Reviewer's report

Title: Choice of relative or cause-specific approach to cancer survival analysis impacts estimates differentially by cancer type, population, and application: evidence from a Canadian population based cohort study

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Reviewer: Linda Cook

Reviewer's report:

Review

Summary

The analysis presented in this paper looks at four methods of estimating cancer survival using two population-based groups, a First Nations population (an Aboriginal population) and a non-Aboriginal population in Canada. These groups were established from adults who completed a long form for the "1991 Canadian Long Form Census" which was linked with the Canadian Cancer Registry and named the "1991 Canadian Census Mortality Cohort". Two approaches were taken to estimate survival using Relative Survival (RS) and Cause-Specific Survival (CS) from 2001 until death, 5-years of FU or 2009, whichever came first. For RS, either ethnic-specific or general life tables were used, noted as RS-E or RS-ELT and RS-G or RS-GLT, respectively. For CS, either a broad or narrow definition of cancer deaths was used, noted as CS-Broad or CS-B and CS-Narrow or CS-N, respectively. Age-standardized five-year survival was estimated for all four methods for Aboriginal and non-Aboriginals separately by gender (Figure 1) and the authors report that variation in survival estimation across the four methods was most notable for the gender-specific cancers of breast and prostate. Excess mortality for Aboriginals relative to non-Aboriginals was also presented (Table 2 and Figure 2 but not by gender) with breast and prostate showing the most variation across the four methods. The authors conclude that they have empirically shown that the survival estimation method employed influences cancer survival estimates in a group, and to a lesser degree, estimates of a survival disparity between groups.

Critique

While the article seems a bit circular in that the background section notes that variation in survival estimation has been shown to vary by FU length, higher proportions of non-cancer deaths, and for rare cancers (page 4, lines 11-27) and this is essentially repeated in the
conclusions (page 12, lines 38-42), it is interesting to see an empirical example of what we generally "guestimate" in our heads. However, apart from a nice empirical example, it is not clear that there is anything "new" in this paper or anything that moves the field of cancer survival estimation and comparisons of survival between populations forward to a new level. There are no concerns about the general analytical approach and framework. Specific concerns about this paper are noted below.

Major comments

1. While it is appreciated that the authors acknowledged the very small number of cases and deaths for some of the cancers in the Aboriginal group, it is difficult to put any confidence in the results for NHL, stomach, oral cavity and pharynx, and cervix. Each of these cancers had less than 71 cases in total in the Aboriginal group (Table 1). The number of deaths were 45 or less for each cancer (Table 1). And in Figure 1 these were further stratified by gender, except cervix of course, making these number very, very small in each estimation (the stratified numbers were not provided in the paper). Further, comparing these imprecise survival estimates to the more robust non-Aboriginal estimates just increases the lack of confidence in these results. The authors may want to restrict their survival analyses to those cancers that can reasonably be estimated and compared (ie, colorectal, lung, breast, prostate, kidney).

2. The authors point out that their empirical example shows that the estimates using the different approaches may not be comparable (Abstract, lines 47-50). Most people who work with survival know that the type of estimation will influence the final result. And, as the authors have shown in their specific example, the variation will be dependent on the specific populations studied. So what is generalizable from this analysis/paper that was not known before? How can others better interpret that results from past and future studies (Abstract, lines 49-52) without going through the same procedure that the authors have completed?

Minor comments

3. Page 3, line 14: Not clear what "so far as the cancer is concerned" means. Please revise.
4. Page 3 line 48: "CS" is used but not defined until the next page.


6. Page 4, lines 52-57: No indication was provided as to the response percentage to the 1991 Canadian Long Form Census. Presumably it was representative of the respective populations. Please provide by Aboriginal/non-Aboriginal status.


8. Please use one acronym for each method and use it consistently in the text and tables/figures.

9. Page 7, lines 6-8: Not clear what "…the cohort…" means here. The CONCORD-2 cohort?

10. Page 11, lines 39-43: "… including these…." is not clear. Does "these" refer to second and higher order cancer diagnoses for the individuals?

11. Figure 2 has an acceptable format where the data/results for five cancers is over-laid on the labels. Please revise.
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