

## ***Long-term analysis of cancer incidence, mortality and survival trends in Canada***

Re: “Cancer incidence, mortality and survival trends in Canada, 1970–2007” by L. Kachuri, P. De, L. F. Ellison, R. Semenciw, The Advisory Committee on Canadian Cancer Statistics (Chronic Diseases and Injuries in Canada, Vol 33, No 2, March 2013, p. 69–80).

The article, “Cancer incidence, mortality and survival trends in Canada, 1970–2007,” analyzed long-term trends for selected cancers (prostate, breast, lung and colorectal) in Canada using data from the Canadian Cancer Registry, National Cancer Incidence and Reporting System, and the Canadian Vital Statistics Death Database. The study first examined long-term trends for all cancers, followed by the 4 most common cancers in Canada, as they have the most notable changes in incidence or mortality trends in the past decade.

The study is not put in its proper context. The authors did not justify the choice of the year range (1970–2007) for studying the long-term trend of cancer. There is a need to provide convincing reasons for the years that has been specified and why the years before 1970 have not been included in the analysis.

The authors also used several data sources for the analysis; however, it is not clear how these various data sources are linked to one another, and the authors could have clarified how the various data sources are related in one way or the other. For instance, how are the mortality data linked to the cancer incidence data that have been used in the analysis? It is not clear whether the population with the cancer incidence is the same population with the mortality rates that has been used in the analysis. This may lead to the misinterpretation of the results of the study. The authors should have explained further what criteria were used in the selection of the mortality rates indicated. It is also not clearly specified in the study

whether those mortality rates were for the years 1970 to 2007. This makes it confusing for the reader to know exactly at what time periods these mortality rates cover.

Since the study was analyzing long-term trends in cancer incidence and mortality, it would have been appropriate to specify the various age categories in the analysis. For that matter, using only sex categories does not provide good trends for cancer analysis since that could have major impact on policy implication. In effect, the results of the study are limited in their interpretations since it does not take into account for other demographic variables that could have wide implications for policy.

The authors have outlined in the limitations of the study that a number of risk factors and modifiable lifestyle factors were considered in the study. A look at the results section of the study shows that no risk factors and modifiable lifestyles factors were accounted for in the study. The authors should state what risk and modifiable factors were taken into consideration in the analysis. The results of the study should therefore be interpreted with caution.

In conclusion, the paper provides a general idea about the trends and incidence of cancer in Canada by offering some policy implications. Further studies are needed to take into account other factors such as demographic and risk factors that could impact on the incidence and mortality rates of cancers in Canada.

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# Authors' response

We thank Mr. Banchani for raising some important issues about our study that require further explanation. However, some aspects of surveillance research appear to have been misunderstood, so we also take this opportunity to clarify.

Our choice of year range was primarily motivated by the availability and consistency of incidence data. The national cancer registry was established in 1969 at Statistics Canada—comprising the event-oriented National Cancer Incidence Reporting System (NCIRS) and succeeded by the current patient-oriented Canadian Cancer Registry (CCR) in 1992.<sup>1</sup> The year 1970 was the earliest year for which we felt that national cancer incidence data were reliable for analysis. At the time of our publication, actual cancer incidence data for Canada were available up to 2007 only, which determined the latest period of observation of our analysis. The time period for the mortality rates was selected to match the year range for the incidence data, as is typical practice for surveillance studies.

The Canadian Vital Statistics Death Database,<sup>2</sup> which is used to derive the mortality rates presented in our publication, includes deaths (including those from cancer) for all residents who died in Canada between 1950 and 2009 (the years of data available at the time of our publication). Although not explicitly stated in the data sources of our article, all tables and figures show the year range of mortality analysis as being 1970–2007. Both the incidence and mortality databases are population-based and hence closely relate to one another. However, incidence and mortality rates for a given year will not directly relate to each other as, in general, individuals diagnosed with cancer tend to survive beyond their diagnosis year. Furthermore, some cancer deaths in the study period may relate to cases diagnosed prior to 1970. Similarly, some cases diagnosed with cancer in the study period may still be alive, may have died after 2007 or may have died from an unrelated cause. Unlike cohort studies, in

which a specific group of individuals is followed over time and health outcomes are subsequently ascertained, surveillance data examine the cross-sectional incidence and mortality from disease.

The methods described in our paper specify that all ages were included in the analysis of incidence and mortality, and ages 15 to 99 years for survival analysis. Furthermore, we explain how age-adjusted rates were calculated to take into account the effect of age in cancer rates when examining trends over time. We recognize that providing an analysis stratified by age group would have enhanced our ability to examine differences by age, but such an analysis was beyond the scope of this paper. Our aim was to provide an overview of trends in cancer incidence, mortality and survival and discuss these in the context of emerging trends in major modifiable risk factors among Canadians. Select sub-group analyses, such as age-specific trends using similar datasets, can be found elsewhere.<sup>3</sup>

Banchani mentions that our analysis should be examined by “other demographic variables,” but it is not clear what this means. Population-based cancer registries do not typically collect sociodemographic variables such as education, occupation and income to allow for stratified analysis by these factors. Only recently has a linkage been made of the CCR with the Canadian census data from 1991. These linked data are expected to allow for future analyses of sociodemographic data with cancer data.

Banchani also highlights that risk factor information is not considered in our analysis. Given that our analysis was based on population rather than individual-level data, adjustment by risk factor prevalence was not possible. Instead, as is customary in most surveillance research, we related the observed trends to a discussion of risk factors for which population-based estimates could be obtained from national surveys, such as prevalence among Canadians of cigarette smoking,

alcohol consumption and infectious diseases as well as measures of body mass index (BMI) and physical activity. Sex and age-specific prevalence for some of these cancer risk factors can be obtained from national health surveys such as the Canadian Community Health Survey.<sup>4</sup>

Surveillance studies such as ours continue to be important sources of information for cancer control and prevention as they identify important trends in cancer that can guide the need for and allocation of health care resources, evaluate the impact of population prevention activities and treatment, and help prioritize the needs of cancer survivors.

**Prithwish De, Linda Kachuri,  
Larry F. Ellison and Robert Semenciw**

## References

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