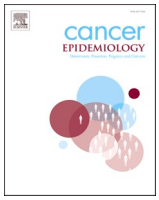
Cancer Epidemiology 80 (2022) 102196

Contents lists available at ScienceDirect

Cancer Epidemiology

journal homepage: www.elsevier.com/locate/canep



World-wide trends in net survival from pancreatic cancer by morphological sub-type: An analysis of 1,258,329 adults diagnosed in 58 countries during 2000–2014 (CONCORD-3)

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ARTICLE INFO

Keywords:
Pancreas
Population-based cancer registries
Net survival
Morphology sub-types
Global

ABSTRACT

Background: Ductal adenocarcinomas and neuroendocrine tumours are the two main morphological sub-types of pancreatic cancer. Using data from CONCORD-3, we examined whether the distribution of morphological sub-types could help explain international variations in pancreatic cancer survival for all morphologies combined. We also examined world-wide survival trends from pancreatic cancer, by morphological sub-type and country.
Methods: We estimated age-standardised one- and five-year net survival by country, calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014) and morphological sub-type, using data from 295 population-based cancer registries in 58 countries for 1,258,329 adults (aged 15–99 years) diagnosed with pancreatic cancer during 2000–2014 and followed up until 31 December 2014.
Results: Carcinomas were by far the most common morphological sub-type, comprising 90% or more of all pancreatic tumours in all countries. Neuroendocrine tumours were rare, generally 0–10% of all tumours.
During 2010–2014, age-standardised one-year net survival ranged from 10% to 30% for carcinomas, while it was much higher for neuroendocrine tumours (40% to 80%).
Age-standardised five-year survival was generally poor (less than 10 %) for carcinomas, but it ranged from 20% to 50% for neuroendocrine tumours.
Conclusions: Survival from pancreatic carcinoma remains poor world-wide and trends showed little improvement during 2000–2014. Despite slight declines in the proportion of carcinomas, they continue to comprise the majority of pancreatic tumours. Increases in survival from neuroendocrine tumours were greater than those for carcinomas, indicating that enhancements in diagnostic techniques and treatments have helped improve survival over time.

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https://doi.org/10.1016/j.canep.2022.102196

Available online 13 July 2022

1. Introduction

Pancreatic ductal adenocarcinomas and pancreatic neuroendocrine tumours are the two main morphological sub-types of pancreatic cancer. Arising from exocrine cells in the pancreas, pancreatic ductal adenocarcinomas are the commonest sub-type, comprising around 85% of all pancreatic cancers. Pancreatic neuroendocrine tumours, which originate in islet cells of the pancreas, comprise only 3–4% of all pancreatic cancers [1–3].

The majority of exocrine pancreatic tumours are diagnosed at advanced stages due to lack of obvious symptoms during early-stage disease, effective population-based screening programmes, aggressive behaviour of tumours [4]. Symptoms for exocrine tumours, such as jaundice, weight loss, abdominal pain, loss of appetite and fatigue, are usually only present in advanced-stage disease, and are often attributed to other illnesses, such as pancreatitis or ulcers. Thus, five-year survival from these tumours is very poor (less than 5%) [2,4].

Pancreatic neuroendocrine tumours are either functional or non-functional, depending on whether the tumour produces hormones (e.g., insulin). Functional tumours may cause symptoms before the tumour has grown or spread due to the increase in hormones, while patients with non-functional tumours generally only have symptoms after the tumour has grown or spread to other areas of the body [3]. The majority of neuroendocrine tumours are functional (60–70%) [1]. Five-year survival from neuroendocrine tumours is relatively high (50–60%) [1,5].

Given the high proportion of aggressive pancreatic ductal adenocarcinomas, pancreatic cancer survival for all morphological sub-types combined is poor world-wide. The CONCORD programme established global surveillance of cancer survival in 2015 with CONCORD-2 [6], which has since been updated with the publication of CONCORD-3 [7]. CONCORD-3 included data on over 37.5 million cancer patients diagnosed with one of 18 common cancers, contributed by 322 population-based cancer registries in 71 countries. CONCORD-3 reported some variation in five-year survival from pancreatic cancer between countries, ranging from 5% to 15% world-wide: 5-year survival was highest in Asia, while survival was less than 15% in all other countries. Trends in pancreatic cancer survival from 2000-2004 to 2010-2014 were generally flat, though survival did increase by 3-5% for some countries [7].

Previous studies examining the distribution of morphological sub-types have been limited to one country [5,8]. Additionally, studies examining survival have been limited to either one morphological sub-type or to one country or region, if including more than one morphological sub-type [5,9–11]. Using data from all 295 population-based registries participating in CONCORD-3 that submitted data on pancreatic cancer, we examined whether the distribution of morphological sub-types could help explain international variations in survival. Additionally, we provided estimates of survival from pancreatic cancer, by morphological sub-type, by country and over time.

2. Methods

We estimated age-standardised one- and five-year net survival by country, calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014) and morphological sub-type, using data from 295 population-based cancer registries in 58 countries for 1,258,329 adults (aged 15–99 years) diagnosed with pancreatic cancer during 2000–2014.

We included only primary, invasive tumours (ICD-O-3 behaviour code 3) in the analysis. If a patient was diagnosed with two or more primary, invasive tumours of the pancreas, then only the first record was included. Patients whose cancer registration was from a death certificate or autopsy only were excluded, because their true survival time was unknown. Follow-up data on the patient's vital status were available until 31 December 2014.

We defined three morphological sub-types based on the WHO classification of tumours of the digestive system [1] and on the *International Classification Diseases of Oncology,* 3rd edition [12] (ICD-O-3) morphological codes: carcinomas, neuroendocrine tumours and other specified tumours (Table 1). Tumours with non-specific morphology (ICD-O-3 codes 8000–8005) were included in carcinomas. A separate category for tumours with unknown morphology was also defined. We included all tumours regardless of whether the cancer registry reported the tumour as morphologically verified. If a tumour was reported by the registry as not morphologically verified but had a specific ICD-O-3 code (i.e., any code except 8000–8005), then we recoded this tumour as morphologically verified, because a specific morphology code implies that morphological verification had been completed.

Net survival was estimated using the Pohar Perme estimator [13]. Net survival is the probability of a cancer patient to survive their cancer up to a given time since diagnosis, e.g. one year, after controlling for competing risks of death (background mortality), which are higher in the elderly. To account for the differences in background mortality between regions and over time, we used life tables of all-cause mortality that were specific to each region, single year of age, sex, calendar year and, where possible, race or ethnic group. The Pohar Perme estimator was implemented using *stns* [14] in Stata version 15.

We used the cohort approach [15] to estimate net survival for patients diagnosed during 2000–2004 and 2005–2009, because at least one year of follow-up data were available for all patients by the end of 2014 for the estimation of one-year survival, and at least five years of follow-up data were available for the estimation of five-year survival. We used the period approach [16] to estimate survival for patients diagnosed during 2010–2014, because five years of follow-up data were not available for all patients by 31 December 2014.

We produced survival estimates for five age groups (15–44, 45–54, 55–64, 65–74 and 75–99 years) and obtained age-standardised estimates for all ages combined, using the International Cancer Survival Standard (ICSS) weights [17]. If an age-specific estimate could not be produced, or fewer than 10 patients were available for analysis in an age group, data for adjacent age groups were pooled and the re-estimated survival was used for both of the original age groups. If two or more age-specific estimates could not be produced, or fewer than 10 patients were available for analysis in two or more age groups, only the

Table 1
Morphological sub-types.

Description	ICD-O-3 Morphology
Carcinoma (including ductal and non-specific)	8000–8005; 8010–8012; 8014–8015; 8020–8022; 8030–8035; 8040; 8042; 8045–8046; 8050; 8052; 8070–8076; 8082–8084; 8090–8091; 8094; 8120–8122; 8130; 8140–8145; 8147–8148; 8160; 8162–8163; 8170–8171; 8180; 8190; 8200–8201; 8210–8211; 8221; 8230–8231; 8245; 8250–8253; 8255; 8260–8263; 8265; 8290; 8310; 8312–8313; 8320; 8323; 8331; 8337; 8340–8342; 8344–8345; 8350; 8370; 8380; 8400–8401; 8408; 8410; 8420; 8430; 8440–8441; 8450; 8452–8453; 8460–8461; 8470–8473; 8480–8482; 8490; 8500–8501; 8503–8504; 8507–8508; 8510; 8512; 8514; 8520–8525; 8530; 8543; 8550–8552; 8560; 8562; 8570–8573; 8575–8576
Neuroendocrine tumours	8013; 8041; 8043–8044; 8150–8156; 8240–8244; 8246; 8248–8249; 8360; 8574
Other specified morphologies	8680; 8683; 8693; 8700; 8720; 8743; 8800–8806; 8810–8811; 8814–8815; 8825; 8830; 8840; 8850–8852; 8854–8855; 8857–8858; 8890–8891; 8896; 8900–8901; 8920; 8930; 8933–8936; 8940–8941; 8950; 8963; 8970–8971; 8980; 8982; 8990; 9015; 9040–9041; 9043–9044; 9050–9052; 9064–9065; 9070; 9080–9081; 9100; 9120; 9130; 9133; 9150; 9170; 9231; 9240; 9250–9251; 9260; 9342; 9363–9364; 9370; 9473; 9540; 9560; 9581
Unknown morphology	9999

Table 2
Number and proportion of eligible cases excluded due to death certificate or auotopsy only registration by country and calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014): adults (15–99 years) diagnosed with pancreatic cancer.

Country		Calendar Period	No.	%
AFRICA				
Algeria		2000–2004	–	–
	(3 registries)	2005–2009	9	**6.2**
		2010–2014	13	**11.5**
Mauritius*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
South Africa (Eastern Cape)		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
AMERICA (CENTRAL AND SOUTH)				
Argentina		2000–2004	127	**38.6**
	(3 registries)	2005–2009	506	**37.8**
		2010–2014	430	**44.2**
Brazil		2000–2004	720	**27.1**
	(6 registries)	2005–2009	159	**9.7**
		2010–2014	20	**1.7**
Chile		2000–2004	16	**12.2**
	(4 registries)	2005–2009	18	**9.0**
		2010–2014	15	**9.2**
Colombia		2000–2004	58	**17.1**
	(3 registries)	2005–2009	41	**10.3**
		2010–2014	78	**14.4**
Costa Rica*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
Ecuador		2000–2004	92	**31.3**
	(5 registries)	2005–2009	193	**31.8**
		2010–2014	143	**23.5**
Guadeloupe (France)*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
Martinique (France)*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
Puerto Rico*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
Uruguay*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
AMERICA (NORTH)				
Canada		2000–2004	850	**4.9**
	(10 registries)	2005–2009	952	**4.8**
		2010–2014	788	**4.0**
United States		2000–2004	6703	**4.8**
	(49 registries)	2005–2009	7618	**4.6**
		2010–2014	6754	**4.5**
ASIA				
China		2000–2004	16	**0.7**
	(21 registries)	2005–2009	168	**2.1**
		2010–2014	240	**2.8**
Cyprus*		2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
India (Karunagappally)		2000–2004	–	–
		2005–2009	1	**2.0**
		2010–2014	1	**1.7**

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Table 2 (*continued*)

	Country	Calendar Period	No.	%
	Israel*	2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
	Japan	2000–2004	7488	**32.5**
	(16 registries)	2005–2009	11,727	**25.3**
		2010–2014	5202	**15.0**
	Jordan*	2000–2004	2	**1.1**
		2005–2009	1	**0.3**
		2010–2014	8	**1.6**
	Korea*	2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
	Kuwait*	2000–2004	–	–
		2005–2009	3	**3.2**
		2010–2014	2	**2.1**
	Malaysia (Penang)	2000–2004	–	–
		2005–2009	9	**3.8**
		2010–2014	–	–
	Qatar*	2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
	Singapore*	2000–2004	42	**4.9**
		2005–2009	61	**5.2**
		2010–2014	34	**2.1**
	Taiwan*	2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
	Thailand	2000–2004	70	**7.5**
	(6 registries)	2005–2009	62	**4.5**
		2010–2014	50	**4.2**
	Turkey	2000–2004	28	**4.1**
	(9 registries)	2005–2009	114	**3.5**
		2010–2014	104	**2.8**
EUROPE				
	Austria*	2000–2004	–	–
		2005–2009	1094	**15.0**
		2010–2014	–	–
	Belgium*	2000–2004	1	**0.1**
		2005–2009	3	**0.1**
		2010–2014	4	**<0.1**
	Croatia*	2000–2004	312	**10.5**
		2005–2009	413	**12.3**
		2010–2014	–	–
	Czech Republic*	2000–2004	704	**8.4**
		2005–2009	235	**2.4**
		2010–2014	119	**1.1**
	Denmark*	2000–2004	–	–
		2005–2009	–	–
		2010–2014	–	–
	Estonia*	2000–2004	78	**7.9**
		2005–2009	88	**7.4**
		2010–2014	50	**6.7**
	Finland*	2000–2004	381	**9.1**
		2005–2009	537	**10.6**
		2010–2014	–	–

(*continued on next page*)

Table 2 (*continued*)

Country	Calendar Period	No.	%
France	2000–2004	–	–
(15 registries)	2005–2009	–	–
	2010–2014	–	–
Germany	2000–2004	6534	**31.6**
(10 registries)	2005–2009	858	**12.2**
	2010–2014	778	**13.4**
Iceland*	2000–2004	1	**0.7**
	2005–2009	3	**2.0**
	2010–2014	–	–
Ireland*	2000–2004	126	**6.6**
	2005–2009	86	**3.7**
	2010–2014	40	**2.0**
Italy	2000–2004	264	**1.4**
(44 registries)	2005–2009	371	**1.3**
	2010–2014	174	**1.5**
Latvia*	2000–2004	–	–
	2005–2009	–	–
	2010–2014	–	–
Lithuania*	2000–2004	76	**3.3**
	2005–2009	–	–
	2010–2014	–	–
Malta*	2000–2004	25	**10.7**
	2005–2009	–	–
	2010–2014	–	–
Netherlands*	2000–2004	71	**0.9**
	2005–2009	55	**0.6**
	2010–2014	48	**0.4**
Norway*	2000–2004	58	**1.9**
	2005–2009	198	**5.7**
	2010–2014	111	**3.0**
Poland*	2000–2004	405	**4.1**
(16 registries)	2005–2009	793	**4.9**
	2010–2014	71	**0.4**
Portugal*	2000–2004	10	**0.4**
(4 registries)	2005–2009	10	**0.3**
	2010–2014	–	–
Romania (Cluj)	2000–2004	–	–
	2005–2009	–	–
	2010–2014	–	–
Russian Federation	2000–2004	58	**2.4**
(5 registries)	2005–2009	49	**1.3**
	2010–2014	85	**2.0**
Slovakia*	2000–2004	–	–
	2005–2009	473	**11.9**
	2010–2014	26	**3.0**
Slovenia*	2000–2004	88	**7.0**
	2005–2009	51	**3.2**
	2010–2014	30	**2.1**
Spain	2000–2004	346	**7.4**
(9 registries)	2005–2009	217	**4.1**
	2010–2014	104	**3.0**
Sweden*	2000–2004	329	**7.2**
	2005–2009	224	**4.9**
	2010–2014	159	**2.7**
Switzerland	2000–2004	157	**6.5**
(9 registries)	2005–2009	95	**3.4**
	2010–2014	87	**3.0**

(*continued on next page*)

Table 2 (*continued*)

	Country	Calendar Period	No.	%
	United Kingdom*	2000–2004	2156	**6.4**
	(4 registries)	2005–2009	2010	**5.4**
		2010–2014	1649	**3.8**
OCEANIA				
	Australia*	2000–2004	347	**3.5**
	(8 registries)	2005–2009	576	**4.6**
		2010–2014	561	**4.5**
	New Zealand*	2000–2004	183	**10.9**
		2005–2009	251	**11.7**
		2010–2014	273	**10.5**

* Data with 100% coverage of the national population.

unstandardised, all ages combined estimated was reported.

The pooled estimates for countries with more than one registry do not include data from registries for which the estimates were less reliable. However, if data were only available for one registry in a given country or territory, less reliable estimates are shown with a flag in figures and tables because they provide the only available information from that country or territory.

The CONCORD-3 protocol, the ethical approvals and the data quality control procedures have been described elsewhere [7].

3. Results

The proportion of patients registered only from a death certificate or at autopsy varied over time and between countries (Table 2). For most countries, the proportion of death certificate or autopsy only registrations decreased over time. Of the 1,258,329 adults included in the analysis, 75.7% had tumours that were reported by the registry as morphologically verified or had a specific morphology code. The proportion of tumours morphologically verified, however, varied between countries and over time (Table 3): during 2010–2014, it was only 24.2% in Chile but 100% in Kuwait. The proportion of tumours that were morphologically verified generally increased over time. In 20 of the 58 countries, the proportion of morphologically verified tumours increased by 10% or more from 2000-04 to 2010-14. In 17 countries, this proportion decreased, but the decrease was less than 10% in all but 4 countries. Given that a specific morphology code was required for a tumour to be categorised as either a neuroendocrine tumour or a tumour with other specified morphologies, 100% of these tumours were morphologically verified. For carcinomas, however, tumours with non-specific morphology were included in this sub-type. Thus, the proportion of tumours morphologically verified differed between countries, but generally it increased over time. All carcinomas were morphologically verified in 10 countries in 2010–2014, while morphological verification was less than 50% in seven countries.

The distribution of the known morphological sub-types varied between countries and over time (Fig. 1). Carcinomas were by far the most common morphological sub-type, comprising around 90% or more of all pancreatic tumours in all countries. Neuroendocrine tumours were rare, generally 0-10% of all tumours. Tumours with other specified morphologies were extremely rare, only comprising of less than 1% of all tumours.

The highest proportion of tumours reported as carcinoma was 100% in South Africa in 2010–2014 (Table 4), though the majority of these carcinomas were non-specific (Supplementary Table 1), and none were morphologically verified (Table 3).

In 2010–2014, the proportion of carcinomas was the lowest in Norway (89.9%). The proportion of carcinomas decreased over time in all but eight countries (South Africa, Argentina, Martinique, Uruguay, Malaysia, France, Romania and Sweden). The proportion of neuroendocrine tumours was highest in Norway (10.0%) and lowest in Uruguay (0.6%) (Table 4). This proportion increased over time in all but eight countries (Argentina, Martinique, Uruguay, India, Malaysia, France, Romania and Sweden). The proportion of neuroendocrine tumours increased more than 5% in 29 countries (Algeria; Guadeloupe and Martinique; Canada and the United States; seven counties in Asia; 16 countries in Europe; and Australia), with consequent decreases in the proportion of carcinomas in all but two of these countries (Martinique and France).

The proportion of tumours with other specified morphologies remained extremely small (1% or less) throughout 2000–2014 (Table 4): it was relatively stable over time in 18 countries and it decreased slightly in 16 countries. Eight countries had slight increases in the proportion of other specified morphologies. The highest proportion of other specified morphologies was in Algeria and Argentina (1.1%).

The proportion of tumours with unknown morphology decreased over time in 21 countries, while it increased in five countries (Supplementary Table 2). Unknown morphology was the second commonest morphological group in countries that reported tumours of this sub-type, though its proportion varied widely between countries. In 2010–2014, unknown morphology was highest in Croatia (49.8%).

3.1. Carcinomas

Age-standardised one-year net survival from carcinomas was generally poor, ranging from 10% to 30% (Table 5, Fig. 2). One-year survival for adults diagnosed during 2010–2014 was highest in Kuwait (40.3%, 95% CI: 29.6–51.1%) and lowest in the Russian Federation (14.9%, 13.5–16.4%). Improvements in one-year survival were modest, with increases of less than 5% in 10 countries (Canada; Malaysia, Taiwan, Turkey; five countries in Europe; and New Zealand), 5–10% in 12 countries (Martinique; United States; Korea; eight countries in Europe; and Australia) and more than 10% in eight countries (Kuwait and Singapore; and six countries in Europe). One-year survival decreased over time in Chile; China and Thailand; Croatia, Iceland, Russian Federation and Slovakia.

Age-standardised five-year survival from carcinomas was less than 10% for adults diagnosed during 2010–2014 in all countries except Kuwait (21.0%, 95% CI: 9.7–32.4%) and Malaysia (17.6%, 10.6-24.6%) (Table 6, Fig. 3). During the same calendar period, five-year survival was lowest in Norway (3.9%, 2.9-4.9%). Five-year survival increased by less than 5% in 27 countries (Martinique; Canada and the United States; Korea, Singapore, Taiwan and Turkey; 18 countries in Europe; Australia and New Zealand) and more than 10% in Kuwait, Malaysia and Sweden. Five-year survival decreased over time in seven countries (Chile; China and Thailand; Croatia, Iceland, Poland and the Russian Federation). There was some variation world-wide in age-standardised five-year survival from carcinomas (Fig. 4).

Table 3
Morphological verification (MV) by sub-type, country and calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014): adults (15–99 years) diagnosed with pancreatic cancer.

	Period of diagnosis	Carcinomas						Unknown morphology						All morphologies combined					
		MV		Non-MV		Unknown MV		MV		Non-MV		Unknown MV		MV		Non-MV		Unknown MV	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
AFRICA																			
Algeria	2000–2004	22	**100.0**	–	–	–	–	–	–	13	**72.2**	5	**27.8**	22	**55.0**	13	**32.5**	5	**12.5**
(3 registries)	2005–2009	99	**100.0**	–	–	–	–	–	–	31	**93.9**	2	**6.1**	101	**75.4**	31	**23.1**	2	**1.5**
	2010–2014	85	**100.0**	–	–	–	–	–	–	7	**100.0**	–	–	91	**92.9**	7	**7.1**	–	–
Mauritius*	2000–2004	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2005–2009	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2010–2014	32	**71.1**	13	**28.9**	–	–	–	–	–	–	–	–	32	**71.1**	13	**28.9**	–	–
South Africa (Eastern Cape)	2000–2004	–	–	21	**100.0**	–	–	–	–	–	–	–	–	–	–	21	**100.0**	–	–
	2005–2009	3	**13.6**	19	**86.4**	–	–	–	–	–	–	–	–	3	**13.6**	19	**86.4**	–	–
	2010–2014	–	–	19	**100.0**	–	–	–	–	–	–	–	–	–	–	19	**100.0**	–	–
AMERICA (CENTRAL AND SOUTH)																			
Argentina	2000–2004	146	**87.4**	19	**11.4**	2	**1.2**	–	–	27	**100.0**	–	–	151	**75.9**	46	**23.1**	2	**1.0**
(3 registries)	2005–2009	595	**82.6**	116	**16.1**	9	**1.3**	–	–	113	**100.0**	–	–	614	**72.1**	229	**26.9**	9	**1.1**
	2010–2014	421	**78.7**	106	**19.8**	8	**1.5**	–	–	57	**100.0**	–	–	435	**71.8**	163	**26.9**	8	**1.3**
Brazil	2000–2004	1069	**47.6**	1175	**52.3**	3	**0.1**	–	–	–	–	–	–	1094	**48.2**	1175	**51.7**	3	**0.1**
(6 registries)	2005–2009	1549	**79.9**	386	**19.9**	3	**0.2**	–	–	–	–	–	–	1608	**80.5**	386	**19.3**	3	**0.2**
	2010–2014	979	**72.1**	377	**27.8**	2	**0.1**	–	–	–	–	–	–	1050	**73.5**	377	**26.4**	2	**0.1**
Chile	2000–2004	51	**57.3**	38	**42.7**	–	–	–	–	51	**100.0**	–	–	51	**36.4**	89	**63.6**	–	–
(4 registries)	2005–2009	158	**39.4**	243	**60.6**	–	–	–	–	46	**100.0**	–	–	166	**36.5**	289	**63.5**	–	–
	2010–2014	45	**32.6**	93	**67.4**	–	–	–	–	57	**100.0**	–	–	48	**24.2**	150	**75.8**	–	–
Colombia	2000–2004	170	**50.7**	165	**49.3**	–	–	–	–	–	–	–	–	172	**51.0**	165	**49.0**	–	–
(3 registries)	2005–2009	223	**52.1**	205	**47.9**	–	–	–	–	–	–	–	–	231	**53.0**	205	**47.0**	–	–
	2010–2014	273	**62.5**	164	**37.5**	–	–	20	**26.7**	55	**73.3**	–	–	311	**58.7**	219	**41.3**	–	–
Costa Rica*	2000–2004	124	**43.4**	162	**56.6**	–	–	–	–	–	–	–	–	129	**44.3**	162	**55.7**	–	–
	2005–2009	254	**56.2**	198	**43.8**	–	–	–	–	–	–	–	–	269	**57.6**	198	**42.4**	–	–
	2010–2014	243	**59.3**	166	**40.5**	1	**0.2**	–	–	–	–	–	–	263	**61.2**	166	**38.6**	1	**0.2**
Ecuador	2000–2004	101	**50.0**	101	**50.0**	–	–	–	–	–	–	–	–	101	**50.0**	101	**50.0**	–	–
(5 registries)	2005–2009	190	**47.6**	209	**52.4**	–	–	–	–	–	–	–	–	199	**48.8**	209	**51.2**	–	–
	2010–2014	221	**49.6**	225	**50.4**	–	–	–	–	–	–	–	–	234	**51.0**	225	**49.0**	–	–
Guadeloupe (France)*	2000–2004	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2005–2009	39	**81.3**	9	**18.8**	–	–	–	–	–	–	–	–	43	**82.7**	9	**17.3**	–	–
	2010–2014	77	**72.6**	29	**27.4**	–	–	–	–	–	–	–	–	86	**74.8**	29	**25.2**	–	–
Martinique (France)*	2000–2004	89	**100.0**	–	–	–	–	–	–	35	**92.1**	3	**7.9**	100	**72.5**	35	**25.4**	3	**2.2**
	2005–2009	106	**100.0**	–	–	–	–	–	–	81	**98.8**	1	**1.2**	114	**58.2**	81	**41.3**	1	**0.5**
	2010–2014	80	**100.0**	–	–	–	–	–	–	52	**100.0**	–	–	87	**62.6**	52	**37.4**	–	–
Puerto Rico*	2000–2004	576	**94.1**	36	**5.9**	–	–	–	–	–	–	–	–	587	**94.2**	36	**5.8**	–	–
	2005–2009	666	**84.7**	110	**14.0**	10	**1.3**	–	–	–	–	–	–	706	**85.5**	110	**13.3**	10	**1.2**
	2010–2014	477	**93.2**	26	**5.1**	9	**1.8**	–	–	–	–	–	–	500	**93.5**	26	**4.9**	9	**1.7**

(*continued on next page*)

Table 3 (*continued*)

	Period of diagnosis	Carcinomas						Unknown morphology						All morphologies combined					
		MV		Non-MV		Unknown MV		MV		Non-MV		Unknown MV		MV		**Non-MV**		**Unknown MV**	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	**%**	**No.**	**%**	**No.**	**%**
Uruguay*	2000–2004	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2005–2009	257	**42.3**	351	**57.7**	–	–	–	–	–	–	–	–	266	**43.1**	351	**56.9**	–	–
	2010–2014	397	**41.6**	557	**58.4**	–	–	–	–	–	–	–	–	403	**42.0**	557	**58.0**	–	–
AMERICA (NORTH)																			
Canada	2000–2004	10,488	**67.3**	4702	**30.2**	397	**2.5**	–	–	224	**100.0**	–	–	10,971	**67.3**	4926	**30.2**	397	**2.4**
(10 registries)	2005–2009	12,597	**70.7**	4803	**27.0**	412	**2.3**	–	–	240	**100.0**	–	–	13,294	**70.9**	5043	**26.9**	412	**2.2**
	2010–2014	13,616	**78.2**	2221	**12.8**	1564	**9.0**	–	–	175	**100.0**	–	–	14,854	**79.0**	2396	**12.7**	1564	**8.3**
United States	2000–2004	115,432	**90.5**	9247	**7.2**	2918	**2.3**	–	–	–	–	–	–	120,224	**90.8**	9247	**7.0**	2918	**2.2**
(49 registries)	2005–2009	134,166	**90.6**	10,172	**6.9**	3678	**2.5**	–	–	–	–	–	–	141,296	**91.1**	10,172	**6.6**	3678	**2.4**
	2010–2014	122,137	**91.8**	8122	**6.1**	2730	**2.1**	–	–	–	–	–	–	131,744	**92.4**	8122	**5.7**	2730	**1.9**
ASIA																			
China	2000–2004	819	**34.3**	1570	**65.7**	–	–	–	–	–	–	–	–	833	**34.7**	1570	**65.3**	–	–
(21 registries)	2005–2009	2307	**29.5**	5502	**70.4**	4	**0.1**	–	–	–	–	–	–	2447	**30.8**	5502	**69.2**	4	**0.1**
	2010–2014	2472	**29.1**	6026	**70.9**	3	**<0.1**	–	–	–	–	–	–	2725	**31.1**	6026	**68.8**	3	**<0.1**
Cyprus*	2000–2004	24	**75.0**	6	**18.8**	2	**6.3**	–	–	–	–	–	–	25	**75.8**	6	**18.2**	2	**6.1**
	2005–2009	164	**83.7**	29	**14.8**	3	**1.5**	–	–	–	–	–	–	174	**84.5**	29	**14.1**	3	**1.5**
	2010–2014	261	**94.9**	12	**4.4**	2	**0.7**	–	–	–	–	–	–	281	**95.3**	12	**4.1**	2	**0.7**
India (Karunagappally)	2000–2004	10	**37.0**	17	**63.0**	–	–	–	–	–	–	–	–	10	**37.0**	17	**63.0**	–	–
	2005–2009	15	**30.0**	35	**70.0**	–	–	–	–	–	–	–	–	15	**30.0**	35	**70.0**	–	–
	2010–2014	33	**58.9**	23	**41.1**	–	–	–	–	–	–	–	–	34	**59.6**	23	**40.4**	–	–
Israel*	2000–2004	1610	**64.6**	835	**33.5**	49	**2.0**	–	–	–	–	–	–	1676	**65.5**	835	**32.6**	49	**1.9**
	2005–2009	1982	**73.4**	716	**26.5**	3	**0.1**	–	–	–	–	–	–	2098	**74.5**	716	**25.4**	3	**0.1**
	2010–2014	2003	**79.7**	503	**20.0**	6	**0.2**	–	–	–	–	–	–	2197	**81.2**	503	**18.6**	6	**0.2**
Japan	2000–2004	7713	**54.0**	5950	**41.7**	614	**4.3**	–	–	1093	**99.9**	1	**0.1**	7868	**50.7**	7043	**45.4**	615	**4.0**
(16 registries)	2005–2009	18,459	**58.0**	12,599	**39.6**	794	**2.5**	–	–	2424	**99.1**	23	**0.9**	18,827	**54.3**	15,023	**43.3**	817	**2.4**
	2010–2014	15,041	**56.4**	10,889	**40.8**	738	**2.8**	–	–	2324	**98.6**	32	**1.4**	15,460	**52.5**	13,213	**44.9**	770	**2.6**
Jordan*	2000–2004	150	**89.8**	17	**10.2**	–	–	–	–	–	–	–	–	154	**90.1**	17	**9.9**	–	–
	2005–2009	249	**92.2**	21	**7.8**	–	–	–	–	–	–	–	–	260	**92.5**	21	**7.5**	–	–
	2010–2014	403	**83.8**	78	**16.2**	–	–	–	–	–	–	–	–	422	**84.4**	78	**15.6**	–	–
Korea*	2000–2004	5748	**41.3**	8156	**58.7**	–	–	–	–	–	–	–	–	5880	**41.9**	8156	**58.1**	–	–
	2005–2009	9551	**49.8**	9610	**50.2**	–	–	–	–	–	–	–	–	9812	**50.5**	9610	**49.5**	–	–
	2010–2014	16,600	**66.6**	8320	**33.4**	–	–	–	–	–	–	–	–	17,579	**67.9**	8320	**32.1**	–	–
Kuwait*	2000–2004	54	**100.0**	–	–	–	–	–	–	–	–	–	–	57	**100.0**	–	–	–	–
	2005–2009	91	**100.0**	–	–	–	–	–	–	–	–	–	–	91	**100.0**	–	–	–	–
	2010–2014	85	**100.0**	–	–	–	–	–	–	–	–	–	–	92	**100.0**	–	–	–	–
Malaysia (Penang)	2000–2004	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2005–2009	129	**82.2**	28	**17.8**	–	–	–	–	–	–	–	–	135	**82.8**	28	**17.2**	–	–
	2010–2014	118	**64.5**	65	**35.5**	–	–	–	–	–	–	–	–	121	**65.1**	65	**34.9**	–	–

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Table 3 (*continued*)

	Period of diagnosis	Carcinomas						Unknown morphology						All morphologies combined					
		MV		Non-MV		Unknown MV		MV		Non-MV		Unknown MV		MV		**Non-MV**		**Unknown MV**	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	**%**	**No.**	**%**	**No.**	**%**
Qatar*	2000–2004	34	**97.1**	1	**2.9**	–	–	–	–	–	–	–	–	35	**97.2**	1	**2.8**	–	–
	2005–2009	47	**90.4**	4	**7.7**	1	**1.9**	–	–	–	–	–	–	48	**90.6**	4	**7.5**	1	**1.9**
	2010–2014	62	**69.7**	27	**30.3**	–	–	–	–	–	–	–	–	70	**72.2**	27	**27.8**	–	–
Singapore*	2000–2004	483	**71.6**	192	**28.4**	–	–	–	–	121	**100.0**	–	–	502	**61.6**	313	**38.4**	–	–
	2005–2009	758	**99.7**	2	**0.3**	–	–	–	–	312	**100.0**	–	–	792	**71.6**	314	**28.4**	–	–
	2010–2014	1153	**100.0**	–	–	–	–	–	–	307	**100.0**	–	–	1253	**80.3**	307	**19.7**	–	–
Taiwan*	2000–2004	3346	**100.0**	–	–	–	–	–	–	2024	**100.0**	–	–	3438	**62.9**	2024	**37.1**	–	–
	2005–2009	4555	**100.0**	–	–	–	–	–	–	2477	**100.0**	–	–	4739	**65.7**	2477	**34.3**	–	–
	2010–2014	6310	**100.0**	–	–	–	–	–	–	2751	**100.0**	–	–	6854	**71.4**	2751	**28.6**	–	–
Thailand	2000–2004	400	**54.9**	328	**45.1**	–	–	–	–	–	–	–	–	404	**55.2**	328	**44.8**	–	–
(6 registries)	2005–2009	527	**39.0**	822	**60.9**	1	**0.1**	–	–	–	–	–	–	541	**39.7**	822	**60.3**	1	**0.1**
	2010–2014	523	**45.3**	632	**54.7**	–	–	–	–	–	–	–	–	556	**46.8**	632	**53.2**	–	–
Turkey	2000–2004	426	**65.6**	205	**31.6**	18	**2.8**	–	–	–	–	–	–	435	**66.1**	205	**31.2**	18	**2.7**
(9 registries)	2005–2009	2242	**76.2**	616	**20.9**	86	**2.9**	11	**10.2**	86	**79.6**	11	**10.2**	2354	**74.7**	702	**22.3**	97	**3.1**
	2010–2014	2894	**84.0**	485	**14.1**	68	**2.0**	3	**4.1**	63	**86.3**	7	**9.6**	3092	**83.2**	548	**14.8**	75	**2.0**
EUROPE																			
Austria*	2000–2004	4928	**93.7**	313	**6.0**	16	**0.3**	–	–	–	–	–	–	5096	**93.9**	313	**5.8**	16	**0.3**
	2005–2009	5300	**89.9**	484	**8.2**	111	**1.9**	–	–	–	–	–	–	5521	**90.3**	484	**7.9**	111	**1.8**
	2010–2014	5615	**86.5**	609	**9.4**	269	**4.1**	–	–	–	–	–	–	5952	**87.1**	609	**8.9**	269	**3.9**
Belgium*	2000–2004	840	**83.2**	170	**16.8**	–	–	–	–	–	–	–	–	895	**84.0**	170	**16.0**	–	–
	2005–2009	5008	**89.4**	592	**10.6**	–	–	–	–	–	–	–	–	5378	**90.1**	592	**9.9**	–	–
	2010–2014	6416	**87.1**	951	**12.9**	–	–	–	–	–	–	–	–	7029	**88.1**	951	**11.9**	–	–
Croatia*	2000–2004	1608	**100.0**	–	–	–	–	–	–	374	**36.1**	663	**63.9**	1627	**61.1**	374	**14.0**	663	**24.9**
	2005–2009	1626	**99.8**	4	**0.2**	–	–	–	–	489	**39.1**	763	**60.9**	1674	**57.1**	493	**16.8**	763	**26.0**
	2010–2014	1405	**99.8**	3	**0.2**	–	–	–	–	729	**48.7**	767	**51.3**	1503	**50.1**	732	**24.4**	767	**25.5**
Czech Republic*	2000–2004	3870	**100.0**	–	–	–	–	–	–	3652	**100.0**	–	–	3971	**52.1**	3652	**47.9**	–	–
	2005–2009	4533	**100.0**	–	–	–	–	–	–	4674	**100.0**	–	–	4766	**50.5**	4674	**49.5**	–	–
	2010–2014	5601	**100.0**	–	–	–	–	–	–	4620	**100.0**	–	–	5939	**56.2**	4620	**43.8**	–	–
Denmark*	2000–2004	2708	**71.2**	1043	**27.4**	55	**1.4**	–	–	–	–	–	–	2787	**71.7**	1043	**26.8**	55	**1.4**
	2005–2009	3779	**85.2**	638	**14.4**	17	**0.4**	–	–	–	–	–	–	3882	**85.6**	638	**14.1**	17	**0.4**
	2010–2014	4155	**88.2**	525	**11.1**	32	**0.7**	–	–	–	–	–	–	4300	**88.5**	525	**10.8**	32	**0.7**
Estonia*	2000–2004	455	**100.0**	–	–	–	–	–	–	443	**100.0**	–	–	462	**51.0**	443	**49.0**	–	–
	2005–2009	494	**100.0**	–	–	–	–	–	–	582	**100.0**	–	–	515	**46.9**	582	**53.1**	–	–
	2010–2014	365	**100.0**	–	–	–	–	–	–	303	**100.0**	–	–	393	**56.5**	303	**43.5**	–	–
Finland*	2000–2004	2428	**99.5**	–	–	12	**0.5**	–	–	1291	**100.0**	–	–	2503	**65.8**	1291	**33.9**	12	**0.3**
	2005–2009	2810	**100.0**	–	–	–	–	–	–	1546	**100.0**	–	–	2973	**65.8**	1546	**34.2**	–	–
	2010–2014	3010	**100.0**	–	–	–	–	–	–	1292	**100.0**	–	–	3234	**71.5**	1292	**28.5**	–	–
France	2000–2004	2985	**100.0**	–	–	–	–	–	–	1680	**99.3**	11	**0.7**	3203	**65.4**	1680	**34.3**	11	**0.2**
(15 registries)	2005–2009	5474	**100.0**	–	–	–	–	–	–	2423	**99.3**	18	**0.7**	5892	**70.7**	2423	**29.1**	18	**0.2**
	2010–2014	1424	**100.0**	–	–	–	–	–	–	575	**99.3**	4	**0.7**	1522	**72.4**	575	**27.4**	4	**0.2**

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Table 3 (*continued*)

	Period of diagnosis	Carcinomas						Unknown morphology						All morphologies combined					
		MV		Non-MV		Unknown MV		MV		Non-MV		Unknown MV		MV		**Non-MV**		**Unknown MV**	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	**%**	**No.**	**%**	**No.**	**%**
Germany	2000–2004	10,783	**96.6**	354	**3.2**	22	**0.2**	–	–	2240	**87.9**	309	**12.1**	11,205	**79.3**	2594	**18.4**	331	**2.3**
(10 registries)	2005–2009	17,818	**98.2**	296	**1.6**	37	**0.2**	–	–	2565	**88.6**	331	**11.4**	18,579	**85.2**	2861	**13.1**	368	**1.7**
	2010–2014	17,825	**98.7**	199	**1.1**	39	**0.2**	–	–	2133	**87.9**	295	**12.1**	18,894	**87.6**	2332	**10.8**	334	**1.5**
Iceland*	2000–2004	98	**70.0**	42	**30.0**	–	–	–	–	–	–	–	–	102	**70.8**	42	**29.2**	–	–
	2005–2009	106	**72.6**	40	**27.4**	–	–	–	–	–	–	–	–	107	**72.8**	40	**27.2**	–	–
	2010–2014	145	**81.5**	33	**18.5**	–	–	–	–	–	–	–	–	157	**82.6**	33	**17.4**	–	–
Ireland*	2000–2004	793	**96.1**	–	–	32	**3.9**	–	–	903	**100.0**	–	–	833	**47.1**	903	**51.1**	32	**1.8**
	2005–2009	1308	**97.7**	–	–	31	**2.3**	–	–	800	**99.6**	3	**0.4**	1385	**62.4**	800	**36.1**	34	**1.5**
	2010–2014	1292	**97.0**	–	–	40	**3.0**	–	–	497	**99.6**	2	**0.4**	1405	**72.3**	497	**25.6**	42	**2.2**
Italy	2000–2004	7747	**43.4**	9975	**55.9**	118	**0.7**	–	–	–	–	–	–	8096	**44.5**	9975	**54.8**	118	**0.6**
(44 registries)	2005–2009	12,058	**45.2**	14,597	**54.7**	36	**0.1**	–	–	–	–	–	–	12,787	**46.6**	14,597	**53.2**	36	**0.1**
	2010–2014	5454	**51.2**	5170	**48.5**	32	**0.3**	–	–	–	–	–	–	5887	**53.1**	5170	**46.6**	32	**0.3**
Latvia*	2000–2004	348	**23.4**	1120	**75.4**	17	**1.1**	–	–	–	–	–	–	355	**23.8**	1120	**75.1**	17	**1.1**
	2005–2009	403	**27.5**	1042	**71.1**	20	**1.4**	–	–	–	–	–	–	425	**28.6**	1042	**70.1**	20	**1.3**
	2010–2014	478	**27.7**	996	**57.7**	253	**14.6**	–	–	–	–	–	–	505	**28.8**	996	**56.8**	253	**14.4**
Lithuania*	2000–2004	974	**100.0**	–	–	–	–	139	**11.8**	1037	**88.0**	2	**0.2**	1160	**52.8**	1037	**47.2**	2	**0.1**
	2005–2009	1228	**100.0**	–	–	–	–	42	**5.6**	693	**93.1**	9	**1.2**	1330	**65.5**	693	**34.1**	9	**0.4**
	2010–2014	696	**100.0**	–	–	–	–	30	**6.7**	373	**83.4**	44	**9.8**	773	**65.0**	373	**31.3**	44	**3.7**
Malta*	2000–2004	77	**37.4**	127	**61.7**	2	**1.0**	–	–	–	–	–	–	78	**37.7**	127	**61.4**	2	**1.0**
	2005–2009	96	**45.3**	115	**54.2**	1	**0.5**	–	–	–	–	–	–	101	**46.5**	115	**53.0**	1	**0.5**
	2010–2014	158	**58.1**	114	**41.9**	–	–	–	–	–	–	–	–	171	**60.0**	114	**40.0**	–	–
Netherlands*	2000–2004	4399	**59.3**	3025	**40.7**	–	–	–	–	–	–	–	–	4601	**60.3**	3025	**39.7**	–	–
	2005–2009	5826	**62.6**	3485	**37.4**	–	–	–	–	–	–	–	–	6191	**64.0**	3485	**36.0**	–	–
	2010–2014	7608	**70.3**	3209	**29.7**	–	–	–	–	–	–	–	–	8206	**71.9**	3209	**28.1**	–	–
Norway*	2000–2004	1810	**99.8**	3	**0.2**	–	–	–	–	1155	**99.9**	1	**0.1**	1916	**62.3**	1158	**37.7**	1	**<0.1**
	2005–2009	2115	**100.0**	–	–	–	–	–	–	1004	**100.0**	–	–	2253	**69.2**	1004	**30.8**	–	–
	2010–2014	2244	**99.9**	2	**0.1**	–	–	–	–	1039	**100.0**	–	–	2497	**70.6**	1041	**29.4**	–	–
Poland*	2000–2004	5398	**100.0**	–	–	–	–	3085	**36.6**	4092	**48.5**	1255	**14.9**	8587	**61.6**	4092	**29.4**	1255	**9.0**
(16 registries)	2005–2009	8071	**100.0**	–	–	–	–	4130	**52.5**	3371	**42.9**	364	**4.6**	12,478	**77.0**	3371	**20.8**	364	**2.2**
	2010–2014	10,108	**100.0**	–	–	–	–	3576	**51.1**	3039	**43.5**	377	**5.4**	14,072	**80.5**	3039	**17.4**	377	**2.2**
Portugal*	2000–2004	1440	**92.0**	118	**7.5**	8	**0.5**	–	–	568	**97.6**	14	**2.4**	1522	**68.3**	686	**30.8**	22	**1.0**
(4 registries)	2005–2009	2197	**84.8**	298	**11.5**	96	**3.7**	–	–	628	**97.2**	18	**2.8**	2360	**69.4**	926	**27.2**	114	**3.4**
	2010–2014	1901	**92.2**	125	**6.1**	36	**1.7**	–	–	408	**99.0**	4	**1.0**	2100	**78.6**	533	**19.9**	40	**1.5**
Romania (Cluj)	2000–2004	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2005–2009	157	**61.8**	97	**38.2**	–	–	–	–	–	–	–	–	171	**63.8**	97	**36.2**	–	–
	2010–2014	168	**58.7**	118	**41.3**	–	–	–	–	–	–	–	–	177	**60.0**	118	**40.0**	–	–
Russian Federation	2000–2004	752	**98.6**	11	**1.4**	–	–	58	**3.8**	1467	**95.6**	9	**0.6**	829	**35.8**	1478	**63.8**	9	**0.4**
(5 registries)	2005–2009	1698	**96.9**	30	**1.7**	24	**1.4**	74	**4.0**	1738	**93.7**	43	**2.3**	1800	**49.5**	1768	**48.6**	67	**1.8**
	2010–2014	2615	**99.9**	2	**0.1**	–	–	39	**2.8**	1348	**95.7**	22	**1.6**	2725	**66.5**	1350	**33.0**	22	**0.5**

(*continued on next page*)

Table 3 (*continued*)

	Period of diagnosis	Carcinomas						Unknown morphology						All morphologies combined					
		MV		Non-MV		Unknown MV		MV		Non-MV		Unknown MV		MV		**Non-MV**		**Unknown MV**	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	**%**	**No.**	**%**	**No.**	**%**
Slovakia*	2000–2004	1492	**66.6**	747	**33.4**	–	–	–	–	–	–	–	–	1539	**67.3**	747	**32.7**	–	–
	2005–2009	2391	**70.1**	1021	**29.9**	–	–	–	–	–	–	–	–	2468	**70.7**	1021	**29.3**	–	–
	2010–2014	562	**68.0**	263	**31.8**	1	**0.1**	–	–	–	–	–	–	585	**68.9**	263	**31.0**	1	**0.1**
Slovenia*	2000–2004	596	**100.0**	–	–	–	–	4	**0.8**	525	**99.2**	–	–	638	**54.9**	525	**45.1**	–	–
	2005–2009	789	**100.0**	–	–	–	–	–	–	699	**100.0**	–	–	845	**54.7**	699	**45.3**	–	–
	2010–2014	652	**100.0**	–	–	–	–	–	–	656	**100.0**	–	–	710	**52.0**	656	**48.0**	–	–
Spain	2000–2004	2300	**83.6**	427	**15.5**	25	**0.9**	–	–	1339	**95.8**	58	**4.2**	2442	**56.9**	1766	**41.2**	83	**1.9**
(9 registries)	2005–2009	3054	**88.0**	393	**11.3**	25	**0.7**	–	–	1465	**98.7**	19	**1.3**	3199	**62.7**	1858	**36.4**	44	**0.9**
	2010–2014	2080	**90.2**	215	**9.3**	10	**0.4**	–	–	872	**99.3**	6	**0.7**	2257	**67.2**	1087	**32.4**	16	**0.5**
Sweden*	2000–2004	3564	**87.1**	526	**12.9**	–	–	–	–	–	–	–	–	3715	**87.6**	526	**12.4**	–	–
	2005–2009	3853	**91.2**	374	**8.8**	–	–	–	–	–	–	–	–	3980	**91.4**	374	**8.6**	–	–
	2010–2014	4640	**84.6**	847	**15.4**	–	–	–	–	–	–	–	–	4798	**85.0**	847	**15.0**	–	–
Switzerland	2000–2004	1523	**81.3**	349	**18.6**	1	**0.1**	–	–	266	**100.0**	–	–	1599	**72.2**	615	**27.8**	1	**<0.1**
(9 registries)	2005–2009	1943	**84.4**	359	**15.6**	–	–	–	–	236	**100.0**	–	–	2066	**77.6**	595	**22.4**	–	–
	2010–2014	2107	**87.4**	303	**12.6**	2	**0.1**	–	–	248	**100.0**	–	–	2265	**80.4**	551	**19.6**	2	**0.1**
United Kingdom*	2000–2004	27,799	**86.8**	4044	**12.6**	173	**0.5**	–	–	1581	**94.8**	86	**5.2**	28,379	**82.8**	5625	**16.4**	259	**0.8**
(4 registries)	2005–2009	30,476	**84.3**	5585	**15.4**	92	**0.3**	–	–	1659	**97.0**	51	**3.0**	31,429	**81.0**	7244	**18.7**	143	**0.4**
	2010–2014	33,653	**81.5**	7084	**17.2**	531	**1.3**	–	–	1896	**98.7**	25	**1.3**	35,519	**78.8**	8980	**19.9**	556	**1.2**
OCEANIA																			
Australia*	2000–2004	7272	**81.2**	1506	**16.8**	181	**2.0**	–	–	407	**99.0**	4	**1.0**	7518	**78.2**	1913	**19.9**	185	**1.9**
(8 registries)	2005–2009	8981	**81.7**	1777	**16.2**	236	**2.1**	–	–	383	**99.2**	3	**0.8**	9405	**79.7**	2160	**18.3**	239	**2.0**
	2010–2014	9177	**84.5**	1590	**14.6**	94	**0.9**	–	–	263	**97.0**	8	**3.0**	9944	**83.6**	1853	**15.6**	102	**0.9**
New Zealand*	2000–2004	667	**45.9**	782	**53.8**	4	**0.3**	–	–	–	–	–	–	703	**47.2**	782	**52.5**	4	**0.3**
	2005–2009	860	**46.6**	982	**53.3**	2	**0.1**	–	–	–	–	–	–	903	**47.9**	982	**52.0**	2	**0.1**
	2010–2014	1055	**47.6**	1162	**52.4**	–	–	–	–	–	–	–	–	1157	**49.9**	1162	**50.1**	–	–

* Data with 100% coverage of the national population.

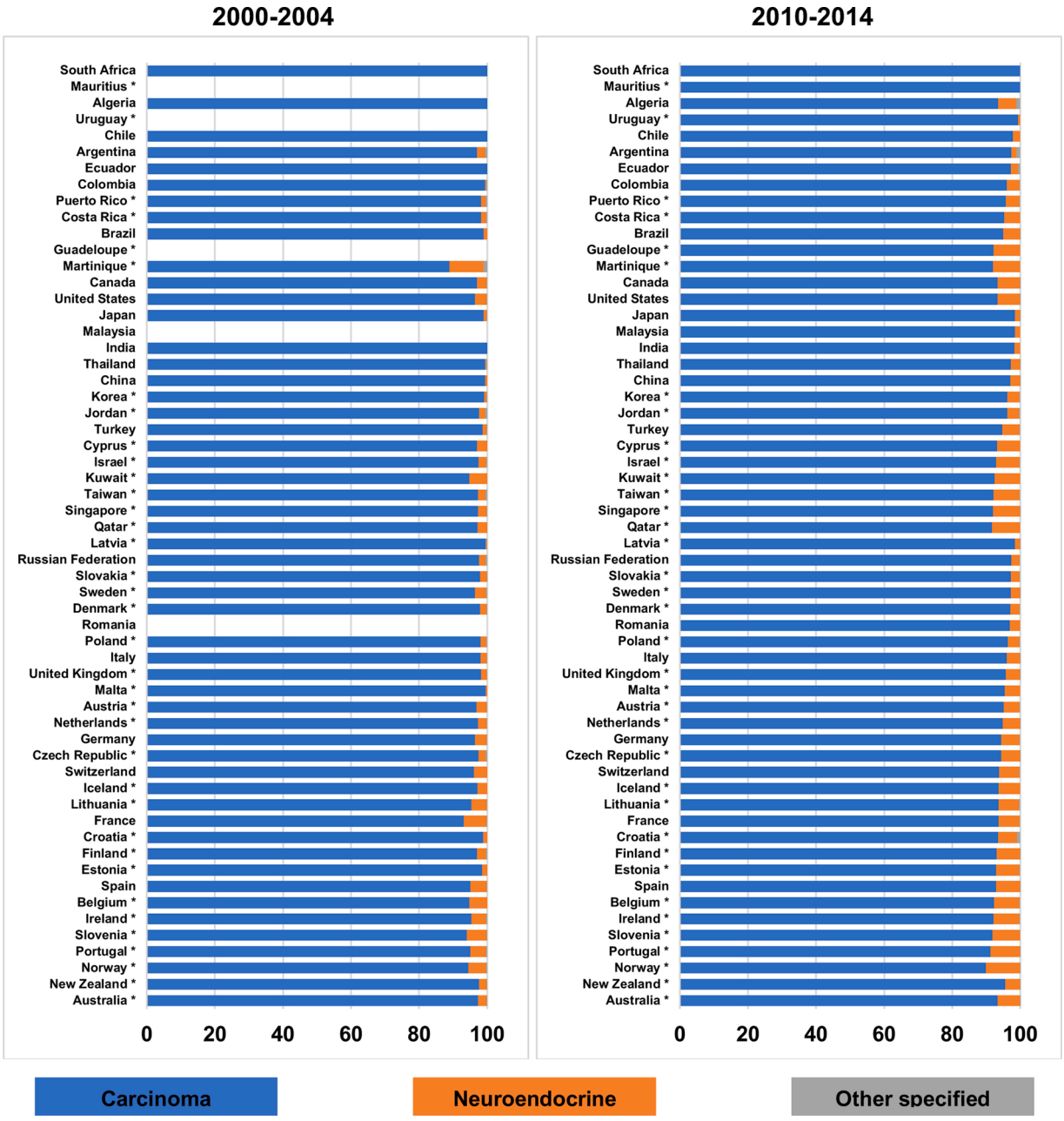

Fig. 1. Distribution (%) of morphological sub-type by calendar period (2000–2004 and 2010–2014) and country: adults (15–99 years) diagnosed with pancreatic cancer. * Data with 100% coverage of the national population.

3.2. Neuroendocrine tumours

Age-standardised one-year net survival from neuroendocrine tumours was much higher than that of carcinomas, ranging from 40–80% (Table 5, Fig. 5). During 2010–2014, one-year survival was highest in Switzerland (83.7%, 95% CI: 77.2–90.2%), and lowest in China (29.8%, 24.4–35.2%). Improvements in one-year survival were also greater than those of carcinomas, increasing less than 5% in six countries (Korea and Turkey; and France, Germany, Italy and Portugal), 5–10% Ireland and Taiwan, and more than 10% in 12 countries (Canada and the United States; nine countries in Europe; and Australia). Four countries (China; Belgium, Finland and Poland) showed small decreases in one-year survival over time.

Age-standardised five-year survival from neuroendocrine tumours was also much higher than that of carcinomas, in the range 20–50% (Table 6, Fig. 6). The highest five-year survival for adults diagnosed during 2010–2014 was in Slovakia (75.0%, 95% CI: 58.4–91.5%) and the lowest survival was in China (18.4%, 13.6–23.2%). There were large improvements in five-year survival from neuroendocrine tumours in most countries: survival increased 10–15% in eight countries (Canada; Taiwan; and six countries in Europe) and more than 15% in six countries (United States; Finland, Netherlands, Slovakia and the United Kingdom; and Australia), while it decreased only in Belgium, China and Denmark. There was wide variation world-wide in age-standardised five-year survival from neuroendocrine tumours (Fig. 4).

3.3. Other specified morphologies

Age-standardised one-year net survival from tumours of other specified morphologies could only be estimated for the United States (Table 5) due to small numbers. In 2010–2014, one-year survival from these tumours (60.7%, 95% CI: 53.9–67.5%) was slightly lower than

Table 4
Number and proportion of tumours with known morphological sub-type, by country and calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014): adults (15–99 years) diagnosed with pancreatic cancer.

	Period of diagnosis	Carcinomas		Neuroendocrine		Other specific		Total
		No.	%	No.	%	No.	%	No.
AFRICA								
Algeria	2000–2004	22	**100.0**	–	–	–	–	22
(3 registries)	2005–2009	99	**98.0**	1	**1.0**	1	**1.0**	101
	2010–2014	85	**93.4**	5	**5.5**	1	**1.1**	91
Mauritius*	2000–2004	–	–	–	–	–	–	–
	2005–2009	–	–	–	–	–	–	–
	2010–2014	45	**100.0**	–	–	–	–	45
South Africa (Eastern Cape)	2000–2004	21	**100.0**	–	–	–	–	21
	2005–2009	22	**100.0**	–	–	–	–	22
	2010–2014	19	**100.0**	–	–	–	–	19
AMERICA (CENTRAL AND SOUTH)								
Argentina	2000–2004	167	**97.1**	4	**2.3**	1	**0.6**	172
(3 registries)	2005–2009	720	**97.4**	17	**2.3**	2	**0.3**	739
	2010–2014	535	**97.4**	8	**1.5**	6	**1.1**	549
Brazil	2000–2004	2247	**98.9**	25	**1.1**	–	–	2272
(6 registries)	2005–2009	1938	**97.0**	57	**2.9**	2	**0.1**	1997
	2010–2014	1358	**95.0**	69	**4.8**	2	**0.1**	1429
Chile	2000–2004	89	**100.0**	–	–	–	–	89
(4 registries)	2005–2009	401	**98.0**	8	**2.0**	–	–	409
	2010–2014	138	**97.9**	3	**2.1**	–	–	141
Colombia	2000–2004	335	**99.4**	1	**0.3**	1	**0.3**	337
(3 registries)	2005–2009	428	**98.2**	7	**1.6**	1	**0.2**	436
	2010–2014	437	**96.0**	17	**3.7**	1	**0.2**	455
Costa Rica*	2000–2004	286	**98.3**	4	**1.4**	1	**0.3**	291
	2005–2009	452	**96.8**	15	**3.2**	–	–	467
	2010–2014	410	**95.3**	20	**4.7**	–	–	430
Ecuador	2000–2004	202	**100.0**	–	–	–	–	202
(5 registries)	2005–2009	399	**97.8**	8	**2.0**	1	**0.2**	408
	2010–2014	446	**97.2**	10	**2.2**	3	**0.7**	459
Guadeloupe (France)*	2000–2004	–	–	–	–	–	–	–
	2005–2009	48	**92.3**	3	**5.8**	1	**1.9**	52
	2010–2014	106	**92.2**	9	**7.8**	–	–	115
Martinique (France)*	2000–2004	89	**89.0**	10	**10.0**	1	**1.0**	100
	2005–2009	106	**93.0**	8	**7.0**	–	–	114
	2010–2014	80	**92.0**	7	**8.0**	–	–	87
Puerto Rico*	2000–2004	612	**98.2**	8	**1.3**	3	**0.5**	623
	2005–2009	786	**95.2**	36	**4.4**	4	**0.5**	826
	2010–2014	512	**95.7**	22	**4.1**	1	**0.2**	535
Uruguay*	2000–2004	–	–	–	–	–	–	–
	2005–2009	608	**98.5**	7	**1.1**	2	**0.3**	617
	2010–2014	954	**99.4**	6	**0.6**	–	–	960
AMERICA (NORTH)								
Canada	2000–2004	15,587	**97.0**	468	**2.9**	15	**0.1**	16,070
(10 registries)	2005–2009	17,812	**96.2**	678	**3.7**	19	**0.1**	18,509
	2010–2014	17,401	**93.4**	1215	**6.5**	23	**0.1**	18,639
United States	2000–2004	127,597	**96.4**	4593	**3.5**	199	**0.2**	132,389
(49 registries)	2005–2009	148,016	**95.4**	6952	**4.5**	178	**0.1**	155,146
	2010–2014	132,989	**93.3**	9413	**6.6**	194	**0.1**	142,596
ASIA								
China	2000–2004	2389	**99.4**	14	**0.6**	–	–	2403
(21 registries)	2005–2009	7813	**98.2**	140	**1.8**	–	–	7953
	2010–2014	8501	**97.1**	245	**2.8**	8	**0.1**	8754
Cyprus*	2000–2004	32	**97.0**	1	**3.0**	–	–	33
	2005–2009	196	**95.1**	10	**4.9**	–	–	206
	2010–2014	275	**93.2**	20	**6.8**	–	–	295

(*continued on next page*)

Table 4 (*continued*)

	Period of diagnosis	Carcinomas		Neuroendocrine		Other specific		Total
		No.	%	No.	%	No.	%	No.
India (Karunagappally)	2000–2004	27	**100.0**	–	–	–	–	27
	2005–2009	50	**100.0**	–	–	–	–	50
	2010–2014	56	**98.2**	1	**1.8**	–	–	57
Israel*	2000–2004	2494	**97.4**	60	**2.3**	6	**0.2**	2560
	2005–2009	2701	**95.9**	111	**3.9**	5	**0.2**	2817
	2010–2014	2512	**92.8**	189	**7.0**	5	**0.2**	2706
Japan	2000–2004	14,277	**98.9**	142	**1.0**	13	**0.1**	14,432
(16 registries)	2005–2009	31,852	**98.9**	339	**1.1**	29	**0.1**	32,220
	2010–2014	26,668	**98.5**	404	**1.5**	15	**0.1**	27,087
Jordan*	2000–2004	167	**97.7**	3	**1.8**	1	**0.6**	171
	2005–2009	270	**96.1**	10	**3.6**	1	**0.4**	281
	2010–2014	481	**96.2**	17	**3.4**	2	**0.4**	500
Korea*	2000–2004	13,904	**99.1**	113	**0.8**	19	**0.1**	14,036
	2005–2009	19,161	**98.7**	238	**1.2**	23	**0.1**	19,422
	2010–2014	24,920	**96.2**	935	**3.6**	44	**0.2**	25,899
Kuwait*	2000–2004	54	**94.7**	3	**5.3**	–	–	57
	2005–2009	91	**100.0**	–	–	–	–	91
	2010–2014	85	**92.4**	7	**7.6**	–	–	92
Malaysia (Penang)	2000–2004	–	–	–	–	–	–	–
	2005–2009	157	**96.3**	5	**3.1**	1	**0.6**	163
	2010–2014	183	**98.4**	3	**1.6**	–	–	186
Qatar*	2000–2004	35	**97.2**	1	**2.8**	–	–	36
	2005–2009	52	**98.1**	1	**1.9**	–	–	53
	2010–2014	89	**91.8**	8	**8.2**	–	–	97
Singapore*	2000–2004	675	**97.3**	18	**2.6**	1	**0.1**	694
	2005–2009	760	**95.7**	33	**4.2**	1	**0.1**	794
	2010–2014	1153	**92.0**	99	**7.9**	1	**0.1**	1253
Taiwan*	2000–2004	3346	**97.3**	77	**2.2**	15	**0.4**	3438
	2005–2009	4555	**96.1**	176	**3.7**	8	**0.2**	4739
	2010–2014	6310	**92.1**	526	**7.7**	18	**0.3**	6854
Thailand	2000–2004	728	**99.5**	2	**0.3**	2	**0.3**	732
(6 registries)	2005–2009	1350	**99.0**	13	**1.0**	1	**0.1**	1364
	2010–2014	1155	**97.2**	32	**2.7**	1	**0.1**	1188
Turkey	2000–2004	649	**98.6**	8	**1.2**	1	**0.2**	658
(9 registries)	2005–2009	2944	**96.7**	95	**3.1**	6	**0.2**	3045
	2010–2014	3447	**94.6**	189	**5.2**	6	**0.2**	3642
EUROPE								
Austria*	2000–2004	5257	**96.9**	164	**3.0**	4	**0.1**	5425
	2005–2009	5895	**96.4**	214	**3.5**	7	**0.1**	6116
	2010–2014	6493	**95.1**	324	**4.7**	13	**0.2**	6830
Belgium*	2000–2004	1010	**94.8**	55	**5.2**	–	–	1065
	2005–2009	5600	**93.8**	358	**6.0**	12	**0.2**	5970
	2010–2014	7367	**92.3**	601	**7.5**	12	**0.2**	7980
Croatia*	2000–2004	1608	**98.8**	19	**1.2**	–	–	1627
	2005–2009	1630	**97.1**	43	**2.6**	5	**0.3**	1678
	2010–2014	1408	**93.5**	84	**5.6**	14	**0.9**	1506
Czech Republic*	2000–2004	3870	**97.5**	82	**2.1**	19	**0.5**	3971
	2005–2009	4533	**95.1**	221	**4.6**	12	**0.3**	4766
	2010–2014	5601	**94.3**	332	**5.6**	6	**0.1**	5939
Denmark*	2000–2004	3806	**98.0**	74	**1.9**	5	**0.1**	3885
	2005–2009	4434	**97.7**	98	**2.2**	5	**0.1**	4537
	2010–2014	4712	**97.0**	136	**2.8**	9	**0.2**	4857
Estonia*	2000–2004	455	**98.5**	7	**1.5**	–	–	462
	2005–2009	494	**95.9**	19	**3.7**	2	**0.4**	515
	2010–2014	365	**92.9**	27	**6.9**	1	**0.3**	393

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Table 4 (*continued*)

	Period of diagnosis	Carcinomas		Neuroendocrine		Other specific		Total
		No.	%	No.	%	No.	%	No.
Finland*	2000–2004	2440	**97.0**	69	**2.7**	6	**0.2**	2515
	2005–2009	2810	**94.5**	158	**5.3**	5	**0.2**	2973
	2010–2014	3010	**93.1**	222	**6.9**	2	**0.1**	3234
France	2000–2004	2985	**93.2**	213	**6.7**	5	**0.2**	3203
(15 registries)	2005–2009	5474	**92.9**	403	**6.8**	15	**0.3**	5892
	2010–2014	1424	**93.6**	95	**6.2**	3	**0.2**	1522
Germany	2000–2004	11,159	**96.4**	403	**3.5**	19	**0.2**	11,581
(10 registries)	2005–2009	18,151	**96.0**	727	**3.8**	34	**0.2**	18,912
	2010–2014	18,063	**94.4**	1038	**5.4**	31	**0.2**	19,132
Iceland*	2000–2004	140	**97.2**	4	**2.8**	–	–	144
	2005–2009	146	**99.3**	1	**0.7**	–	–	147
	2010–2014	178	**93.7**	12	**6.3**	–	–	190
Ireland*	2000–2004	825	**95.4**	38	**4.4**	2	**0.2**	865
	2005–2009	1339	**94.6**	72	**5.1**	5	**0.4**	1416
	2010–2014	1332	**92.2**	110	**7.6**	3	**0.2**	1445
Italy	2000–2004	17,840	**98.1**	334	**1.8**	15	**0.1**	18,189
(44 registries)	2005–2009	26,691	**97.3**	710	**2.6**	19	**0.1**	27,420
	2010–2014	10,656	**96.1**	424	**3.8**	9	**0.1**	11,089
Latvia*	2000–2004	1485	**99.5**	6	**0.4**	1	**0.1**	1492
	2005–2009	1465	**98.5**	20	**1.3**	2	**0.1**	1487
	2010–2014	1727	**98.5**	26	**1.5**	1	**0.1**	1754
Lithuania*	2000–2004	974	**95.4**	45	**4.4**	2	**0.2**	1021
	2005–2009	1228	**95.3**	56	**4.3**	4	**0.3**	1288
	2010–2014	696	**93.7**	44	**5.9**	3	**0.4**	743
Malta*	2000–2004	206	**99.5**	1	**0.5**	–	–	207
	2005–2009	212	**97.7**	5	**2.3**	–	–	217
	2010–2014	272	**95.4**	13	**4.6**	–	–	285
Netherlands*	2000–2004	7424	**97.4**	191	**2.5**	11	**0.1**	7626
	2005–2009	9311	**96.2**	350	**3.6**	15	**0.2**	9676
	2010–2014	10,817	**94.8**	591	**5.2**	7	**0.1**	11,415
Norway*	2000–2004	1813	**94.5**	101	**5.3**	5	**0.3**	1919
	2005–2009	2115	**93.9**	136	**6.0**	2	**0.1**	2253
	2010–2014	2246	**89.9**	251	**10.0**	2	**0.1**	2499
Poland*	2000–2004	5398	**98.1**	91	**1.7**	13	**0.2**	5502
(16 registries)	2005–2009	8071	**96.7**	262	**3.1**	15	**0.2**	8348
	2010–2014	10,108	**96.3**	364	**3.5**	24	**0.2**	10,496
Portugal*	2000–2004	1566	**95.0**	78	**4.7**	4	**0.2**	1648
(4 registries)	2005–2009	2591	**94.1**	155	**5.6**	8	**0.3**	2754
	2010–2014	2062	**91.2**	196	**8.7**	3	**0.1**	2261
Romania (Cluj)	2000–2004	–	–	–	–	–	–	–
	2005–2009	254	**94.8**	14	**5.2**	–	–	268
	2010–2014	286	**96.9**	9	**3.1**	–	–	295
Russian Federation	2000–2004	763	**97.6**	16	**2.0**	3	**0.4**	782
(5 registries)	2005–2009	1752	**98.4**	22	**1.2**	6	**0.3**	1780
	2010–2014	2617	**97.4**	66	**2.5**	5	**0.2**	2688
Slovakia*	2000–2004	2239	**97.9**	46	**2.0**	1	**<0.1**	2286
	2005–2009	3412	**97.8**	74	**2.1**	3	**0.1**	3489
	2010–2014	826	**97.3**	21	**2.5**	2	**0.2**	849
Slovenia*	2000–2004	596	**94.0**	37	**5.8**	1	**0.2**	634
	2005–2009	789	**93.4**	54	**6.4**	2	**0.2**	845
	2010–2014	652	**91.8**	58	**8.2**	–	–	710
Spain	2000–2004	2752	**95.1**	138	**4.8**	4	**0.1**	2894
(9 registries)	2005–2009	3472	**96.0**	144	**4.0**	1	**<0.1**	3617
	2010–2014	2305	**92.9**	174	**7.0**	3	**0.1**	2482
Sweden*	2000–2004	4090	**96.4**	142	**3.3**	9	**0.2**	4241
	2005–2009	4227	**97.1**	123	**2.8**	4	**0.1**	4354
	2010–2014	5487	**97.2**	155	**2.7**	3	**0.1**	5645

(*continued on next page*)

Table 4 (*continued*)

	Period of diagnosis	Carcinomas		Neuroendocrine		Other specific		Total
		No.	%	No.	%	No.	%	No.
Switzerland	2000–2004	1873	**96.1**	76	**3.9**	–	–	1949
(9 registries)	2005–2009	2302	**94.9**	119	**4.9**	4	**0.2**	2425
	2010–2014	2412	**93.9**	153	**6.0**	5	**0.2**	2570
United Kingdom*	2000–2004	32,016	**98.2**	547	**1.7**	33	**0.1**	32,596
(4 registries)	2005–2009	36,153	**97.4**	911	**2.5**	42	**0.1**	37,106
	2010–2014	41,268	**95.7**	1829	**4.2**	37	**0.1**	43,134
OCEANIA								
Australia*	2000–2004	8959	**97.3**	232	**2.5**	14	**0.2**	9205
(8 registries)	2005–2009	10,994	**96.3**	409	**3.6**	15	**0.1**	11,418
	2010–2014	10,861	**93.4**	755	**6.5**	12	**0.1**	11,628
New Zealand*	2000–2004	1453	**97.6**	35	**2.4**	1	**0.1**	1489
	2005–2009	1844	**97.7**	41	**2.2**	2	**0.1**	1887
	2010–2014	2217	**95.6**	101	**4.4**	1	**<0.1**	2319

* Data with 100% coverage of the national population.

that of neuroendocrine tumours but much higher than survival for carcinomas.

As for one-year survival, age-standardised five-year survival from tumours of other specified morphologies could only be estimated for the United States (Table 6). Five-year survival (41.5%, 95% CI: 34.0–49.1%) followed a similar pattern as one-year survival, with survival lower than that of neuroendocrine tumours but much higher than that of carcinomas. Improvements in one- and five-year survival were similar, showing a 15% increase over time.

3.4. Unknown morphology

Age-standardised one-year net survival from tumours with unknown morphology was the lowest of all morphological sub-types, ranging from 10% to 20% (Table 5). One-year survival was highest in Turkey (18.3%, 95% CI: 10.4–26.2%) and lowest in Slovenia(7.8%, 5.4–10.1%). One-year survival from tumours with unknown morphology decreased over time in 9 countries and increases in one-year survival were generally less than 5%.

Age-standardised five-year net survival from tumours with unknown morphology followed a similar pattern as one-year survival (Table 6). Five-year survival was generally similar to or lower than five-year survival for carcinomas, in the range 0–10%. Five-year survival was highest in Turkey (14.1%, 95% Ci: 7.0–21.1%) and lowest in the United Kingdom (2.2%, 0.9–3.5%). Unlike one-year survival, five-year survival for tumours of unknown morphology was slightly higher than that of carcinomas in Poland, Taiwan and Turkey. Five-year survival increased in only 5 countries, with an improvement of less than 5% in each country.

4. Discussion

Including high-quality data from 295 population-based cancer registries in 58 countries, this is to our knowledge the largest study examining trends in pancreatic cancer survival by morphological sub-type to date. Net survival estimates were produced using the same protocol for data collection, the same stringent three-phase data quality control procedures, the same robust methods for each registry, and life tables of background mortality that were specific to single year of age, sex, race/ethnicity (where possible), country and the calendar year of death.

The results from these analyses show that survival from carcinomas of the pancreas remains poor in many countries world-wide, despite some improvement during the 15-year period from 2000 to 2014. Survival from neuroendocrine tumours was much higher and there were larger improvements in survival over time for this sub-type.

The distribution of known morphological sub-types changed over time, with the proportion of carcinomas decreasing and the proportion of neuroendocrine tumours increasing in the majority of countries. This result is in contrast to previous studies that have reported an increase in the incidence of both pancreatic carcinomas and pancreatic neuroendocrine tumours, which would result in the distribution of the morphological sub-types remaining the same over time [5,8,10]. This difference can be explained by the inclusion of all tumours, regardless of morphological verification, in our study. Though morphological verification of pancreatic tumours remains low relative to other solid tumours, the proportion of tumours that are morphologically verified increased by 10% or more in 20 of the 58 countries. Previous studies examining the incidence of carcinomas excluded non-morphologically verified tumours, thus, the increase in the incidence of carcinomas is likely due to the increase over time in the proportion of tumours morphologically verified [5,8,10].

Additionally, the proportion of tumours with unknown morphology decreased in 21 of the 27 countries that registered tumours of this subtype. When tumours of unknown morphology were present in the distribution, a decrease in the proportion of unknown morphology generally corresponded to an increase in the proportion of both carcinomas and neuroendocrine tumours over time (Supplementary Table 2). This is in line with results from other studies showing increases in incidence for both carcinomas and neuroendocrine tumours – as the proportion of tumours morphologically verified increases over time, the proportion of unknown morphology decreases resulting in increases in both carcinomas and neuroendocrine tumours [5,8,10].

CONCORD-3 showed a high age-standardised five-year net survival for all pancreatic tumours combined in Kuwait (23.6%, 95% CI: 12.0–35.2%) and Malaysia (19.0%, 12.0–26.0%), during 2010–2014 [7]. Kuwait had a higher proportion of neuroendocrine tumours (7.6%) than many other countries, but also showed a relatively high five-year survival from carcinomas (21.0%, 9.7–32.4%). Additionally, the distribution of morphological sub-types does not explain the higher survival for all morphologies combined in Malaysia (1.6% neuroendocrine).

There is little international variation in survival from carcinomas, while the international variation from pancreatic neuroendocrine tumours is wider. Furthermore, there is no clear geographical pattern in survival for the different morphological sub-types. Some countries, such as the United States, Korea, Portugal and Italy have higher survival than other countries in the same continent for each morphological sub-type.

Table 5
Age-standardised one-year net survival (NS, %): adults (15–99 years) diagnosed with pancreatic cancer by morphological sub-type, country and calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014).

	Period of diagnosis	Carcinoma					Neuroendocrine					Other specified					Unknown				
		NS (%)		95% CI			NS (%)		95% CI			NS (%)	95% CI				NS (%)		95% CI		
AFRICA																					
Algeria	2000–2004				–					–				–						–	
(3 registries)	2005–2009	*53.0*	§	*42.5*	–	*63.4*				–				–						–	
	2010–2014	**46.9**	§	35.0	–	58.8				–				–						–	
Mauritius*	2000–2004				–					–				–						–	
	2005–2009				–					–				–						–	
	2010–2014				–					–				–						–	
South Africa (Eastern Cape)	2000–2004				–					–				–						–	
	2005–2009				–					–				–						–	
	2010–2014				–					–				–						–	
AMERICA (CENTRAL AND SOUTH)																					
Argentina	2000–2004	**20.1**	§	14.3	–	25.9				–				–			*38.5*	§	*20.3*	–	*56.8*
(3 registries)	2005–2009	**21.9**	§	18.9	–	25.0				–				–			*18.1*	§	*10.9*	–	*25.2*
	2010–2014	**27.3**	§	23.3	–	31.3				–				–			*24.0*	§	*13.7*	–	*34.4*
Brazil	2000–2004	**13.7**	§	12.2	–	15.2	*63.6*	§	*42.5*	–	*84.8*			–						–	
(6 registries)	2005–2009	**30.4**	§	28.0	–	32.9	*72.7*	§	*59.2*	–	*86.2*			–						–	
	2010–2014	**30.5**	§	27.8	–	33.2	*91.6*	§	*84.0*	–	*99.2*			–						–	
Chile	2000–2004	**21.1**		12.4	–	29.8				–				–						–	
(4 registries)	2005–2009	**8.9**		4.7	–	13.0				–				–						–	
	2010–2014	*13.8*		*6.7*	–	*20.9*				–				–						–	
Colombia	2000–2004	**18.8**	§	14.0	–	23.5				–				–						–	
(3 registries)	2005–2009	**15.2**		11.4	–	19.0				–				–						–	
	2010–2014	**18.0**	§	13.7	–	22.3	*64.1*	§	*39.4*	–	*88.7*			–						–	
Costa Rica*	2000–2004	**40.6**	§	34.6	–	46.6				–				–						–	
	2005–2009	**29.0**	§	24.5	–	33.5	*77.1*	§	*55.1*	–	*99.1*			–						–	
	2010–2014	**30.8**	§	26.1	–	35.6	*80.2*	§	*63.1*	–	*97.2*			–						–	
Ecuador	2000–2004	**21.2**	§	16.0	–	26.4				–				–						–	
(5 registries)	2005–2009	**18.8**	§	15.0	–	22.6				–				–						–	
	2010–2014	**18.4**	§	14.8	–	22.1	*79.2*	§	*54.4*	–	*100.0*			–						–	
Guadeloupe (France)*	2000–2004				–					–				–						–	
	2005–2009	*32.3*	§	*18.3*	–	*46.3*				–				–						–	
	2010–2014				–					–				–						–	
Martinique (France)*	2000–2004	**22.9**		15.0	–	30.7	*70.5*		*43.6*	–	*97.4*			–			*23.2*		*9.8*	–	*36.7*
	2005–2009	**28.7**		21.2	–	36.3				–				–			*18.0*		*9.6*	–	*26.3*
	2010–2014	*28.4*		*18.2*	–	*38.5*				–				–			*26.3*		*14.4*	–	*38.3*
Puerto Rico*	2000–2004	**23.4**	§	20.0	–	26.9				–				–						–	
	2005–2009	**19.0**	§	16.3	–	21.7	*73.5*	§	*58.9*	–	*88.1*			–						–	
	2010–2014	**23.0**	§	19.3	–	26.8	*77.4*	§	*59.4*	–	*95.4*			–						–	
Uruguay*	2000–2004				–					–				–						–	
	2005–2009	**15.8**	§	13.0	–	18.7				–				–						–	
	2010–2014	**16.9**	§	14.4	–	19.4				–				–						–	
AMERICA (NORTH)																					
Canada	2000–2004	**21.9**		21.2	–	22.6	**63.0**		57.7	–	68.3	*46.9*	*22.8*	–	*71.0*		*9.4*		*5.5*	–	*13.3*
(10 registries)	2005–2009	**23.4**		22.7	–	24.1	**67.7**		63.6	–	71.7	*58.6*	*36.9*	–	*80.3*		*14.2*		*9.7*	–	*18.8*
	2010–2014	**25.8**		25.0	–	26.5	**76.9**		74.1	–	79.7	*71.0*	*51.2*	–	*90.8*		*12.1*		*7.5*	–	*16.7*
United States	2000–2004	**23.9**		23.6	–	24.1	**63.3**		61.8	–	64.9	**45.0**	38.0	–	51.9					–	
(49 registries)	2005–2009	**27.0**		26.7	–	27.2	**69.3**		68.1	–	70.5	**55.8**	48.2	–	63.4					–	
	2010–2014	**31.6**		31.3	–	31.8	**77.2**		76.2	–	78.2	**60.7**	53.9	–	67.5					–	
ASIA																					
China	2000–2004	**26.2**		24.4	–	28.0	*43.0*		*18.4*	–	*67.7*									–	
(21 registries)	2005–2009	**21.8**		20.8	–	22.8	**32.6**		24.6	–	40.6									–	
	2010–2014	**22.5**		21.5	–	23.4	**29.8**		24.4	–	35.2									–	

(*continued on next page*)

Table 5 (*continued*)

	Period of diagnosis	Carcinoma			Neuroendocrine			Other specified			Unknown		
		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI	
Cyprus*	2000–2004	*19.4* §	*6.0* –	*32.7*		–			–			–	
	2005–2009	**32.5** §	26.6 –	38.5	*70.9* §	*43.9* –	*97.9*		–			–	
	2010–2014	**34.0** §	28.4 –	39.7	*82.3* §	*66.4* –	*98.2*		–			–	
India (Karunagappally)	2000–2004	*18.9*	*4.8* –	*33.1*		–			–			–	
	2005–2009	*26.9*	*14.7* –	*39.2*		–			–			–	
	2010–2014	*30.4*	*18.4* –	*42.4*		–			–			–	
Israel*	2000–2004	**31.5** §	29.6 –	33.5	**84.3** §	74.0 –	94.7		–			–	
	2005–2009	**33.4** §	31.4 –	35.3	**77.2** §	68.7 –	85.7		–			–	
	2010–2014	**36.6** §	34.5 –	38.7	**76.1** §	69.0 –	83.2		–			–	
Japan	2000–2004	**27.0** §	26.2 –	27.8	**68.2** §	59.7 –	76.7	*38.8* §	*13.9* –	*63.7*	**16.6** §	14.0 –	19.1
(16 registries)	2005–2009	**34.3** §	33.7 –	35.0	**73.6** §	68.1 –	79.1	*56.4* §	*37.9* –	*75.0*	**21.9** §	19.4 –	24.4
	2010–2014	**36.8** §	36.1 –	37.6	**73.9** §	69.1 –	78.7	*58.9* §	*34.7* –	*83.1*	**23.1** §	20.5 –	25.6
Jordan*	2000–2004	**65.8** §	56.8 –	74.8		–			–			–	
	2005–2009	**46.3** §	39.4 –	53.2	*70.1* §	*43.3* –	*96.8*		–			–	
	2010–2014	**34.1** §	29.4 –	38.8	*74.6* §	*53.3* –	*95.9*		–			–	
Korea*	2000–2004	**23.0**	22.3 –	23.7	**70.3**	61.9 –	78.6	*32.1*	*12.3* –	*51.9*		–	
	2005–2009	**28.7**	28.0 –	29.3	**70.2**	64.5 –	75.9	*48.4*	*28.4* –	*68.4*		–	
	2010–2014	**32.6**	32.0 –	33.2	**74.4**	70.0 –	78.9	*53.2*	*38.2* –	*68.2*		–	
Kuwait*	2000–2004	*23.6* §	*12.2* –	*35.0*		–			–			–	
	2005–2009	**24.3**	17.0 –	31.5		–			–			–	
	2010–2014	**40.3**	29.6 –	51.1		–			–			–	
Malaysia (Penang)	2000–2004		–			–			–			–	
	2005–2009	**28.0**	21.3 –	34.7		–			–			–	
	2010–2014	**30.9**	24.1 –	37.6		–			–			–	
Qatar*	2000–2004	*19.1* §	*3.7* –	*34.4*		–			–			–	
	2005–2009	*30.6* §	*15.7* –	*45.6*		–			–			–	
	2010–2014	**48.2** §	37.8 –	58.6		–			–			–	
Singapore*	2000–2004	**18.6**	15.7 –	21.6	*51.3*	*28.7* –	*73.8*		–		*16.5*	*9.8* –	*23.1*
	2005–2009	**27.6**	24.5 –	30.8	*73.6*	*58.5* –	*88.7*		–		*10.4*	*7.0* –	*13.9*
	2010–2014	**31.4**	28.6 –	34.2	**70.7**	62.0 –	79.3		–		*9.7*	*6.4* –	*13.0*
Taiwan*	2000–2004	**24.6**	23.1 –	26.0	*68.2*	*57.7* –	*78.7*	*47.9*	*23.6* –	*72.3*	**20.7**	18.7 –	22.7
	2005–2009	**26.6**	25.3 –	27.9	**57.8**	49.5 –	66.1		–		**19.3**	17.4 –	21.2
	2010–2014	**29.4**	28.3 –	30.6	**65.0**	59.8 –	70.2		–		**18.2**	16.3 –	20.1
Thailand	2000–2004	**15.6** §	13.0 –	18.2		–			–			–	
(6 registries)	2005–2009	**22.7**	20.4 –	25.1	*74.4*	*49.0* –	*99.9*		–			–	
	2010–2014	**16.6**	14.5 –	18.8	*66.1*	*49.7* –	*82.5*		–			–	
Turkey	2000–2004	**30.8** §	26.3 –	35.3		–			–			–	
(9 registries)	2005–2009	**26.9**	25.2 –	28.5	**59.6**	46.9 –	72.3		–		*20.7*	*12.9* –	*28.4*
	2010–2014	**29.3**	27.8 –	30.8	**63.8**	53.1 –	74.5		–		**18.3**	10.4 –	26.2
EUROPE													
Austria*	2000–2004	**24.1** §	22.8 –	25.4	**55.1** §	47.3 –	62.8		–			–	
	2005–2009	**30.1**	28.8 –	31.4	**57.3**	50.6 –	63.9		–			–	
	2010–2014	**34.1** §	32.8 –	35.4	**64.6** §	59.3 –	69.8	*61.2* §	*35.2* –	*87.2*		–	
Belgium*	2000–2004	**29.4**	26.5 –	32.4	*85.2*	*75.0* –	*95.3*		–			–	
	2005–2009	**33.3**	31.9 –	34.6	**82.2**	77.4 –	87.0	*51.2*	*24.0* –	*78.3*		–	
	2010–2014	**35.8**	34.5 –	37.1	**81.8**	78.3 –	85.3	*57.0*	*29.2* –	*84.8*		–	
Croatia*	2000–2004	**17.2**	15.3 –	19.0	*69.5*	*49.0* –	*90.0*		–		**21.7**	19.1 –	24.2
	2005–2009	**16.4**	14.5 –	18.3	*40.1*	*25.5* –	*54.8*		–		**21.8**	19.2 –	24.4
	2010–2014	**21.3** §	18.9 –	23.6	**43.7** §	33.4 –	54.1	*19.6* §	*0.0* –	*39.2*	**18.7** §	16.3 –	21.1
Czech Republic*	2000–2004	**15.1**	14.0 –	16.3	**35.4**	27.0 –	43.7	*42.6*	*21.4* –	*63.9*	**10.8**	9.5 –	12.2
	2005–2009	**19.7**	18.5 –	20.9	**36.1**	30.2 –	42.0		–		**9.9**	8.7 –	11.0
	2010–2014	**25.5**	24.2 –	26.8	**56.2**	50.5 –	61.9		–		**9.5**	8.2 –	10.8
Denmark*	2000–2004	**15.1**	13.8 –	16.4	**47.7**	37.5 –	58.0		–			–	
	2005–2009	**19.7**	18.4 –	21.1	**53.1**	43.7 –	62.5		–			–	
	2010–2014	**27.1**	25.7 –	28.6	**58.4**	49.9 –	66.8		–			–	

(*continued on next page*)

Table 5 (*continued*)

	Period of diagnosis	Carcinoma				Neuroendocrine				Other specified				Unknown			
		NS (%)	95% CI			NS (%)	95% CI			NS (%)	95% CI			NS (%)	95% CI		
Estonia*	2000–2004	**16.0**	12.7	–	19.4			–				–		**18.7**	14.7	–	22.7
	2005–2009	**22.7**	19.2	–	26.1	*75.6*	*56.0*	–	*95.2*			–		**13.8**	10.6	–	17.0
	2010–2014	**30.8**	26.1	–	35.6	*89.2*	*75.8*	–	*100.0*			–		**22.0**	16.7	–	27.3
Finland*	2000–2004	**23.3**	21.5	–	25.1	**65.8**	54.8	–	76.8			–		**13.6**	10.9	–	16.3
	2005–2009	**26.8**	24.9	–	28.7	**65.4**	57.3	–	73.5			–		**13.3**	10.9	–	15.8
	2010–2014	**26.9** §	25.0	–	28.7	**67.2** §	60.9	–	73.5			–		*12.3* §	*10.5*	–	*14.1*
France	2000–2004	**31.4**	29.6	–	33.1	**71.4**	64.2	–	78.7			–		**17.6**	15.2	–	20.0
(15 registries)	2005–2009	**34.4**	33.1	–	35.8	**70.9**	66.2	–	75.6			–		**20.2**	17.8	–	22.6
	2010–2014	**36.2**	33.5	–	38.9	**73.8**	64.4	–	83.3			–		**16.2**	11.9	–	20.4
Germany	2000–2004	**30.0** §	29.1	–	30.9	**63.7** §	58.3	–	69.2	*64.8* §	*43.5*	–	*86.1*	**20.2** §	18.1	–	22.2
(10 registries)	2005–2009	**32.8**	31.2	–	34.3	**63.8**	57.4	–	70.3			–		**14.5**	12.0	–	17.0
	2010–2014	**35.9**	34.1	–	37.6	**66.1**	59.8	–	72.5			–		**16.6**	12.9	–	20.4
Iceland*	2000–2004	**21.0**	14.8	–	27.2			–				–				–	
	2005–2009	**20.4**	14.0	–	26.8			–				–				–	
	2010–2014	*25.6*	*19.3*	–	*31.9*	*65.2*	*38.5*	–	*91.9*			–				–	
Ireland*	2000–2004	**16.8**	14.2	–	19.3	*61.7*	*46.2*	–	*77.3*			–		**15.0**	11.2	–	18.7
	2005–2009	**23.5**	21.2	–	25.8	**65.1**	54.0	–	76.1			–		**9.7**	6.6	–	12.8
	2010–2014	**27.6**	24.9	–	30.2	**72.7**	63.5	–	82.0			–		**16.7**	11.9	–	21.5
Italy	2000–2004	**25.0**	24.2	–	25.7	**72.2**	66.8	–	77.6	*53.7*	*29.4*	–	*77.9*			–	
(44 registries)	2005–2009	**27.5**	26.8	–	28.1	**72.1**	68.4	–	75.9	*63.4*	*42.1*	–	*84.7*			–	
	2010–2014	**29.5**	28.5	–	30.5	**75.4**	70.7	–	80.0			–				–	
Latvia*	2000–2004	**14.8**	12.9	–	16.7			–				–				–	
	2005–2009	**18.1**	16.0	–	20.2	*65.9*	*45.3*	–	*86.6*			–				–	
	2010–2014	**18.8**	16.8	–	20.9	*67.9*	*48.8*	–	*87.1*			–				–	
Lithuania*	2000–2004	**22.9**	20.2	–	25.6	*63.6*	*49.4*	–	*77.9*			–		**15.7**	13.3	–	18.0
	2005–2009	**23.4** §	21.0	–	25.8	*58.1* §	*45.0*	–	*71.1*			–		**13.6** §	10.7	–	16.5
	2010–2014	**28.7** §	25.2	–	32.1	**62.2** §	50.3	–	74.2			–		**14.3** §	10.6	–	18.0
Malta*	2000–2004	**18.7**	13.8	–	23.7			–				–				–	
	2005–2009	**15.4** §	11.0	–	19.9			–				–				–	
	2010–2014	**20.6** §	16.1	–	25.0	*76.7* §	*54.5*	–	*99.0*			–				–	
Netherlands*	2000–2004	**15.1**	14.2	–	15.9	**51.8**	44.6	–	59.0	*55.4*	*26.5*	–	*84.3*			–	
	2005–2009	**17.6**	16.8	–	18.5	**68.2**	62.5	–	73.9	*74.5*	*52.7*	–	*96.3*			–	
	2010–2014	**21.7**	20.8	–	22.6	**72.4**	68.5	–	76.4			–				–	
Norway*	2000–2004	**18.0**	16.2	–	19.8	**59.3**	48.9	–	69.6			–		**6.7**	4.0	–	9.4
	2005–2009	**23.6**	21.7	–	25.5	**65.5**	57.5	–	73.5			–		**15.1**	10.3	–	20.0
	2010–2014	**27.5**	25.6	–	29.5	**74.5**	68.6	–	80.4			–		*6.8*	*5.3*	–	*8.3*
Poland*	2000–2004	**24.8**	23.3	–	26.3	*64.8*	*53.0*	–	*76.7*			–		**21.2**	20.2	–	22.3
(16 registries)	2005–2009	**25.6**	24.6	–	26.7	**69.9**	61.7	–	78.1	*60.9*	*36.9*	–	*84.9*	**21.4**	20.4	–	22.4
	2010–2014	**27.5**	26.5	–	28.5	**65.4**	58.3	–	72.5	*37.7*	*18.2*	–	*57.2*	**17.5**	16.4	–	18.6
Portugal*	2000–2004	**25.0**	22.8	–	27.1	**72.0**	63.0	–	80.9			–		*14.5*	*11.6*	–	*17.5*
(4 registries)	2005–2009	**29.1**	27.3	–	31.0	**63.4**	54.1	–	72.7			–		**20.6**	16.6	–	24.5
	2010–2014	**31.1**	27.2	–	34.9	**75.3**	65.8	–	84.8			–		**13.8**	7.8	–	19.7
Romania (Cluj)	2000–2004			–				–				–				–	
	2005–2009	**19.2** §	14.5	–	23.8	*50.9* §	*25.6*	–	*76.2*			–				–	
	2010–2014			–				–				–				–	
Russian Federation	2000–2004	**17.4**	14.4	–	20.5	*44.2*	*20.9*	–	*67.5*			–		**18.9**	16.8	–	21.0
(5 registries)	2005–2009	**15.7**	13.9	–	17.5	*59.8*	*39.6*	–	*80.1*			–		**13.0**	11.3	–	14.6
	2010–2014	**14.9**	13.5	–	16.4	**60.3**	48.8	–	71.7			–		**8.1**	6.6	–	9.5
Slovakia*	2000–2004	**15.4** §	13.8	–	16.9	*57.2* §	*42.9*	–	*71.5*			–				–	
	2005–2009	**18.9**	17.5	–	20.3	**51.3**	41.1	–	61.4			–				–	
	2010–2014	**16.7**	14.0	–	19.4	**75.9**	60.6	–	91.2			–				–	
Slovenia*	2000–2004	**21.4**	17.9	–	24.8	*57.4*	*41.4*	–	*73.3*			–		**7.9**	5.2	–	10.6
	2005–2009	**27.8**	24.7	–	30.9	*67.4*	*54.7*	–	*80.0*			–		**8.3**	6.1	–	10.4
	2010–2014	**28.4**	24.8	–	32.0	**71.3**	61.0	–	81.7			–		**7.8**	5.4	–	10.1
Spain	2000–2004	**22.0**	20.4	–	23.5	**58.1**	48.9	–	67.4			–		**11.2**	8.7	–	13.7
(9 registries)	2005–2009	**25.2**	23.7	–	26.7	**74.7**	66.9	–	82.6			–		**9.5**	7.4	–	11.7
	2010–2014	**28.9**	26.4	–	31.3	**71.5**	61.3	–	81.7			–		*8.1*	*5.8*	–	*10.3*

(*continued on next page*)

Table 5 (*continued*)

	Period of diagnosis	Carcinoma			Neuroendocrine			Other specified			Unknown		
		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI	
Sweden*	2000–2004	**19.9**	18.5	– 21.2	**62.2**	53.3	– 71.2			–			–
	2005–2009	**25.0**	23.6	– 26.5	**67.7**	59.5	– 75.9			–			–
	2010–2014	**32.3**	30.9	– 33.7	**77.7**	70.1	– 85.2			–			–
Switzerland	2000–2004	**25.9**	23.6	– 28.2	**60.0**	49.2	– 70.8			–	*13.2*	*9.1*	– *17.4*
(9 registries)	2005–2009	**32.1**	30.0	– 34.2	**72.7**	64.6	– 80.8			–	*13.7*	*9.1*	– *18.2*
	2010–2014	**33.8**	31.8	– 35.9	**83.7**	77.2	– 90.2			–	*7.5*	*4.4*	– *10.6*
United Kingdom*	2000–2004	**15.1**	14.6	– 15.5	**59.1**	54.6	– 63.6	36.8	*20.6*	– *52.9*	**10.1**	8.3	– 12.0
(4 registries)	2005–2009	**19.5**	19.0	– 20.0	**64.8**	61.3	– 68.4			–	**11.0**	8.7	– 13.4
	2010–2014	**22.1**	21.6	– 22.6	**73.3**	71.0	– 75.6	*42.6*	*27.0*	– *58.1*	**10.4**	7.8	– 13.1
OCEANIA													
Australia*	2000–2004	**24.4**	23.4	– 25.4	**67.2**	60.3	– 74.0	*43.4*	*18.6*	– *68.2*	**18.4**	13.4	– 23.4
(8 registries)	2005–2009	**27.5**	26.6	– 28.5	**74.1**	69.1	– 79.0	*34.5*	*11.6*	– *57.5*	**18.9**	13.6	– 24.1
	2010–2014	**32.5**	31.5	– 33.5	**80.4**	77.1	– 83.7	*26.0*	*0.3*	– *51.6*	*10.7*	*7.2*	– *14.1*
New Zealand*	2000–2004	**17.6**	15.5	– 19.7	*69.4*	*54.0*	– *84.8*			–			–
	2005–2009	**19.3**	17.3	– 21.3	*81.2*	*69.1*	– *93.2*			–			–
	2010–2014	**20.8**	18.8	– 22.8	*78.6*	*70.1*	– *87.1*			–			–

§ Survival estimate considered less reliable, because 15% or more of patients were (a) lost to follow-up or censored alive within five years of diagnosis (or if diagnosed in 2010 or later, before 31 December 2014), **or** (b) registered only from a death certificate or at autopsy, **or** (c) registered with incomplete dates, i.e., unknown year of birth, unknown month and/or year of diagnosis or unknown year of last vital status. Italics denote survival estimates that are not age-standardised. Survival estimates of 100% that are shown without a confidence interval are those for which the first event (either death or censoring) in that group of patients occurred more than five years after diagnosis.

* Data with 100% coverage of the national population.

However, for the majority of the countries, higher survival for one morphological sub-type does not mean that the country also has higher survival for the others.

Age-standardised one- and five-year net survival from tumours with unknown morphology was the lowest of all the morphological sub-types. As the proportion of unknown morphology generally decreased over time, so did the survival from these tumours. Therefore, it is likely that these tumours are actually aggressive carcinomas that are not biopsied at the time of diagnosis.

Several of the survival estimates were flagged as less reliable, and this was largely due to a high proportion of patients being registered through death certificate only (DCO). Around 7% of all records were registered through DCO, though this proportion varied widely between countries.

Given that all carcinomas were included in the same group, this sub-type is not as homogenous as a group comprising solely of pancreatic ductal adenocarcinomas (ICD-O-3 morphology codes 8020, 8035, 8480, 8490, 8500, 8510, 8560 and 8576) [1]. However, only 8.8% of the patients included in analysis were diagnosed with pancreatic ductal adenocarcinomas. Restricting our analyses only to these tumours would have excluded patients diagnosed with adenocarcinomas (ICD-O-3 morphology code 8140, 45.0% of all patients included in the analyses). We have included some carcinomas that may have better survival than pure adenocarcinomas: serous cystadenocarcinoma (8441), solid pseudopapillary carcinoma (8452), mucinous cystadenocarcinoma (8470), acinar cell carcinoma (8550), acinar cell cystadenocarcinoma (8551) and pancreatoblastoma (8971) [1]. However, the total proportion of carcinomas with these specific morphologies was only 0.6%, thus inclusion of these carcinomas with adenocarcinomas is unlikely to increase survival substantially.

Likewise, within our definition of neuroendocrine tumours, there are some morphologies that have been known to be more aggressive than neuroendocrine tumours in general. Neuroendocrine carcinomas (8246), including large cell (8013) and small cell (8041), have survival similar to other carcinomas [1]. The proportion of neuroendocrine tumours that are neuroendocrine carcinomas was relatively high (63.5%), so the survival estimates for all neuroendocrine tumours may be slightly lower because of the inclusion of neuroendocrine carcinomas.

There are only small variations in the world-wide distribution of pancreatic cancer morphological sub-types, and these variations do not explain fully international differences in five-year survival for all pancreatic tumours combined. However, these analyses highlighted a decreasing trend in the proportion of pancreatic carcinomas that has not been reported previously in the literature.

Stage at diagnosis is an important prognostic factor for pancreatic cancer. The CONCORD-3 database includes data on stage at diagnosis submitted by participating registries that use several different staging classifications. We are finalising a staging algorithm to allow for robust comparisons of stage-specific survival between countries. Future analyses of stage-specific survival for all morphologies combined and by morphology may provide further insight into the international variations in survival.

Survival from pancreatic carcinomas remains poor world-wide and trends for survival from carcinoma showed little improvement over time. Despite slight declines in the proportion of carcinomas over time, carcinomas continue to be the majority of pancreatic tumours. Thus, efforts to develop effective population-based screening techniques, to increase early diagnosis and to decrease resistance to treatment of these tumours, are needed.

Pancreatic neuroendocrine tumours have much higher survival, owing to the fact that the majority of these tumours are functional and are, therefore, symptomatic at earlier stages than carcinomas. Increases in survival from neuroendocrine tumours were also greater than that of carcinomas, indicating that enhancements in diagnostic techniques and treatments have helped improve survival over time. If

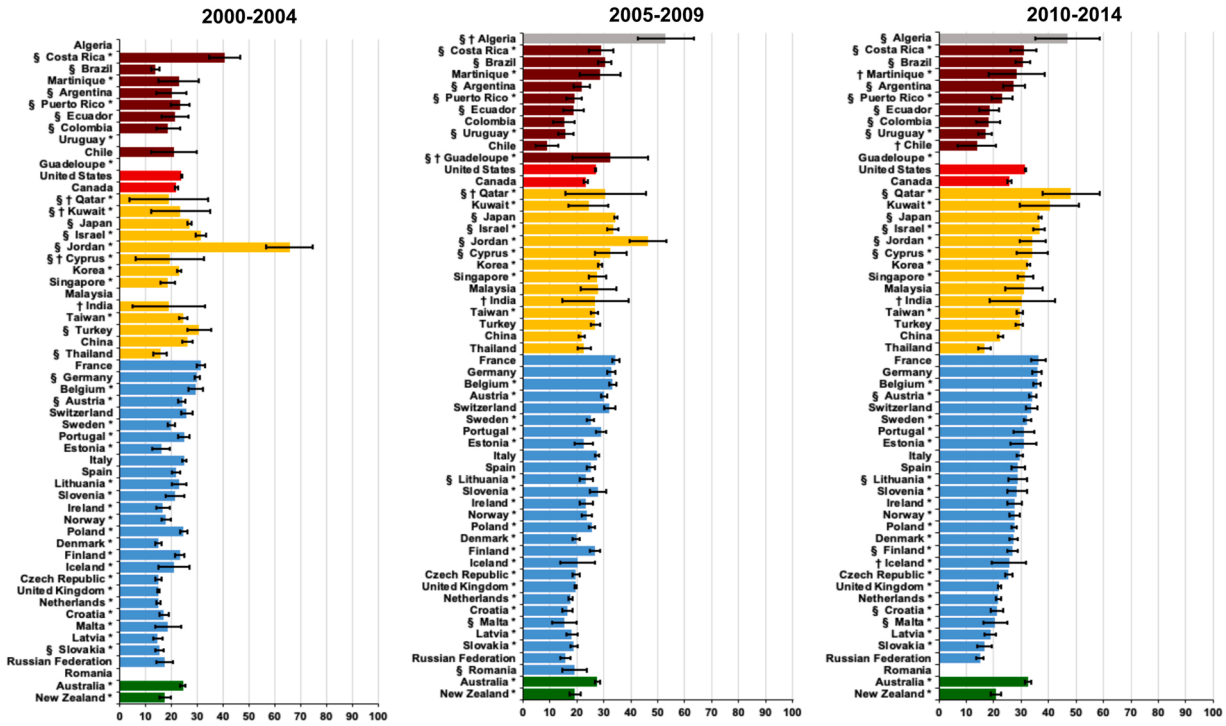

Fig. 2. Distribution of age-standardised one-year net survival (%), adults (15–99 years) diagnosed with pancreatic cancer, by continent, country and period of diagnosis (2000–2004, 2005–2009, 2010–2014): carcinomas. * Data with 100% coverage of the national population. † National estimate not age-standardised. § National estimate flagged as less reliable.

the proportion of neuroendocrine tumours continues to increase, efforts are needed to ensure that patients are diagnosed early and treated adequately.

Ethics approval and consent to participate

The Cancer Survival Group maintains approval for processing sensitive personal data for the CONCORD programme from the UK's statutory Health Research Authority (reference ECC 3–04(i)/2011; last update 2 October 2021), the National Health Service Research Ethics Service (11/LO/0331; 6 October 2021), and the Ethics Committee of the London School of Hygiene & Tropical Medicine (12171; 6 October 2021).

Funding

This project was supported by the Institut National du Cancer (France), La Ligue Contre le Cancer, US Centers for Disease Control and Prevention, Swiss Re, Swiss Cancer Research Foundation, Swiss Cancer League, Rossy Family Foundation, US National Cancer Institute (USA) and the American Cancer Society.

Role of the funding source

The funding sources played no part in the design, data collection, quality control, analysis, interpretation of the findings, writing of the manuscript or the decision to submit for publication. The corresponding author had full access to all the data and responsibility for submission for publication.

The interpretation of the findings in this report, and the opinions, conclusions, and recommendations are those of the authors and do not necessarily reflect the views or official position of the British Columbia Cancer Agency or Cancer Care Ontario (Canada); the Centers for Disease Control and Prevention, the National Cancer Institute, Maryland Cancer Registry, New Hampshire Department of Health and Human Services, New York City Department of Health and Mental Hygiene, Ohio Department of Health, Pennsylvania Department of Health or West Virginia Cancer Registry (USA); the Health Directorate of the Australian Capital Territory, or the Institut National du Cancer (France).

CRediT authorship contribution statement

Study design: CA and MPC. Acquisition of statutory and ethical approvals: MPC and CA. Data; quality controls: MM, MN, CA, MPC. Formal analyses: MM, MN. Writing original draft: MN, MM, CA,MPC. Review and editing: All authors checked and contributed to writing the final report. All; CONCORD Working Group members had access to the results of all steps of data preparation,quality control and analyses, and contributed to interpretation of the findings. Funding acquisition: CA and MPC.

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Table 6
Age-standardised five-year net survival (NS, %): adults (15-99 years) diagnosed with pancreatic cancer by morphological sub-type, country and calendar period of diagnosis (2000-2004, 2005-2009, 2010-2014).

	Period of diagnosis	Carcinoma			Neuroendocrine			Other specified			Unknown		
		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI	
AFRICA													
Algeria	2000-2004		-			-			-		*76.8* §	*52.7* -	*100.0*
(3 registries)	2005-2009	*38.3* §	*27.1* -	*49.4*		-			-			-	
	2010-2014	**30.9** §	18.9 -	42.9		-			-			-	
Mauritius*	2000-2004		-			-			-			-	
	2005-2009		-			-			-			-	
	2010-2014	*24.5*	*11.4* -	*37.6*		-			-			-	
South Africa (Eastern Cape)	2000-2004		-			-			-			-	
	2005-2009		-			-			-			-	
	2010-2014	*21.8* §	*0.0* -	*49.5*		-			-			-	
AMERICA (CENTRAL AND SOUTH)													
Argentina	2000-2004	**7.8** §	4.0 -	11.5		-			-		*16.9* §	*3.0* -	*30.8*
(3 registries)	2005-2009	**6.2** §	4.3 -	8.2		-			-		*19.1* §	*9.0* -	*29.3*
	2010-2014	**8.5** §	5.6 -	11.4		-			-		*22.7* §	*9.4* -	*35.9*
Brazil	2000-2004	**3.4** §	2.5 -	4.2	*49.4* §	*26.8* -	*71.9*		-			-	
(6 registries)	2005-2009	**7.8** §	6.1 -	9.5	*45.2* §	*28.7* -	*61.8*		-			-	
	2010-2014	**7.3** §	5.6 -	9.1	*60.1* §	*42.3* -	*77.9*		-			-	
Chile	2000-2004	**4.2**	0.2 -	8.2		-			-		*0.1*	*0.0* -	*0.5*
(4 registries)	2005-2009	**2.7**	0.8 -	4.6		-			-		*0.0*	*0.0* -	*0.0*
	2010-2014	*4.7*	*0.0* -	*9.3*		-			-			-	
Colombia	2000-2004	**6.7** §	3.6 -	9.7		-			-			-	
(3 registries)	2005-2009	**3.1**	1.4 -	4.9		-			-			-	
	2010-2014	**4.5** §	2.2 -	6.8	*39.4* §	*12.1* -	*66.8*		-			-	
Costa Rica*	2000-2004	**38.1** §	31.3 -	44.8		-			-			-	
	2005-2009	**22.2** §	17.6 -	26.9	*73.7* §	*48.5* -	*98.8*		-			-	
	2010-2014	**21.8** §	16.8 -	26.7	*75.9* §	*55.8* -	*96.1*		-			-	
Ecuador	2000-2004	**8.4** §	4.7 -	12.2		-			-			-	
(5 registries)	2005-2009	**8.7** §	5.9 -	11.5		-			-			-	
	2010-2014	**7.7** §	5.1 -	10.4	*47.9* §	*11.3* -	*84.4*		-			-	
Guadeloupe (France)*	2000-2004		-			-			-			-	
	2005-2009	*6.4* §	*0.0* -	*13.8*		-			-			-	
	2010-2014		-			-			-			-	
Martinique (France)*	2000-2004	**8.9**	3.7 -	14.0	*38.1*	*8.3* -	*67.9*		-		*13.2*	*0.8* -	*25.5*
	2005-2009	**9.2**	3.8 -	14.6		-			-		*1.5*	*0.0* -	*4.0*
	2010-2014	*9.6*	*2.5* -	*16.8*		-			-		*3.1*	*0.0* -	*7.8*
Puerto Rico*	2000-2004	**7.7** §	5.4 -	10.1		-			-			-	
	2005-2009	**6.8** §	5.0 -	8.7	*44.6* §	*27.5* -	*61.8*		-			-	
	2010-2014	**7.5** §	4.8 -	10.2	*52.0* §	*24.9* -	*79.0*		-			-	
Uruguay*	2000-2004		-			-			-			-	
	2005-2009	**2.9** §	1.6 -	4.3		-			-			-	
	2010-2014	**4.3** §	2.9 -	5.7		-			-			-	
AMERICA (NORTH)													
Canada	2000-2004	**7.0**	6.5 -	7.5	**41.6**	35.7 -	47.5	*33.8*	*11.1* -	*56.5*	*1.1*	*0.0* -	*2.4*
(10 registries)	2005-2009	**7.4**	6.9 -	7.8	**45.6**	41.2 -	50.1	*48.2*	*26.0* -	*70.4*	*0.5*	*0.0* -	*1.3*
	2010-2014	**7.2**	6.8 -	7.7	**53.4**	49.1 -	57.6	*61.4*	*37.5* -	*85.3*	*0.9*	*0.0* -	*2.0*
United States	2000-2004	**5.5**	5.4 -	5.7	**37.0**	35.3 -	38.6	**25.6**	19.2 -	31.9		-	
(49 registries)	2005-2009	**6.3**	6.2 -	6.5	**48.2**	46.7 -	49.7	**33.6**	26.0 -	41.3		-	
	2010-2014	**7.8**	7.6 -	8.0	**56.8**	55.4 -	58.3	**41.5**	34.0 -	49.1		-	
ASIA													
China	2000-2004	**14.4**	12.8 -	16.0	*14.5*	*0.0* -	*30.7*		-			-	
(21 registries)	2005-2009	**9.9**	9.1 -	10.6	**22.9**	14.7 -	31.2		-			-	
	2010-2014	**9.4**	8.6 -	10.2	**18.4**	13.6 -	23.2		-			-	

(*continued on next page*)

Table 6 (*continued*)

	Period of diagnosis	Carcinoma					Neuroendocrine					Other specified					Unknown				
		NS (%)		95% CI			NS (%)		95% CI			NS (%)		95% CI			NS (%)		95% CI		
Cyprus*	2000-2004	*10.0*	§	*0.0*	-	*20.1*				-					-					-	
	2005-2009	**7.9**	§	4.3	-	11.5	*15.2*	§	*0.0*	-	*35.3*				-					-	
	2010-2014	**8.6**	§	5.2	-	12.1	*34.0*	§	*7.1*	-	*60.9*				-					-	
India (Karunagappally)	2000-2004	*4.2*		*0.0*	-	*10.5*				-					-					-	
	2005-2009	*5.3*		*0.0*	-	*11.4*				-					-					-	
	2010-2014	*5.7*		*0.0*	-	*11.8*				-					-					-	
Israel*	2000-2004	**6.0**	§	4.9	-	7.1	**51.1**	§	37.6	-	64.6				-					-	
	2005-2009	**7.1**	§	5.9	-	8.3	**46.9**	§	36.8	-	56.9				-					-	
	2010-2014	**8.9**	§	7.4	-	10.4	**50.0**	§	41.6	-	58.3				-					-	
Japan	2000-2004	**6.4**	§	5.9	-	6.9	**51.1**	§	40.8	-	61.4	*32.5*	§	*8.1*	-	*56.9*	**1.8**	§	1.0	-	2.5
(16 registries)	2005-2009	**7.0**	§	6.7	-	7.4	**50.8**	§	43.6	-	58.1	*35.2*	§	*16.8*	-	*53.7*	**1.5**	§	0.9	-	2.2
	2010-2014	**7.6**	§	7.2	-	8.1	**50.6**	§	43.8	-	57.3	*45.9*	§	*21.3*	-	*70.4*	**1.1**	§	0.6	-	1.6
Jordan*	2000-2004	**65.6**	§	50.9	-	80.3				-					-					-	
	2005-2009	**32.2**	§	25.2	-	39.2	*41.5*	§	*12.7*	-	*70.4*				-					-	
	2010-2014	**23.0**	§	17.7	-	28.3	*67.8*	§	*42.5*	-	*93.2*				-					-	
Korea*	2000-2004	**7.3**		6.9	-	7.8	**46.1**		36.4	-	55.8	*15.9*		*0.8*	-	*31.0*				-	
	2005-2009	**7.9**		7.5	-	8.3	**41.0**		34.9	-	47.1	*28.8*		*10.2*	-	*47.4*				-	
	2010-2014	**9.0**		8.5	-	9.4	**50.8**		43.6	-	57.9	*25.7*		*10.9*	-	*40.5*				-	
Kuwait*	2000-2004	*7.8*	§	*0.9*	-	*14.7*				-					-					-	
	2005-2009	**7.0**		3.0	-	11.0				-					-					-	
	2010-2014	**21.0**		9.7	-	32.4				-					-					-	
Malaysia (Penang)	2000-2004				-					-					-					-	
	2005-2009	**9.3**		4.8	-	13.8				-					-					-	
	2010-2014	**17.6**		10.6	-	24.6				-					-					-	
Qatar*	2000-2004	*9.8*	§	*0.0*	-	*21.1*				-					-					-	
	2005-2009	*4.2*	§	*0.0*	-	*10.2*				-					-					-	
	2010-2014	**16.6**	§	7.2	-	25.9				-					-					-	
Singapore*	2000-2004	**5.2**		3.5	-	7.0	*21.0*		*2.5*	-	*39.4*				-		*2.3*		*0.0*	-	*5.9*
	2005-2009	**6.7**		4.9	-	8.5	*32.0*		*15.6*	-	*48.4*				-		*2.2*		*0.4*	-	*4.0*
	2010-2014	**7.8**		6.0	-	9.7	**33.0**		22.7	-	43.3				-		*2.2*		*0.4*	-	*3.9*
Taiwan*	2000-2004	**5.1**		4.4	-	5.9	*43.9*		*32.3*	-	*55.5*	*16.0*		*0.0*	-	*33.6*	**9.6**		8.0	-	11.1
	2005-2009	**5.0**		4.3	-	5.7	**38.2**		29.7	-	46.7				-		**7.7**		6.3	-	9.1
	2010-2014	**5.2**		4.6	-	5.8	**51.3**		43.9	-	58.7	*0.1*		*0.0*	-	*0.2*	**7.2**		5.8	-	8.6
Thailand	2000-2004	**6.7**	§	4.8	-	8.5				-					-					-	
(6 registries)	2005-2009	**9.3**		7.5	-	11.2	*29.5*		*0.5*	-	*58.5*				-					-	
	2010-2014	**6.0**		4.6	-	7.4	*41.0*		*18.5*	-	*63.6*				-					-	
Turkey	2000-2004	**10.7**	§	7.6	-	13.9				-					-					-	
(9 registries)	2005-2009	**8.5**		7.3	-	9.6	**30.8**		21.3	-	40.2				-		*12.5*		*5.9*	-	*19.1*
	2010-2014	**8.8**		7.7	-	9.8	**33.6**		25.1	-	42.1				-		**14.1**		7.0	-	21.1
EUROPE																					
Austria*	2000-2004	**5.5**	§	4.8	-	6.3	**33.9**	§	26.1	-	41.6				-					-	
	2005-2009	**7.0**		6.2	-	7.8	**35.3**		28.6	-	42.0				-					-	
	2010-2014	**8.2**	§	7.3	-	9.1	**42.8**	§	36.4	-	49.3	*22.3*	§	*0.0*	-	*45.4*				-	
Belgium*	2000-2004	**5.1**		3.6	-	6.6	*64.6*		*48.5*	-	*80.7*				-					-	
	2005-2009	**5.8**		5.1	-	6.5	**67.5**		61.0	-	74.0	*20.1*		*0.0*	-	*43.3*				-	
	2010-2014	**6.7**		5.9	-	7.5	**63.2**		57.9	-	68.5	*30.0*		*0.0*	-	*60.8*				-	
Croatia*	2000-2004	**4.9**		3.8	-	6.1	*34.9*		*13.2*	-	*56.7*				-		**15.0**		12.5	-	17.5
	2005-2009	**4.7**		3.6	-	5.9	*24.5*		*11.7*	-	*37.4*				-		**12.8**		10.5	-	15.2
	2010-2014	**5.1**	§	3.9	-	6.4	**32.2**	§	22.1	-	42.2	*10.3*	§	*0.0*	-	*25.2*	**10.3**	§	8.3	-	12.4
Czech Republic*	2000-2004	**3.0**		2.4	-	3.6	**22.3**		15.3	-	29.3	*27.1*		*7.9*	-	*46.3*	**3.3**		2.4	-	4.3
	2005-2009	**4.8**		4.0	-	5.5	**23.2**		17.8	-	28.6	*0.2*		*0.0*	-	*0.8*	**2.6**		1.9	-	3.3
	2010-2014	**5.9**		5.1	-	6.8	**34.0**		27.7	-	40.3				-		**2.4**		1.6	-	3.1
Denmark*	2000-2004	**2.9**		2.2	-	3.6	**27.7**		18.3	-	37.1				-					-	
	2005-2009	**4.8**		3.9	-	5.6	**26.8**		18.5	-	35.0				-					-	

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Table 6 (*continued*)

	Period of diagnosis	Carcinoma				Neuroendocrine				Other specified				Unknown			
		NS (%)	95% CI			NS (%)	95% CI			NS (%)	95% CI			NS (%)	95% CI		
	2010-2014	**7.2**	6.2	-	8.3	**25.7**	17.8	-	33.7			-				-	
Estonia*	2000-2004	**2.9**	1.3	-	4.4			-				-		**8.0**	5.0	-	11.0
	2005-2009	**4.2**	2.4	-	6.0	*66.1*	*41.8*	-	*90.4*			-		**3.8**	1.9	-	5.6
	2010-2014	**5.4**	2.8	-	8.0	*74.7*	*43.3*	-	*100.0*			-		**4.5**	0.8	-	8.2
Finland*	2000-2004	**3.5**	2.7	-	4.3	**25.0**	16.7	-	33.2			-		**0.9**	0.0	-	1.7
	2005-2009	**4.6**	3.5	-	5.7	**50.8**	42.2	-	59.4			-		**0.2**	0.0	-	0.4
	2010-2014	**4.2** §	3.3	-	5.0	**53.4** §	45.4	-	61.5			-		*0.4* §	*0.1*	-	*0.8*
France	2000-2004	**5.8**	4.9	-	6.7	**43.9**	36.1	-	51.6			-		**2.4**	1.4	-	3.3
(15 registries)	2005-2009	**6.4**	5.7	-	7.2	**45.9**	40.1	-	51.6	*0.0*	*0.0*	-	*0.1*	**4.1**	2.8	-	5.4
	2010-2014	**6.8**	5.1	-	8.4	**52.8**	43.3	-	62.3			-		**3.5**	1.4	-	5.6
Germany	2000-2004	**6.6** §	6.1	-	7.2	**43.1** §	37.0	-	49.2	*39.6* §	*16.9*	-	*62.3*	**6.9** §	5.4	-	8.4
(10 registries)	2005-2009	**8.3**	7.3	-	9.3	**40.9**	33.9	-	47.9			-		**4.3**	2.7	-	6.0
	2010-2014	**9.3**	8.1	-	10.5	**41.5**	34.1	-	48.8			-		**5.9**	3.2	-	8.6
Iceland*	2000-2004	**3.0**	0.5	-	5.5			-				-				-	
	2005-2009	**0.0**	0.0	-	0.1			-				-				-	
	2010-2014	*0.0*	*0.0*	-	*0.0*	*33.3*	*0.0*	-	*68.6*			-				-	
Ireland*	2000-2004	**3.5**	2.2	-	4.8	*36.9*	*19.5*	-	*54.3*			-		**6.3**	3.9	-	8.7
	2005-2009	**5.3**	4.0	-	6.6	**34.6**	22.9	-	46.3			-		**5.0**	2.3	-	7.7
	2010-2014	**5.9**	4.4	-	7.4	**46.7**	35.1	-	58.3			-		**6.0**	3.2	-	8.8
Italy	2000-2004	**5.4**	4.9	-	5.9	**50.0**	43.7	-	56.3	*42.0*	*15.9*	-	*68.1*			-	
(44 registries)	2005-2009	**5.9**	5.5	-	6.3	**49.8**	45.4	-	54.2	*49.4*	*26.9*	-	*71.9*			-	
	2010-2014	**6.8**	6.2	-	7.4	**55.0**	49.4	-	60.7			-				-	
Latvia*	2000-2004	**5.8**	4.3	-	7.3			-				-				-	
	2005-2009	**8.4**	6.7	-	10.1	*66.1*	*43.0*	-	*89.2*			-				-	
	2010-2014	**9.7**	8.0	-	11.5	*59.8*	*36.8*	-	*82.7*			-				-	
Lithuania*	2000-2004	**4.2**	2.8	-	5.6	*31.5*	*17.1*	-	*45.9*			-		**7.8**	5.9	-	9.8
	2005-2009	**3.8** §	2.7	-	5.0	*38.2* §	*24.6*	-	*51.8*			-		**5.4** §	3.4	-	7.4
	2010-2014	**6.5** §	4.2	-	8.8	**37.3** §	26.2	-	48.3			-		**5.3** §	2.8	-	7.8
Malta*	2000-2004	**5.9**	3.1	-	8.8			-				-				-	
	2005-2009	**1.5** §	0.1	-	2.8			-				-				-	
	2010-2014	**3.1** §	0.9	-	5.3	*77.9* §	*55.3*	-	*100.0*			-				-	
Netherlands*	2000-2004	**2.1**	1.7	-	2.5	**30.0**	24.2	-	35.8	*29.3*	*3.8*	-	*54.8*			-	
	2005-2009	**3.1**	2.7	-	3.5	**47.1**	40.9	-	53.2	*32.9*	*9.0*	-	*56.9*			-	
	2010-2014	**4.1**	3.6	-	4.7	**52.3**	46.8	-	57.7			-				-	
Norway*	2000-2004	**2.7**	1.9	-	3.4	**38.7**	27.3	-	50.2			-		**3.1**	0.6	-	5.6
	2005-2009	**2.9**	2.1	-	3.6	**41.6**	32.8	-	50.3			-		**5.8**	2.3	-	9.4
	2010-2014	**3.9**	2.9	-	4.9	**52.4**	44.5	-	60.4			-		*2.1*	*1.1*	-	*3.2*
Poland*	2000-2004	**5.2**	4.4	-	6.0	*41.9*	*29.3*	-	*54.5*			-		**9.9**	9.0	-	10.7
(16 registries)	2005-2009	**6.1**	5.4	-	6.8	**42.0**	33.1	-	50.9	*48.4*	*23.4*	-	*73.3*	**12.6**	11.7	-	13.5
	2010-2014	**5.1**	4.6	-	5.7	**42.8**	34.6	-	51.0	*14.4*	*1.3*	-	*27.5*	**9.6**	8.7	-	10.4
Portugal*	2000-2004	**6.9**	5.5	-	8.2	**46.9**	36.1	-	57.7			-		*3.2*	*1.5*	-	*4.8*
(4 registries)	2005-2009	**8.3**	7.1	-	9.6	**35.3**	28.0	-	42.5			-		**7.4**	4.6	-	10.2
	2010-2014	**9.8**	6.9	-	12.6	**57.4**	46.5	-	68.3			-		**6.5**	1.8	-	11.2
Romania (Cluj)	2000-2004			-				-				-				-	
	2005-2009	**3.1** §	1.2	-	5.0	*30.4* §	*7.1*	-	*53.6*			-				-	
	2010-2014	*7.0* §	*3.8*	-	*10.2*			-				-				-	
Russian Federation	2000-2004	**6.6**	4.2	-	8.9	*11.1*	*0.0*	-	*25.9*			-		**7.3**	5.5	-	9.1
(5 registries)	2005-2009	**5.1**	3.9	-	6.4	*51.3*	*30.0*	-	*72.6*			-		**4.8**	3.6	-	6.1
	2010-2014	**4.4**	3.4	-	5.4	**20.9**	14.6	-	27.2			-		**2.9**	1.9	-	3.8
Slovakia*	2000-2004	**4.2** §	3.2	-	5.2	*30.2* §	*16.2*	-	*44.2*			-				-	
	2005-2009	**4.9**	4.1	-	5.8	**30.8**	20.7	-	40.9			-				-	
	2010-2014	**5.4**	3.6	-	7.2	**75.0**	58.4	-	91.5			-				-	
Slovenia*	2000-2004	**4.1**	2.5	-	5.7	*36.4*	*20.8*	-	*52.0*			-		**2.8**	1.0	-	4.5
	2005-2009	**4.5**	3.0	-	6.0	*47.7*	*34.0*	-	*61.5*			-		**1.5**	0.5	-	2.4
	2010-2014	**4.4**	2.7	-	6.2	**55.2**	40.6	-	69.8			-		**0.7**	0.0	-	1.5

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Table 6 (*continued*)

	Period of diagnosis	Carcinoma			Neuroendocrine			Other specified			Unknown		
		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI		NS (%)	95% CI	
Spain	2000-2004	**4.4**	3.6	5.3	**33.9**	24.6	43.1		-		**1.8**	1.0	2.7
(9 registries)	2005-2009	**5.8**	5.0	6.7	**48.5**	39.9	57.1		-		**2.6**	1.2	4.1
	2010-2014	**6.9**	5.4	8.3	**43.0**	31.0	55.0		-		*0.9*	*0.1*	*1.7*
Sweden*	2000-2004	**2.6**	2.1	3.2	**40.9**	30.9	51.0		-			-	
	2005-2009	**6.3**	5.3	7.3	**44.2**	35.4	53.1		-			-	
	2010-2014	**8.3**	7.2	9.3	**51.4**	41.3	61.6		-			-	
Switzerland	2000-2004	**3.7**	2.6	4.8	**40.2**	28.8	51.6		-		*1.4*	*0.0*	*2.9*
(9 registries)	2005-2009	**4.5**	3.5	5.5	**43.2**	33.8	52.6		-		*1.0*	*0.0*	*2.2*
	2010-2014	**5.5**	4.3	6.6	**54.3**	44.3	64.3		-		*0.6*	*0.0*	*1.4*
United Kingdom*	2000-2004	**2.6**	2.4	2.9	**32.1**	27.8	36.4	*23.1*	*8.5*	*37.6*	**2.3**	1.3	3.3
(4 registries)	2005-2009	**3.8**	3.5	4.0	**39.1**	35.2	43.0	*0.0*	*0.0*	*0.0*	**0.8**	0.3	1.2
	2010-2014	**4.4**	4.1	4.7	**47.6**	44.1	51.2	*7.6*	*0.0*	*19.2*	**2.2**	0.9	3.5
OCEANIA													
Australia*	2000-2004	**5.9**	5.3	6.5	**39.9**	33.3	46.5	*7.3*	*0.0*	*18.2*	**2.7**	0.5	5.0
(8 registries)	2005-2009	**6.7**	6.1	7.3	**47.5**	41.8	53.2	*15.1*	*0.0*	*32.4*	**4.8**	1.7	7.9
	2010-2014	**8.0**	7.3	8.6	**58.5**	52.5	64.4	*11.5*	*0.0*	*26.7*	*2.7*	*0.7*	*4.6*
New Zealand*	2000-2004	**5.5**	4.1	6.8	*50.5*	*33.6*	*67.4*		-			-	
	2005-2009	**6.7**	5.3	8.0	*40.5*	*25.3*	*55.7*		-			-	
	2010-2014	**6.1**	4.8	7.4	*44.8*	*31.9*	*57.7*		-			-	

§ Survival estimate considered less reliable, because 15% or more of patients were (a) lost to follow-up or censored alive within five years of diagnosis (or if diagnosed in 2010 or later, before 31 December 2014), or (b) registered only from a death certificate or at autopsy, or (c) registered with incomplete dates, i.e., unknown year of birth, unknown month and/or year of diagnosis or unknown year of last vital status Italics denote survival estimates that are not age-standardised Survival estimates of 100% that are shown without a confidence interval are those for which the first event (either death or censoring) in that group of patients occurred more than five years after diagnosis

* Data with 100% coverage of the national population

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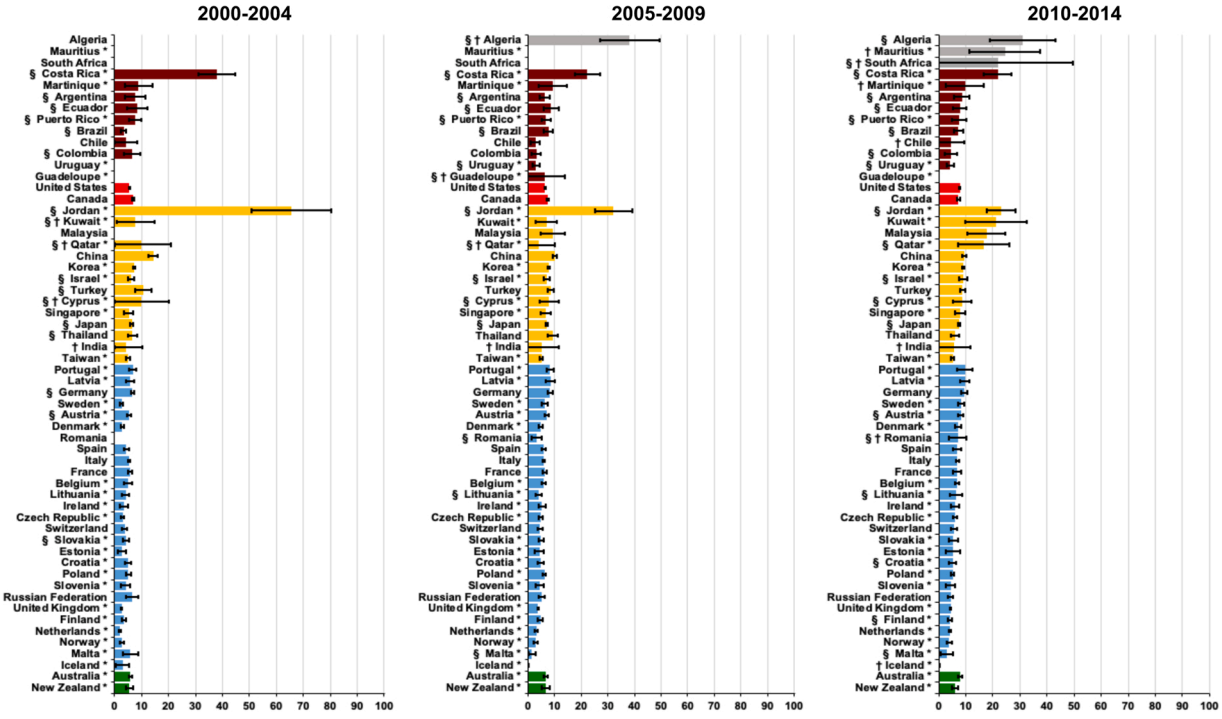

Fig. 3. Distribution of age-standardised five-year net survival (%), adults (15–99 years) diagnosed with pancreatic cancer, by continent, country and period of diagnosis (2000–2004, 2005–2009, 2010–2014): carcinomas. * Data with 100% coverage of the national population. † National estimate not age-standardised. § National estimate flagged as less reliable.

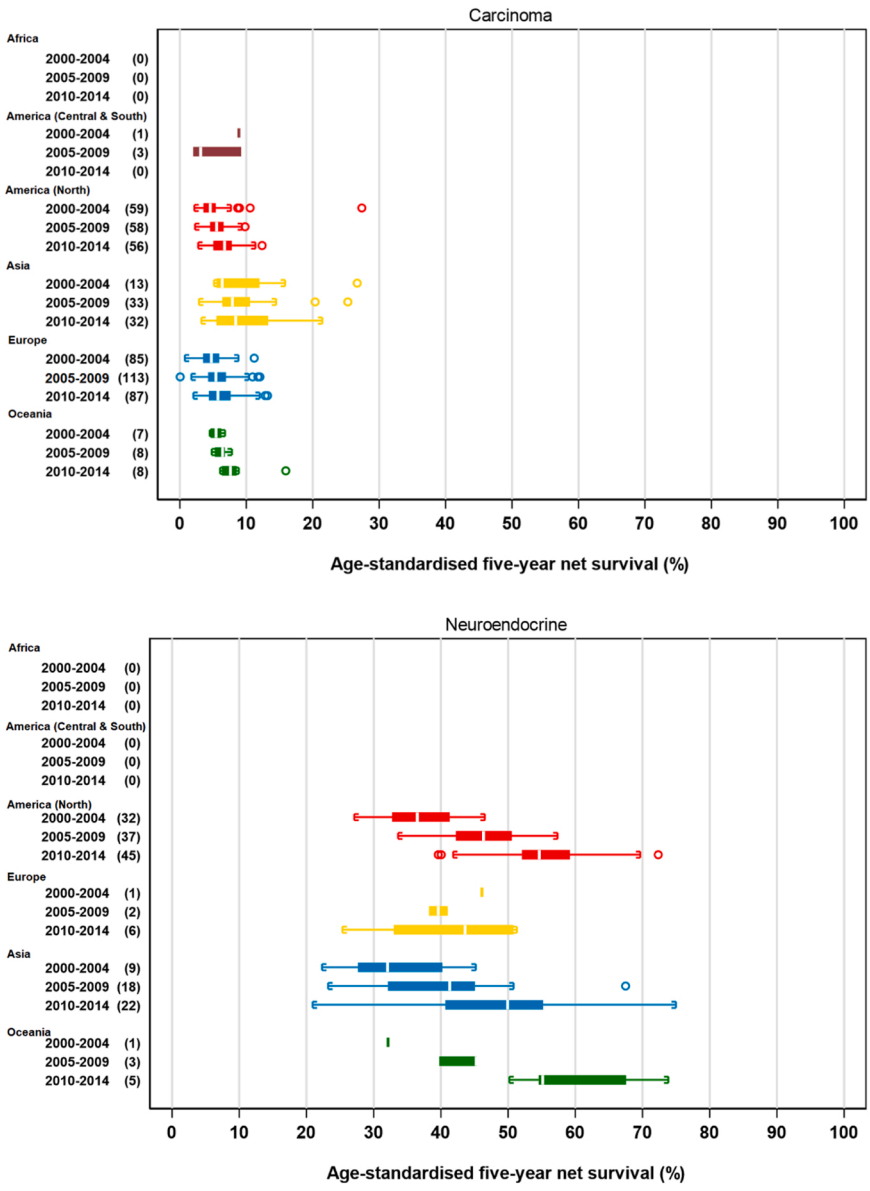

Fig. 4. Global range of age-standardised five-year net survival (%) estimates for carcinomas and neuroendocrine tumours of the pancreas, by continent and calendar period of diagnosis (2000–2004, 2005–2009, 2010–2014): adults (15–99 years). Each box-plot shows the range of survival estimates among all cancer registries for which suitable estimates could be obtained for patients diagnosed in each calendar period, in each continent. The number of registries included in each box-plot is shown in parentheses. Survival estimates considered less reliable are not included (see text). The vertical line inside each box represents the median survival estimate among all contributing registries (the central value in the range, or 50th centile). The box covers the inter-quartile range (IQR) between the lower and upper quartiles (25th and 75th centiles). Where there are only a few widely scattered estimates, the median may be close to the lower or upper quartile. The extreme limits of the box-plot are 1.5*IQR below the lower quartile and 1.5*IQR above the upper quartile. Open circles indicate 'outlier' values, outside the range.

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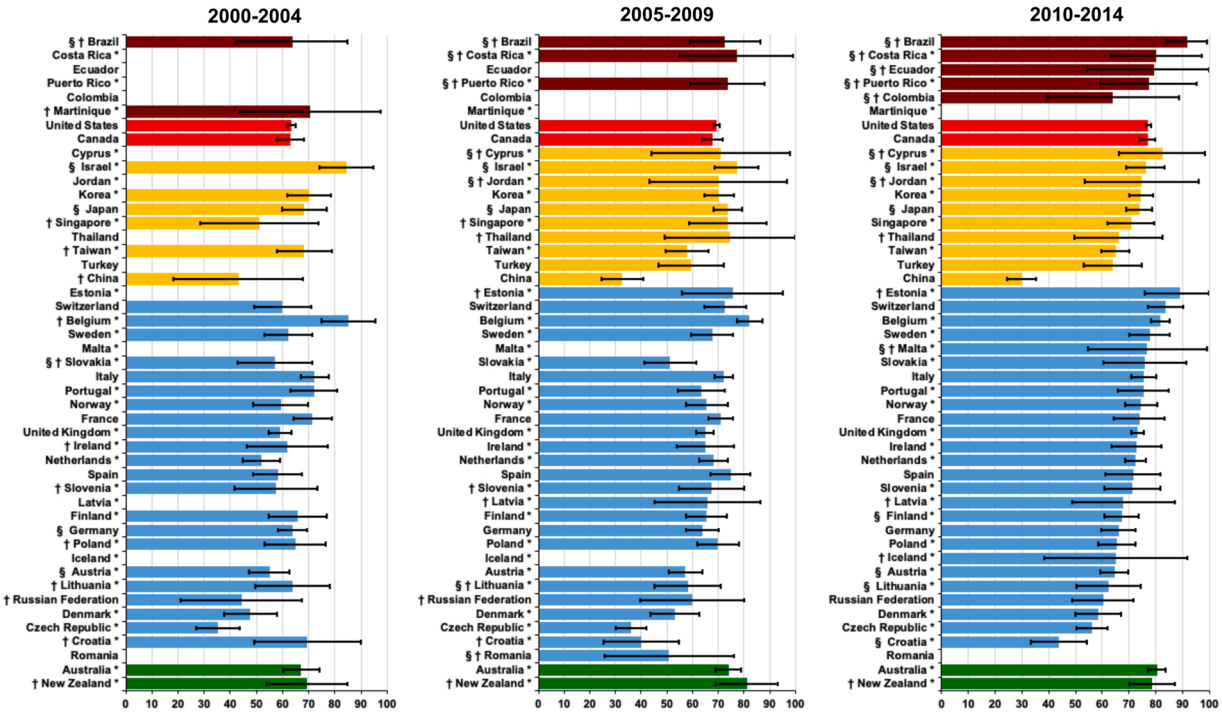

Fig. 5. Distribution of age-standardised one-year net survival (%), adults (15–99 years) diagnosed with pancreatic cancer, by continent, country and period of diagnosis (2000–2004, 2005–2009, 2010–2014): neuroendocrine tumours. * Data with 100% coverage of the national population. † National estimate not age-standardised. § National estimate flagged as less reliable.

Society); ***Ireland*:** DE Murray, PM Walsh (National Cancer Registry Ireland); H Sundseth* (European Institute of Women's Health); ***Italy*:** G Mazzoleni, F Vittadello (Registro Tumori Alto Adige); E Coviello, F Cuccaro (Registro Tumori Puglia – Sezione ASL BT); R Galasso (Registro Tumori di Basilicata); G Sampietro (Registro Tumori di Bergamo); A Giacomin† (Piedmont Cancer Registry Provinces of Biella and Vercelli); M Magoni (Registro Tumori Dell'ASL Di Brescia); A Ardizzone (Registro Tumori Brindisi); A D'Argenzio (Caserta Cancer Registry); AA Di Prima, A Ippolito (Integrated Cancer Registry of Catania-Messina-Siracusa-Enna); AM Lavecchia, A Sutera Sardo (Registro Tumori Catanzaro); G Gola (Registro Tumori della Provincia di Como); P Ballotari, E Giacomazzi (Registro Tumori Cremona; Registro Tumori Mantova); S Ferretti (Registro Tumori della Provincia di Ferrara); L Dal Maso, D Serraino (Registro Tumori del Friuli Venezia Giulia); MV Celesia, RA Filiberti (Registro Tumori Regione Liguria); F Pannozzo (Registro Tumori della Provincia di Latina); A Melcarne, F Quarta (Registro Tumori Della Provincia Di Lecce Sezione RTP); A Andreano, AG Russo (Registro Tumori Milano); G Carrozzi, C Cirilli (Registro Tumori della Provincia di Modena); L Cavalieri d'Oro, M Rognoni (Registro Tumori di Monza e Brianza); M Fusco, MF Vitale (Registro Tumori della ASL Napoli 3 Sud); M Usala (Nuoro Cancer Registry); R Cusimano, W Mazzucco (Registro Tumori di Palermo e Provincia); M Michiara, P Sgargi (Registro Tumori della Provincia di Parma); L Boschetti (Cancer Registry of the province of Pavia); G Chiaranda, P Seghini (Registro Tumori Piacenza); MM Maule, F Merletti (Piedmont Childhood Cancer Registry); E Spata, R Tumino (Registro Tumori della Provincia di Ragusa); P Mancuso (Registro Tumori Reggio Emilia); T Cassetti, R Sassatelli (Pancreas Tumor Registry of Reggio Emilia Province); F Falcini, S Giorgetti (Registro Tumori della Romagna); AL Caiazzo, R Cavallo (Registro Tumori Salerno); D Piras (Registro Tumori Nord Sardegna); F Bella, A Madeddu (Registro Tumori Siracusa); AC Fanetti, S Maspero (Registro Tumori della Provincia di Sondrio); S Carone, A Mincuzzi (Registro Tumori Taranto); G Candela, T Scuderi (Registro Tumori Trapani); MA Gentilini, R Rizzello (Registro Tumori Trento); S Rosso (Piedmont Cancer Registry); A Caldarella, T Intrieri (Registro Tumori della Regione Toscana); F Bianconi (Registro Tumori Umbro di Popolazione); P Contiero, G Tagliabue (Registro Tumori Lombardia, Provincia di Varese); M Rugge, M Zorzi (Registro Tumori Veneto); S Beggiato, A Brustolin (Registro Tumori Della Provincia Di Viterbo); G Gatta (Fondazione IRCCS Istituto Nazionale dei Tumori); R De Angelis (National Centre for Epidemiology); M Vicentini (Italian Association of Cancer Registries (AIRTUM); Registro Tumori Reggio Emilia); R Zanetti* (International Association of Cancer Registries; Piedmont Cancer Registry); F Stracci (Italian Association of Cancer Registries (AIRTUM); Registro Tumori Umbro di Popolazione); ***Latvia*:** A Maurina, M Oniščuka (Latvian Cancer Registry); ***Liechtenstein*:** M Mousavi (Liechtenstein); ***Lithuania*:** N Lipunova, I Vincerževskienė (Lithuanian Cancer Registry); ***Malta*:** D Agius, N Calleja (Malta National Cancer Registry); ***Netherlands*:** S Siesling, O Visser (Netherlands Cancer Registry, IKNL); ***Norway*:** TB Johannesen, S Larønningen (The Cancer Registry of Norway); ***Poland*:** M Trojanowski (Wielkopolski Rejestr Nowotworów); P Macek (Świętokrzyski Rejestr Nowotworów); T Mierzwa (Kujawsko-Pomorski Rejestr Nowotworów); J Rachtan (Małopolski Rejestr Nowotworów); A Rosińska (Łódzki Rejestr Nowotworów); K Kępska (Dolnośląski Rejestr Nowotworów); B Kościańska (Lubelski Rejestr Nowotworów); K Barna (Lubuski Rejestr Nowotworów); U Sulkowska (Mazowiecki Rejestr Nowotworów); T Gebauer (Opolski Rejestr Nowotworów); JB Łapińska (Podlaski Rejestr Nowotworów); J Wójcik-Tomaszewska (Pomorski Rejestr Nowotworów); M Motnyk (Śląski Rejestr Nowotworów); A Patro (Podkarparcki Rejestr Nowotworów); A Gos (Warmińsko-Mazurski Rejestr Nowotworów); K Sikorska (Zachodniopomorski Rejestr Nowotworów); M Bielska-Lasota (National Institute of Public Health, NIH); JA Didkowska, U Wojciechowska (Polish National Cancer Registry); ***Portugal*:** G Forjaz de Lacerda, RA Rego (Registo Oncológico Regional dos Açores); B Carrito, A Pais (Registo Oncológico Regional do Centro); MJ Bento, J Rodrigues (Registo Oncológico Regional do Norte); A Lourenço, A Mayer-da-Silva (Registo Oncólogico Regional do Sul); ***Romania*:** LM Blaga, D Coza (Cancer Institute I. Chiricuta); ***Russia*:** MY Valkov (Arkhangelsk Regional Cancer Registry); L Gusenkova, O Lazarevich (Population Cancer Registry of the Republic of Karelia); O Prudnikova,

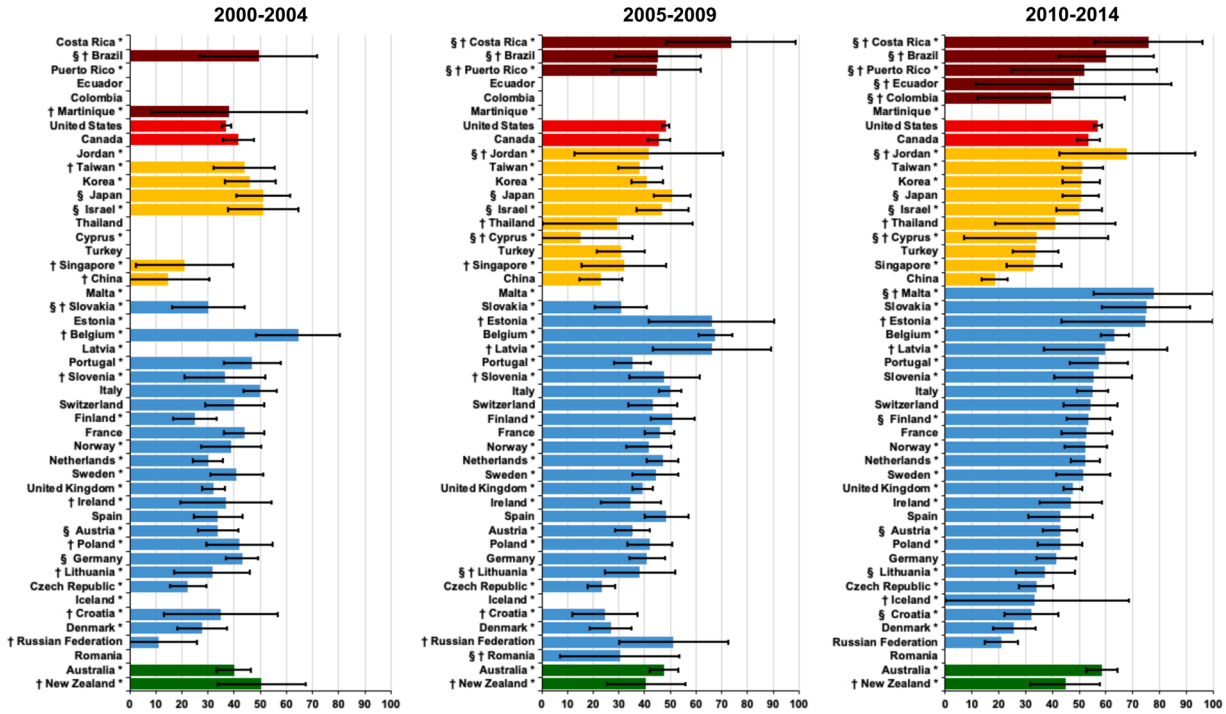

Fig. 6. Distribution of age-standardised five-year net survival (%), adults (15–99 years) diagnosed with pancreatic cancer, by continent, country and period of diagnosis (2000–2004, 2005–2009, 2010–2014): neuroendocrine tumours. * Data with 100% coverage of the national population. † National estimate not age-standardised. § National estimate flagged as less reliable.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

Acknowledgements

We thank Brian Rous at the National Cancer Registration and Analysis Service for assistance with the morphological groupings. We thank Adeladia García Velasco (Girona Cancer Registry) for her thoughtful comments.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.canep.2022.102196.

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