



Provincial rates and time trends in pancreatic cancer outcomes

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INTRODUCTION

Pancreatic cancer, often called the “silent killer,” is the twelfth most common cancer in Canada, with an estimated 4600 new cases in 2012¹. Surpassing prostate cancer, pancreatic cancer is also the fourth leading cause of cancer-related death in Canada, with an estimated 4300 deaths in 2012¹. Smoking, obesity, diabetes, and genetic predisposition are all known risk factors for pancreatic cancer. Currently, no early detection method and no effective treatment are available for pancreatic cancer². Of all patients diagnosed with pancreatic cancer, 75% die within the first year, most within the first 3–6 months². The objective of the present article is to highlight the outcomes of this highly fatal cancer. Further details on the results and on the methodologies used can be found in the *2012 Cancer System Performance Report* released by the Canadian Partnership Against Cancer as part of the system performance initiative.

METHODS

Cancer incidence data (the number of newly diagnosed cases) from 1992 to 2009 (to 2007 for Quebec) were extracted from the Canadian Cancer Registry, a population-based database maintained by Statistics Canada. Mortality (number of deaths) through December 31, 2009, was determined using record linkage to the Canadian Vital Statistics Death Database (excluding deaths registered in the province of Quebec) and information reported by provincial and territorial cancer registries³.

Incidence and mortality rates were age-standardized to the Canadian 1991 standard population. The age-standardized incidence rate (ASIR) and age-standardized mortality rate (ASMR) allow for a comparison of rates over time and across provinces in which age structures differ. Trends in ASIR and ASMR were examined using piecewise linear regression analysis, a technique that identifies changes in

trends over time. The resulting trends were quantified as annual percent change (APC), with a positive or negative APC corresponding to an increased or decreased trend respectively.

The 5-year conditional relative survival⁴, which describes the probability of a patient surviving to a given time in the future during the cancer experience (5 years in this case) relative to the expected survival of the general population of the same age and sex, was calculated. Pancreatic cancer was defined using the site code C25 (*International Classification of Diseases for Oncology*, 3rd edition) for incidence and the site code C25 (*International Classification of Diseases for Oncology*, 9th and 10th editions) for mortality.

FINDINGS AND INTERPRETATION

Incidence and Mortality

The ASIR for pancreatic cancer declined significantly for men (APC: -0.46% ; $p = 0.01$) to 10.5 cases in 2007 from 11.2 cases in 1992 per 100,000 population, but remained relatively stable for women during the same period, hovering around 8.5 cases per 100,000 population (Figure 1). Pooled data show interprovincial variations in the ASIR for 2007–2009, ranging from 6.1 cases per 100,000 population in Newfoundland and Labrador to 10.4 cases per 100,000 population in Prince Edward Island (data not shown).

The ASMR declined significantly from 1992 to 2009 for men (APC: -0.61% ; $p < 0.01$) and remained stable for women (APC: -0.2%). When examined by province, the pooled data for 2005–2009 (Figure 2) indicate that Newfoundland and Labrador also had the lowest ASMR (8.0 cases per 100,000 population) and that New Brunswick had the highest ASMR (10.1 cases per 100,000 population). The overall ASMR for Canada was 9 cases per 100,000 population.

Overall, deaths caused by pancreatic cancer in Canada in 2006 surpassed those caused by prostate cancer, but that observation varied by province. In

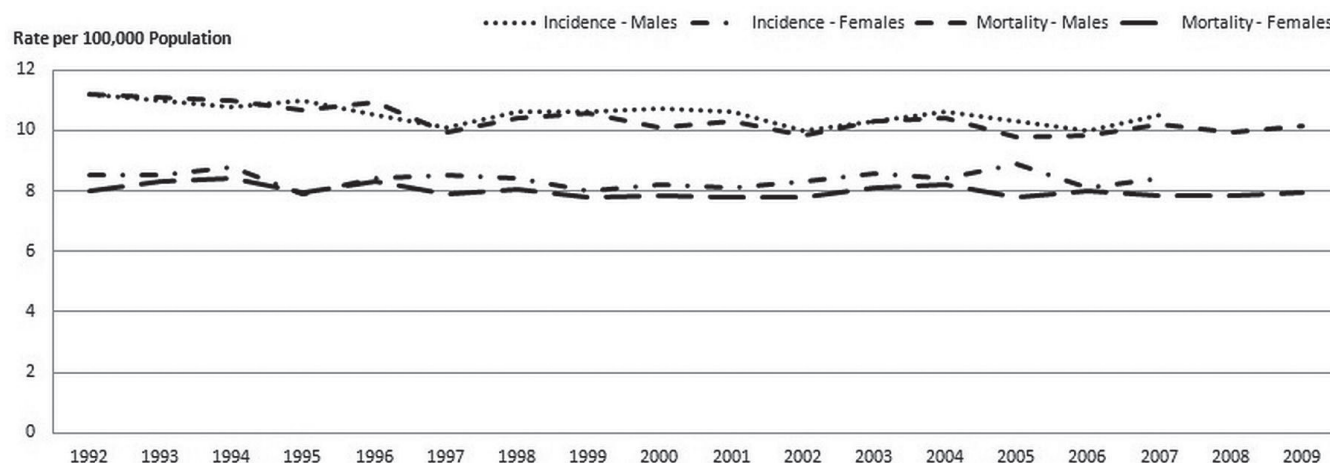


FIGURE 1 Age-standardized (to the Canadian 1991 standard population) incidence and mortality rates for pancreatic cancer, by sex, Canada, 1992–2009. Data source: Statistics Canada, Canadian Cancer Registry, Vital Statistics Death Database.

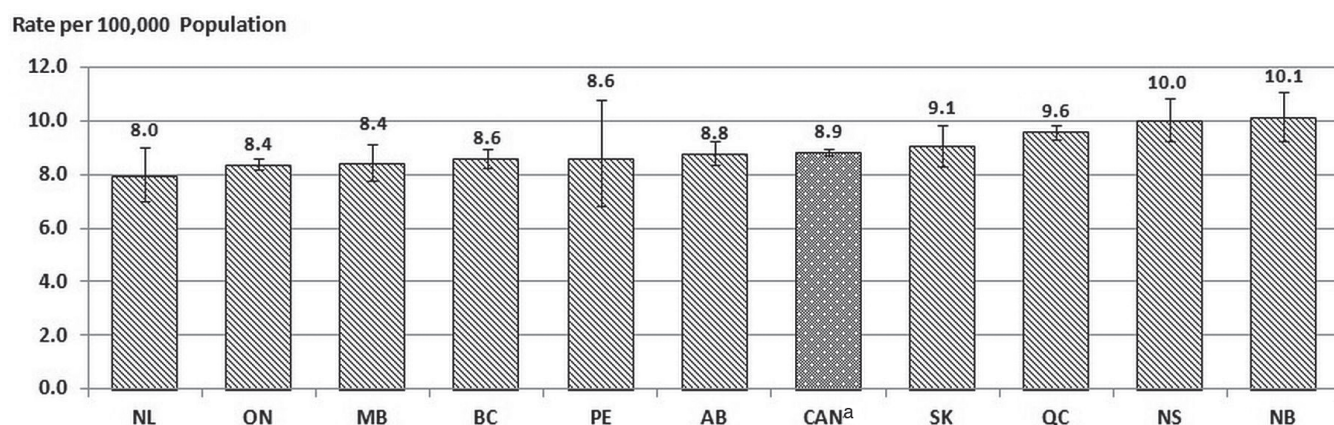


FIGURE 2 Age-standardized (to the Canadian 1991 standard population) mortality rates for pancreatic cancer, by province, 2005–2009. Whiskers indicate the 95% confidence intervals. ^a Excludes Quebec. Data source: Statistics Canada, Vital Statistics Death Database.

Quebec, the number of deaths attributable to pancreatic cancer surpassed those attributable to prostate cancer as early as 1998. In 2009, deaths caused by prostate cancer still outnumbered those caused by pancreatic cancer in Alberta, Manitoba, and Saskatchewan (data not shown).

Relative Survival

Despite significant advancements in detection and treatment for some cancers, no effective early detection tool is currently available for pancreatic cancer. Most pancreatic cancer cases are detected at the advanced stage, leading to a 5-year survival rate in the single digits².

Using pooled data for 2005–2007, the crude 5-year overall relative survival ratio for pancreatic cancer in Canada (excluding Quebec) was 9%. The percentage varied by province, from 3% in Manitoba to 12% in Newfoundland and Labrador (Figure 3).

Caution should be used when comparing the relative survival ratio across provinces. Under-ascertainment of deaths because of linkage failure of registry data with death certificates or because of unregistered annual emigration could lead to severe overestimation of survival, because patients lost to follow-up are assumed to be alive at the cut-off date⁵. This limitation has a much greater effect on estimates for people in younger and middle-aged groups. It could be one reason for the double-digit crude 5-year relative survival ratios in Ontario and Newfoundland and Labrador.

With increasing crude numbers of new cases and deaths on the horizon, pancreatic cancer will become a significant cancer burden for the nation.

THE CANCER SYSTEM PERFORMANCE COLLABORATION

The *Cancer System Performance Report* is published by the Canadian Partnership Against Cancer and

Relative survival (%)

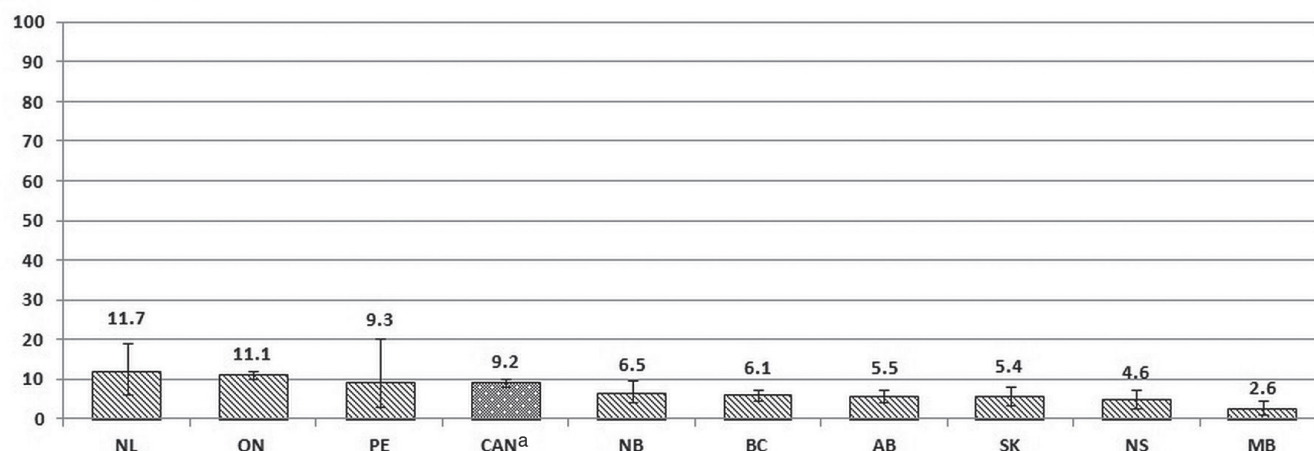


FIGURE 3 Five-year relative survival ratios for the pancreatic cancer population aged 15–74 years, by province,^a 2005–2007. Whiskers indicate the 95% confidence intervals. ^a Excludes Quebec. Data source: Statistics Canada, Canadian Cancer Registry.

made possible through the dedicated efforts of the System Performance Steering Committee and the Technical Working Group for System Performance, comprising representatives from each of the 10 provincial cancer agencies, programs, and directorates.

The 2012 *Cancer System Performance Report* can be viewed at <http://www.cancerview.ca/system-performancereport>.

Slides of figures in this communication and the *Cancer System Performance Report* can be downloaded at <http://www.cancerview.ca/downloadables>.

CONFLICT OF INTEREST DISCLOSURES

The authors have no financial conflicts of interest to declare.

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