Chapter 19:

Kidney cancer (C64-C66; C68)

KEY FINDINGS

- *INCIDENCE AND MORTALITY*
  - *Annually there were on average 349 male and 201 female cases diagnosed during 2000-2004.*
  - *Incidence rates increased between 1994 and 2004 by 2.4% for males and 2.6% for females.*
  - *Incidence among males was higher than expected during 1994-2004 in Coleraine, Offaly and Westmeath. Among females there were no geographic areas with higher than expected rates of the disease.*
  - *Incidence of the disease during 2000-2004 was positively related to deprivation.*
  - *Incidence rates in Ireland were higher than in UK for males but were lower than Europe, USA and Australia for males and females.*
  - *There were 170 male and 86 female deaths from the disease each year during 2000-2004.*
  - *Between 1994 and 2004 mortality rates increased among males by 3.8% per year while there was no change among females.*

- *SURVIVAL AND PREVALENCE*
  - *Five-year (age-standardised) relative survival was estimated to be 47.6% for patients diagnosed in 2000-2004 and was 9.0% higher for males than females.*
  - *There was no significant variation in one or five-year (age-standardised) relative survival for males or females between those diagnosed in 1994-1996 and 1997-1999.*
  - *At the end of 2004 there were 2,446 people living in Ireland who had been diagnosed with kidney cancer in 1994-2004.*

- *NORTH/SOUTH COMPARISONS*
  - *Incidence rates did not differ significantly between Northern Ireland and Republic of Ireland during 2000-2004.*
  - *During 1994-2004 incidence rates increased in Republic of Ireland by 3.6% per year among males and by 3.3% for females while there was no significant change in Northern Ireland.*
  - *Neither one nor five-year (age-standardised) relative survival varied significantly by country.*
  - *There was no significant difference in mortality rates between Northern Ireland and Republic of Ireland during 2000-2004.*
  - *The number of people living with kidney cancer per 100,000 persons was 9.3% higher in Northern Ireland than Republic of Ireland.*

19.1: Incidence

Annually there were on average 550 cancers of the kidney diagnosed during 2000-2004, with 63.4% of these among males. Overall this cancer accounted for 3.2% of all male and 1.9% of all female cancers (excluding NMSC) during the period. It was the ninth most common male cancer with the odds of a male member of the population developing the disease before the age of 75 being 1 in 89. This was in contrast to the 1 in 179 chance of a female developing the disease. Kidney cancer was the twelfth most common female cancer. (Tab. 19.1)

European age-standardised incidence rates (EASIR) varied by sex with male rates double those of females ($p<0.001$). The difference between males and females was slightly larger in the Republic of Ireland than in Northern Ireland; however EASIRs did not differ significantly between the two countries for either sex. (Tab. 19.1)

Table 19.1: Summary statistics for incidence of kidney cancer: 2000-2004

	Northern Ireland			Republic of Ireland			Ireland		
	Male	Female	All persons	Male	Female	All persons	Male	Female	All persons
Number of cases per year	107	70	177	241	131	373	349	201	550
% of all cancer cases (ex. NMSC)	3.3%	2.0%	2.6%	3.1%	1.9%	2.5%	3.2%	1.9%	2.6%
Rank (ex. NMSC)	8	11	11	9	14	13	9	12	12
Median age at diagnosis	67	69	67	66	67	66	66	67	67
Cumulative risk (Aged 0 to 74)	1.1%	0.6%	0.8%	1.1%	0.6%	0.8%	1.1%	0.6%	0.8%
Crude rate per 100,000 persons	13.0	8.0	10.4	12.4	6.7	9.5	12.6	7.1	9.8
EASIR ± 95% CI	13.3 ±1.1	6.9 ±0.8	9.7 ±0.7	14.1 ±0.8	6.6 ±0.5	10.0 ±0.5	13.8 ±0.7	6.7 ±0.4	9.9 ±0.4
% difference (NI vs ROI) ± 95% CI (+ NI higher, - NI lower)							-5.9% ±9.7	4.6% ±14.2	-3.0% ±7.9

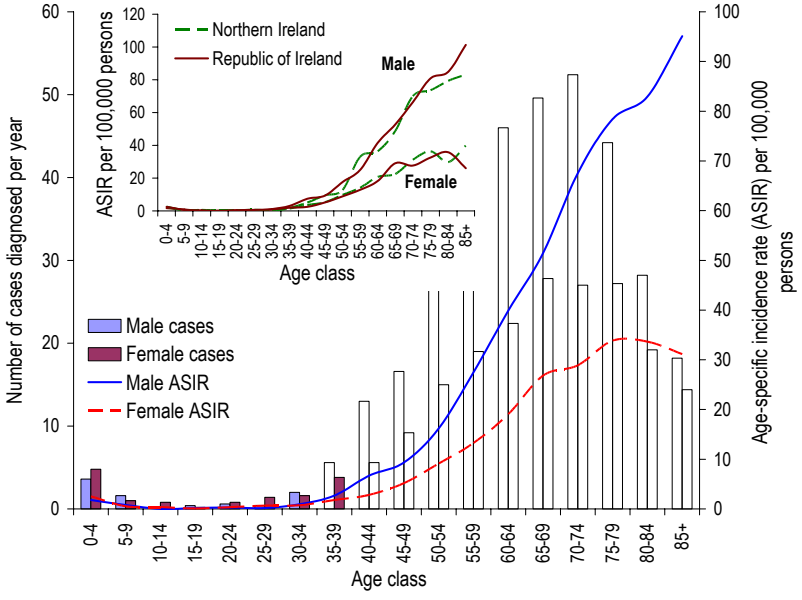
EASIR: European age-standardised incidence rate per 100,000 persons; CI: Confidence interval

19.1.1: Age distribution

Half of the patients with kidney cancer in 2000-2004 were diagnosed with the disease before the age of 67 making the age distribution of patients slightly younger than most cancers. This was in part due to a small number of children aged 0-14 being diagnosed with the disease during the period – 5 boys and 7 girls each year. (Fig. 19.1)

The number of cases diagnosed each year was highest among males in the 70-74 age class with 52 cases per year, although age-specific incidence rates (ASIR) were highest among those aged 85 and over. Female cases however peaked among those aged 65-69 with 28 cases per year while female ASIRs were highest among those aged 75-79. (Fig. 19.1)

Figure 19.1: Number of cases of kidney cancer diagnosed per year by sex and age with age-specific incidence rate (ASIR) per 100,000 persons: 2000-2004

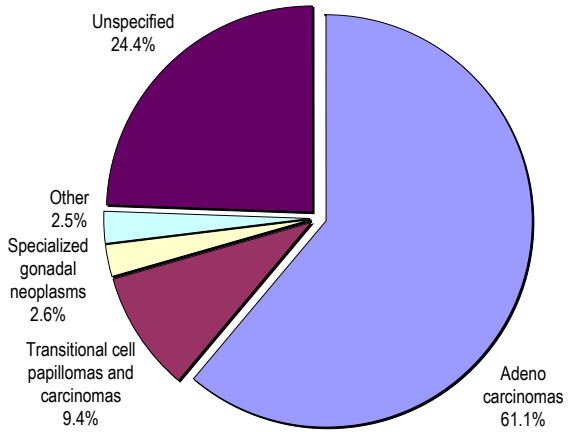


19.1.2: Cell type

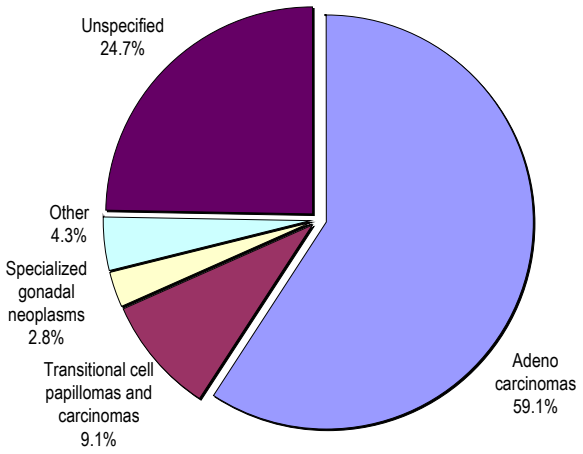
During 2000-2004 the majority of kidney cancers diagnosed were adenocarcinomas with 61.1% of males and 59.1% of females diagnosed with kidney cancer affected by this form of the disease. A further 9.4% of males and 9.1% of females had transitional cell papillomas or carcinomas; however 24.4% of males and 24.7% of females had an unspecified cell type. This percentage did not vary between Northern Ireland and Republic of Ireland (NI: 24.3%; ROI: 24.6%). (Fig. 19.2)

Figure 19.2: Types of kidney cancer diagnosed in Ireland: 2000-2004

(a) Male



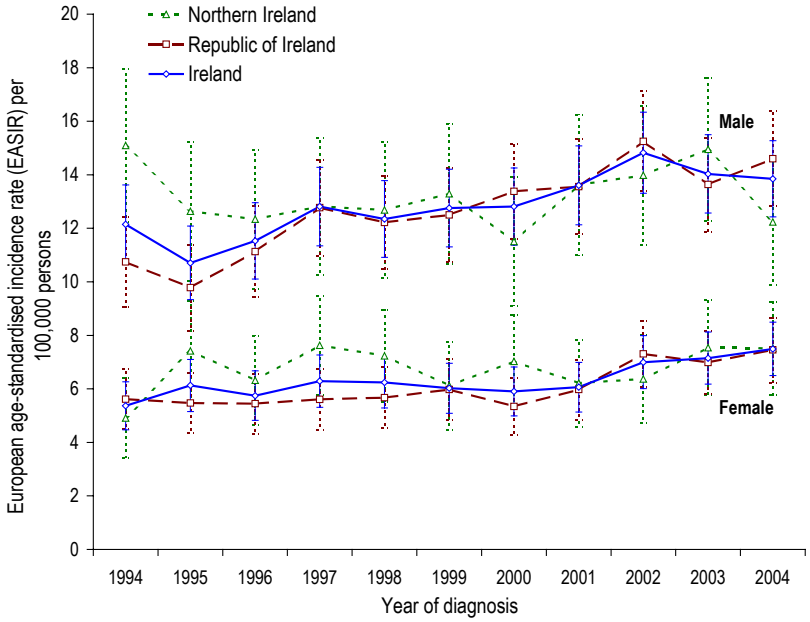
(b) Female



19.1.3: Trends

In Ireland rates of kidney cancer increased between 1994 and 2004 with an annual percentage change in European age-standardised incidence rates (EASIR) of 2.4% (p<0.001) for males and 2.6% (p=0.001) for females. Combined with the effects of population growth and ageing this resulted in a large annual change in the number of cases diagnosed per year, with average increases of 12.9 male and 6.9 female cases per year. (Fig. 19.3, Tab. 19.2)

Figure 19.3: Trends in European age-standardised incidence rates (EASIR) for kidney cancer by sex and country: 1994-2004



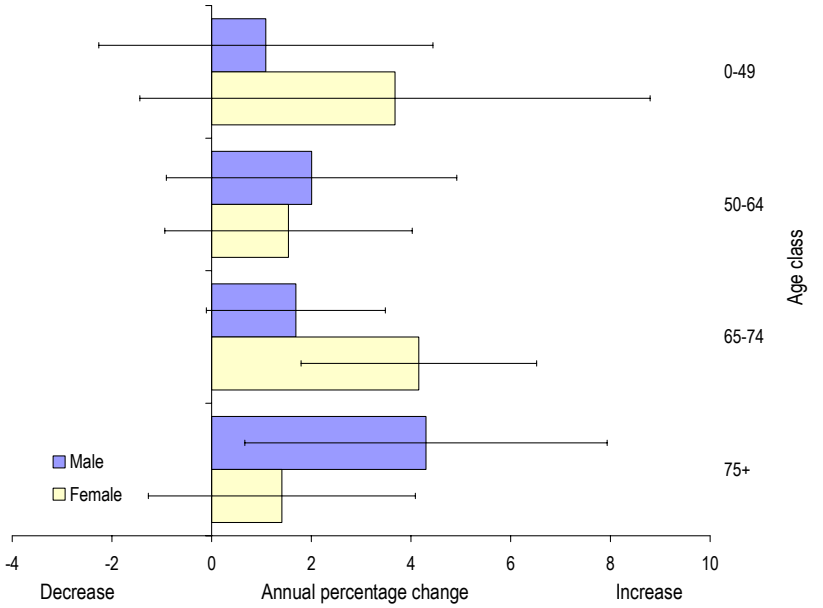
The increasing rates of kidney cancer were only observed in Republic of Ireland with rates in Northern Ireland remaining static. During the eleven-year period EASIRs rose in Republic of Ireland by 3.6% (p<0.001) per year among males and by 3.3% (p=0.001) for females. This translated to an annual increase of 11.3 male and 5.3 female cases per year. The remainder of the increase in the number of cases in Ireland was a result of demographic change in Northern Ireland, which caused a slight annual

Table 19.2: Number of cases and European age-standardised incidence rates (EASIR) for kidney cancer by year of diagnosis, sex and country: 1994-2004

Year	Male						Female					
	Northern Ireland		Republic of Ireland		Ireland		Northern Ireland		Republic of Ireland		Ireland	
	Cases	EASIR	Cases	EASIR	Cases	EASIR	Cases	EASIR	Cases	EASIR	Cases	EASIR
1994	110	15.1 ±2.9	159	10.7 ±1.7	269	12.1 ±1.5	46	4.9 ±1.5	104	5.6 ±1.1	150	5.4 ±0.9
1995	92	12.6 ±2.6	147	9.8 ±1.6	239	10.7 ±1.4	66	7.4 ±1.9	99	5.5 ±1.1	165	6.1 ±1.0
1996	89	12.3 ±2.6	168	11.1 ±1.7	257	11.5 ±1.4	62	6.3 ±1.7	101	5.5 ±1.1	163	5.7 ±0.9
1997	97	12.8 ±2.6	200	12.8 ±1.8	297	12.8 ±1.5	72	7.6 ±1.8	100	5.6 ±1.1	172	6.3 ±1.0
1998	97	12.7 ±2.5	193	12.2 ±1.7	290	12.3 ±1.4	75	7.2 ±1.7	102	5.7 ±1.1	177	6.2 ±1.0
1999	101	13.3 ±2.6	200	12.5 ±1.7	301	12.8 ±1.5	58	6.1 ±1.7	114	6.0 ±1.1	172	6.0 ±0.9
2000	90	11.5 ±2.4	218	13.4 ±1.8	308	12.8 ±1.4	69	7.0 ±1.7	102	5.3 ±1.1	171	5.9 ±0.9
2001	105	13.6 ±2.6	228	13.6 ±1.8	333	13.6 ±1.5	61	6.2 ±1.6	117	6.0 ±1.1	178	6.1 ±0.9
2002	114	14.0 ±2.6	260	15.2 ±1.9	374	14.8 ±1.5	65	6.4 ±1.6	140	7.3 ±1.2	205	7.0 ±1.0
2003	123	15.0 ±2.7	238	13.6 ±1.7	361	14.0 ±1.5	76	7.5 ±1.8	145	7.0 ±1.2	221	7.2 ±1.0
2004	105	12.2 ±2.4	263	14.6 ±1.8	368	13.8 ±1.4	78	7.5 ±1.7	153	7.5 ±1.2	231	7.5 ±1.0

EASIR: European age-standardised incidence rate per 100,000 persons with 95% confidence interval

Figure 19.4: Annual percentage change (APC) in European age-standardised incidence rates (EASIR) for kidney cancer by sex and age: 1994-2004



increase in the annual number of cases despite the static incidence rates. (Fig. 19.3, Tab. 19.2)

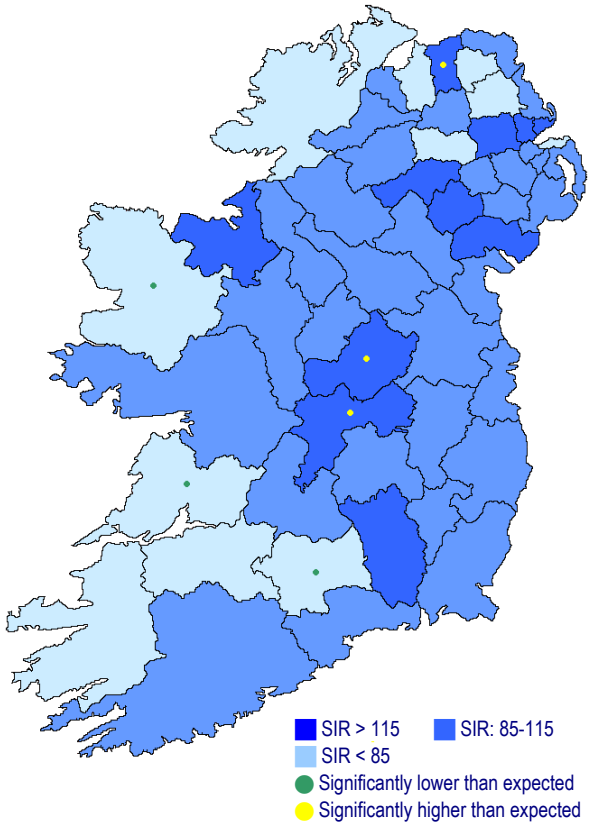
The increases in male kidney cancer EASIRs were largest among among those aged 75 and over with significant increases of 4.3% (p=0.021) each year. Among females however the largest increases were among those aged 0-49 and 65-74. While the changes in the 0-49 age group were not statistically significant due to the small number of cases, among the 65-74 age class EASIRs increased by 4.2% (p=0.003) each year. (Fig. 19.4)

19.1.4: Geographic variations

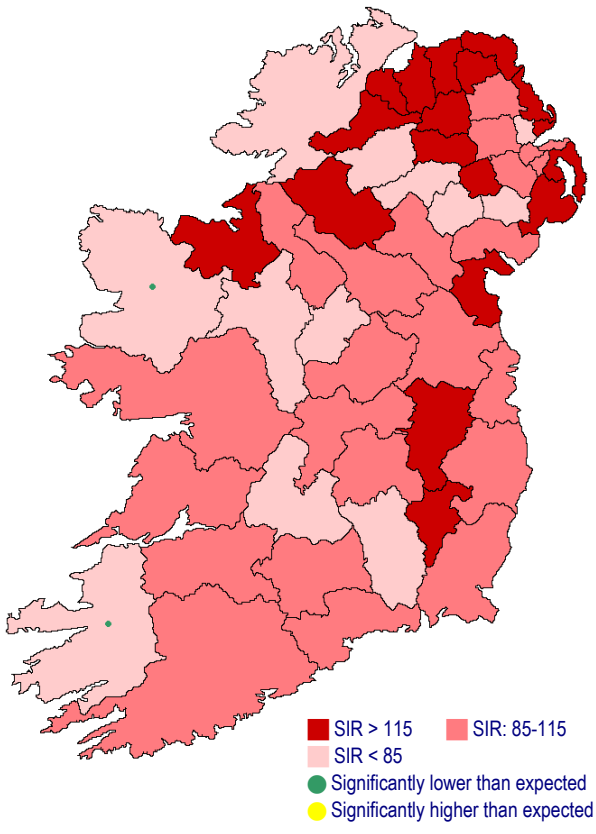
Compared to incidence rates for the whole of Ireland, kidney cancer among males was higher than expected during 1994-2004 in Coleraine district council and counties Offaly and Westmeath located in the centre of Ireland. Among females there were no geographic areas with higher than expected rates of the disease. Lower levels of kidney cancer were present for male and females resident in county Mayo. Additionally among males there were lower levels in Clare and South Tipperary while among females lower levels were present in Kerry. Neither Belfast nor Dublin had significantly higher or lower rates of the disease with 29 and 90 cases diagnosed per year respectively. (Fig. 19.5)

Figure 19.5: Significant differences in county/council standardised incidence ratios for kidney cancer compared to Ireland as a whole: 1994-2004

(a) Male



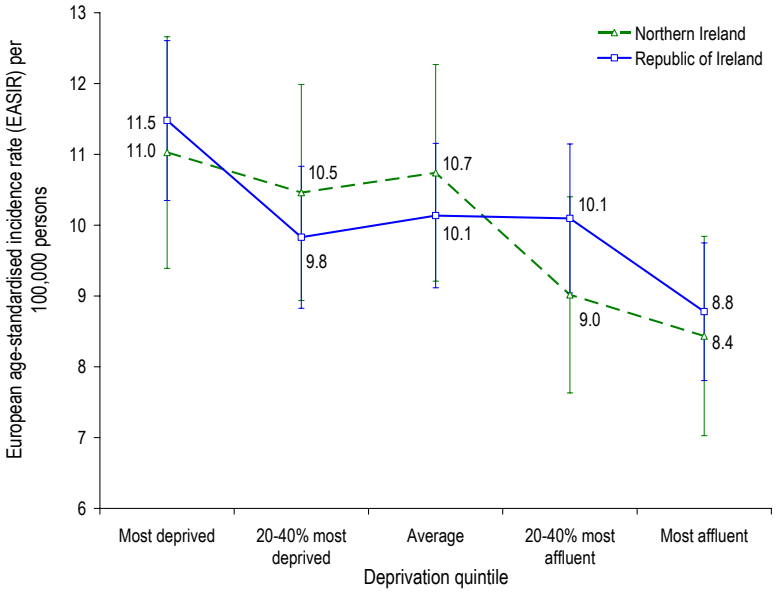
(b) Female



19.1.5: Socio-economic factors

In both Northern Ireland and Republic of Ireland incidence of kidney cancer was related to the socio-economic conditions of the geographic area that patients resided during 2000-2004. The strength of the relationship between deprivation and kidney cancers was similar in both countries with EASIRs in the most deprived areas 30.8% (p=0.002) higher than in the most affluent areas in Republic of Ireland compared to a 30.7% (p=0.041) difference in Northern Ireland. (Fig. 19.6)

Figure 19.6: European age-standardised incidence rates (EASIR) for kidney cancer by country specific deprivation quintile: 2000-2004



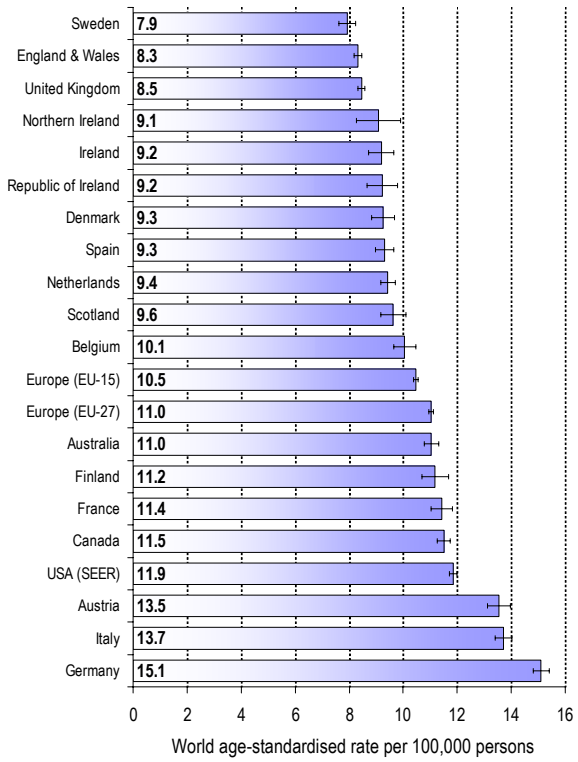
EASIRs in the most deprived areas of Northern Ireland were similar to those in the most deprived areas of Republic of Ireland. This was also the case for the other deprivation quintiles including the most affluent areas. (Fig. 19.6)

19.1.6: International comparisons

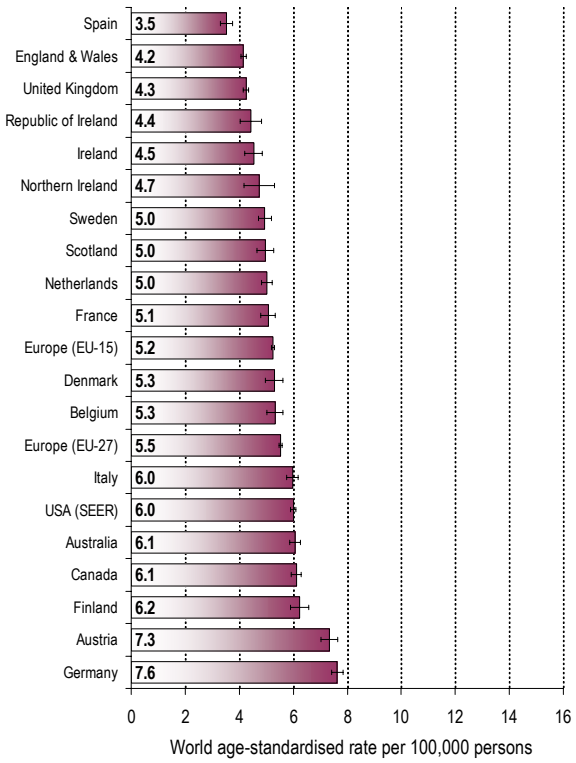
Compared to the European Union (15 and 27 countries) incidence of kidney cancer in Ireland for both males and females was low during 1998-2000. There was a larger difference in incidence rates compared to USA and Australia, with Ireland having the lower incidence rates. However kidney cancer levels in Ireland were higher for males than those found in the UK. This was driven by slightly higher incidence rates in the Republic of Ireland. (Fig. 19.7)

Figure 19.7: International comparisons of world age-standardised incidence rates for kidney cancer: 1998-2000

(a) Male



(b) Female



Source: IARC[149]

19.2: Survival

Five-year (age-standardised) relative survival from kidney cancer was estimated to be 47.6% for patients diagnosed in 2000-2004. (Fig. 19.11, Tab. 19.3)

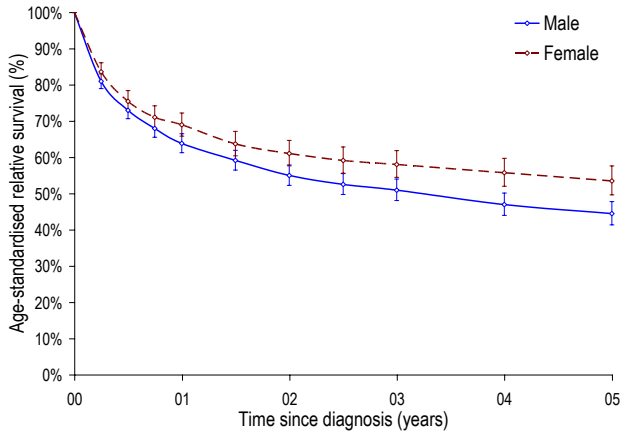
Table 19.3: Age-standardised relative survival for kidney cancer patients by country and sex: 2000-2004 period analysis estimates

		Age-standardised relative survival (95% CI)		
		Male	Female	All
1-year	Northern Ireland	64.9% (60.4%, 69.7%)	68.4% (63.3%, 74.0%)	65.9% (62.5%, 69.5%)
	Republic of Ireland	63.5% (60.4%, 66.7%)	69.4% (65.6%, 73.5%)	65.5% (63.1%, 68.1%)
	Ireland	63.9% (61.3%, 66.6%)	69.0% (65.9%, 72.3%)	65.6% (63.6%, 67.7%)
5-year	Northern Ireland	47.4% (42.0%, 53.4%)	52.5% (46.4%, 59.5%)	48.8% (44.7%, 53.2%)
	Republic of Ireland	42.8% (39.1%, 46.9%)	54.4% (49.6%, 59.7%)	46.8% (43.8%, 50.1%)
	Ireland	44.5% (41.4%, 47.9%)	53.5% (49.7%, 57.7%)	47.6% (45.2%, 50.2%)

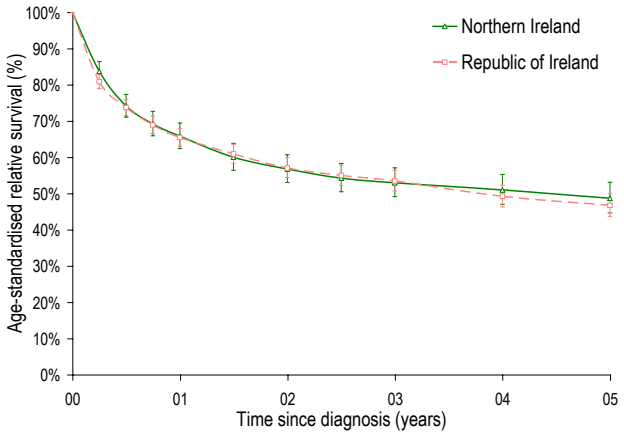
Five-year (age-standardised) relative survival was estimated to be 9.0% (p=0.014) higher for males than females diagnosed in 2000-2004. However a significant difference in survival between males and females was only observed in Republic of Ireland. Despite this neither one nor five-year (age-standardised) relative survival varied significantly by country. (Fig. 19.8, Tab. 19.3)

Figure 19.8: Age-standardised relative survival for kidney cancer patients by country and sex: 2000-2004 period analysis estimates

(a) All Ireland



(b) Northern Ireland and Republic of Ireland



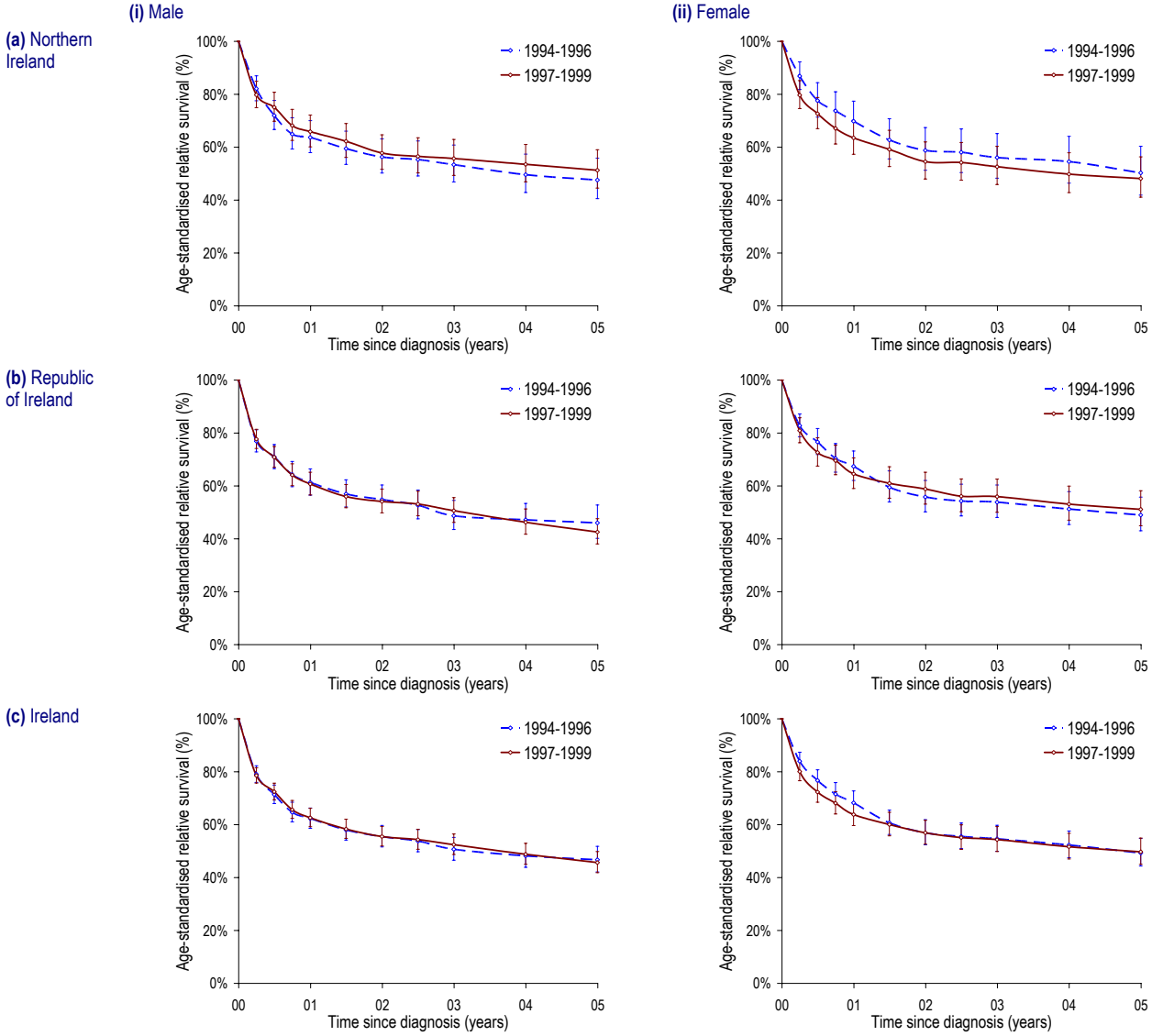
19.2.1: Changes in survival over time

There was no significant variation in one or five-year (age-standardised) relative survival from kidney cancer for males or females between those diagnosed in 1994-1996 and 1997-1999 in Ireland or in Northern Ireland and Republic of Ireland considered separately. (Fig. 19.9, Tab. 19.4)

Table 19.4: Age-standardised relative survival for kidney cancer patients by sex, country and period of diagnosis: 1994-1999

		Age-standardised relative survival (95% CI)			
		1-year		5-year	
		1994-1996	1997-1999	1994-1996	1997-1999
All persons	Northern Ireland	66.0% (61.5%, 70.8%)	64.3% (60.0%, 68.9%)	48.8% (43.3%, 55.0%)	50.2% (45.2%, 55.7%)
	Republic of Ireland	63.8% (60.3%, 67.5%)	62.2% (58.8%, 65.7%)	46.4% (42.2%, 50.9%)	45.8% (42.1%, 49.9%)
	Ireland	64.6% (61.8%, 67.6%)	63.0% (60.4%, 65.8%)	47.3% (44.0%, 50.9%)	47.5% (44.5%, 50.7%)
Male	Northern Ireland	63.7% (57.9%, 70.0%)	65.9% (60.1%, 72.2%)	47.6% (40.6%, 55.8%)	51.3% (44.6%, 59.1%)
	Republic of Ireland	61.3% (56.5%, 66.5%)	60.7% (56.6%, 65.2%)	46.0% (40.2%, 52.8%)	42.6% (38.1%, 47.6%)
	Ireland	62.3% (58.6%, 66.3%)	62.6% (59.2%, 66.2%)	46.7% (42.1%, 51.8%)	45.7% (41.8%, 49.9%)
Female	Northern Ireland	69.8% (63.0%, 77.4%)	63.5% (57.3%, 70.4%)	50.3% (41.9%, 60.3%)	48.1% (41.1%, 56.4%)
	Republic of Ireland	67.4% (62.1%, 73.2%)	64.6% (59.0%, 70.6%)	49.0% (43.0%, 55.8%)	51.1% (44.9%, 58.2%)
	Ireland	68.2% (64.0%, 72.7%)	63.8% (59.7%, 68.3%)	49.3% (44.4%, 54.8%)	49.7% (45.0%, 54.9%)

Figure 19.9: Age-standardised relative survival for kidney cancer patients by sex, country and period of diagnosis: 1994-1999



19.2.2: Observed survival

Observed survival includes causes of death other than cancer and represents survival actually experienced by those diagnosed with cancer. Of those diagnosed in Ireland with kidney cancer during 1997-1999 42.1% survived a minimum of five years. There was no significant variation in observed survival by sex or by country. There was also no change in either one or five-year observed survival for kidney cancer between 1994-1996 and 1997-1999. (Tab. 19.5)

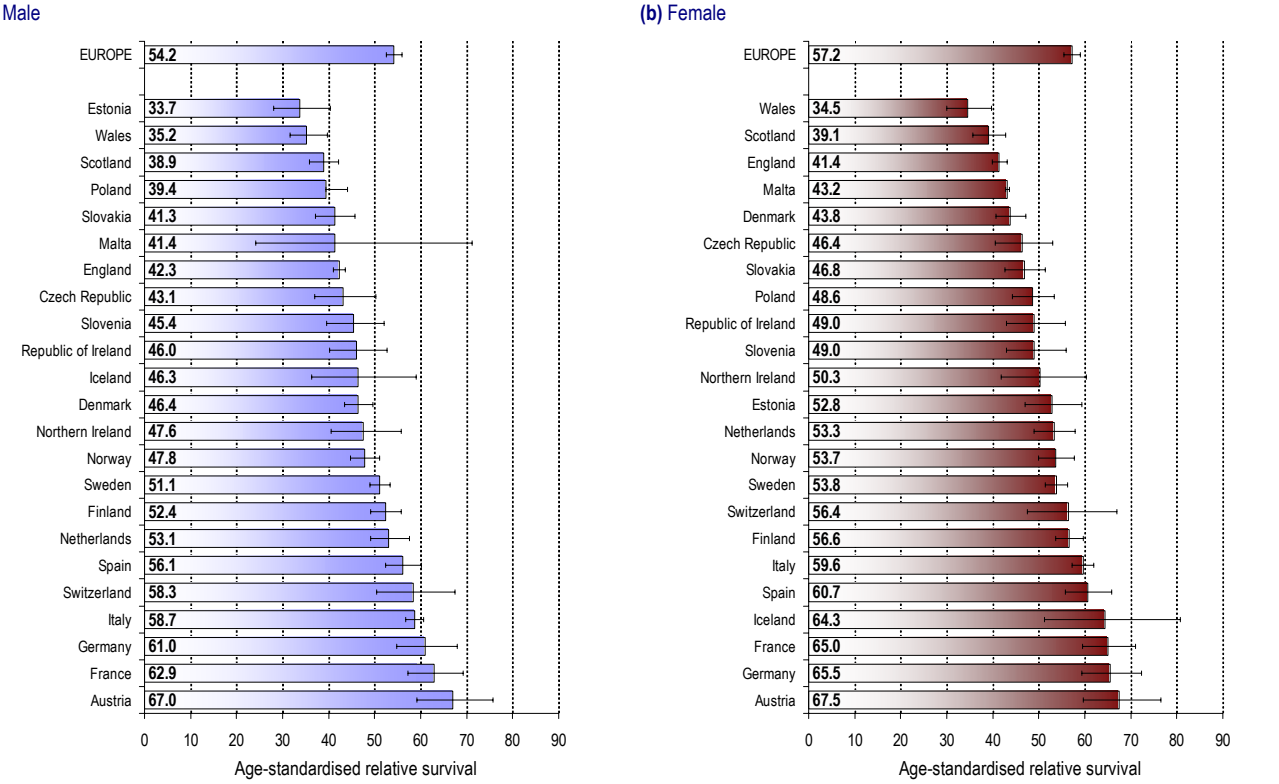
Table 19.5: Observed survival for kidney cancer patients by sex, country and period of diagnosis: 1994-1999

		Observed survival (95% CI)			
		1-year		5-year	
		1994-1996	1997-1999	1994-1996	1997-1999
All persons	Northern Ireland	63.4% (59.0%, 68.1%)	61.6% (57.3%, 66.3%)	40.3% (35.9%, 45.2%)	42.3% (38.0%, 47.1%)
	Republic of Ireland	61.9% (58.5%, 65.6%)	61.9% (58.6%, 65.4%)	39.9% (36.5%, 43.6%)	41.9% (38.7%, 45.5%)
	Ireland	62.5% (59.7%, 65.3%)	61.8% (59.2%, 64.5%)	40.0% (37.3%, 43.0%)	42.1% (39.4%, 44.9%)
Male	Northern Ireland	61.3% (55.7%, 67.3%)	63.4% (57.9%, 69.5%)	39.1% (33.7%, 45.4%)	43.8% (38.2%, 50.2%)
	Republic of Ireland	60.7% (56.3%, 65.4%)	60.3% (56.3%, 64.6%)	39.3% (35.0%, 44.2%)	38.9% (35.0%, 43.3%)
	Ireland	60.9% (57.4%, 64.6%)	61.4% (58.1%, 64.8%)	39.2% (35.8%, 43.0%)	40.5% (37.3%, 44.1%)
Female	Northern Ireland	67.1% (60.2%, 74.7%)	59.2% (52.6%, 66.6%)	42.2% (35.3%, 50.6%)	40.3% (33.9%, 47.9%)
	Republic of Ireland	63.8% (58.5%, 69.7%)	65.0% (59.6%, 70.9%)	40.8% (35.4%, 46.9%)	47.8% (42.2%, 54.1%)
	Ireland	65.0% (60.7%, 69.6%)	62.6% (58.3%, 67.1%)	41.3% (37.0%, 46.2%)	44.7% (40.4%, 49.5%)

19.2.3: European comparisons

Five-year (age-standardised) relative survival from kidney cancer in Europe for patients diagnosed in 1990-1994 was 54.2% for males and 57.2% for females. While this was apparently higher than the equivalent values in Northern Ireland and Republic of Ireland for patients diagnosed in 1994-1996, these differences were not statistically significant. However survival in Austria, France and Italy was significantly better for males than in both Northern Ireland and Republic of Ireland and than for females in Republic of Ireland. (Fig. 19.10)

Figure 19.10: European comparisons of five-year age-standardised relative survival for kidney cancer patients: 1990-1994 (EUROCARE III), 1994-1996 (NI & ROI)



Source: EUROCARE-IV[150]

19.3: Mortality

Kidney cancer was the eleventh commonest form of cancer death among males during 2000-2004 and was the fifteenth most common cause of female cancer death. With 170 male deaths per year it made up 2.9% of all cancer deaths (excluding NMSC) with a cumulative risk of death from this disease before age 75 of 0.5%. Among females there were 86 deaths per year thereby contributing 1.6% of all cancer deaths (excluding NMSC) with a cumulative risk of 0.2% of death from this disease before age 75. (Tab. 19.6)

Table 19.6: Summary statistics for deaths from kidney cancer: 2000-2004

	Northern Ireland			Republic of Ireland			Ireland		
	Male	Female	All persons	Male	Female	All persons	Male	Female	All persons
Number of deaths per year	55	32	87	115	54	169	170	86	256
% of all cancer deaths (ex. NMSC)	2.9%	1.8%	2.4%	2.9%	1.5%	2.2%	2.9%	1.6%	2.3%
Rank (ex. NMSC)	9	13	11	11	15	13	11	15	13
Median age at death	71	76	73	69	73	70	69	74	71
Cumulative risk (Aged 0 to 74)	0.5%	0.2%	0.3%	0.5%	0.2%	0.3%	0.5%	0.2%	0.3%
Crude rate per 100,000 persons	6.6	3.7	5.1	5.9	2.7	4.3	6.1	3.0	4.6
EASMR ± 95% CI	6.7 ±0.8	2.7 ±0.4	4.5 ±0.4	6.8 ±0.6	2.5 ±0.3	4.5 ±0.3	6.8 ±0.5	2.6 ±0.3	4.5 ±0.2
% difference (NI vs ROI) ± 95% CI (+ NI higher, - NI lower)							-1.4% ±14.4	7.8% ±22.2	0.1% ±11.9

EASMR: European age-standardised mortality rate per 100,000 persons; CI: Confidence interval

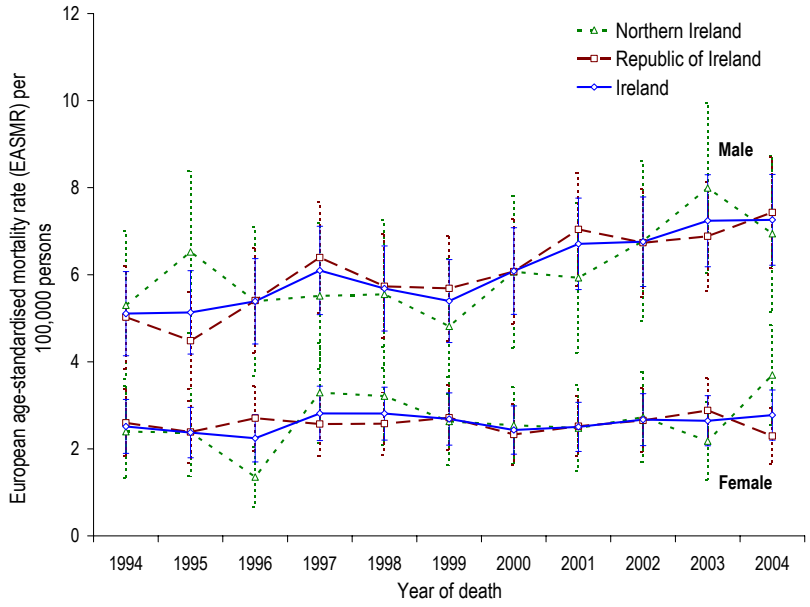
The number of deaths per year among males was almost double that among females with European age-standardised mortality rates (EASMR) higher among males by 161.4% (p<0.001). There was however no significant difference in EASMRs between Northern Ireland and Republic of Ireland during 2000-2004. (Tab. 19.6)

19.3.1: Trends

Between 1994 and 2004, European age-standardised mortality rates (EASMR) for kidney cancer increased among males by an average of 3.8% (p<0.001) per year. This translated to an annual increase of 8.0 deaths per year as a result of demographic change. Female EASMRs however did not change significantly during the eleven-year period although the actual number of deaths increased by 2.0 per year. (Fig. 19.11)

The increasing trend in male EASMRs was apparent in both Northern Ireland and Republic of Ireland with annual increases of 3.0% (p=0.025) and 4.1% (p<0.001) respectively. Female EASMRs did not change significantly in either country. (Fig. 19.11)

Figure 19.11: Trends in European age-standardised mortality rates (EASMR) for kidney cancer by sex and country: 1994-2004



19.4: Prevalence

Of the people diagnosed with kidney cancer during 1994-2004 45.3% (2,446 people) were still alive at the end of 2004 while of those diagnosed in 2000-2004 55.1% (1,515 people) were alive at the end of 2004. (Tab. 19.7)

The number of people per 100,000 of the population alive at the end of 2004 having been diagnosed within the previous five-years (i.e. 2000-2004) was 9.3% greater in Northern Ireland than Republic of Ireland. (Tab. 19.7)

Table 19.7: Prevalence of kidney cancer in Ireland at the end of 2004 by country, sex and period of diagnosis

		Diagnosed 1994-2004		Diagnosed 2000-2004	
		Prevalence	% of cases diagnosed during period	Prevalence	% of cases diagnosed during period
Northern Ireland	Male	483	43.0%	280	52.1%
	Female	334	45.9%	199	57.0%
	All persons	817	44.1%	479	54.1%
Republic of Ireland	Male	979	43.1%	630	52.2%
	Female	650	50.9%	406	61.8%
	All persons	1,629	45.9%	1,036	55.6%
Ireland	Male	1,462	43.0%	910	52.2%
	Female	984	49.1%	605	60.1%
	All persons	2,446	45.3%	1,515	55.1%

19.5: Discussion

The body contains two kidneys which are organs that filter the blood and create urine that is then stored in the bladder. Symptoms of the disease usually present at a later stage with the most common being blood in the urine or a lump in the area of one of the kidneys. Other less common symptoms include fever, side pain, loss of weight or appetite, raised blood pressure and tiredness.[151]

The risk of developing cancer of the kidney depends greatly on lifestyle factors, with tobacco use[152] and obesity[153] being significant risk factors with smokers being twice as likely as non-smokers to develop the disease.[154] Eating a well balanced diet is thought to lower the risk of developing this cancer type.[155] High blood pressure and kidney failure resulting in the use of regular dialysis are associated with increased risk of developing cancer of the kidney.[154] Some inherited diseases or conditions also increase kidney cancer risk (Von Hippel-Lindau (VHL) syndrome, tuberous sclerosis, Birt-Hogg-Dube syndrome, hereditary non-VHL clear cell renal cell cancer and hereditary papillary renal cell cancer) while some kidney cancers (familial kidney cancer) can be caused by inheriting faulty genes.[156] Chemicals and compounds such as asbestos, cadmium, trichloroethylene and dry cleaning solutions are also associated with increased risk of developing kidney cancer.[154] Consequently higher levels of incidence of kidney cancer are linked with those working in the petrochemical and iron and steel industries.[154] The use of some mild painkillers is also potentially linked to an increased risk of kidney cancer, although work is continuing into the types of painkiller that may induce an increased hazard.[154]

Incidence of kidney cancer varies throughout the world with the disease more common in developed countries due to its relationship to smoking and obesity. Overall however there are approximately 190,000 cases of kidney cancer diagnosed each year, with incidence of the disease having increased over the last decade. The disease is more common among males and the elderly; however the cancer can also occur in young adults.

Surgery is the most common form of treatment for kidney cancer with removal of the kidney, adjacent lymph nodes and adrenal gland resulting in high survival rates for the disease at an early stage. However detecting kidney cancer at an early stage is difficult due to the lack of obvious symptoms until later stages. Improvements in imaging make early detection of tumours possible allowing accurate diagnosis when symptoms do present, however no accurate screening method for kidney cancer currently exists. Other than surgery, radiotherapy has some success as a method of treatment, although chemotherapy has little impact.