

<b>Reviewer comments: CMAJ Open 2015-0013</b>	
Title	<b>Hypothermia as a cause of death in British Columbia, 1998–2012: a descriptive assessment</b>
Authors	Joanne Stares; Tom Kosatsky
<b>Reviewer 1</b>	Siavash Jafari
Name	
Institution	University of British Columbia, School of Population and Public Health
General comments	<p>Your study aims at answering a very important public health question using the best data source available. Your manuscript presents the results in a descriptive way which is easy to follow and understand. There are other interesting questions that still need to be answered in such a study however I understand that it would be impossible mainly because of the limitations inherent to your dataset.</p> <p>One question that would be helpful to answer in the discussion section would be the potential explanations for hypothermia death in the summer time? Do you think it is data collection error (cause of death) or is it related to specific geographic areas where the temp changes rapidly within a 24 hr period...etc?</p> <p>Also, I would suggest authors to add a limitation about the differentiating between overdose related deaths versus hypothermia in those cases where drugs and alcohol was a contributing factor. A person can overdose in a cold day and die, before the hypothermia kills him. This might be difficult to be answered by such a data but would be helpful to discuss it briefly.</p>
<b>Author response</b>	<p>Your study aims at answering a very important public health question using the best data source available. Your manuscript presents the results in a descriptive way which is easy to follow and understand. There are other interesting questions that still need to be answered in such a study however I understand that it would be impossible mainly because of the limitations inherent to your dataset.</p> <p>Thank-you for taking the time to review this manuscript and providing us with such thoughtful comments.</p> <p>1. One question that would be helpful to answer in the discussion section would be the potential explanations for hypothermia death in the summer time? Do you think it is data collection error (cause of death) or is it related to specific geographic areas where the temp changes rapidly within a 24 hr period...etc?</p> <p>We don't necessarily think that it is entirely the result of data collection errors or areas characterised by sudden changes in temperature within a 24 hour cycle, though that could very well be the case among some decedents. Summertime hypothermia-related deaths may also occur as a result of a</p>

	<p>number of activities, such as boating accidents, traumatic injury, or underlying physiological vulnerabilities. We do briefly discuss risk factors in the introduction (page 1 paragraph 1). If directed, we can make more detailed mention of this in the discussion.</p> <p>2. Also, I would suggest authors to add a limitation about the differentiating between overdose related deaths versus hypothermia in those cases where drugs and alcohol was a contributing factor. A person can overdose in a cold day and die, before the hypothermia kills him. This might be difficult to be answered by such a data but would be helpful to discuss it briefly.</p> <p>We agree with the Reviewer's comment. Please see lines 4-6 on page 18</p>
<b>Reviewer 2</b>	Judy MacDonald
Institution	Alberta Health Services, Calgary Zone
General comments	<p>This is an interesting analysis of data that should be of interest to Canadians and others living in geographic areas that experience colder temperatures, though hypothermia-related injury and death does not only occur in such areas. Linkages of the Vital Statistics data with other sources of data providing mean temperatures, SES, population density have led to some additional associations, some that are more strongly supported by the data than others. This manuscript clearly shows there is a significant gap in our understanding of hypothermia-related death (and injury), and provides many good suggestions for future research. Please see the attached file for my specific comments.</p> <p>Reviewer: Judy MacDonald, Medical Officer of Health, Alberta Health Services - Calgary Zone. No competing interests.</p> <p>Minor comments:</p> <ol style="list-style-type: none"> <li>1. Spelling of some terms is not consistent with what is typically used in Canadian journals – hospitalisation, characterisation, etc. rather than hospitalization, characterization, etc. Is this consistent with CMAJ Open guidelines?</li> <li>2. Page 3, paragraph 1: Hypothermia symptoms in adults are covered; what about symptoms in children since this age group is also included in the statistics?</li> <li>3. Page 7, paragraph 2: Suggest that the abbreviation LHA be specifically defined in the text, i.e. local health area (LHA).</li> <li>4. Page 8, paragraph 1: The term “elderly” should be clearly defined – is it individuals 75 years of age and older?</li> <li>5. Page 8, paragraph 3: Grammar – mixing of present and past tenses – “are” and “were”. Suggest you choose one tense and stay with it throughout the manuscript. There may be other instances of mixed tenses that I have not caught.</li> <li>6. Pages 9, 10 and 15: Make sure that text references to tables and figures are correct as you seem to have got out of</li> </ol>

	<p>sequence. E.g. in paragraph 1, page 9, the text should reference Figure 1, not Table 3, and in paragraph 2, the text should reference Table 3, not Table 4. This carries onto pages 10 and 15 with several more incorrect references to tables or figures. You also seem to have missed Table 4 in your tables and figures numbering.</p> <p>7. Page 9, paragraph 2: Text says that for &lt;75 year olds, non-alcohol psychoactive substances accounted for 27% of additional causes of mortality – the figure in Table 3 is 26%.</p> <p>8. Page 12, Table 2 – May be helpful to indicate the season of the months for readers not familiar with Canadian seasons, e.g. Dec-Feb (winter), Mar-May (spring), etc.</p> <p>9. Page 17, Figure 2 – Two inset maps on left should have legends or some kind of labeling.</p> <p>10. Page 19, paragraph 1, last sentence – Please check 9% value – what does it refer to and why use the word “respectively” when only one value is given?</p> <p>Major comments:</p> <p>1. Page 6, paragraph 3 (and throughout manuscript): What is the rationale for choosing age groups less than 75 years of age, and 75 years and older in the analysis? Other papers referenced used the more traditional 65 years of age and older in their analyses.</p> <p>2. Pages 19 and 20 - Analysis of location of death: You note that hypothermia mortalities were geo-located by postal codes of residences of decedents, rather than sites of death. Yet you go on to analyze this data element in some depth and make assumptions that may not be justified, if the Vital Statistics database indeed does not say anything definitive about where the cold exposure or death actually occurred. As well, you are able to localize the location of death to a hospital in some cases, which is clearly not the postal code of the decedent’s residence. Please explain the location data element more clearly – what exactly can you get from the death certificate as I believe that most death certificates give specific addresses/locations of the place of death e.g. XXYY Hospital, Vancouver, BC.</p> <p>3. Page 19, paragraph 1: you list the associations between hypothermia-related mortality and various factors that your data indicated – male gender, advanced age, winter months and cool temperatures, etc. I don’t think you should include rurality and socioeconomic status in this list because the association is not as strong as for the other factors you explored. Perhaps indicate that there is a trend but the numbers are small, or some such statement.</p> <p>4. Page 19, paragraph 2: you note that the differences in age-related contributors to hypothermia-related deaths may be related to social conditions, and make what might be seen as a leap in assuming elderly individuals might be more likely to be living in substandard housing and thus more at risk of hypothermia-related death. This may be so, but I don’t think the data you have support that very well.</p>
<b>Author response</b>	This is an interesting analysis of data that should be of interest to Canadians and others living in geographic areas

that experience colder temperatures, though hypothermia-related injury and death does not only occur in such areas. Linkages of the Vital Statistics data with other sources of data providing mean temperatures, SES, population density have led to some additional associations some that are more strongly supported by the data than others. This manuscript clearly shows there is a significant gap in our understanding of hypothermia-related death (and injury), and provides many good suggestions for future research.

Thank-you for taking the time to review this manuscript and providing us with such thoughtful comments.

Major comments:

1. Page 6, paragraph 3 (and throughout manuscript): What is the rationale for choosing age groups less than 75 years of age, and 75 years and older in the analysis? Other papers referenced used the more traditional 65 years of age and older in their analyses.

We felt that increasing the age cut-off to 75 years of age would better aide us in teasing individuals out of our data set who are vulnerable due to advanced age than would the traditional cut-off of age 65 years given increases in life expectancies and health adjusted life expectancies at age 65. We decided to use 75 years of age as a cut-off given that in the most recent years reported (2005-2007), the health adjusted life expectancy at age 65 in British Columbia was 14.5 and 15.9 years for males and females respectively (CANSIM Table 102-0122: Health-adjusted life expectancy, at birth and at age 65). Would it be preferable for this justification be explained in the text of the manuscript?

2. Pages 19 and 20 - Analysis of location of death: You note that hypothermia mortalities were geo-located by postal codes of residences of decedents, rather than sites of death. Yet you go on to analyze this data element in some depth and make assumptions that may not be justified, if the Vital Statistics database indeed does not say anything definitive about where the cold exposure or death actually occurred. As well, you are able to localize the location of death to a hospital in some cases, which is clearly not the postal code of the decedent's residence. Please explain the location data element more clearly – what exactly can you get from the death certificate as I believe that most death certificates give specific addresses/locations of the place of death e.g. XXYY Hospital, Vancouver, BC.

This element was not explained very clearly, and I have made some slight edits to try and correct this. In the BC Vital Statistics Death File we only have access to location of death which is categorised as occurring at home, in a residential institution, in hospital, or as occurring in "[an]other specified locality" (please see the sentence on line 3-6 on page 2). More detailed information on location of death is likely included on medical certificates of death; however it is not included with data received from the BC Vital Statistics Death File. Other than this, we have access to postal code of residence. Postal code of residence is used to link

temperature on the day of death to decedents by local health area of residence (please see line 1-2 page 4). This is a limitation to our data given that deaths may have occurred outside the local health area of residence; particularly among transient populations (and lines 7-13 on page 18).

3. Page 19, paragraph 1: you list the associations between hypothermia-related mortality and various factors that your data indicated – male gender, advanced age, winter months and cool temperatures, etc. I don't think you should include rurality and socioeconomic status in this list because the association is not as strong as for the other factors you explored. Perhaps indicate that there is a trend but the numbers are small, or some such statement.

We agree with the reviewer's comment. Please see lines 5-7 on page 16.

4. Page 19, paragraph 2: you note that the differences in age-related contributors to hypothermia-related deaths may be related to social conditions, and make what might be seen as a leap in assuming elderly individuals might be more likely to be living in substandard housing and thus more at risk of hypothermia-related death. This may be so, but I don't think the data you have support that very well.

We agree with the reviewer's comment and have edited this statement out of the manuscript.

Minor comments:

1. Spelling of some terms is not consistent with what is typically used in Canadian journals – hospitalisation, characterisation, etc. rather than hospitalization, characterization, etc. Is this consistent with CMAJOpen guidelines?

It is my understanding, from an email exchange with Ms. Erin Russell from CMAJOpen, that copy editing at this level will be addressed by CMAJOpen manuscript editors. Thus I have not made any changes.

2. Page 3, paragraph 1: Hypothermia symptoms in adults are covered; what about symptoms in children since this age group is also included in the statistics?

We agree with the reviewer's comment. However, I feel that describing hypothermia symptoms in this manuscript to be unnecessary. Rather than include symptoms in children, I have removed any mention of hypothermia symptoms from the manuscript.

3. Page 7, paragraph 2: Suggest that the abbreviation LHA be specifically defined in the text, i.e. local health area (LHA).

We agree with the reviewer's comment and have spelled out each occurrence of the abbreviation LHA in the manuscript.

4. Page 8, paragraph 1: The term "elderly" should be clearly defined – is it individuals 75 years of age and older?

We agree, usage of this term is unclear and I have clarified this in the methods section. Please refer to page 3, lines 17-18.

5. Page 8, paragraph 3: Grammar – mixing of present and past tenses – "are" and "were". Suggest you choose one

tense and stay with it throughout the manuscript. There may be other instances of mixed tenses that I have not caught. We agree with the reviewer and have edited the manuscript to use past tense throughout.

6. Pages 9, 10 and 15: Make sure that text references to tables and figures are correct as you seem to have got out of sequence. E.g. in paragraph 1, page 9, the text should reference Figure 1, not Table 3, and in paragraph 2, the text should reference Table 3, not Table 4. This carries onto pages 10 and 15 with several more incorrect references to tables or figures. You also seem to have missed Table 4 in your tables and figures numbering.

Thank you for noticing this and bringing it to my attention. I have corrected the discrepancies in the text and in the titles of the tables.

7. Page 9, paragraph 2: Text says that for <75 year olds, non-alcohol psychoactive substances accounted for 27% of additional causes of mortality – the figure in Table 3 is 26%.

Again, thank you for noticing this and bringing it to my attention. I have corrected this: please see line 21, page 5.

8. Page 12, Table 2 – May be helpful to indicate the season of the months for readers not familiar with Canadian seasons, e.g. Dec-Feb (winter), Mar-May (spring), etc.

We agree with this comment. Please see the changes to Table 2, page 9.

9. Page 17, Figure 2 – Two inset maps on left should have legends or some kind of labeling.

We agree with this comment. Please see the edited version of Figure 2 on page 14.

10. Page 19, paragraph 1, last sentence – Please check 9% value – what does it refer to and why use the word “respectively” when only one value is given?

We agree that this sentence was confusing. We also feel that it is unnecessary, so I edited it out of the manuscript.