

## Chapter 10:

# Pancreatic cancer (c25)

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### KEY FINDINGS

#### - INCIDENCE AND MORTALITY

- There were on average 265 male and 272 female cases diagnosed annually in Ireland during 2000-2004.
- There was no significant trend in incidence rates between 1994 and 2004 for either sex or country.
- Incidence rates during 1994-2004 were higher than expected in Cork for both males and females, in Leitrim for males and Mayo for females.
- Incidence rates in Ireland for males and females were similar to those of the EU-15 countries but were lower than those found in USA.
- During 2000-2004 there was an average of 270 male and 277 female deaths each year.
- Between 1994 and 2004 there was no significant trend in mortality rates in Ireland for either sex.

#### - SURVIVAL AND PREVALENCE

- Five-year relative survival was estimated to be 6.1%. There was no significant variation in this value by sex.
- In Ireland as a whole both one-year and five-year (age-standardised) relative survival remained unchanged between 1994-1996 and 1997-1999.
- At the end of 2004 there were only 367 people living in Ireland who had been diagnosed with the disease during 1994-2004. The majority of these (157) were diagnosed in 2004.

#### - NORTH/SOUTH COMPARISONS

- Incidence rates were 17.8% lower in Northern Ireland than Republic of Ireland for males and 13.2% lower for females.
  - Five-year (age-standardised) survival was 4.7% higher in Republic of Ireland than in Northern Ireland, driven by higher survival for females.
  - In Northern Ireland five-year (age-standardised) relative survival decreased by 7.3% for females between 1994-1996 and 1997-1999 while there was no change in Republic of Ireland.
  - Mortality rates in Northern Ireland were 10.4% lower than those in Republic of Ireland.
  - Mortality rates in Republic of Ireland showed a decrease of 1.4% per year for males, with no significant change in Northern Ireland.
  - The number of people per 100,000 of the population alive at the end of 2004 having been diagnosed in 2000-2004 was 17.1% greater in Republic of Ireland than Northern Ireland.
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### 10.1: Incidence

Pancreatic cancer made up 2.4% of all male and 2.6% of all female cancers (excluding NMSC) in Ireland during 2000-2004. It was one of the few cancers where the number of female cases exceeded the number of male cases with 265 male and 272 female cases diagnosed annually. Overall it was the tenth most common female cancer and twelfth most common male cancer. Once adjusted for age however incidence rates (EASIRs) were 30.3% higher for males compared to females (p<0.001). The odds of developing the disease before the age of 75 was 1 in 128 for males and 1 in 167 for females. (Tab. 10.1)

There was a considerable difference in levels of this cancer between Northern Ireland and Republic of Ireland with European age-standardised incidence rates (EASIR) 17.8% lower in Northern Ireland than Republic of Ireland for males (p<0.001) and 13.2% lower for females (p=0.014). (Tab. 10.1)

Table 10.1: Summary statistics for incidence of pancreatic 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	75	84	160	190	188	378	265	272	538
% of all cancer cases (ex. NMSC)	2.3%	2.4%	2.4%	2.5%	2.7%	2.6%	2.4%	2.6%	2.5%
Rank (ex. NMSC)	12	9	13	12	9	11	12	10	13
Median age at diagnosis	71	74	73	71	75	73	71	75	73
Cumulative risk (Aged 0 to 74)	0.7%	0.6%	0.6%	0.8%	0.6%	0.7%	0.8%	0.6%	0.7%
Crude rate per 100,000 persons	9.1	9.7	9.4	9.8	9.5	9.7	9.6	9.6	9.6
EASIR ± 95% CI	9.1 ± 0.9	7.3 ± 0.7	8.1 ± 0.6	11.1 ± 0.7	8.4 ± 0.6	9.6 ± 0.4	10.4 ± 0.6	8.0 ± 0.4	9.1 ± 0.4
% difference (NI vs ROI) ± 95% CI (+ NI higher, - NI lower)							-17.8% ± 9.9	-13.2% ± 10.5	-15.7% ± 7.2

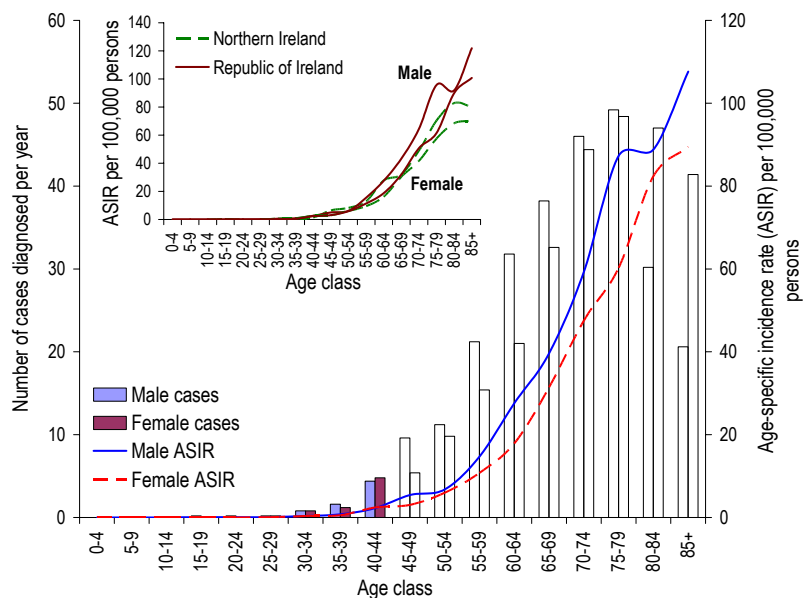
EASIR: European age-standardised incidence rate per 100,000 persons; CI: Confidence interval

#### 10.1.1: Age distribution

The median age at diagnosis for male patients with pancreatic cancer was 71 years of age compared to 75 for females. However the number of cases peaked in the 75-79 age class for both males and females. This age class represented 18.5% of all male and 17.8% of all female cases of pancreatic cancer diagnosed in 2000-2004. (Fig. 10.1)

Age-specific rates were highest for those aged 85 and over with 107.6 male and 89.5 female cases per 100,000 people of that age and sex. This pattern was observed for females in both Northern Ireland and Republic of Ireland, although the former had much lower rates, however in Northern Ireland male age-specific rates peaked in the 80-84 age class. (Fig. 10.1)

Figure 10.1: Number of cases of pancreatic cancer diagnosed per year by sex and age with age-specific incidence rate (ASIR) per 100,000 persons: 2000-2004

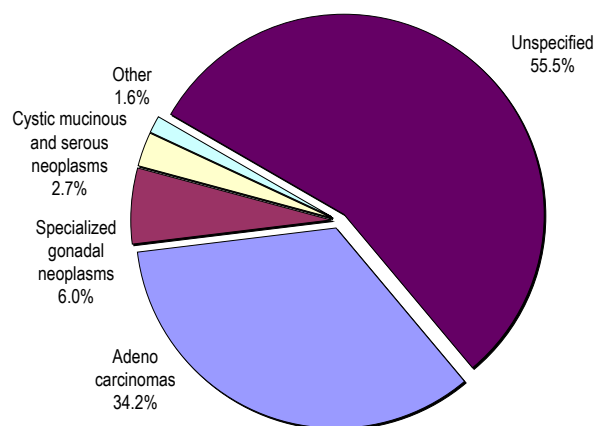


#### 10.1.2: Cell type

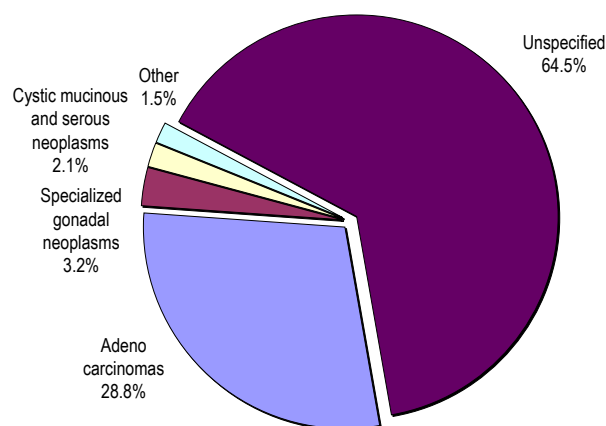
Of the 265 male cases of pancreatic cancer in Ireland diagnosed between 2000 and 2004 per year 34.2% were adenocarcinomas as were 28.8% of the 272 female cases diagnosed each year. This, however, needs considered in the context of the 60.1% (male: 55.5%; female: 64.5%) of cases with an unspecified cell type. The proportion of cases with an unknown cell type varied by county with 69.3% unknown in Northern Ireland compared to 56.1% in Republic of Ireland. (Fig. 10.2)

Figure 10.2: Types of pancreatic cancer diagnosed in Ireland: 2000-2004

(a) Male



(b) Female



### 10.1.3: Trends

There was no significant trend in European age-standardised incidence rates (EASIR) of pancreatic cancer between 1994 and 2004 for either sex or country. (Fig. 10.3)

Despite the static rates the number of cases in the population increased by 4.0 male and 4.0 female cases each year. (Tab. 10.2)

### 10.1.4: Geographic variations

Incidence of pancreatic cancer during 1994-2004 was higher than expected in Cork for males and females, in Leitrim for males and Mayo for females. Six of the counties/councils in Ireland showed lower than expected levels of pancreatic cancer compared to nine for females. With the exception of Monaghan, which had lower than expected female pancreatic cancer levels, all of these areas were in Northern Ireland. Neither Belfast nor Dublin had significantly different numbers of pancreatic cancer cases diagnosed than expected. (Fig. 10.4)

Figure 10.3: Trends in European age-standardised incidence rates (EASIR) for pancreatic cancer by sex and country: 1994-2004

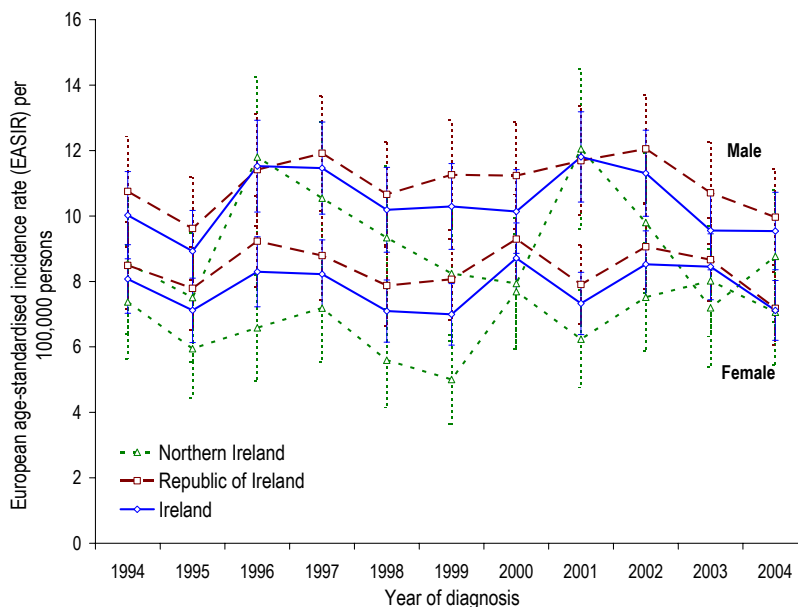


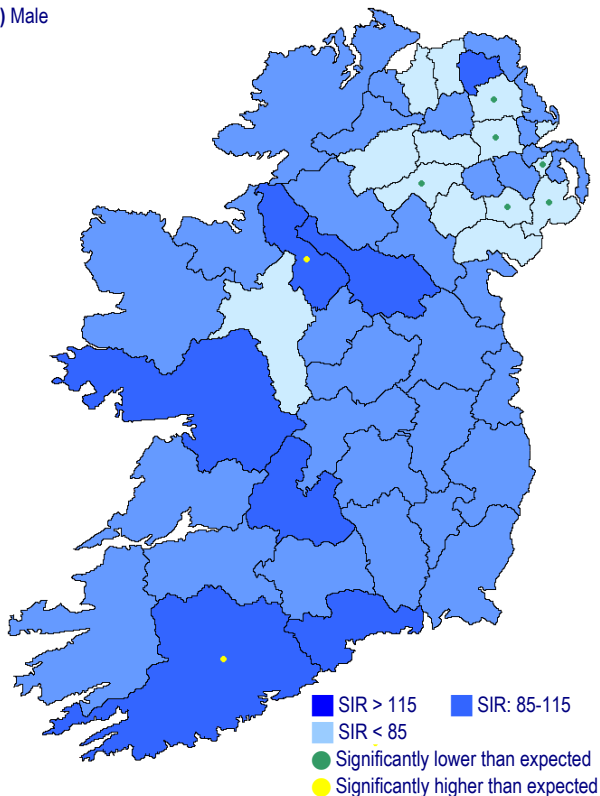
Table 10.2: Number of cases and European age-standardised incidence rates (EASIR) for pancreatic cancer by year of diagnosis, sex and country: 1994-2004

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	62	8.5 ±2.2	164	10.8 ±1.7	226	10.0 ±1.3	77	7.4 ±1.7	173	8.5 ±1.3	250	8.1 ±1.0
1995	57	7.5 ±2.0	148	9.6 ±1.6	205	8.9 ±1.2	65	5.9 ±1.5	156	7.8 ±1.3	221	7.1 ±1.0
1996	91	11.8 ±2.5	176	11.4 ±1.7	267	11.5 ±1.4	72	6.6 ±1.6	183	9.2 ±1.4	255	8.3 ±1.1
1997	80	10.5 ±2.3	182	11.9 ±1.8	262	11.5 ±1.4	82	7.2 ±1.7	179	8.8 ±1.3	261	8.2 ±1.0
1998	71	9.3 ±2.2	172	10.7 ±1.6	243	10.2 ±1.3	65	5.6 ±1.4	170	7.9 ±1.2	235	7.1 ±1.0
1999	63	8.2 ±2.1	179	11.3 ±1.7	242	10.3 ±1.3	58	5.0 ±1.4	175	8.1 ±1.2	233	7.0 ±0.9
2000	62	7.9 ±2.0	185	11.2 ±1.6	247	10.1 ±1.3	80	7.7 ±1.8	192	9.3 ±1.4	272	8.7 ±1.1
2001	96	12.0 ±2.4	192	11.7 ±1.7	288	11.8 ±1.4	75	6.2 ±1.5	175	7.9 ±1.2	250	7.3 ±1.0
2002	83	9.8 ±2.1	207	12.1 ±1.7	290	11.3 ±1.3	87	7.5 ±1.7	205	9.1 ±1.3	292	8.5 ±1.0
2003	62	7.2 ±1.8	186	10.7 ±1.6	248	9.6 ±1.2	97	8.0 ±1.7	196	8.7 ±1.3	293	8.4 ±1.0
2004	74	8.8 ±2.0	180	10.0 ±1.5	254	9.5 ±1.2	83	7.1 ±1.6	172	7.2 ±1.1	255	7.1 ±0.9

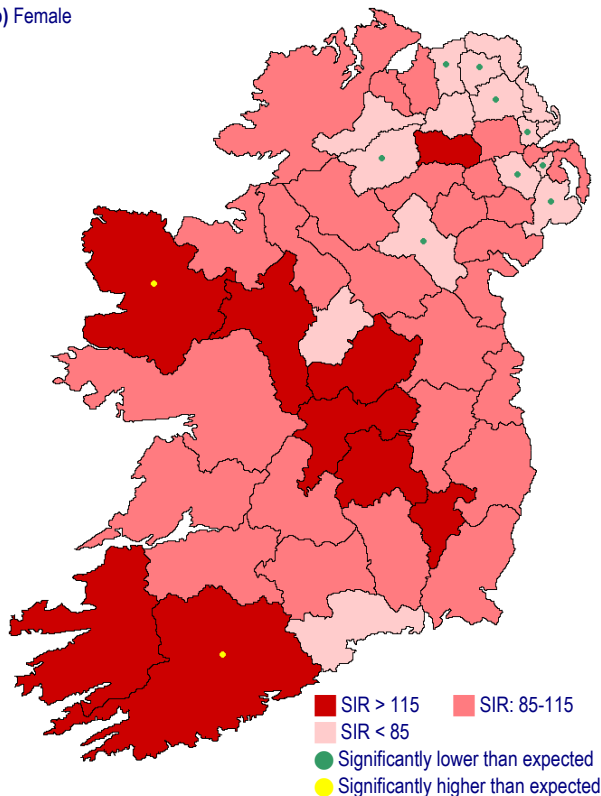
EASIR: European age-standardised incidence rate per 100,000 persons with 95% confidence interval

**Figure 10.4:** Significant differences in county/council standardised incidence ratios for pancreatic cancer compared to Ireland as a whole: 1994-2004

(a) Male



(b) Female

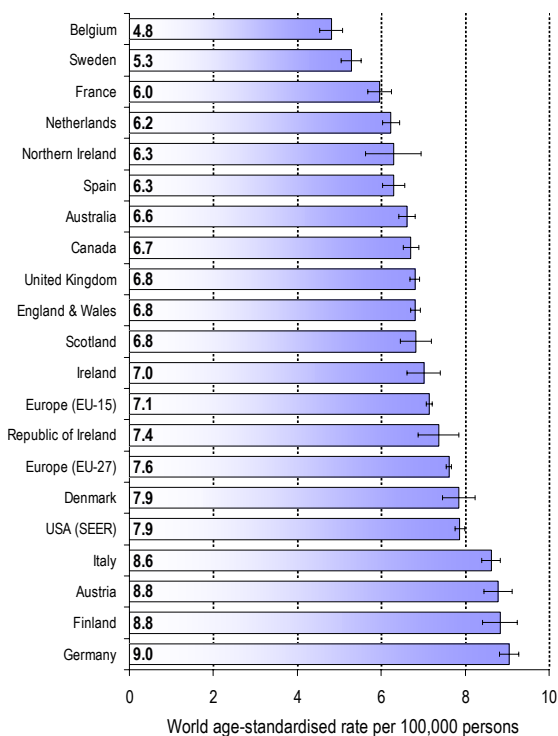


### 10.1.5: International comparisons

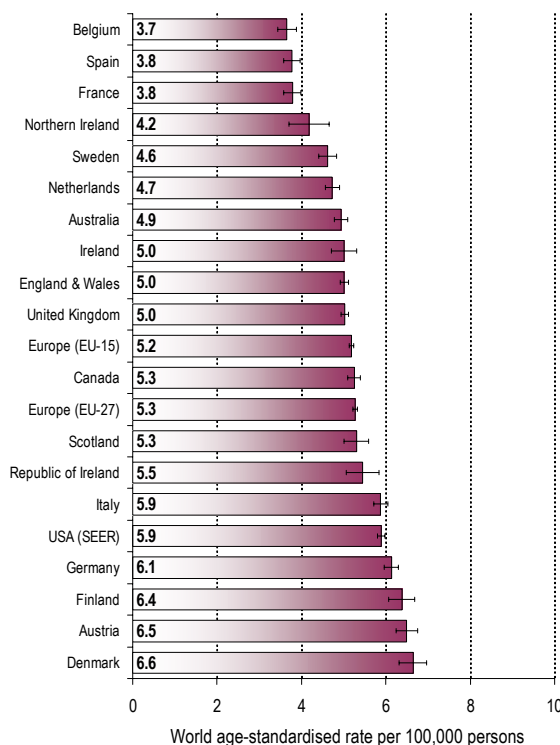
Incidence rates of pancreatic cancer in Ireland for males and females were similar to those of the EU-15 countries but were 7.9% lower for males than in the EU-27 countries ( $p=0.009$ ). Rates for males in Ireland overall and in both constituent countries were similar to those in the UK, while female rates in Northern Ireland were 16.0% lower than in that country ( $p=0.004$ ). Compared to USA pancreatic cancer levels in Ireland were 11.4% lower for males ( $p=0.001$ ) and 15.2% lower for females ( $p<0.001$ ). (Fig. 10.5)

**Figure 10.5:** International comparisons of world age-standardised incidence rates for pancreatic cancer: 1998-2000

(a) Male



(b) Female



Source: IARC<sup>73</sup>

## 10.2: Survival

Survival from pancreatic cancer in Ireland was very poor for patients diagnosed in 2000-2004 with five-year (age-standardised) relative survival Ireland estimated to be 6.1%. (Fig. 10.6, Tab. 10.3)

There was no significant variation in one or five-year (age-standardised) relative survival by sex despite the one-year value being 3.7% higher for females

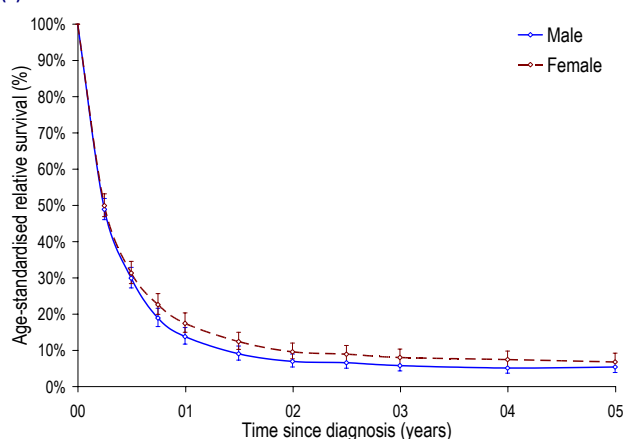
than males ( $p=0.149$ ). Five-year (age-standardised) relative survival however varied by country for all patients, with a significant survival advantage of 4.7% ( $p=0.009$ ) for patients in the Republic of Ireland compared to Northern Ireland. This difference was driven by higher female survival in Republic of Ireland (1.2% in NI compared to 9.2% in ROI;  $p<0.001$ ). (Fig. 10.6, Tab. 10.3)

**Table 10.3:** Age-standardised relative survival for pancreatic cancer patients by country and sex: 2000-2004 period analysis estimates

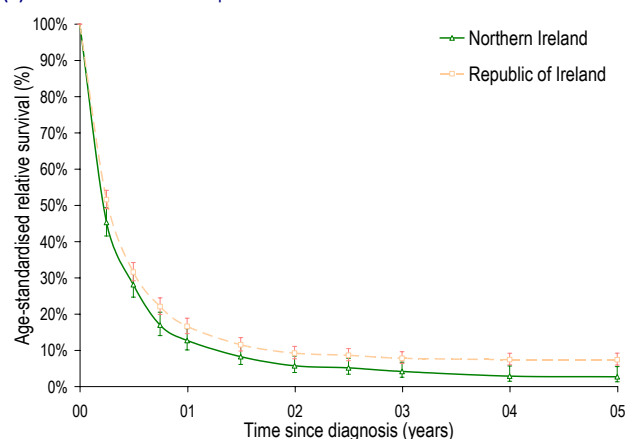
		Age-standardised relative survival (95% CI)		
		Male	Female	All
1-year	Northern Ireland	12.5% (8.9%, 17.5%)	13.2% (9.7%, 18.0%)	12.7% (10.1%, 16.0%)
	Republic of Ireland	14.6% (12.1%, 17.6%)	19.5% (16.4%, 23.1%)	16.6% (14.6%, 18.9%)
	Ireland	13.8% (11.7%, 16.3%)	17.5% (15.0%, 20.3%)	15.4% (13.8%, 17.2%)
5-year	Northern Ireland	6.3% (3.7%, 10.8%)	1.2% (0.3%, 4.4%)	2.7% (1.3%, 5.5%)
	Republic of Ireland	6.0% (4.3%, 8.5%)	9.2% (6.8%, 12.4%)	7.4% (6.0%, 9.3%)
	Ireland	5.4% (3.9%, 7.5%)	6.8% (5.0%, 9.2%)	6.1% (5.0%, 7.5%)

**Figure 10.6:** Age-standardised relative survival for pancreatic cancer patients by sex and country: 2000-2004 period analysis estimates

(a) All Ireland



(b) Northern Ireland and Republic of Ireland



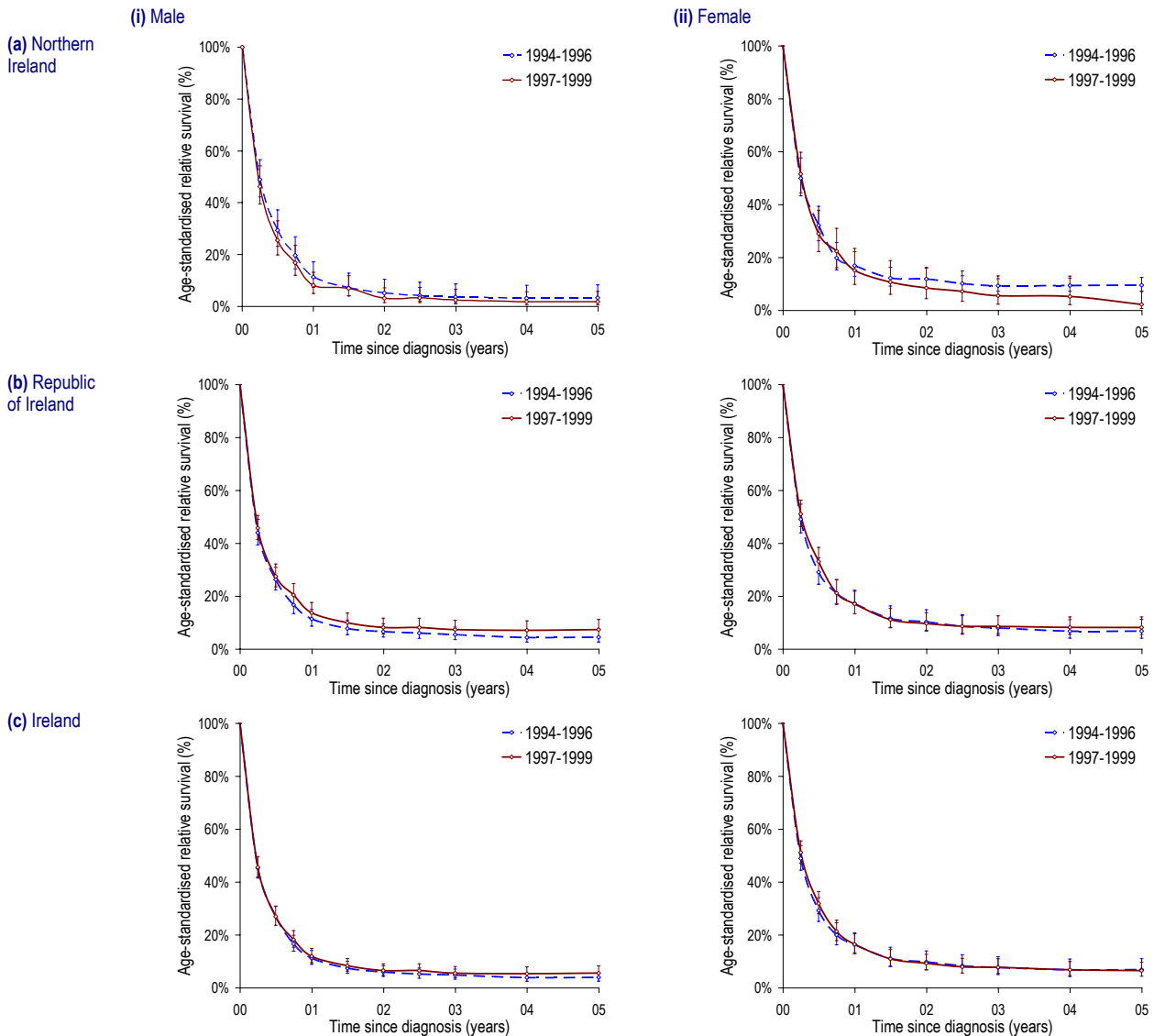
### 10.2.1: Changes in survival over time

In Ireland as a whole and for all persons in each country both one-year and five-year (age-standardised) relative survival remained unchanged between 1994-1996 and 1997-1999. However in Northern Ireland five-year (age-standardised) relative survival decreased by 7.3% for females between 1994-1996 and 1997-1999 ( $p<0.001$ ) to 2.3%, a value similar to the estimates for the 2000-2004 period. In Republic of Ireland five-year (age-standardised) relative survival did not change significantly between the two periods for either sex. (Fig. 10.7, Tab. 10.4)

**Table 10.4:** Age-standardised relative survival for pancreatic 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	11.6% (8.3%, 16.0%)	11.1% (8.1%, 15.3%)	4.0% (2.0%, 8.0%)	2.4% (1.0%, 5.3%)
	Republic of Ireland	14.0% (11.7%, 16.8%)	14.9% (12.5%, 17.8%)	5.3% (3.8%, 7.4%)	7.6% (5.7%, 10.1%)
	Ireland	13.2% (11.3%, 15.5%)	13.7% (11.8%, 16.0%)	4.9% (3.6%, 6.6%)	5.9% (4.5%, 7.8%)
Male	Northern Ireland	11.3% (7.4%, 17.3%)	8.2% (5.1%, 13.2%)	3.3% (1.3%, 8.4%)	1.9% (0.6%, 5.8%)
	Republic of Ireland	11.5% (8.7%, 15.1%)	13.8% (10.7%, 17.7%)	4.6% (2.8%, 7.5%)	7.4% (4.9%, 11.3%)
	Ireland	11.2% (8.9%, 14.2%)	12.0% (9.6%, 14.9%)	4.0% (2.6%, 6.3%)	5.6% (3.8%, 8.4%)
Female	Northern Ireland	16.9% (12.9%, 22.2%)	15.2% (9.9%, 23.4%)	9.6% (7.3%, 12.5%)	2.3% (0.7%, 7.2%)
	Republic of Ireland	17.3% (13.4%, 22.3%)	17.1% (13.3%, 21.9%)	6.9% (4.2%, 11.3%)	8.2% (5.6%, 12.2%)
	Ireland	16.4% (12.9%, 20.9%)	16.5% (13.3%, 20.5%)	6.9% (4.4%, 11.0%)	6.6% (4.4%, 9.7%)

**Figure 10.7:** Age-standardised relative survival for pancreatic cancer patients by sex, country and period of diagnosis: 1994-1999



**10.2.2: 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 pancreatic cancer during 1997-1999 3.8% survived a minimum of five-years. While there was no significant variation by sex this value varied by country with five-year observed survival during this period higher for all persons in Republic of Ireland than Northern Ireland by 3.5% (p=0.007). There was no change in either one or five-year observed survival between 1994-1996 and 1997-1999. (Tab. 10.5)

**Table 10.5:** Observed survival for pancreatic 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	10.0% (7.4%, 13.5%)	10.1% (7.5%, 13.6%)	2.3% (1.2%, 4.4%)	1.3% (0.6%, 3.2%)
	Republic of Ireland	12.6% (10.7%, 15.0%)	12.3% (10.4%, 14.5%)	4.0% (2.9%, 5.5%)	4.8% (3.6%, 6.3%)
	Ireland	11.9% (10.2%, 13.7%)	11.7% (10.1%, 13.5%)	3.5% (2.6%, 4.6%)	3.8% (2.9%, 5.0%)
Male	Northern Ireland	9.8% (6.4%, 15.0%)	8.3% (5.2%, 13.3%)	2.1% (0.8%, 5.4%)	1.6% (0.5%, 4.8%)
	Republic of Ireland	10.8% (8.3%, 14.1%)	12.0% (9.4%, 15.3%)	3.3% (2.0%, 5.4%)	4.3% (2.9%, 6.6%)
	Ireland	10.5% (8.4%, 13.2%)	10.9% (8.8%, 13.6%)	2.9% (1.9%, 4.6%)	3.6% (2.4%, 5.3%)
Female	Northern Ireland	10.3% (6.8%, 15.5%)	12.0% (8.1%, 17.7%)	2.6% (1.1%, 6.1%)	1.1% (0.3%, 4.3%)
	Republic of Ireland	14.3% (11.5%, 17.9%)	12.6% (9.9%, 15.9%)	4.6% (3.1%, 7.0%)	5.2% (3.6%, 7.7%)
	Ireland	13.2% (10.8%, 16.0%)	12.4% (10.1%, 15.2%)	4.0% (2.8%, 5.8%)	4.1% (2.8%, 5.9%)

### 10.3: Mortality

Due to the low survival experienced by those diagnosed with pancreatic cancer the number of deaths per year in Ireland from this disease was similar to the number of cases diagnosed. During 2000-2004 there was an average of 270 male and 277 female deaths from pancreatic cancer each year. This represented 4.6% of all male and 5.2% of all female cancer deaths (excluding NMSC). It was the sixth most common male cancer death and the fifth most common among females with a cumulative risk of dying from pancreatic cancer before the age of 75 being 0.8% for males and 0.6% for females. (Tab. 10.6)

While the number of deaths was similar for males and female, age standardised rates were 33.2% ( $p < 0.001$ ) higher for males than females. Variations by country also existed with rates lower in Northern Ireland by 10.4% ( $p = 0.006$ ) although differences for each gender did not reach statistical significance. (Tab. 10.6)

**Table 10.6:** Summary statistics for deaths from pancreatic 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	82	89	171	188	188	376	270	277	547
% of all cancer deaths (ex. NMSC)	4.4%	5.0%	4.7%	4.7%	5.3%	5.0%	4.6%	5.2%	4.9%
Rank (ex. NMSC)	6	5	6	6	5	5	6	5	5
Median age at death	71.5	75	74	71	75	74	71	75	74
Cumulative risk (Aged 0 to 74)	0.7%	0.5%	0.6%	0.8%	0.6%	0.7%	0.8%	0.6%	0.7%
Crude rate per 100,000 persons	9.9	10.2	10.1	9.7	9.6	9.6	9.7	9.8	9.8
EASMR $\pm$ 95% CI	9.9 $\pm$ 1.0	7.4 $\pm$ 0.7	8.5 $\pm$ 0.6	11.0 $\pm$ 0.7	8.3 $\pm$ 0.6	9.5 $\pm$ 0.4	10.7 $\pm$ 0.6	8.0 $\pm$ 0.4	9.2 $\pm$ 0.4
% difference (NI vs ROI) $\pm$ 95% CI (+ NI higher, - NI lower)							-9.7% $\pm$ 10.6	-10.5% $\pm$ 10.6	-10.4% $\pm$ 7.4

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

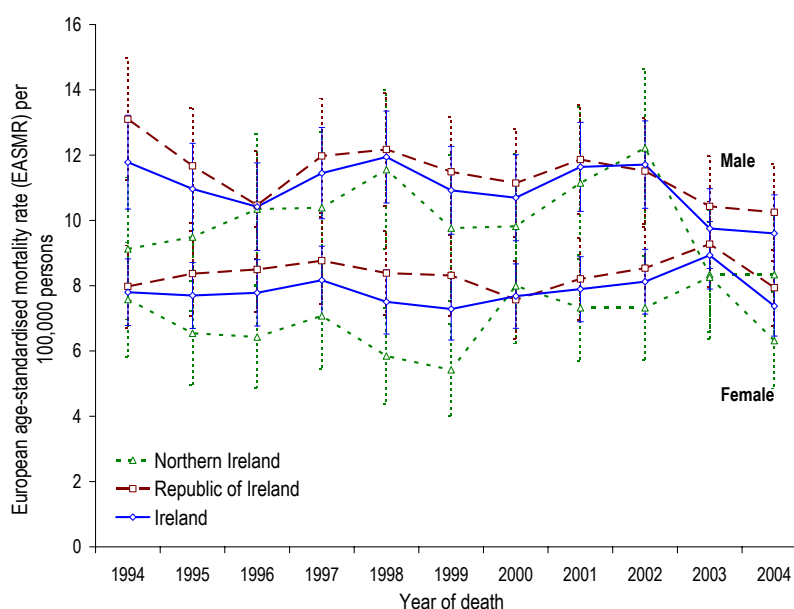
#### 10.3.1: Trends

Between 1994 and 2004 there was no significant trend in European age-standardised mortality rates (EASMR) for pancreatic cancer in Ireland for either males or females. Despite this the actual number of deaths rose as a result of demographic change with an increase of 1.5 deaths per year among males and a larger increase of 4.6 deaths per year among females. (Fig. 10.8)

Considering each country separately, Northern Ireland exhibited static age-standardised rates with an accompanying increase in the annual number of deaths of 0.9 male and 1.8 female deaths per year. In Republic of Ireland however while there was no change in female EASMRs male rates showed a decrease of 1.4% per year

( $p = 0.036$ ). However this still translated to a small increase in the annual number of deaths for both sexes due to the large increases in the population over the last ten years. The increase was 0.6 deaths per year for males and 2.8 deaths per year for females. (Fig. 10.8)

**Figure 10.8:** Trends in European age-standardised mortality rates (EASMR) for pancreatic cancer by sex and country: 1994-2004



## 10.4: Prevalence

Of the people diagnosed with pancreatic cancer during 1994-2004 only 6.6% were still alive at the end of 2004 (367 people) reflecting the poor survival from the disease. Among those diagnosed in 2000-2004 only 285 people were alive at the end of 2004 with the majority (157 people) diagnosed in 2004. (Tab. 10.7)

**Table 10.7:** Prevalence of pancreatic 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	41	5.1%	36	9.5%
	Female	43	5.1%	38	9.0%
	All persons	84	5.1%	74	9.3%
Republic of Ireland	Male	135	6.8%	105	11.1%
	Female	148	7.5%	106	11.3%
	All persons	283	7.2%	211	11.2%
Ireland	Male	176	6.3%	141	10.6%
	Female	191	6.8%	144	10.6%
	All persons	367	6.6%	285	10.6%

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 17.1% greater in Republic of Ireland than Northern Ireland. (Tab. 10.7)

## 10.5: Discussion

The pancreas is a large gland lodged behind the stomach, the function of which is to produce digestive juices and insulin. Cancer can develop in the separate parts of the pancreas that perform these functions. Symptoms for the disease vary depending upon the cancer site but include loss of weight or appetite, jaundice (yellowing of the skin), abdominal pain, itching, sickness or fever<sup>74</sup>.

Cigarette smoking is associated with 30% of all pancreatic cancers<sup>75</sup> while an unhealthy diet with low levels of fruit and vegetables and high fat and sugar intake can also increase risk.<sup>76</sup> Alcohol abuse, low levels of physical exercise and being overweight may increase the risk of developing pancreatic cancer by a small amount although studies are inconclusive and there is further work required in this area.<sup>77</sup> An increased risk may also come from frequent exposure to chlorinated hydrocarbon solvents which are found in paints, glue and dry cleaning solutions.<sup>78</sup> A link has also been established between pancreatic cancer and medical conditions such as chronic pancreatitis, diabetes and stomach ulcers.<sup>77</sup> Hereditary diseases such as hereditary pancreatitis<sup>79</sup> and a family history of pancreatic cancer also substantially increase risk of pancreatic cancer.<sup>80</sup>

Pancreatic cancer is the fourteenth most common cancer worldwide and is more common in developing countries. Survival from the disease is globally very poor as diagnosis is rarely made at an early stage. While surgery can potentially improve survival the success rate is low and treatment is usually applied for symptom control and pain relief. Further study is required to better understand this disease.