality)

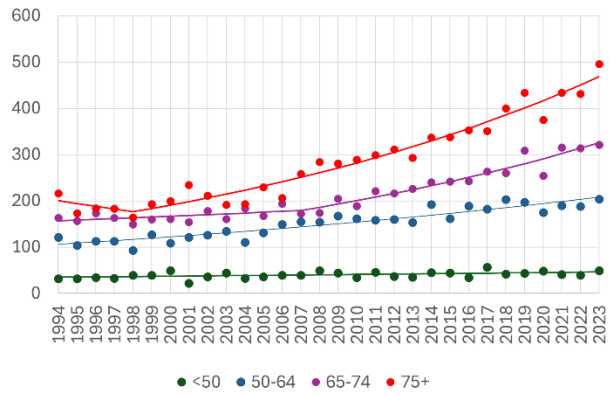
	Incidence	Mortality
Cases		
	Period **APC%** **95% CI** **Trend** 1994-2003 1 -0.3, 2.3 flat 2003-2023 3.5 3.2, 3.9 up	**Period** **APC%** **95% CI** **Trend** 1994-2005 -0.3 -2.1, 1.5 flat 2005-2015 4 1.8, 6.3 up 2015-2022 -0.9 -3.3, 1.7 flat
Crude rate per 100,000		
	Period **APC%** **95% CI** **Trend** 1994-2004 -0.4 -1.5, 0.6 flat 2004-2023 2.3 2.0, 2.7 up	**Period** **APC%** **95% CI** **Trend** 1994-2005 -2 -3.7, -0.2 down 2005-2015 2.8 0.6, 5.0 up 2015-2022 -2 -4.4, 0.5 flat
Age standardised Rate per 100,000		
	Period **APC%** **95% CI** **Trend** 1994-2023 0.2 0.0, 0.4 flat	**Period** **APC%** **95% CI** **Trend** 1994-2018 -0.6 -1.2, 0.0 down 2018-2022 -5.7 -11.0, 0.0 down

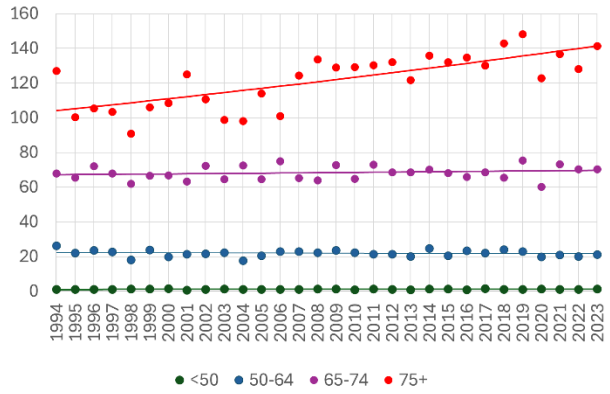
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

The number of cases and crude rates for bladder cancer in males increased in the past 20 years. However, age standardised incidence rate remained flat suggesting that the observed increase in case counts and crude rates was driven by an aging population. The age standardised mortality rate has steadily decreased from 1994-2022 (Figure 7.3). Case counts and crude rates are considerably higher in males than females.

7.4. Incidence by age group

Figure 7.4
Invasive bladder & NMIBC (C67, D09.0, D41.4) trends: case counts and age specific incidence rate by age group (1994-2023)





Age Group	Case Counts				Age specific incidence per 100,000			
<50	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2023	1	0.2,1.8	up	1994-2023	0.1	-0.7,0.9	flat
	AAPC% (95% CI) = 1.0 (0.2, 1.8)				AAPC% (95% CI) = 0.1 (-0.7, 0.9)			
50-64	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2023	2.3	1.9,2.8	up	1994-2023	-0.1	-0.5,0.3	flat
	AAPC% (95% CI) = 2.3 (1.9, 2.8)				AAPC% (95% CI) = -0.1 (-0.5, 0.3)			
65-74	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-2007	1	-2.2,2.2	flat	1994-2023	0.1	-0.2,0.5	flat
	2007-2023	3.8	3.1,5.7	up				
	AAPC% (95% CI) = 2.6 (2.2, 3.0)				AAPC% (95% CI) = 0.1 (-0.2, 0.5)			
75+	Period	APC%	95% CI	Trend	Period	APC%	95% CI	Trend
	1994-1998	-3.1	-6.1,2.8	flat	1994-2023	1.1	0.7,1.6	up
	1998-2023	4	3.7,4.7	up				
	AAPC% (95% CI) = 3.0 (2.6, 3.6)				AAPC% (95% CI) = 1.1 (0.7, 1.6)			

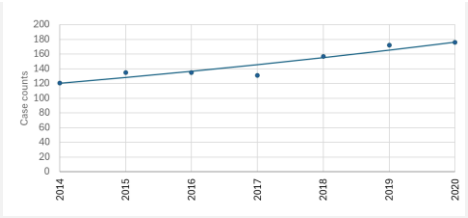
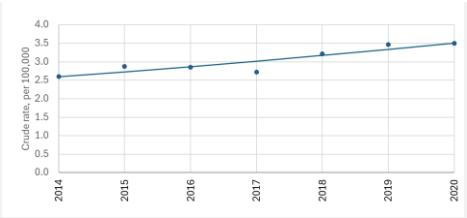
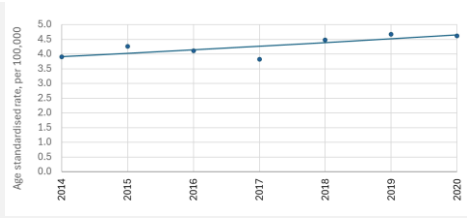
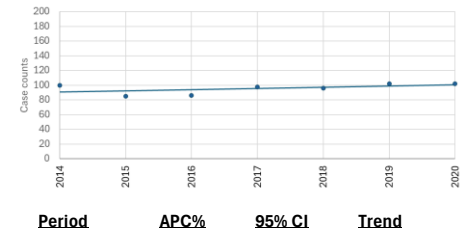
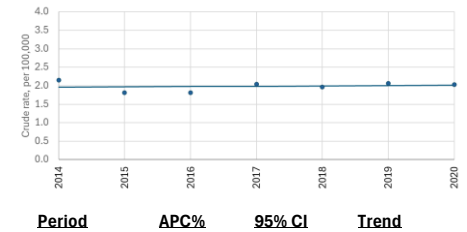
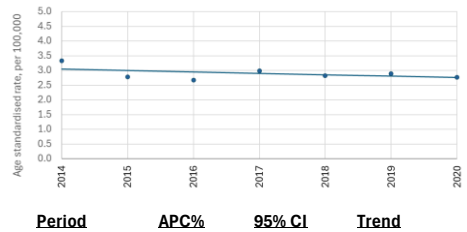
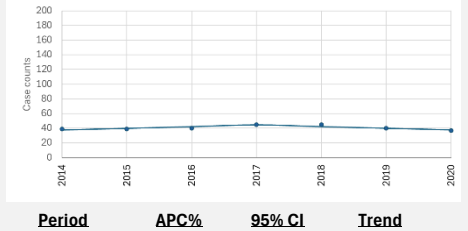
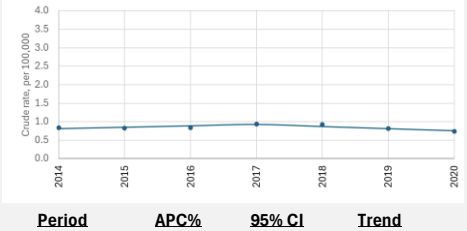
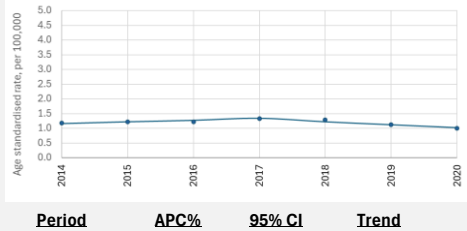
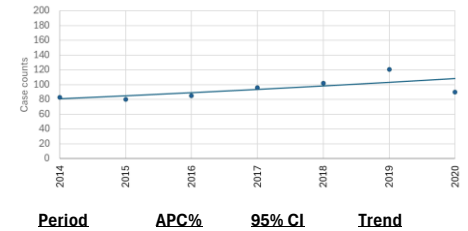
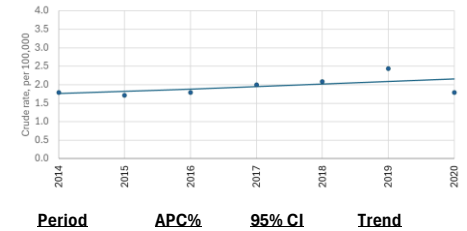
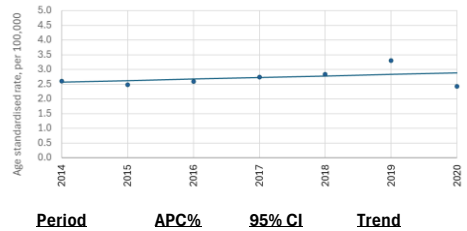
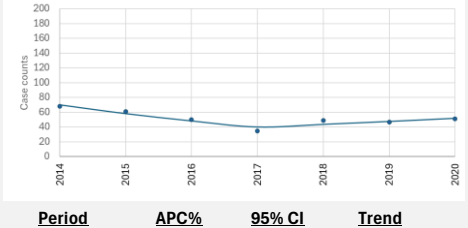
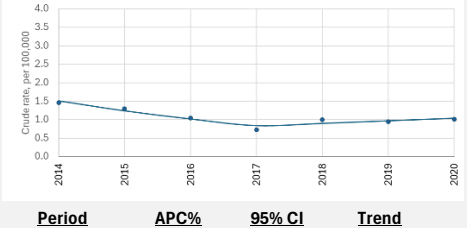
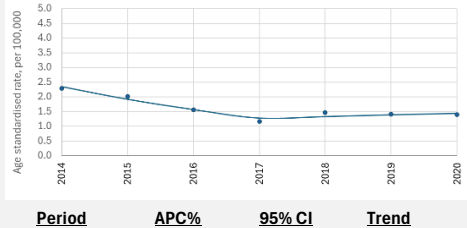
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Crude incidence rates for invasive bladder cancer and NMIBC have remained largely stable across all age groups from 1994 to 2023, despite substantial increases in case counts (Figure 7.4). While overall bladder cancer risk has remained stable for most age groups, incidence has risen slightly among the oldest individuals. For those under 50, the overall AAPC was +0.1% (95% CI: –0.7, 0.9), indicating no significant change. Rates for ages 50–64 and 65–74 were similarly flat, with AAPCs of –0.1% (95% CI: –0.5, 0.3) and +0.1% (95% CI: –0.2, 0.5), respectively. In contrast, individuals aged 75+ experienced a modest but statistically significant increase, with an AAPC of +1.1% (95% CI: 0.7, 1.6). For both men and women, age-specific incidence patterns for invasive bladder cancer and NMIBC followed the same trends as in the overall population (Appendix 2).

7.5. Incidence by stage

Figure 7.5

Invasive bladder (C67) 2014-2020: trends in case counts, crude rate and age standardised rate, by stage at diagnosis

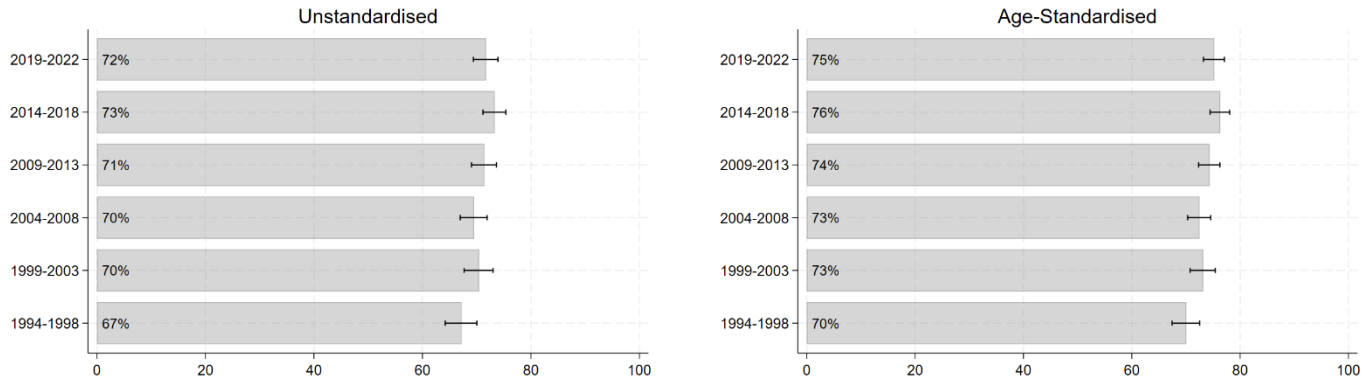
	case counts	crude rate, per 100,000	age-standardised rate, per 100,000
stage I			
	Period **APC%** **95% CI** **Trend** 2014-2020 6.6 4.2,9.2 up AAPC% (95% CI) = 6.6 (4.2, 9.2)	**Period** **APC%** **95% CI** **Trend** 2014-2020 5.1 2.7,7.7 up AAPC% (95% CI) = 5.1 (2.7, 7.7)	**Period** **APC%** **95% CI** **Trend** 2014-2020 2.9 0.4,5.6 up AAPC% (95% CI) = 2.9 (0.4, 5.6)
stage II			
	Period **APC%** **95% CI** **Trend** 2014-2020 1.8 -0.6,4.4 flat AAPC% (95% CI) = 1.8 (-0.6, 4.4)	**Period** **APC%** **95% CI** **Trend** 2014-2020 0.4 -1.9,2.9 flat AAPC% (95% CI) = 0.4 (-1.9, 2.9)	**Period** **APC%** **95% CI** **Trend** 2014-2020 -1.6 -4.2,1.1 flat AAPC% (95% CI) = -1.6 (-4.2, 1.1)
stage III			
	Period **APC%** **95% CI** **Trend** 2014-2017 6.1 1.6,11.3 up 2017-2020 -5.5 -9.9,-1.5 down AAPC% (95% CI) = 0.1 (-1.9, 2.2)	**Period** **APC%** **95% CI** **Trend** 2014-2017 4.8 0.7,9.6 up 2017-2020 -7 -11.0,-3.2 down AAPC% (95% CI) = -1.3 (-3.1, 0.7)	**Period** **APC%** **95% CI** **Trend** 2014-2017 4.7 1.2,8.9 up 2017-2020 -8.5 -11.9,-5.3 down AAPC% (95% CI) = -2.1 (-3.7, -0.4)
stage IV			
	Period **APC%** **95% CI** **Trend** 2014-2020 5 -0.7,11.9 flat AAPC% (95% CI) = 5.0 (-0.7, 11.9)	**Period** **APC%** **95% CI** **Trend** 2014-2020 3.5 -1.7,9.8 flat AAPC% (95% CI) = 3.5 (-1.7, 9.8)	**Period** **APC%** **95% CI** **Trend** 2014-2020 1.9 -2.3,6.7 flat AAPC% (95% CI) = 1.9 (-2.3, 6.7)
Stage X			
	Period **APC%** **95% CI** **Trend** 2014-2017 -16.8 -24.8,-8.1 down 2017-2020 8.9 -2.3,20.5 flat AAPC% (95% CI) = -4.8 (-9.0, -0.9)	**Period** **APC%** **95% CI** **Trend** 2014-2017 -17.8 -26.0,-8.7 down 2017-2020 7.2 -4.4,19.2 flat AAPC% (95% CI) = -6.1 (-10.5, -2.1)	**Period** **APC%** **95% CI** **Trend** 2014-2017 -18.1 -23.0,-13.3 down 2017-2020 3.9 -2.3,10.5 flat AAPC% (95% CI) = -7.8 (-10.2, -5.5)

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

Stage-specific incidence trends for C67 bladder cancer (Figure 7.5) show that Stage I diagnoses increased significantly from 2014 to 2020 (AAPC 6.6%, 95% CI: 4.2–9.2). Trends for Stage III cancers are decreasing, while Stages II and IV were stable.

7.6. Survival - Overall

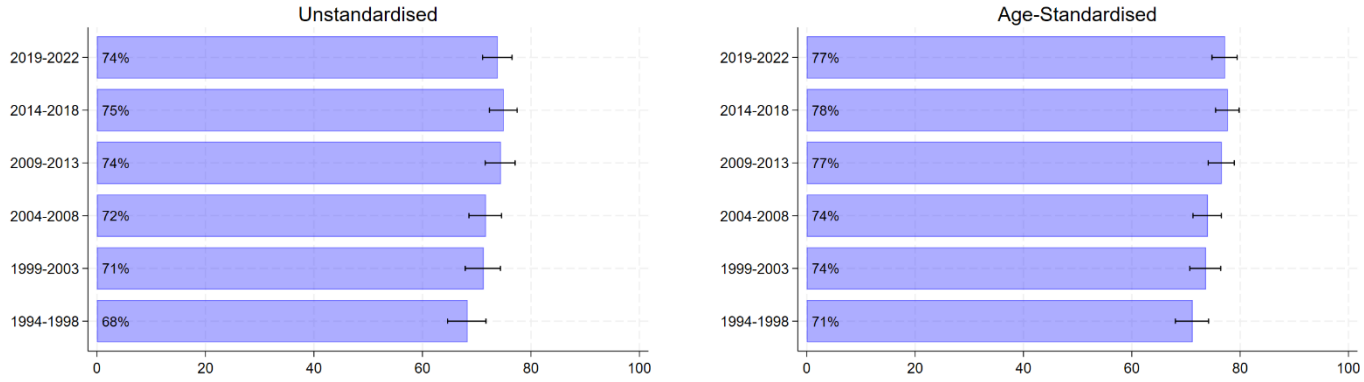
Figure 7.6: Total Invasive bladder & NMIBC (C67, D09.0, D41.4): 5-year net survival (%) over six consecutive diagnosis periods



Five-year net survival for invasive bladder cancer and NMIBC has remained relatively stable over time, with modest improvements (Figure 7.6). Unstandardised survival increased from 67% in 1994–1998 to 72% in 2019–2022, while age-standardised survival rose from 70% to 75% over the same period.

7.7. Survival - Males

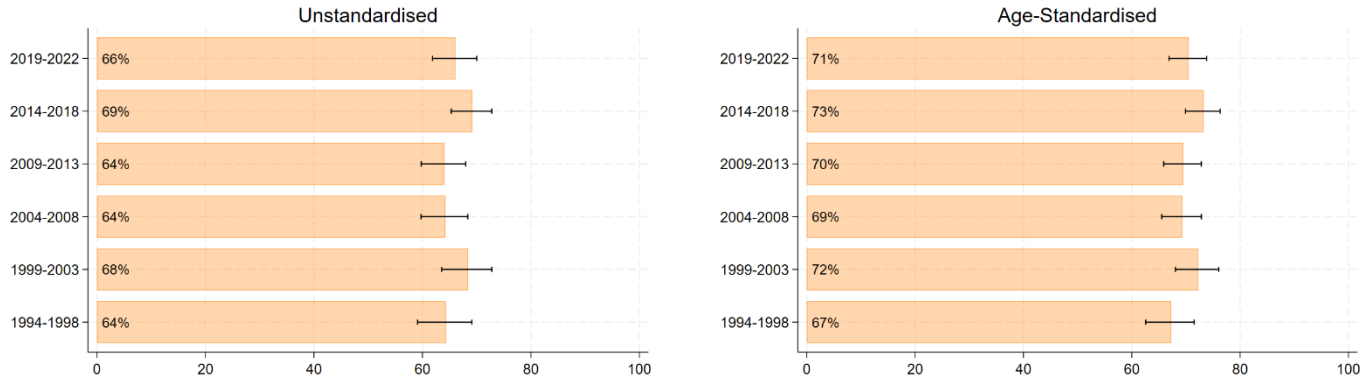
Figure 7.7: Male
Invasive bladder & NMIBC (C67, D09.0, D41.4): 5-year net survival (%) over six consecutive diagnosis periods



Five-year net survival for males diagnosed with invasive bladder cancer and NMIBC has remained high and relatively stable over time (Figure 7.7). Unstandardised survival increased from 68% in 1994–1998 to 74% in 2019–2022, while age-standardised survival improved from 71% to 77% across the same periods. These figures indicate consistently strong outcomes for men, slightly above the overall population survival.

7.8. Survival - Females

Figure 7.8: Female
Invasive bladder & NMIBC (C67, D09.0, D41.4): 5-year net survival (%) over six consecutive diagnosis periods

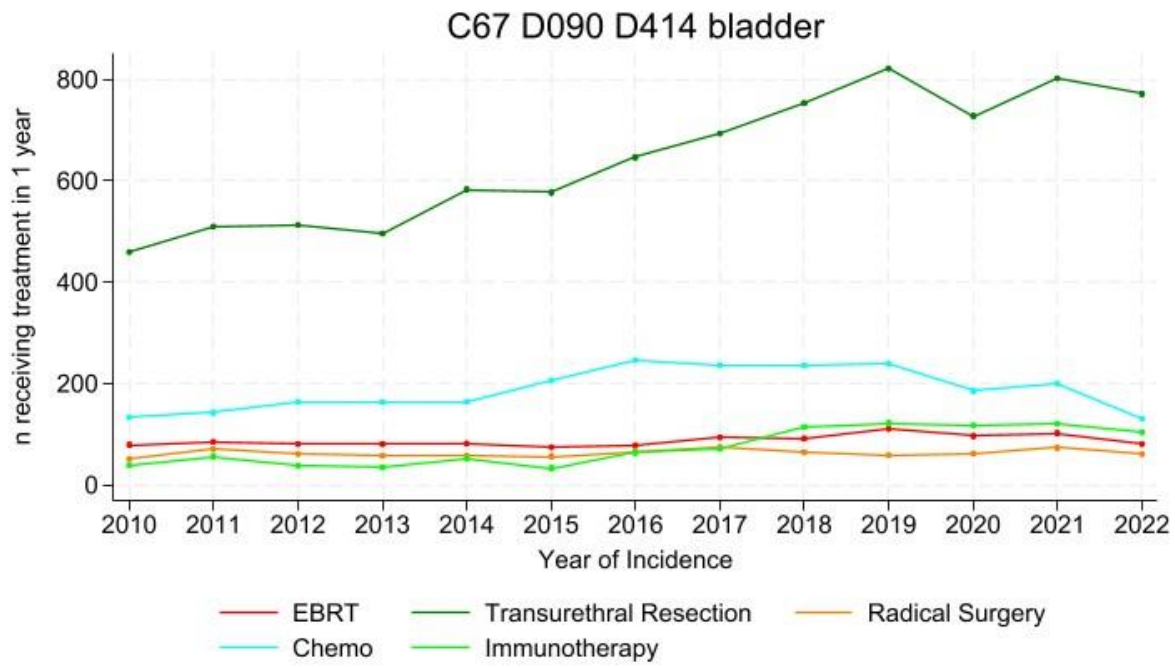


Five-year net survival for females diagnosed with invasive bladder cancer and NMIBC has remained relatively stable over time. Unstandardised survival ranged from 64% in 1994–1998 to 66% in 2019–2022, while age-standardised survival improved from 67% to 71% across the same periods. These figures are slightly below the overall population survival (72% unstandardised and 75% age-standardised in 2019–2022), indicating a modest survival disadvantage for females compared to males.

7.9. Treatment

Figure 7.9
Invasive bladder & NMIBC (C67, D09.0, D41.4) Treatment – All Stage (2010-2022)

Detailed



- EBRT = External Beam Radiation Therapy
- Chemo = Chemotherapy
- Note: Route of chemotherapy administration (intravenous or intravesical) not specified for bladder cancer in data.

Treatment data in Figure 7.9 and Table 14.7 (Appendix 3) reveal that treatment patterns for invasive bladder cancer and NMIBC have remained relatively consistent between 2010 and 2022. Transurethral resection remains the most frequently used modality across both invasive and non-invasive disease, with consistently high annual volumes—rising from 459 cases in 2010 to 771 in 2022.

Immunotherapy has seen a marked rise in bladder cancer treatment, from 39 cases in 2010 to 103 in 2022, reflecting its growing role in bladder cancer management.

8. Discussion

This report presents the epidemiological and clinical trends observed across urological cancers in Ireland from 1994 to 2023, drawing on population-based data from the NCRI. The analysis spans incidence, mortality, treatment patterns and survival. We also looked at the impact of RAPCs on prostate cancer diagnosis.

While crude incidence rates have generally increased across sites, age-standardised trends are often more stable or declining, suggesting that population ageing rather than changes in underlying risk factors is a key driver of case growth (28).

Improvements in survival outcomes are evident across all urological cancer sites. The implementation of RAPCs has reshaped diagnostic pathways for prostate cancer, centralising diagnosis in the designated cancer centres.

The following sections explore these findings in detail, highlighting site-specific implications for clinical practice and service planning.

8.1. Prostate Cancer (C61)

Prostate cancer crude incidence rates increased substantially over the past three decades. However, age-standardised rates tell a different story: after a sharp rise, the trend flattened, with no significant change from 2002 onwards. Age-standardised mortality rates declined significantly reflecting advances in treatment and possibly earlier detection.

Stage-specific incidence trends are consistent with the widespread uptake of PSA testing in Ireland from 1994 onwards, peaking around 2004, despite the absence of national screening guidelines (29). This surge in testing led to a marked increase in Stage I prostate cancer diagnoses, shifting the distribution toward earlier stages. Together, these findings suggest that opportunistic PSA testing significantly influenced prostate cancer epidemiology in Ireland during this period, an observation previously described in an NCRI report (30).

Age-specific incidence rates also reveal the impact of PSA testing, with a sharp increase in rates in the 50-74 age groups, where opportunistic screening is usually offered (29). In contrast, rates among men aged 75+ declined slightly, reflecting less aggressive diagnostic practices in older populations (19). Men under 50 saw sustained growth throughout the period (AAPC +10.0%).

Similar patterns have been observed internationally, where PSA testing has driven sharp increases in incidence without corresponding trends in mortality (31). A recent population-based study estimated that up to half of prostate cancers detected in high-incidence countries may represent overdiagnosis—cases unlikely to cause symptoms or death during a patient's lifetime (32). This highlights the unintended consequences of widespread PSA testing, including unnecessary biopsies, anxiety, and overtreatment (33). Ireland's experience, with rising early-stage diagnoses and stable mortality, aligns with these concerns and underscores the need for risk-stratified screening rather than population-wide PSA testing.

While opportunistic PSA testing has clearly shaped Ireland's prostate cancer epidemiology, emerging evidence shows that underlying risk is also influenced by broader factors. Lifestyle factors remain central: maintaining a healthy weight, regular physical activity, and plant-rich dietary patterns are associated with lower risk of aggressive disease (36). Recent analyses link higher exposure to air pollutants such as nitrogen dioxide (NO_2) with increased prostate cancer risk, and urinary microbiome studies identify greater levels of pro-inflammatory bacteria in men with prostate cancer, suggesting inflammation-related biological pathways (34,35). These findings highlight the need to consider prevention alongside early detection.

Despite improvements in earlier detection, the number of men diagnosed with Stage IV prostate cancer continued to increase throughout the study period. This rise was seen in both case counts and crude rates. Although population ageing contributes to higher crude rates, the upward pattern in age standardised rates between 2009 and 2020 suggests that demographic change alone does not fully explain these trends. This indicates that a meaningful proportion of men still present with advanced disease. These findings emphasise the need to explore factors that may hinder earlier diagnosis, such as delays in help seeking (37), to help identify opportunities to reduce late-stage presentations.

Survival outcomes for prostate cancer are among the most favourable of all urological cancers. This high survival rate reflects both the indolent nature of many prostate cancers and the effectiveness of current treatment strategies.

Treatment patterns have evolved substantially over the past decade. While EBRT remains the most used treatment within one year of diagnosis, robotic assisted radical prostatectomy has increased dramatically, rising from 30 cases in 2014 to 644 in 2022, overtaking open radical prostatectomy as the dominant surgical modality. Active surveillance and watchful waiting have grown substantially, from just 12 cases in 2010 to 848 in 2022. This reflects a broader shift toward conservative management, supported by the HSE National Clinical Guideline on active surveillance, which recommends careful monitoring to avoid overtreatment while maintaining patient safety (11). Hormone therapy has remained consistently used across all years, with over 1,000 cases annually.

While the uptake of active surveillance/watchful waiting for patients diagnosed with Stage I tumours increased considerably, the modest rise in active surveillance/watchful waiting for stage II tumours does not fully explain the sharp decline in EBRT and hormone therapy. Other factors likely contributed, including greater uptake of robotic assisted radical prostatectomy and guideline-driven de-escalation of radiotherapy and hormone therapy for localised disease, consistent with EAU recommendations promoting conservative management for low-risk patients (38). For Stage II and III, robotic assisted radical prostatectomy has overtaken open radical prostatectomy, but no significant change in treatment modality was observed for Stage IV cancer.

The implementation of Rapid Access Prostate Clinics is associated with measurable changes in prostate cancer diagnosis in Ireland. RAPCs were introduced to streamline diagnostic pathways and improve access to timely assessment, particularly for patients with suspected prostate cancer. Overall trends show a substantial increase in case numbers and crude incidence rates following RAPC implementation. Importantly, while

case numbers were higher during the implementation period, the underlying trend flattened; slope estimates indicate no meaningful quarterly increase, unlike the steady rises observed beforehand.

As expected, based on the centralised design of the programme, RAPCs have shifted diagnostic activity from public hospitals to designated cancer centres. Cancer centres experienced a substantial increase in number of cases and rates post-implementation, while public hospitals saw a decline, indicating successful centralisation of diagnostic services. Private hospitals, which operate independently of the public system, also reported higher activity, broadly mirroring the pattern seen in cancer centres.

Stage-specific analysis reveals further differences in how trends evolved during the implementation period. Stage I diagnoses increased in both case numbers and crude incidence rates, but their positive pre-implementation trend slowed considerably during implementation, consistent with earlier detection and improved triage. Stage II diagnoses, however, showed a declining trend during the implementation period, suggesting a shift in the distribution of cases, possibly due to stage migration or more accurate staging practices (19,39). This reduction may reflect improved classification of early-stage disease into Stage I or more advanced categories.

In contrast, Stage III and IV diagnoses showed increasing trends post-implementation. While some of this rise may be attributable to better triage of advanced cases or enhanced referral pathways for complex presentations (39), the trend indicates that a proportion of patients continue to present with advanced disease despite the availability of rapid access pathways. This highlights the need to examine potential barriers to early diagnosis, such as delays in referral or capacity constraints within RAPCs, and to ensure that pathways are optimised for timely detection across all stages.

8.2. Testis cancer (C62)

Crude and age-standardised incidence rates increased significantly from 1994 to 2007 followed by a plateau from 2007 to 2023. Testicular cancer remains predominantly a disease of younger men, but age-specific trends show modest increases in older cohorts (AAPC +2.7% for ages 50–64), despite overall stability in the younger group after 2007. These findings highlight the need for vigilance in older patients, even though absolute rates remain low. Mortality rates have remained low and stable throughout the period, with age-standardised mortality showing a non-significant decline.

Prevention efforts for testicular cancer focus on improving awareness and encouraging early presentation. A scoping review found that young men have low awareness of symptoms and risk, but simple educational measures such as leaflets and brief teaching sessions can increase knowledge and intention to seek care or perform self-examination, helping to reduce diagnostic delay in a highly curable cancer (40).

Survival rates for testis cancer are high. These trends reflect the high curability of testicular cancer and the effectiveness of standard treatment protocols. However, due

to the relatively low number of deaths, comparisons of survival and mortality estimates across time periods should be interpreted with caution.

Changes in treatment patterns reflect evolving guidelines that favour surgery and minimise overtreatment. Prophylactic EBRT is no longer recommended for Stage I testicular seminoma as per current European guidelines (41), aligning with broader efforts to preserve fertility and reduce long-term complications in a population with excellent prognosis and long-life expectancy.

8.3. Penis and other male genital cancers (C60, C63)

National Cancer Registry data demonstrate a gradual but sustained increase in incidence since the mid-1990s, with the age-standardised rate reaching 3.1 per 100,000 in 2023. The rise in incidence is most pronounced among men aged 50–64 and 65–74, while age-specific rates for those aged 75+ have remained largely stable despite higher case counts.

While the highest incidence is observed in older men, there is evidence of a concerning increase among younger men, with age-specific rates of 0.46 per 100,000 in those under 50, though absolute numbers remain low. Recent global analyses confirm a significant increase in incidence among men under 50 years, reinforcing the relevance of this trend in Ireland (42). This increase among younger men likely reflects known risk factors for penile cancer, including HPV infection, poor genital hygiene and changing sexual behaviours (43). Increasing HPV vaccination coverage, especially in at-risk groups, remains a key component of penile cancer prevention (44).

Persistent gains across all survival measures point to advances in treatment and care as key drivers of improved outcomes. However, due to the relatively small number of deaths and wide confidence intervals, comparisons across periods should be interpreted with caution. A recent national review reported a 5-year disease-specific survival (DSS) of 70% based on cases diagnosed between 1995 and 2010. Notably, DSS was significantly higher (92%) in a single-centre cohort, where patients were managed via a dedicated referral pathway (45). The observed difference in survival underscores the potential benefits of centralisation.

In recognition of these issues, penile cancer management in Ireland has undergone significant reconfiguration, culminating in the formal centralisation of referral pathways in 2021 (46). This aligns with long-standing national and international recommendations advocating for the development of a supra-regional network for penile cancer management in Ireland (47). Treatment data indicate that complete or partial amputation remains the most consistently used modality, reflecting its central role in managing locally advanced disease. Similar findings have been reported elsewhere in Europe, where partial penectomy was the most common tumour directed treatment (48). Local excision has gradually increased, suggesting a growing preference for organ-preserving approaches. This shift toward organ preservation is supported by evidence on the psychological impact of treatment. Patients undergoing conservative procedures report better sexual function and fewer mental health issues compared to those undergoing complete or total amputation. While oncological control remains of key

importance, these findings reinforce the importance of offering organ-preserving options whenever clinically appropriate (49).

8.4. Kidney cancer (C64–66), including renal pelvis and ureter

Kidney cancer incidence rose steadily from 1994 to 2016, followed by a plateau until 2023. These trends are consistent across sexes, though the timing and magnitude of changes differ slightly. In 2023, Ireland's kidney cancer age-standardised incidence was 24.3 per 100,000 in males, 11.6 in females, and 18.0 overall. These rates exceed the European averages reported for 2020, which were 18.9 in males, 6.9 in females, and 12.6 overall (50).

Ireland's higher kidney cancer incidence may reflect greater exposure to risk factors such as obesity, which has risen substantially over recent decades (51) and smoking, still reported by 17% of adults in 2024 (52,53). Ambient air pollution is another emerging modifiable risk factor for kidney cancer. A recent meta-analysis found that every 5 $\mu g/m^3$ increase in PM2.5 is linked to a 9% rise in kidney cancer risk, suggesting that reducing population exposure to fine particulate matter may contribute to lowering incidence rates (34). A recent review also highlights hypertension, diabetes, alcohol use and dietary factors as additional modifiable risks for renal cell carcinoma, underscoring the importance of metabolic health in primary prevention (54).

Stage-specific incidence trends likely reflect a broader shift in diagnostic practice rather than true changes in disease burden. The utilisation of CT and MRI in diagnostics has led to a surge in incidental renal mass detection, often during investigations for unrelated abdominal complaints. Incidental renal lesions are increasingly common in oncology imaging, with a significant proportion representing clinically relevant malignancies. This imaging-driven detection has contributed to rising incidence rates globally (55). However, by 2017, the diagnostic yield may have been moving toward a saturation point in the imaging-accessible population. With widespread availability of imaging, the pool of undiagnosed Stage III disease may have been diminishing, potentially contributing to the observed plateau.

Survival has improved significantly: Ireland's 5-year net survival increased from ~46% (1994–1998) to ~70% (2019–2022), comparable to improvements observed in other high-income countries (56).

Although radical nephrectomy and nephroureterectomy have historically been the mainstay of tumour-directed treatment for kidney cancer, there has been a growing trend in recent years toward nephron-sparing surgery. Partial nephrectomy volumes rose between 2010 and 2022, reflecting the increasing recognition of the benefits of preserving renal function without compromising oncological outcomes (57).

8.5. Bladder Cancer and NMIBC (C67, D09.0, D41.4)

Bladder cancer including non-muscle invasive bladder cancer (NMIBC) has shown increasing incidence since 1999, with mortality trends declining from 2014 to 2022. Age-specific analysis shows stable rates across most age groups, except for a slight rise

among those aged 75+ (AAPC +1.1%). This suggests that the overall increase in case counts is primarily attributable to population ageing rather than rising risk in younger cohorts. Case counts are considerably higher in males than females, consistent with other European countries (58).

For this report, NMIBC and invasive bladder cancers were combined to ensure consistency across time and avoid artefacts from evolving coding practices. Historically, registries varied in whether non-invasive urothelial tumours were included, creating discontinuities in trends. The European Network of Cancer Registries (ENCR) 2022 recommendations on the recording and reporting of urothelial tumours clarified that both non-invasive and invasive bladder cancers should be recorded separately, and that progressions from NMIBC to invasive disease must be treated as distinct events (59). Combining both provides a stable measure of overall bladder cancer burden and prevents misinterpreting classification changes as real epidemiological shifts.

Stage-specific incidence trends for bladder cancer (Figure 7.5) show that Stage I diagnoses increased significantly from 2014 to 2020. However, this increase has not been accompanied by a corresponding decline in Stage II–IV diagnoses, suggesting that the overall burden of advanced disease remains stable. The stable incidence of Stage II-IV disease suggests that these early detections are additive, not substitutive, and do not yet reflect a population-wide stage shift. The increase in Stage I diagnoses may persist with the introduction of sensitive diagnostic tools such as liquid biopsy and molecular markers that detect previously undiagnosed or asymptomatic cases (60).

Five-year net survival for bladder cancer and NMIBC has remained relatively stable over time. Unstandardised survival increased modestly from 67% in 1994–1998 to 72% in 2019–2022, while age-standardised survival rose from 70% to 75% over the same period. This contrasts with the more substantial gains observed for the other urological cancer sites. Survival remains consistently higher in males than females, with males reaching 77% age-standardised survival in the most recent period compared to 71% in females. The gap between men and women likely reflects several interacting factors: women more often face delays in the investigation of haematuria, frequently attributed to urinary infection. Emerging biological differences, including hormone signalling and sex-linked immune and tumour-microenvironment features, may also contribute (61).

Bladder-cancer prevention continues to centre on reducing exposure to its major modifiable risk factors. Smoking cessation represents the single most impactful intervention, as tobacco use accounts for a substantial proportion of cases (62). Occupational exposure to urothelial carcinogens remains relevant, emphasising the need for robust workplace regulation and monitoring (63).

Immunotherapy has seen a marked rise in invasive and NMIBC treatments, reflecting its growing role in bladder cancer management. However, the results would suggest that less than 10% of patients diagnosed received intravesical BCG treatment within one year of diagnosis. The observed proportion of cases receiving BCG treatment is notably lower than expected compared to other European cohorts (64). The discrepancy in uptake may reflect under-recording in treatment datasets or delayed initiation beyond the one-year window. Nonetheless, the gap highlights a potential shortfall in adherence to guideline-recommended care (65).

9. Implications in practice

The findings of this report have direct implications for urological cancer diagnostics, treatment planning, and service delivery within the Irish healthcare system. The centralisation of diagnostic services for prostate cancer through Rapid Access Prostate Clinics in the public system has likely facilitated earlier diagnosis, particularly among the target age group. The observed increase in Stage I diagnoses and decrease in Stage II diagnoses is encouraging; however, the rise in Stage IV diagnoses following implementation warrants further investigation. The shift toward conservative management strategies such as active surveillance and watchful waiting reflects alignment with international best practice and a maturing approach to risk-adapted care.

In testicular and penile cancers, high survival rates and the emergence of centralised referral pathways underscore the value of specialist-led, guideline-driven care. The centralisation of penile cancer management, although recent, is supported by evidence from national studies and may help reduce variation in outcomes across centres.

For kidney cancer, the increasing use of nephron-sparing surgery reflects a broader shift toward function-preserving approaches, consistent with evolving surgical standards. In bladder cancer, the stable use of transurethral resection and the low uptake of radical surgery are in line with clinical expectations.

10. Limitations

Several limitations should be considered when interpreting the findings of this report. First and foremost, this is a descriptive study; we did not examine other potential factors that may contribute to observed trends, such as comorbidities or socioeconomic status. Analyses were restricted to age and stage distributions.

Treatment data may be subject to under-recording, especially for outpatient-administered therapies such as intravesical BCG. The low recorded uptake of BCG in NMIBC patients is inconsistent with European benchmarks (66), and may reflect incomplete data capture or delayed treatment initiation beyond the one-year window used in this analysis.

Changes in tumour staging systems also limit comparability over time. Since 2014, the NCRI has used the TNM7 classification system, whereas earlier cases were staged using TNM4 or TNM5. Although prostate cancer cases diagnosed between 1994 and 2013 were retrospectively recoded to TNM7 using available clinical T, N, and M values, this process may not fully harmonise staging data across all cancer types, potentially affecting longitudinal analyses of stage distribution. TNM4 and TNM5 summary stage values were used for estimating stage-standardised net survival for penile cancer, as well as stage-standardised and age-stage-standardised net survival for kidney cancer. Although TNM revisions can lead to stage migration, evidence suggests that survival differs only marginally between editions, even when changes occur (67).

11. Conclusion

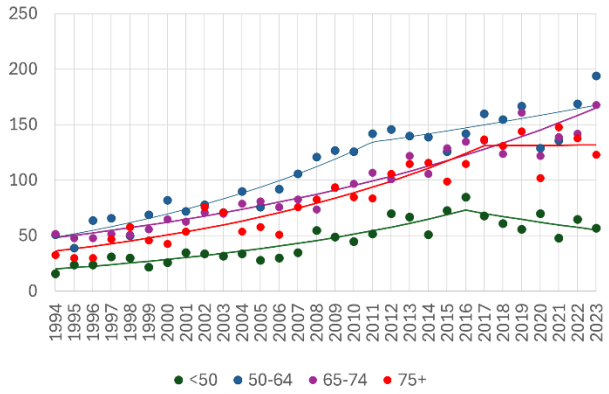
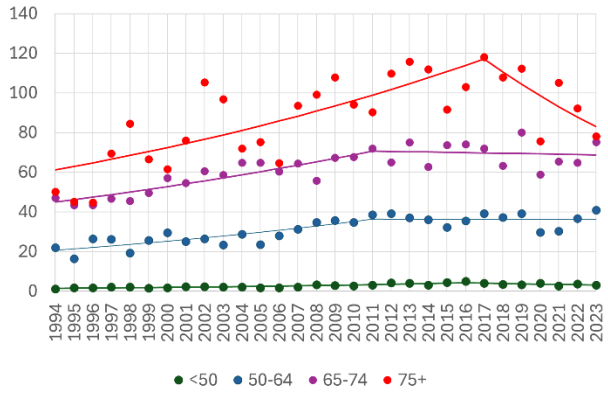
Urological cancer trends in Ireland reflect major advances in diagnosis, treatment, and care delivery. While crude incidence has risen, age-standardised rates remain stable, highlighting the role of population ageing. For prostate cancer, Rapid Access Clinics improved centralised diagnosis, while treatment shifted toward robotic surgery and active surveillance/watchful waiting, with reduced use of EBRT and hormone therapy for localised disease. Similar guideline-driven changes are evident across other sites, including increased nephron-sparing surgery for kidney cancer and organ-preserving approaches for penile cancer. Prevention remains a priority across all urological cancers, with sustained tobacco control, reduction of metabolic and occupational risks, HPV vaccination, and improved public awareness of urological symptoms central to reducing future disease burden. These findings underscore the importance of continued monitoring, adherence to evidence-based guidelines, and investment in specialist-led services to optimise outcomes.

12. Appendix 1 – Kidney, incl. renal pelvis and ureter - incidence by age group and sex

12.1. Incidence by age group - Male

Figure 12.1: Males

Kidney, incl. renal pelvis and ureter (C64-66) trends: case counts and age specific incidence rate by age group (1994-2023)

Age Group	Case Counts	Age specific incidence per 100,000
		

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Period	APC%	95% CI	Trend
1994-2016	6	5.0,8.9	up
2016-2023	-3.9	-13.3,1.3	flat

AAPC% (95% CI) = 3.5 (2.3, 5.1)

Period	APC%	95% CI	Trend
1994-2016	5	4.0,9.0	up
2016-2023	-4.2	-14.4,1.4	flat

AAPC% (95% CI) = 2.7 (1.4, 4.5)

50-64

Period	APC%	95% CI	Trend
1994-2011	6.1	5.0,9.3	up
2011-2023	1.9	-1.1,3.4	flat

AAPC% (95% CI) = 4.4 (3.7, 5.3)

Period	APC%	95% CI	Trend
1994-2011	3.4	2.4,9.1	up
2011-2023	0	-3.9,1.4	flat

AAPC% (95% CI) = 2.0 (1.3, 3.1)

65-74

Period	APC%	95% CI	Trend
1994-2023	4.3	3.9,4.9	up

AAPC% (95% CI) = 4.3 (3.9, 4.9)

Period	APC%	95% CI	Trend
1994-2011	2.7	1.8,6.6	up
2011-2023	-0.2	-3.3,1.0	flat

AAPC% (95% CI) = 1.5 (0.9, 2.3)

75+

Period	APC%	95% CI	Trend
1994-2017	5.8	4.9,18.2	up
2017-2023	0.1	-7.7,4.8	flat

AAPC% (95% CI) = 4.6 (3.6, 6.8)

Period	APC%	95% CI	Trend
1994-2017	2.9	2.0,5.2	up
2017-2023	-5.6	-13.0,-0.6	down

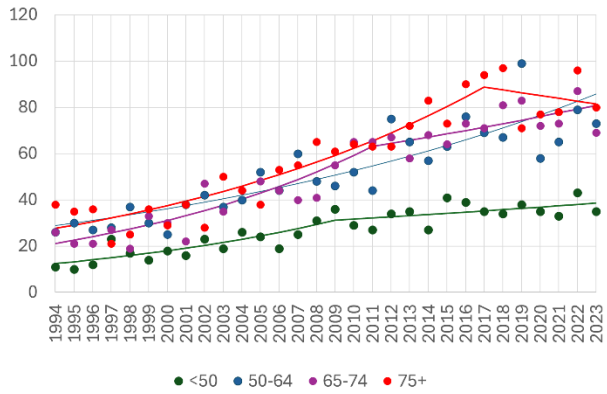
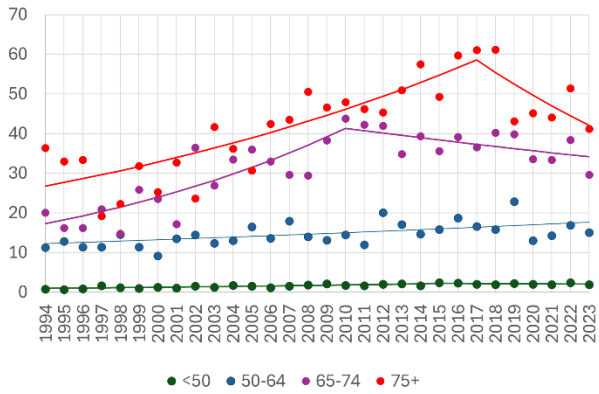
AAPC% (95% CI) = 1.1 (0.2, 2.4)

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

12.2. Incidence by age group - Female

Figure 12.2: Females

Kidney, incl. renal pelvis and ureter (C64-66) trends: case counts and age specific incidence rate by age group (1994-2023)

Age Group	Case Counts	Age specific incidence per 100,000
		

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Period	APC%	95% CI	Trend
1994-2009	6.3	4.4,17.2	up
2009-2023	1.5	-4.0,3.3	flat
AAPC% (95% CI) = 4.0 (2.8, 5.8)			

Period	APC%	95% CI	Trend
1994-2015	3.8	2.8,13.5	up
2015-2023	-0.8	-8.5,2.5	flat
AAPC% (95% CI) = 2.5 (1.5, 4.4)			

50-64

Period	APC%	95% CI	Trend
1994-2023	3.8	3.1,4.7	up
AAPC% (95% CI) = 3.8 (3.1, 4.7)			

Period	APC%	95% CI	Trend
1994-2023	1.3	0.6,2.1	up
AAPC% (95% CI) = 1.3 (0.6, 2.1)			

65-74

Period	APC%	95% CI	Trend
1994-2011	6.6	5.3,12.9	up
2011-2023	2.1	-2.5,4.0	flat
AAPC% (95% CI) = 4.7 (3.9, 6.1)			

Period	APC%	95% CI	Trend
1994-2010	5.6	3.9,9.0	up
2010-2023	-1.5	-4.2,0.3	flat
AAPC% (95% CI) = 2.4 (1.6, 3.6)			

75+

Period	APC%	95% CI	Trend
1994-2017	5.2	4.5,9.8	up
2017-2023	-1.4	-9.3,3.4	flat
AAPC% (95% CI) = 3.8 (2.8, 5.3)			

Period	APC%	95% CI	Trend
1994-2017	3.5	2.7,5.6	up
2017-2023	-5.3	-13.2,-0.2	down
AAPC% (95% CI) = 1.6 (0.6, 2.8)			

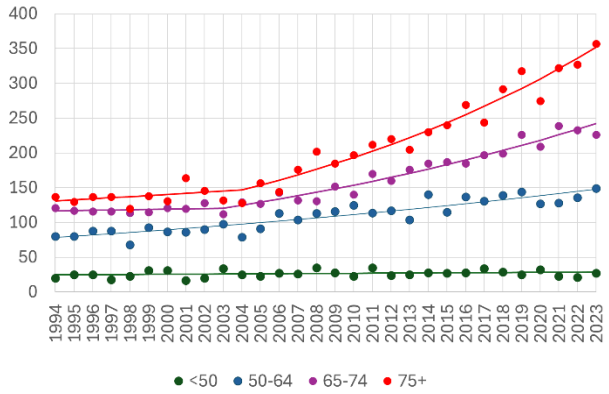
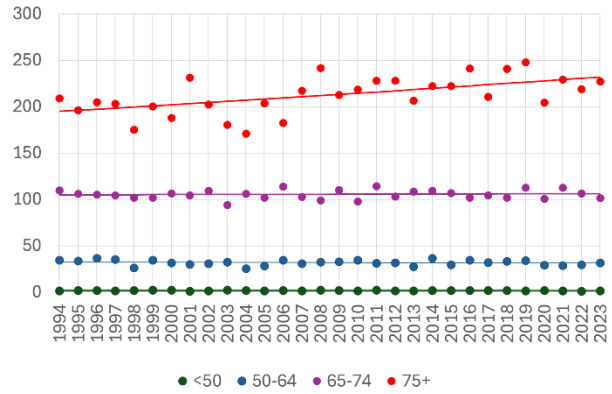
APC%: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression.
Trend: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

13. Appendix 2 – Invasive bladder & NMIBC - incidence by age group and sex

13.1. Incidence by age group - Male

Figure 13.1: Males

Invasive bladder & NMIBC (C67, D09.0, D41.4) trends: case counts and age specific incidence rate by age group (1994-2023)

Age Group	Case Counts	Age specific incidence per 100,000
		

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Period	APC%	95% CI	Trend
1994-2023	0.5	-0.3,1.4	flat

AAPC% (95% CI) = 0.5 (-0.3, 1.4)

Period	APC%	95% CI	Trend
1994-2023	-0.4	-1.2,0.5	flat

AAPC% (95% CI) = -0.4 (-1.2, 0.5)

50-64

Period	APC%	95% CI	Trend
1994-2023	2.2	1.8,2.7	up

AAPC% (95% CI) = 2.2 (1.8, 2.7)

Period	APC%	95% CI	Trend
1994-2023	-0.2	-0.6,0.3	flat

AAPC% (95% CI) = -0.2 (-0.6, 0.3)

65-74

Period	APC%	95% CI	Trend
1994-2003	0.3	-3.1,1.9	flat
2003-2023	3.6	3.2,4.3	up

AAPC% (95% CI) = 2.6 (2.2, 3.0)

Period	APC%	95% CI	Trend
1994-2023	0	-0.2,0.3	flat

AAPC% (95% CI) = 0.0 (-0.2, 0.3)

75+

Period	APC%	95% CI	Trend
1994-2004	1.1	-3.0,3.0	flat
2004-2023	4.7	4.2,5.8	up

AAPC% (95% CI) = 3.5 (3.0, 4.0)

Period	APC%	95% CI	Trend
1994-2023	0.6	0.2,1.1	up

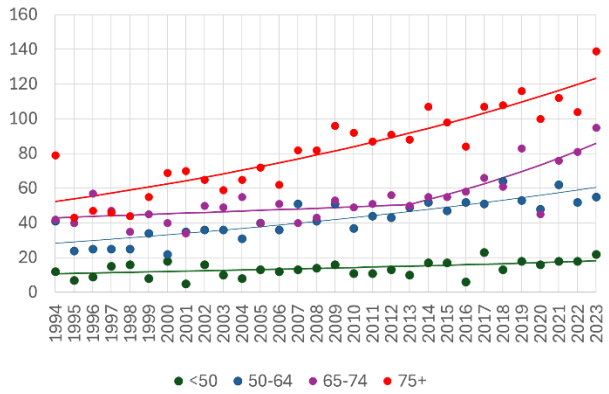
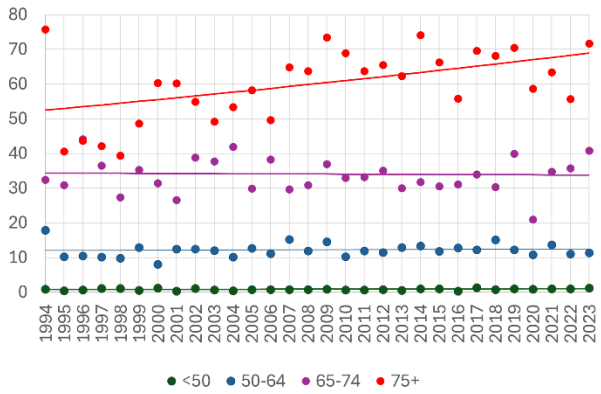
AAPC% (95% CI) = 0.6 (0.2, 1.1)

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

13.2. Incidence by age group - Female

Figure 13.2: Females

Invasive bladder & NMIBC (C67, D09.0, D41.4) trends: case counts and age specific incidence rate by age group (1994-2023)

Age Group	Case Counts	Age specific incidence per 100,000
		

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Period	APC%	95% CI	Trend
1994-2023	1.8	0.6,3.4	up

AAPC% (95% CI) = 1.8 (0.6, 3.4)

Period	APC%	95% CI	Trend
1994-2023	0.8	-0.4,2.3	flat

AAPC% (95% CI) = 0.8 (-0.4, 2.3)

50-64

Period	APC%	95% CI	Trend
1994-2023	2.6	1.9,3.5	up

AAPC% (95% CI) = 2.6 (1.9, 3.5)

Period	APC%	95% CI	Trend
1994-2023	0.1	-0.6,0.9	flat

AAPC% (95% CI) = 0.1 (-0.6, 0.9)

65-74

Period	APC%	95% CI	Trend
1994-2013	0.9	-4.7,2.1	flat
2013-2023	5.4	2.7,13.0	up

AAPC% (95% CI) = 2.4 (1.5, 3.3)

Period	APC%	95% CI	Trend
1994-2023	-0.1	-0.7,0.7	flat

AAPC% (95% CI) = -0.1 (-0.7, 0.7)

75+

Period	APC%	95% CI	Trend
1994-2023	3	2.4,3.8	up

AAPC% (95% CI) = 3.0 (2.4, 3.8)

Period	APC%	95% CI	Trend
1994-2023	0.9	0.3,1.7	up

AAPC% (95% CI) = 0.9 (0.3, 1.7)

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: 'up'=significant increase, 'down'=significant decrease, 'flat'=no change (static), at the 95% level.

14. Appendix 3 – Treatment tables

14.1. C61 prostate tumour directed treatments (2010 – 2022)

Table 14.1:
Prostate cancer (C61) tumour directed treatments - All Stage (2010-2022)

YOI	EBRT	Brachytherapy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	1271	240	654	170	0	12	1006	429	33
2011	1360	245	783	218	0	16	1155	632	18
2012	1234	283	738	217	<5	26	1140	619	26
2013	1138	332	743	214	0	51	1144	380	21
2014	1130	310	709	191	30	187	1154	240	17
2015	986	260	604	180	190	328	954	174	16
2016	992	253	572	174	264	516	978	183	38
2017	1024	234	535	161	369	640	1037	186	23
2018	1045	195	433	188	557	782	1078	217	13
2019	1160	177	352	159	678	800	1238	378	23
2020	1177	188	272	133	697	832	1151	312	15
2021	1185	127	322	199	641	778	1192	461	18
2022	1229	134	407	186	644	848	965	381	13

- SACT = Systemic Anti-Cancer Therapy
- EBRT = External Beam Radiation Therapy
- Other SACT = SACT excluding hormone therapy
- Other surgery = local excision OR lymph node surgery OR treatment outside site of interest
- Active Surveillance/Watchful Waiting included alongside tumour directed treatments

14.2. C61 prostate tumour directed treatments by age group (2010 – 2022)

Table 14.2:
Prostate cancer (C61) tumour directed treatments - By age group (2010-2020)

<50

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	11	12	49	<5	0	0	9	5	<5
2011	7	8	46	<5	0	0	7	5	<5
2012	7	9	57	0	0	<5	5	<5	<5
2013	8	10	63	0	0	<5	8	<5	0
2014	11	9	55	0	0	<5	10	5	0
2015	<5	5	42	0	14	11	<5	<5	<5
2016	5	<5	36	0	15	16	5	<5	<5
2017	5	<5	26	<5	16	8	7	6	<5
2018	6	<5	19	<5	31	16	5	5	0
2019	<5	5	19	<5	36	33	9	11	0
2020	7	<5	9	<5	45	34	8	6	<5
2021	9	<5	23	<5	33	34	9	8	0
2022	5	<5	20	0	32	32	5	5	0

50-64

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	442	139	402	32	0	5	266	108	12
2011	451	135	508	38	0	<5	275	142	11
2012	402	174	486	33	0	8	289	172	16
2013	358	182	464	34	0	16	294	91	11
2014	307	178	451	28	20	73	261	60	8
2015	252	127	360	28	110	126	204	54	8
2016	233	114	369	33	146	221	201	47	22
2017	222	109	334	27	204	280	174	55	6
2018	237	83	257	28	310	313	198	67	6
2019	227	86	195	24	397	326	237	111	10
2020	239	82	139	15	377	344	215	83	5
2021	220	56	177	29	345	307	221	114	10
2022	232	63	252	36	349	339	167	79	<5

65-74

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	642	82	170	67	0	<5	406	179	14
2011	694	96	222	93	0	8	499	285	<5
2012	651	93	191	101	<5	6	527	283	5
2013	597	129	210	101	0	22	530	175	<5
2014	612	107	195	73	10	82	538	97	7
2015	551	111	199	77	65	142	448	69	<5
2016	549	110	158	71	101	219	434	76	9
2017	587	100	165	68	146	269	486	85	11
2018	561	91	147	73	211	332	505	97	<5
2019	627	80	128	64	237	311	545	170	7
2020	588	82	112	61	274	318	510	139	8
2021	588	53	116	92	255	312	522	206	<5
2022	651	59	126	69	250	340	432	178	7

75+

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	176	7	33	70	0	<5	325	137	6
2011	208	6	7	86	0	<5	375	200	<5
2012	174	8	<5	83	0	11	318	162	<5
2013	175	11	6	79	0	11	312	111	7
2014	200	16	8	90	0	29	345	78	<5
2015	180	17	<5	76	<5	50	299	50	<5
2016	205	26	9	70	<5	60	338	58	5
2017	210	22	10	65	<5	84	370	40	<5
2018	241	20	10	86	5	121	370	48	<5
2019	303	6	10	70	8	130	447	86	6
2020	343	21	12	55	<5	136	418	84	<5
2021	368	14	6	77	8	125	440	133	5
2022	341	9	9	81	13	137	361	119	<5

- SACT = Systemic Anti-Cancer Therapy
- EBRT = External Beam Radiation Therapy
- Other SACT = SACT excluding hormone therapy
- Other surgery = local excision OR lymph node surgery OR treatment outside site of interest
- Active Surveillance/Watchful Waiting included alongside tumour directed treatments

14.3. C61 prostate tumour directed treatments by stage (2010 – 2020)

Table 14.3:
Prostate cancer (C61) tumour directed treatments - By Stage (2010-2020)

Stage I

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	503	160	144	69	0	10	277	110	10
2011	522	146	118	108	0	14	323	173	6
2012	455	167	127	112	<5	17	327	178	6
2013	455	206	109	107	0	41	344	113	<5
2014	488	196	117	117	<5	151	380	35	<5
2015	486	202	101	118	23	261	337	34	<5
2016	423	183	103	109	29	403	264	21	9
2017	460	180	120	111	36	522	283	19	<5
2018	465	125	66	139	48	650	317	18	<5
2019	507	115	65	109	71	685	363	44	<5
2020	545	115	59	101	83	709	391	42	5

Stage II

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	359	61	293	20	0	0	233	108	<5
2011	395	67	427	16	0	<5	301	195	<5
2012	347	96	384	14	0	<5	276	149	5
2013	263	88	395	14	0	<5	214	65	<5
2014	228	79	345	8	17	16	199	42	<5
2015	144	34	321	<5	112	35	119	17	<5
2016	154	41	283	10	152	62	135	8	8
2017	131	35	214	6	187	82	114	7	7
2018	172	40	189	0	282	77	136	10	<5
2019	189	32	140	<5	352	63	160	48	<5
2020	190	39	103	<5	351	80	155	21	<5

Stage III

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	224	12	161	<5	0	<5	193	68	8
2011	280	15	214	9	0	0	243	118	<5
2012	285	12	204	6	0	<5	250	145	7
2013	285	21	207	12	0	<5	294	82	<5
2014	236	21	211	11	9	7	235	36	5
2015	221	16	148	10	48	7	239	32	6
2016	254	22	156	11	68	18	234	16	13
2017	290	14	175	8	127	16	282	21	7
2018	255	22	146	8	208	20	262	26	<5
2019	236	21	121	10	237	16	277	71	7
2020	246	24	84	6	224	13	247	62	<5

Stage IV

YOI	EBRT	Brachy	Open Radical Prostatectomy	Minimally Invasive Prostate Ablation	Robotic Assisted Radical Prostatectomy	Surveillance or Watchful Waiting	Hormone Therapy	Other SACT	Other Surgery
2010	108	<5	26	24	0	0	222	114	11
2011	102	<5	20	21	0	0	220	120	6
2012	111	<5	18	26	0	<5	248	133	7
2013	95	<5	25	27	0	<5	245	105	9
2014	140	8	35	25	0	<5	298	119	8
2015	112	0	29	29	6	13	232	87	6
2016	136	<5	27	21	15	12	313	132	8
2017	130	<5	24	24	19	<5	338	135	6
2018	140	<5	29	31	19	8	345	158	5
2019	179	<5	23	23	15	8	415	202	8
2020	168	7	21	18	36	11	343	183	<5

- SACT = Systemic Anti-Cancer Therapy
- EBRT = External Beam Radiation Therapy
- Other SACT = SACT excluding hormone therapy
- Other surgery = local excision OR lymph node surgery OR treatment outside site of interest
- Active Surveillance/Watchful Waiting included alongside tumour directed treatments

14.4. C62 testis treatments (2010 – 2022)

Table 14.4:
Testis (C62) tumour directed treatments - All Stage (2010-2022)

YOI	SACT	EBRT	Orchiectomy	Other Surgery
2010	70	39	174	14
2011	63	20	160	8
2012	71	11	174	6
2013	61	10	152	14
2014	68	7	169	10
2015	70	5	181	13
2016	62	<5	163	9
2017	63	<5	160	12
2018	62	<5	169	13
2019	53	<5	148	9
2020	45	<5	148	6
2021	58	<5	170	6
2022	48	0	168	6

- SACT = Systemic Anti-Cancer Therapy
- EBRT = External Beam Radiation Therapy
- Other surgery = local excision OR lymph node surgery OR treatment outside site of interest

14.5. C60, C63 penis and other male genital organs treatments (2010 – 2022)

Table 14.5:
Penis and other male genital organs (C60, C63) tumour directed treatments - All Stage (2010-2022)

YOI	SACT	Complete or Partial Amputation	Local Excision	EBRT	Other Surgery
2010	<5	13	9	<5	5
2011	6	19	13	5	10
2012	<5	16	11	7	6
2013	6	20	15	5	6
2014	<5	25	28	<5	14
2015	6	21	19	5	8
2016	<5	19	20	<5	14
2017	5	22	24	5	20
2018	<5	21	25	<5	18
2019	8	22	28	5	24
2020	8	20	32	<5	25
2021	11	22	33	5	26
2022	<5	29	23	8	24

- SACT = Systemic Anti-Cancer Therapy
- EBRT = External Beam Radiation Therapy
- Other surgery = lymph node surgery OR treatment outside site of interest

14.6. C64-66 kidney incl. renal pelvis and ureter treatments (2010 – 2022)

Table 14.6:
Kidney incl. renal pelvis and ureter (C64-C66) tumour directed treatments - All Stage (2010-2022)

YOI	EBRT	Radical Nephrectomy and Nephroureterectomy	Partial Nephrectomy	Targeted Therapy	Other SACT	Other Surgery
2010	54	331	40	52	39	29
2011	48	329	54	58	55	28
2012	53	364	84	62	61	26
2013	68	343	79	67	72	33
2014	75	305	83	63	52	30
2015	50	332	95	77	48	26
2016	56	385	134	54	52	20
2017	58	346	158	58	57	23
2018	58	326	140	73	69	42
2019	57	371	147	70	57	69
2020	58	303	103	70	60	41
2021	59	312	129	63	74	14
2022	61	382	161	55	72	19

- SACT = Systemic Anti-Cancer Therapy
- EBRT = External Beam Radiation Therapy
- Other SACT = SACT excluding targeted therapy AND chemotherapy
- Other surgery = local excision OR lymph node surgery OR treatment outside site of interest

14.7. Bladder (C67) & NMIBC (D09.0, D41.4) tumour directed treatments (2010 – 2022)

Table 14.7:
Invasive bladder (C67) & NMIBC (D09.0, D41.4) tumour directed treatments - All Stage (2010-2022)

Invasive bladder & NMIBC (C67, D09.0, D41.4)	YOI	EBRT	Transurethral Resection	Radical Bladder Surgery	Chemotherapy	Immunotherapy	Other SACT	Other Surgery
	2010	79	459	50	133	39	15	34
	2011	85	510	70	142	56	16	35
	2012	80	514	60	164	37	20	20
	2013	80	496	57	163	34	13	23
	2014	82	583	57	164	52	31	19
	2015	74	577	56	206	33	25	30
	2016	78	646	66	246	63	21	27
	2017	93	693	75	236	71	19	27
	2018	92	754	64	235	114	22	36
	2019	110	821	59	239	122	32	31
	2020	96	728	62	185	117	30	32
	2021	102	802	73	200	121	64	38
	2022	80	771	60	130	103	100	33

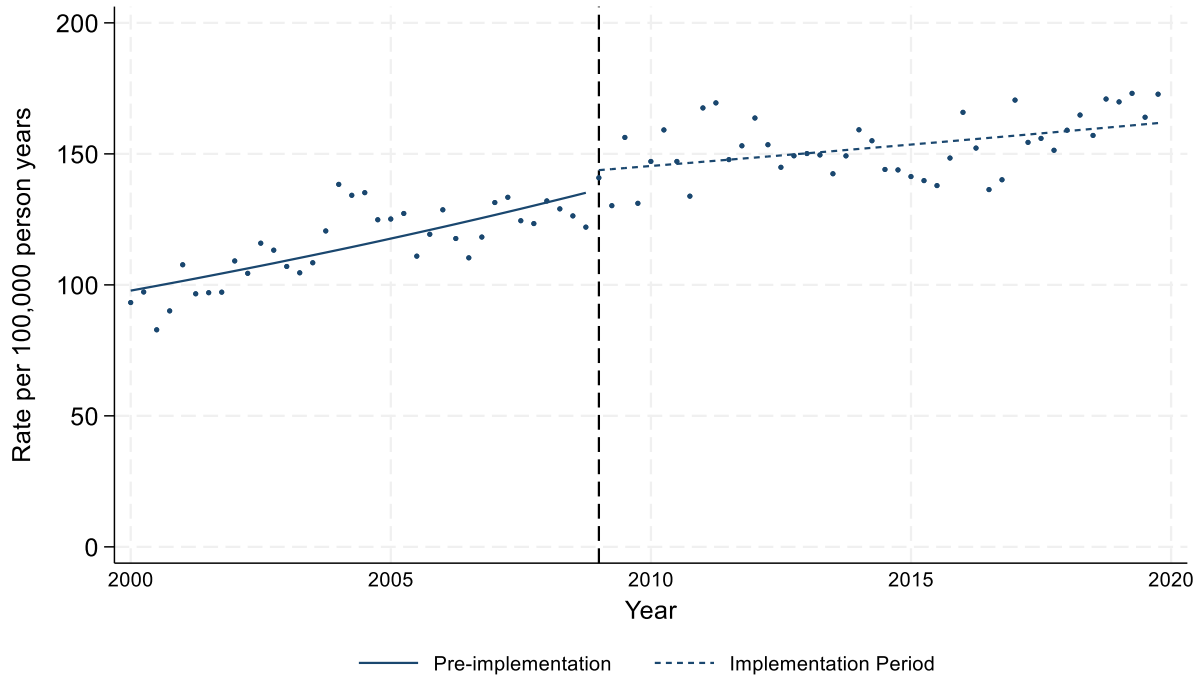
- EBRT = External Beam Radiation Therapy
- Chemo = Chemotherapy
- Note: Route of chemotherapy administration (intravenous or intravesical) not specified for bladder cancer in data.

15. Appendix 4 – Impact of Rapid Access Prostate Clinics (all ages)

15.1. Impact of RAPCs on C61 Diagnosis – all ages

Figure 15.1
Prostate (C61): Impact of Rapid Access Clinics on diagnosis

all cases



Case numbers and crude incidence rates pre- and post-implementation

	Case numbers		Crude Incidence Rates*	
	mean (range)		mean (range)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
All Stage	598 (390-796)	890 (735-1064)	116.3 (82.8-141.1)	152.9 (130.2-173.3)
*Quarterly rates per 100,000 person years across the period				

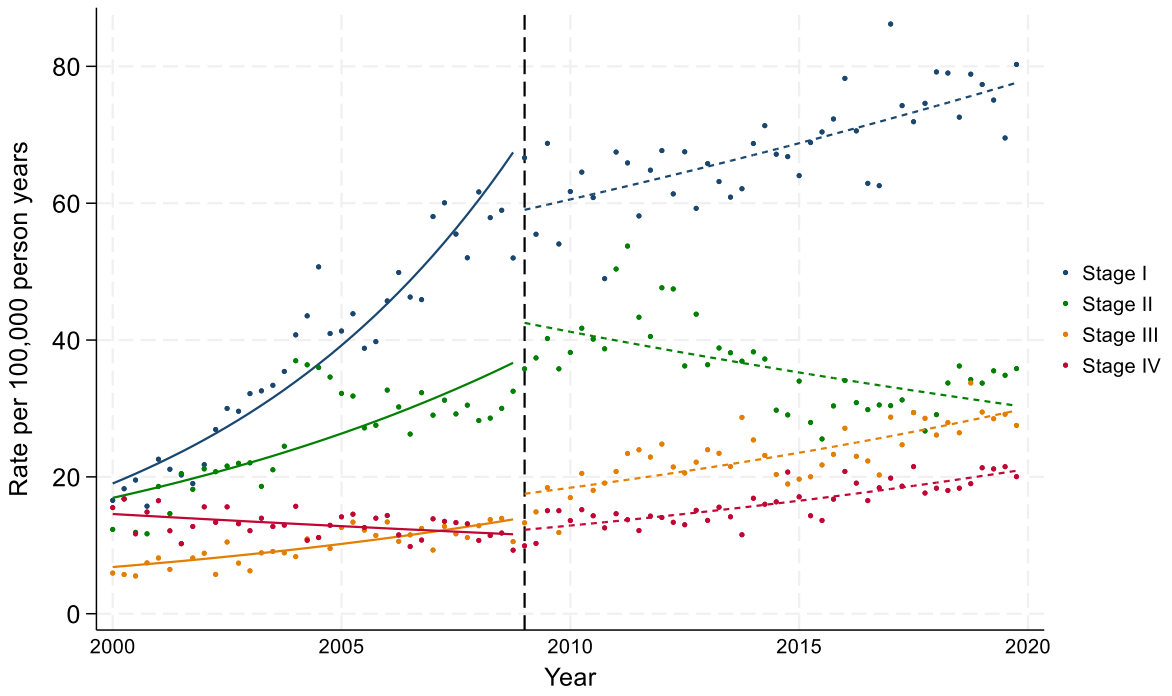
Relative trend in incidence rates (slope IRR) pre- and post-implementation:

	Percentage change in incidence rate per quarter (95% CI)		Slope IRR (95% CI)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
All Stage	0.9% (0.7%, 1.2%)	0.3% (0.1%, 0.4%)	1.009 (1.007, 1.012)	1.003 (1.001, 1.004)

15.2. Impact of RAPCs on C61 Diagnosis (Stage) – all ages

Figure 15.2
Prostate (C61): Impact of Rapid Access Clinics on stage at diagnosis

Stage I-IV



Case numbers and crude incidence rates pre- and post-implementation

	Case numbers mean (range)		Crude Incidence Rates* mean (range)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Stage I	204 (74-376)	396 (277-513)	39.1 (15.7-66.6)	68.0 (49.0-86.2)
Stage II	134 (55-202)	210 (149-305)	25.8 (11.7-37.0)	36.1 (25.7-53.7)
Stage III	52 (26-78)	136 (67-204)	10.0 (5.5-13.9)	23.3 (11.9-33.7)
Stage IV	66 (49-79)	96 (58-132)	13.0 (9.3-16.8)	16.4 (10.3-21.5)

*Quarterly rates per 100,000 person years across the period

Relative trend in incidence rates (slope IRR) pre- and post-implementation:

	Percentage change in incidence rate per quarter (95% CI)		Slope IRR (95% CI)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Stage I	3.7% (3.2%, 4.1%)	0.6% (0.4%, 0.8%)	1.037 (1.032, 1.041)	1.006 (1.004, 1.008)
Stage II	2.2% (1.6%, 2.8%)	-0.8% (-1.1%, -0.5%)	1.022 (1.016, 1.028)	0.992 (0.989, 0.995)
Stage III	2.0% (1.5%, 2.5%)	1.2% (0.9%, 1.5%)	1.020 (1.015, 1.025)	1.012 (1.009, 1.015)
Stage IV	-0.6% (-1.1%, -0.2%)	1.2% (1.0%, 1.5%)	0.994 (0.989, 0.998)	1.012 (1.010, 1.015)

15.3. Impact of RAPCs on C61 Diagnosis (Hospital Type) – all ages

Figure 15.3
Prostate (C61): Impact of Rapid Access Clinics on hospital type of diagnosis

All Stage

Case numbers and crude incidence rates pre- and post-implementation

	Case numbers mean (range)		Crude Incidence Rates* mean (range)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Cancer Centres	170 (77-244)	395 (251-538)	33.0 (16.1-45.5)	67.7 (44.5-87.6)
Public	285 (205-352)	206 (134-318)	56.0 (43.5-70.3)	35.6 (21.8-56.3)
Private	137 (88-211)	287 (179-416)	26.6 (18.4-38.5)	49.3 (31.7-67.7)

*Quarterly rates per 100,000 person years across the period

Relative trend in incidence rates (slope IRR) pre- and post-implementation:

	Percentage change in incidence rate per quarter (95% CI)		Slope IRR (95% CI)	
	Pre-implementation period	Implementation period	Pre-implementation period	Implementation period
Cancer Centres	2.2% (1.8%, 2.7%)	0.8% (0.6%, 1.1%)	1.022 (1.018, 1.027)	1.008 (1.006, 1.011)
Public	-0.2% (-0.6%, 0.2%)	-1.7% (-1.9%, -1.4%)	0.998 (0.994, 1.002)	0.983 (0.981, 0.986)
Private	1.7% (1.5%, 2.0%)	1.0% (0.8%, 1.3%)	1.017 (1.015, 1.020)	1.010 (1.008, 1.013)

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