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ORIGINAL ARTICLE

More deaths from pancreatic cancer than breast cancer in the EU by 2017

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ABSTRACT

Introduction: Pancreatic cancer currently ranks below female breast cancer in terms of the number of deaths in both males and females in the EU. While breast cancer mortality rates have been declining in many higher income EU countries during recent decades, rates of pancreatic cancer in contrast are either stable or moderately increasing; a comparative analysis of the short-term future rates of both is warranted.

Methods: We extracted the annual number of deaths from cancers of the pancreas and breast by gender together with population at risk in each of 28 countries of the EU for the period 2001–2010. We fitted cancer- and gender-specific time-linear regression models and predicted deaths from pancreatic and breast cancer mortality for the years 2011–2025.

Results: We estimated that by the year 2017 more deaths from pancreatic cancer will occur (91 500 annual deaths) than breast cancer (91 000) in the EU. By 2025, deaths from cancer of the pancreas are predicted to be 25% higher (111 500 and 90 000, respectively). Pancreatic cancer may become the third leading cause of death from cancer in the EU after lung and colorectal cancers.

Conclusion: Although strategies may emerge in the near future that will enhance the prospects of improving the very poor five-year survival from pancreatic cancer, coordinated efforts are necessary to reduce the foreseeable high mortality burden of disease within the EU.

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Introduction

Lung, colorectal and breast cancers are the three leading causes of cancer death in the EU [1]. They are collectively responsible for 511 000 deaths in the EU in 2012, corresponding to two-fifths of the 1.3 million cancer deaths. Lung cancer is the most common cause of cancer death in both male and females (268 000 deaths) and among males (186 000), with breast cancer deaths (92 000) exceeding deaths from lung cancer (82 000) in females.

The purpose of this short report is, however, to signal the growing importance of pancreatic cancer as a leading cause of cancer death in the EU countries. With 79 000 estimated deaths in 2012, the neoplasm presently ranks in fourth place ahead in terms of total deaths from prostate cancer (72 000 deaths). Using simple time-linear prediction models, we demonstrate that the annual number of pancreatic cancer deaths will likely surpass those of breast cancer as early as the year 2017.

Materials and methods

We extracted the annual number of deaths from cancers of the pancreas and breast by gender for the period 2001–2010 in each of 28 countries of the EU using the WHO mortality database [2]. The corresponding populations at risk were extracted from the same source. Gaps in the mortality series – in Belgium (2001–2002 missing), Cyprus (2001–2003), Italy (2004–2005) and Portugal (2004–2006), represent less than 4% of the total person-years, and the missing years in Italy and Portugal were extrapolated from the neighboring years. Rather than attempting to correct country-specific data for possible underreporting, or reallocate the unknown or ill-defined causes of deaths between specific cancers and other causes of deaths; we assumed such potential artifacts affect the two forms of cancers equally and consistently with time. Using a 10-year prediction base (eight years for Belgium and seven years for Cyprus), we fitted cancer- and gender-specific time-linear regression models [3] assuming deaths were Poisson-distributed. We predicted deaths from pancreatic and breast cancer mortality for the years 2011–2025 using country-specific population forecasts for the EU [4]. To reduce the prospect of erroneous predictions as a result of an inherently large random variation due to small numbers (male breast cancer, small populations, such as Cyprus, Malta or Luxembourg), cancer- and gender-specific prediction models were fitted only when at least 50 cancer deaths (all ages) were recorded per year. For the combinations where this criterion was not satisfied, the estimated number of cancer deaths was derived from the annual average rates recorded in the 2006–2010 period. The time-linear Poisson regression models used applied here have been widely used to estimate the future burden of cancer in Europe [5] and worldwide [1]. They have been shown to perform well in estimating the

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Table 1. Recorded (2010) and estimated number of cancer deaths in the EU in 2017 and 2025.

	Pancreas			Breast		
Year	Both male and female	Male	Female	Both male and female	Male	Female
2010	76 000	38 000	38 000	92 000	1000	91 000
2017	91 500	45 500	46 000	91 000	1000	90 000
2025	111 500	55 000	56 500	90 000	1000	89 000

short-term future cancer burden, particularly where disease rates exhibit the rather reasonably stable trends observed in this study.

Results

We estimated that around 111 500 deaths from pancreatic cancer (55 000 in men, 56 500 in women) will occur in the EU by 2025, an almost 50% increase in the number of recorded deaths from the disease in 2010 (45% in males, 49% in females). The predicted figure is 25% higher than the number of breast cancer deaths in both males and females in 2025 (90 000 deaths). The models predict that as early as 2017, the number of pancreatic cancer deaths (91 500) will exceed those of breast cancer (91 000) in the EU overall (Table 1). This pattern is replicated in most EU countries, with the year immediately after intersection of the rates ranging from 2013 (in Hungary) through to 2022 (in Portugal). In three countries (the Czech Republic, Finland and Sweden) recorded deaths from pancreatic cancer are already higher than breast cancer deaths, while in a further seven countries (Belgium, Croatia, Cyprus, Greece, Lithuania, Luxembourg and Malta) breast cancer is predicted to remain above pancreatic cancer throughout the period 2011–2025 (Table 2). However, breast cancer mortality will still rank above pancreatic cancer in women only in the EU in 2025 (89 000 deaths compared to 56 500, respectively).

Discussion

According to the results presented in this study, by 2017 there will be more deaths annually from pancreatic cancer in the EU countries than deaths from breast cancer. With a predicted 91 500 deaths from pancreatic cancer, the disease may become the third most important cause of cancer death in the EU after lung and colorectal cancer within the space of a few years. What has brought about the increasing prominence of pancreatic cancer? There are several drivers, mainly the substantial reductions in the national mortality rates of female breast cancer through earlier detection and treatment in most European countries during the 1990s [6,7]. Although the estimated number of new cases of breast cancer in the EU in 2012 was far higher than the corresponding pancreatic cancer figures (361 000 and 79 000 in both males and females, respectively) [1], breast cancer prognosis has been improving in almost all EU-28 countries during recent decades. In contrast, pancreatic cancer survival is consistently low and mortality trends stable [8,9], with a median survival less than 18 months even in the highest income countries in Europe [6]. Observed trends in female breast cancer mortality rates in the EU are sharply declining whereas equivalent trends for pancreatic cancer are stable or slightly increasing (Figure 1).

Table 2. Recorded (2010) and projected number of cancer deaths in the 28 EU countries (both males and females).

	2010		2025		
Country	Pancreas	Breast	Pancreas	Breast	Year when pancreas > breast
Austria	1490	1510	2110	1370	2012
Belgium	1600	2370	2100	2480	–
Bulgaria	1000	1130	1300	810	2014
Croatia	670	1000	1060	1430	–
Cyprus	60	100	130	150	–
Czech Republic	1880	1680	2250	930	<2010
Denmark	890	1220	1430	1060	2017
Estonia	220	230	360	200	2014
Finland	1000	890	1430	950	<2010
France	9250	11 980	14 230	12 310	2020
Germany	15 490	17 570	22 400	17 240	2014
Greece	1460	2070	2260	2620	–
Hungary	1850	2040	2580	1550	2013
Ireland	480	640	950	630	2017
Italy	10 510	12 240	13 910	12 970	2021
Latvia	380	430	480	420	2019
Lithuania	450	580	590	830	–
Luxembourg	60	90	100	120	–
Malta	70	80	110	120	–
The Netherlands	2480	3250	4220	2750	2016
Poland	4530	5290	6370	5260	2017
Portugal	1250	1680	2490	1890	2022
Romania	2640	3210	3860	3460	2020
Slovakia	740	800	1310	1000	2014
Slovenia	360	420	830	500	2015
Spain	5720	6370	9120	6760	2015
Sweden	1550	1400	1940	1070	<2010
United Kingdom	7920	11 650	11 520	8960	2020
EU	76 000	91 920	111 440	89 840	2017

Clearly better diagnosis and improved treatment is required, but concerted efforts are needed to better understand the etiology of the disease and enhance the very limited prospects of primary prevention at present. The most consistently recognized risk factors for pancreatic cancer are cigarette smoking, overweight/obesity and diabetes [10,11]; although declines in lung cancer mortality rates have been observed in a number of the EU countries [6], they do not match the stable or slowly rising mortality trends of pancreatic cancer.

There is a clear need to develop novel research avenues driven by international collaborations, as well as increase public and governmental awareness of the disease. It has been shown that the development of pancreatic cancer from precursor lesions to localized disease and further to metastatic disease takes several years [12]. Therefore, a window of opportunity is afforded to detect pancreatic cancer at an early stage, before the tumor becomes symptomatic and when surgical therapy remains an option without major adverse events. However, due to the low incidence of pancreatic cancer, screening is only conceivable in yet-to-be-defined well specified high-risk populations.

There are evidently caveats in both the data sources and the methods employed in this study. Using the WHO mortality database, the validity of pancreatic cancer data is known to vary across countries and calendar years, and is considered to be of lower quality than that of breast cancer data in some

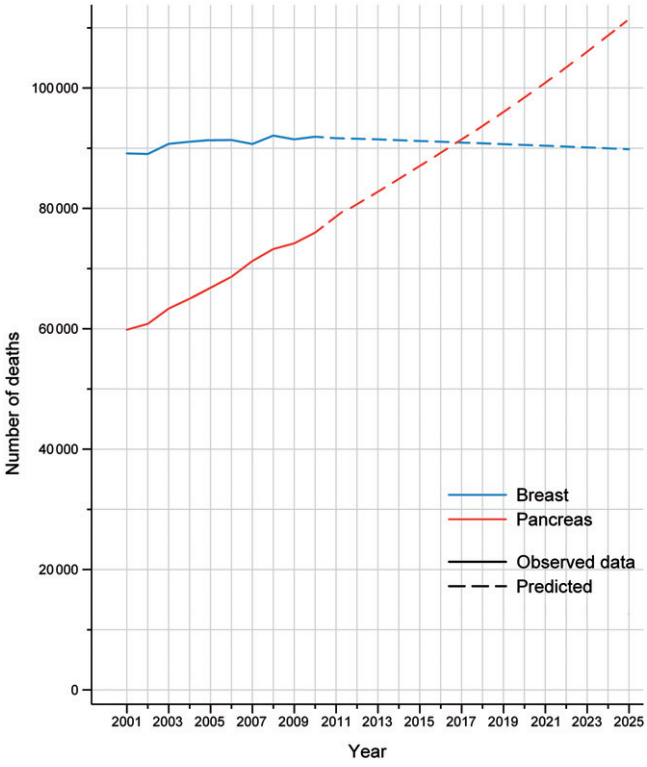

Figure 1. Recorded (2001–2010) and projected (up to 2025) number of breast and pancreatic cancer deaths (both males and females) in the EU.

nations [13]. Similarly, improvements in the accuracy of certifying cause of death may have influenced trends, although the impact is likely to be minimal given the 10-year study period.

We highlight here the increasing prominence of pancreatic cancer in the EU, with deaths from the disease likely to surpass those from breast cancer in the EU within the new few years. Coordinated efforts are needed in Europe and internationally to reduce the foreseeable burden of the disease in the EU and other high income countries including Australia [14], Japan [10] and the US [15]. With the translation of emerging technologies to clinical practice, it is foreseeable that new strategies will emerge in the near future that will offer some hope to control this high case-fatality disease [16].

Disclosure statement

We declare we have no conflict of interest.

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