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Title	The Cardiovascular Health in Ambulatory Care Research Team (CANHEART) performance indicators for the primary prevention of cardiovascular disease: a modified Delphi panel study
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Reviewer 1	Dr. Sophia Papadakis PhD MHA BSc
Institution	Division of Prevention and Rehabilitation, University of Ottawa Heart Institute, Ottawa, Ont.
General comments (author response in bold)	<p>This paper provides a summary of the methods used in the development of a set of performance indicators for the prevention and management of CVD in primary care settings. Working closely in this area for more than 15 years it is my opinion that this is an important paper to share with the primary care and specialty setting (who may be working with primary care in a regional shared care model) and health planners in the province of Ontario as well as the rest of Canada. This paper presents the performance indicators, suggested sources of data and definitions to be used. It is well written and I have no significant comments as a reviewer that I feel are needed prior to publication.</p> <p>1. The only minor suggestion I have for authors would be to expand in the discussion on how these indicators are intended to be used and how health planners ie LHINs, family health teams, and other stakeholders including health links should use these indicators in their work. Great work on an excellent paper. <b>Thank you for your comments. We have included more information on the intended use of the CANHEART indicators by health system planners such as LHINs, health links and other groups in the interpretation section on page 10 paragraph 2.</b></p>
Reviewer 2	Dr. Jeffrey A Bakal PhD MSc BSc
Institution	Canadian VIGOUR Centre, University of Alberta, Edmonton, Alta.
General comments (author response in bold)	<p>The authors present a review of indicators of outcomes in Heart disease.</p> <p>1. What is missing is any review of the quality of these indicators, or ease of developing these from existing Administrative or other sources? <b>We have thoroughly pilot tested the quality indicators (see page 6 paragraphs 2-3 for more detailed information) as part of the CANHEART regional variations paper (In press, CMAJ, manuscript attached) and are confident in the quality of our indicator definitions and ease of calculating the indicators using administrative, EMR, laboratory, and other existing data sources.</b></p> <p>2. Will these be easy to compute in all provinces? <b>We anticipate that indicators will be relatively easy to compute in all provinces, with some exceptions. The Canadian Institute for Health Information Discharge Abstract Database is available for all Canadian provinces and territories, with the exception of Quebec. Most Canadian provinces have physician services databases similar to the Ontario Health Insurance Plan. Other provinces should also have EMR data and drug and laboratory claims data available although they may not be as accessible as they are in Ontario at ICES.</b></p> <p>3. Do they drive outcomes? <b>Our work in the CANHEART regional variations study has shown that indicators such as lipid screening are associated with a decreased risk of major cardiovascular events (myocardial infarction, stroke, or cardiovascular death). Individuals living in regions with high rates of cardiovascular events have been shown to have lower numbers of primary care visits, and lower rates of statin prescriptions among high risk individuals (see attached documents for more information). Previous work by other groups has shown that high rates of preventative health care processes contribute to lower rates of cardiovascular events (Starfield et al 2005 Millbank Quarterly).</b></p>
Reviewer 3	Dr. David Peiris MBBS PhD
Institution	The George Institute for International Health, Renal Division, Newtown, Australia
General comments (author response in bold)	<p>Thank you for the opportunity to review this interesting description of a process to determine meaningful indicators for ambulatory CV care in Canada. The group are well-placed to undertake such work and the methods chosen to arrive at the final list are well explained. It will become a useful policy tool to argue for consistent reporting for primary care level indicators. This has major implications for epidemiological surveillance, system performance assessment, development of QI programs and for maturation of data systems to be able to adequately capture the information needed. I have a few comments and queries below for the authors to consider, many of which come from an Australian perspective.</p> <p>1. Although the flow chart explains it, the text in methods does not explain how the 63 got down to 28 indicators (only mentions the 19 that were removed). <b>We have added more detailed information on reasons why the indicators were excluded on page 6 paragraph 3. Indicators not feasible to measure due to data quality and availability issues were excluded (n=19), in addition to indicators which demonstrated substantial overlap with others (n=9) and indicators deemed to be of low priority by the expert panel (n=7).</b></p> <p>2. I don't quite understand this sentence "Indicators were grouped into these domains opposed to Donabedian's ..." Could you please clarify? <b>This sentence was meant to contrast our grouping of the quality indicators into domains on the basis of prevalence, screening, management, intermediate outcomes, and long-term outcome indicators as opposed to a more traditional framework for indicators based on the classic Donabedian structure, process, and outcomes framework. We agree that this sentence is confusing and have removed it from the text on page 7 paragraph 1.</b></p> <p>3. I like the way the indicators are laid out. The authors may be interested in the format used by the Australian Health Performance Framework which organizes indicators into three tiers (health status, health determinants, and health system performance) with various sub-domains <a href="http://meteor.aihw.gov.au/content/index.phtml/itemId/392569">http://meteor.aihw.gov.au/content/index.phtml/itemId/392569</a>. I find this useful because <b>it starts to get at the issue of who should take 'ownership' of the indicator - community, patients, providers, institutions and governments.</b> <b>Thanks very much you for the framework information. This may be useful for us in future work.</b></p> <p>4. Related to the above I was surprised there were no indicators on responsiveness as measured by patient satisfaction and</p>

experience. Perhaps these were excluded because of data availability, however, they are now increasingly being used to gauge system performance and being integrated into quality measures for payment purposes (e.g in the CAHPS and HCAHPS in the US) **Unfortunately we don't currently have data available on patient satisfaction and experience, which would require population-based surveys in order to report at a regional level. We believe that patient satisfaction and experience is an important component of all health care delivery and additional resources should be invested to collect this information. We have added a statement regarding this to the manuscript on page 11 paragraph 1.**

5. It was very surprising to me that a single risk factor approach was taken, given most guidelines worldwide recommend an overall or absolute CVD risk approach when stratifying risk for a population. E.g. Prescription rates for people at high CVD risk rather than hypertension etc has consistently been shown to be a better strategy than individual risk factors. **Thank you for raising this point. Although we agree that a multiple comorbidity approach is often useful in understanding cardiovascular risk, we chose to take a single risk factor approach in our quality indicator development because most quality indicator development has been at an individual risk factor level and for each of measurement and reporting.**

6. I was also surprised that AF in general, rather than AF at high thromboembolic risk, was chosen as the population of interest. Bleeding harms are not inconsequential for those at low risk. **We defined the atrial fibrillation indicators to focus on all individuals with atrial fibrillation due to measurement challenges in defining who is at high cardiovascular risk (e.g. one would need to calculate a CHADs score or CHADVASC2 score on everyone). Most individuals with atrial fibrillation aged 65 and over (for whom drug data is available) would likely be at intermediate or high cardiovascular risk and should be prescribed anticoagulants (warfarin or direct oral anticoagulant).**

7. The access indicators do not clearly link to the rest of the dataset. Whilst I appreciate that access is critical to assessing system performance in general, is there any evidence that visit frequency improves system performance/ outcomes for cardiovascular care? **We feel that health system access is key prerequisite for appropriate cardiovascular primary care as well as other types of care. Work by our group in the CANHEART regional variations study has demonstrated that increasing numbers of primary care visits and an annual health exam are associated with lower rates of major cardiovascular events (see attached manuscript).**

8. Working more closely with EMR vendors to incorporate agreed indicators into their software specifications and having uniform standards for these definitions is critical. Here in Australia, there are many data fields that capture information slightly differently and this creates headaches in developing robust KPI programs. We have struggled for many years to get consensus from vendors on seemingly simple things like smoking status. I think more explicit mention should be made of this challenge especially given EMR uptake remains relatively low in Canada compared to other OECD countries. **We agree that it is critical to work with EMR vendors in order to stimulate integration of uniform indicator definitions into EMR systems. We have added a statement regarding this in the manuscript on page 10 paragraph 3.**

9. I think more could be made of the need to define particular sub-populations who may be at higher risk of CVD. For example, some indicator programs in Australia mandate that data be reported for the total population and by Aboriginal status. This becomes a critical policy lever when assessing system inequities and I imagine is a similar issue in Canada. **Thank you for raising this important issue. We agree that it is critically important to consider sub-populations who may be at a high risk of cardiovascular disease when calculating indicators and examining system performance in Canada. Documenting primary cardiovascular care performance in ethnic groups known to be at a higher risk of cardiovascular disease such as South Asians and First Nations groups is crucial in understanding whether quality improvement initiatives are needed to address gaps in care provided. We have added a statement regarding this to the interpretation section on page 10 paragraph 3.**