Why should public health agencies across Canada conduct climate change and health vulnerability assessments?

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Abstract

Climate change is increasingly impacting population health outcomes related to several areas of public health service delivery across Canada, and internationally. As a result, public health practitioners are increasingly looking for guidance on how to begin planning for and adapting to a myriad of health-related climate impacts. This paper outlines several benefits for local or regional health agencies in conducting climate change and health vulnerability assessments (CCHVAs), based on the author's experience in conducting two of Canada's first comprehensive assessments. These benefits include, but are not limited to establishing suitable baseline understandings of past, present, and future climate-related health risks; providing guidance on mechanisms to reduce health inequities that may be exacerbated by climate change; generating credibility for health agencies to engage with climate change and pursue collaborative, intersectoral relationships with a range of likely and unlikely allies; identifying suitable, cost-effective adaptation options in the form of public health programming; and encouraging decision-makers to produce proactive policy actions to redress potential climate impacts on population health. Completing a CCHVA can directly optimize health agencies' and their allies' efforts to respond to the health imperatives associated with climate change, while also fueling adaptation options that yield co-benefits across a variety of sectors.

Résumé

Le changement climatique influe de plus en plus sur les résultats en matière de santé des populations liés à plusieurs domaines de la prestation de services de santé publique au Canada et à l'étranger. Par conséquent, les praticiens en santé publique sont de plus en plus à la recherche de conseils sur la façon de commencer à planifier et à s'adapter à une myriade d'impacts climatiques liés à la santé. Cet article présente plusieurs avantages pour les agences de santé locales ou régionales dans la réalisation d'évaluations de la vulnérabilité aux changements climatiques et à la santé (EVCCS), basées sur l'expérience de l'auteur dans la réalisation de deux des premières évaluations approfondies du Canada. Ces avantages comprennent, sans toutefois s'y limiter : établir une compréhension de base appropriée des risques sanitaires passés, présents et futurs liés au climat; donner des conseils sur les mécanismes permettant de réduire les inégalités en matière de santé qui pourraient être exacerbées par les changements climatiques; créer une crédibilité pour les agences de santé afin qu'elles s'engagent dans le changement climatique et poursuivent des relations collaboratives et intersectorielles avec une gamme d'alliés probables et improbables; identifier des options d'adaptation appropriées et rentables sous la forme de programmes de santé publique; et encourager les décideurs à prendre des mesures politiques proactives pour corriger les impacts climatiques potentiels sur la santé des populations. L'achèvement d'une EVCCS peut directement optimiser les efforts des agences de santé et de leurs alliés pour répondre aux impératifs sanitaires associés au changement climatique, tout en alimentant des options d'adaptation qui produisent des retombées positives dans une variété de secteurs.

Keywords Climate change · Population health · Vulnerability assessment · Adaptation

Mots-clés Changement climatique · Santé des populations · Évaluation de la vulnérabilité · Adaptation

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Introduction

Health agencies at all levels (local, regional, provincial, and national) are increasingly required to adapt to shifting population health outcomes resulting from changing climate conditions. Climate change is already impacting aspects of public health service delivery in Canada (Seguin et al. 2008), including infectious and vector-borne disease surveillance, air quality monitoring, food and water quality testing, and emergency preparedness and response for extreme weather events, including storms, flooding and extreme heat/cold events (Patz et al. 2014; Watts et al. 2017; Woodward et al. 2014). In light of these impacts, public health agencies may need to initiate, or be asked to participate in, the process of planning for and adapting to a myriad of climate change impacts. In response to these demands, climate change and health vulnerability assessments (CCHVAs) have been forwarded by the World Health Organization (see WHO 2012), Health Canada (see Seguin et al. 2008) and the US Centers for Disease Control and Prevention (see Manangan et al. 2015) as a foundational step to support public health preparedness under a changing climate. This commentary draws on the author's experience of conducting some of Canada's first CCHVAs in collaboration with staff from Health Canada and local Ontario Public Health Units (PHUs) to clarify the value for public health agencies in conducting such assessments.

A CCHVA is an evidence-based assessment process of articulating past, present, and future health impacts of climate change in a given geographic area, and is therefore akin to a rapid health impact assessment. CCHVAs are designed to better understand vulnerability, or the degree to which populations are susceptible to the effects of climate change, and can be conducted in a relatively short time frame (i.e., 1 to 3 months) with limited resources. In the context of these assessments, vulnerability is conceptualized as a function of a population's: [a] exposure to climate hazards (i.e., the degree to which a person or group is in contact with a particular hazard); [b] physiological sensitivity to those impacts; and [c] adaptive capacity—or the ability to adjust to climate change and reduce associated health risks (WHO 2012).

CCHVAs tend to prescribe an iterative process similar to formal recommendations on the conduct of health impact assessment, including several discrete steps:

- Framing and scoping the assessment;
- Describing the current condition of risks, vulnerabilities and adaptive capacity;
- Projecting future climate and health risks;
- Ascertaining programs or policies to manage identified health risks; and
- Establishing a process for monitoring and evaluating climate change and health risks (WHO 2012).

Public health practitioners and decision-makers have a great deal to gain from conducting CCHVAs. First, CCHVAs can provide baseline information on the state of population health vulnerabilities impacted by climate change based on the best available evidence. Population health vulnerabilities refer to health issues that have the potential to be exacerbated by climate change or may refer to specific populations that are more or less vulnerable due to physiology, differential exposure, or limited adaptive capacity. Given the geographic specificity of both climate impacts and health concerns, CCHVAs are most useful when scoped at a local or regional level. While broader assessment areas could be considered (at the level of a province, for example), such an approach risks losing the ability to comment on the granularity of impacts to specific populations living in areas that will be more or less affected by localized climate change impacts.

Documenting the state of past, present, and future climate risks enables public health decision-makers to streamline climate reporting into a variety of existing reporting mechanisms (i.e., updating vector-borne disease surveillance and reporting with changing climate conditions in mind, or including a climate risk component into regularly conducted community health assessments). CCHVAs can also serve as stand-alone reports updated on a regular basis (e.g., every 5–10 years, or as new climate health risks emerge). In other words, while CCHVAs may be seen as yet another assessment protocol, they can synergize with an array of monitoring and surveillance activities to help address the near and long-term environmental health priorities of health agencies.

An initial assessment can therefore take different forms. It can focus on a single health risk to maximize the depth of assessment, such as focusing only on extreme heat exposure and related morbidity and mortality (see, for example, Åström et al. 2013). Alternatively, CCHVAs can integrate a variety of health impacts into “chapters” to maximize breadth in reporting; that is, a CCHVA can capture as many climate and health risks as seem relevant to the health jurisdiction under analysis (see, for example, Berry, Patterson and Buse 2013). Irrespective of the approach, CCHVAs support evidence-informed public health practice by communicating the best available evidence on a range of possible health impacts, while also providing strategic guidance on the development of programs, policies, and public health actions that can mitigate health risks at present and into the future (Fielding et al. 2016; Hess et al. 2014).

Second, an equity lens is naturally embedded into CCHVAs; that is, CCHVAs consider how existing health inequities can be exacerbated by a changing climate and provide guidance on how to direct budgets and personnel to reduce both vulnerabilities and inequities over time. Framing CCHVAs in relation to health equity can lend political credibility to initiating the assessment process given the promotion of health equity is a broadly articulated goal

of public health practice in Canada. However, addressing health inequities through CCHVAs may run the risk of conflating health inequalities with the inequities that drive the unequal distribution of health outcomes in the first place. Indeed, the way in which health equity is framed in CCHVAs can engender particular programmatic responses such as the simple communication of health risks to priority populations versus a more fulsome engagement with the upstream drivers of inequalities (e.g., poverty, racism) and the conditions that maintain them (Buse 2015). CCHVAs should not be considered a magic bullet to solve the complex challenge of promoting health equity, but public health practitioners can benefit from outlining specific goals for improving health equity by explicitly linking stated goals to aligned programs or policies wherever possible.

Third, the evidence collated in a CCHVA can generate credibility for PHUs or public health agencies to engage with climate change. The sharing of relevant public health evidence and expertise can provide a “seat at the table” in intersectoral governance processes seeking to either mitigate or adapt to the impacts of climate change (e.g., regional climate change adaptation strategy development and implementation). Not only can a completed CCHVA build such capacity, but at the outset of the CCHVA, consideration should be given as to which stakeholders could be engaged to contribute data and expertise to the assessment. This approach is directly supportive of the health-in-all policies agenda to promote healthy public policy through intersectoral action (Buse 2013; Watts et al. 2015). It can also provide future pathways for health agencies to engage a variety of likely and unlikely allies on topics that may not fall within the conventional purview of environmental health protection activities (e.g., working with conservation authorities to evaluate the direct and indirect health benefits of urban forestry strategies).

Fourth, and related to the point above, CCHVAs can provide foundational information for the economic evaluation of a variety of public health activities. It is important to note that any public health action is likely to be more cost effective than no intervention at all. The World Health Organization estimates that by 2030, direct costs to health (not including costs to health-related sectors such as water, sanitation and agriculture) could be between US\$2 and \$4 billion per year, globally. The National Roundtable for the Economy and Environment estimates that between 2010 and 2100, the cumulative costs of premature mortality risk attributable to only heat and air quality impacts resulting from climate change will be CAD\$65–\$96 billion, \$52–\$77 billion and \$36–\$48 billion for Toronto, Montreal, and Vancouver, respectively (NRTEE 2011). To that end, consideration ought to be given on how best to maximize the co-benefits of programs and policies, while mitigating co-harms to other sectors (Cheng and Berry 2012; Spencer et al. 2017).

CCHVAs should enable the analysis of cost-effectiveness of identified interventions wherever possible, but especially those that may have an array of co-benefits across sectors. An example of an intervention that promotes co-benefits is increasing tree canopy cover in urban areas as a means to simultaneously improve air quality, reduce impervious surfaces and flood risk, ameliorate the urban heat island effect, and provide esthetic spaces for people to recreate, while also enhancing urban space’s ability to act as a carbon sink. As climate change continues to unfold, public health capacity must be built to respond to impacts through adaptive management practices, and cost-benefit analysis will be an important tool to quantify the efficacy of public health interventions across a variety of sectors (Hess et al. 2012).

Fifth, piloting CCHVAs in jurisdictions without formal policy guidance can help to spur policy development and the adoption of proactive and preventive public health actions. Ontario serves as a particular exemplar of this phenomenon where the conduct of CCHVAs eventually paved the way for the development of provincial guidance documents (see Paterson et al. 2016) to support Ontario PHUs in conducting their own assessments. Ontario PHUs are now better positioned to meet provincial policy and public health standards mandating the communication of climate change health risks. The guidance documents now enable PHU staff who have yet to conduct a CCHVA to respond to a suite of environmental health hazards that are being modified by climate change over time.

There are a number of reasons why public health decision-makers may decide not to conduct a CCHVA, including a lack of human resources or technical capacity, limited funds, or the absence of political will to initiate and drive the assessment process. This may be the case when climate change is not an identified immediate or near-term priority, when there is climate change denialism within public health leadership, or when climate change is not understood as a public health issue.

However, the evidence is clear: climate change is already impacting the health of Canadians and will continue to do so without suitable interventions. Assessing population health vulnerabilities to climate change is a promising first step to developing programs and policies that are better equipped to both protect and promote the health of Canadians in the twenty-first century. Although our knowledge of the “tipping points” by which environmental changes may impact health are not well understood, this should in no way justify inaction by public health actors on this issue.

Conclusion

The ability of public health researchers and practitioners to both detect and attribute a range of health burdens to climate

change has improved greatly (Ebi et al. 2018), and numerous indicators across public health service delivery areas exist to track progress of public health adaptation to climate change (Ebi 2018). CCHVAs can therefore enable public health practitioners to make evidence-informed judgements to both enhance the delivery of core public health services and plan for health issues that may arise under a changing climate. Completing a CCHVA therefore positions health agencies and their allies to adapt and respond to health impacts of climate change in ways that are proactive and responsive, that build positive relationships across sectors and can provide a necessary impetus to drive public health policy.

References

- Åström, D. O., Forsberg, B., Ebi, K. L., & Rocklöv, J. (2013). Attributing mortality from extreme temperatures to climate change in Stockholm, Sweden. *Nature Climate Change*, 3, 1050–1054.
- Buse, C. (2013). Intersectoral action for health equity as it relates to climate change in Canada: contributions from critical systems heuristics. *Journal of Evaluation in Clinical Practice*, 19(6), 1095–1100.
- Buse, C. G. (2015). Health equity, population health, and climate change adaptation in Ontario, Canada. *Health Tomorrow*, 3, 1.
- Cheng, J. J., & Berry, P. (2012). Health co-benefits and risks of public health adaptation strategies to climate change: a review of current literature. *International Journal of Public Health*, 58(2), 305–311.
- Ebi, K. L. (2018). Indicators for monitoring and evaluation adaptation within health systems. In L. Christiansen, G. Martinez, & P. Naswa (Eds.), *Adaptation metrics: Perspectives on measuring, aggregating and comparing adaptation results* (pp. 157–163). Copenhagen: UNEP DTU Partnership.
- Ebi, K. L., Ogden, N. H., Semenza, J. C., & Woodward, A. (2018). Detecting and attributing health burdens to climate change. *Environmental Health Perspectives*, 125(8), 1–8.
- Fielding, G., McPherson, M., Hansen-Ketchum, P., et al. (2016). Climate change projections and public health systems: Building evidence-informed connections. *One Health*, 2, 152–154.
- Hess, J. J., McDowell, J. Z., & Lubet, G. (2012). Integrating climate change adaptation into public health practice: using adaptive management to increase adaptive capacity and build resilience. *Environmental Health Perspectives*, 120(2), 171–179.
- Hess, J. J., Eidson, M., Tlumak, J. E., et al. (2014). An evidence-based public health approach to climate change adaptation. *Environmental Health Perspectives*, 122, 1177–1186.
- Manangan, A. P., Uejio, C. K., Shubhayu, S., Shramm, P. J., Marinucci, G. D., Langford Brown, C., Hess, J. J., & Lubet, G. (2015). *Assessing health vulnerability to climate change: a guide for health departments*. Atlanta: Centers for Disease Control and Prevention Available at: <https://www.cdc.gov/climateandhealth/pubs/AssessingHealthVulnerabilitytoClimateChange.pdf> (Accessed May 22, 2018).
- National Roundtable for the Environment and Economy (NRTEE). (2011). *Paying the Price: The economic impacts of climate change for Canada* (p. 166). Ottawa: Climate Prosperity; Report 04.
- Paterson, J., Yusa, A., Anderson, V., et al. (2016). *Ontario climate change and health vulnerability and adaptation assessment guidelines*. Toronto, ON: Ministry of Health and Long-Term Care Available at: http://www.health.gov.on.ca/en/common/ministry/publications/reports/climate_change_toolkit/climate_change_health_va_workbook.pdf (Accessed February 17, 2018).
- Patz, J. A., Frumkin, H., Holloway, T., et al. (2014). Climate change: Challenges and opportunities for Global Health. *JAMA*, 312(15), 1565.
- Seguin, J., Berry, P., Bouchet, V., et al. (Eds.). (2008). *Human health in a changing climate: a Canadian assessment of vulnerabilities and adaptive capacity*. Ottawa: Health Canada Available at: http://publications.gc.ca/collections/collection_2008/hc-sc/H128-1-08-528E.pdf (Accessed February 17, 2018).
- Spencer, B., Lawler, J., Lowe, C., et al. (2017). Case studies in co-benefits approaches to climate change mitigation and adaptation. *Journal of Environmental Planning and Management*, 60(4), 647–667.
- Watts, N., Adger, W. N., Agnolucci, P., et al. (2015). Health and climate change: policy responses to protect public health. *Lancet*, 386(10006), 1861–1914.
- Watts, N., Adger, W. N., Ayeb-Karlsson, S., et al. (2017). The lancet countdown: tracking progress on health and climate change. *Lancet*, 389(10074), 1151–1164.
- Woodward, A., Smith, K. R., Campbell-Lendrum, D., et al. (2014). Climate change and health: on the latest IPCC report. *Lancet*, 383(9924), 1185–1189.
- World Health Organization (WHO). (2012). *Protecting health from climate change: vulnerability and adaptation assessment*. Geneva: WHO Available at: http://apps.who.int/iris/bitstream/10665/104200/1/9789241564687_eng.pdf?ua=1 (Accessed July 2, 2017).