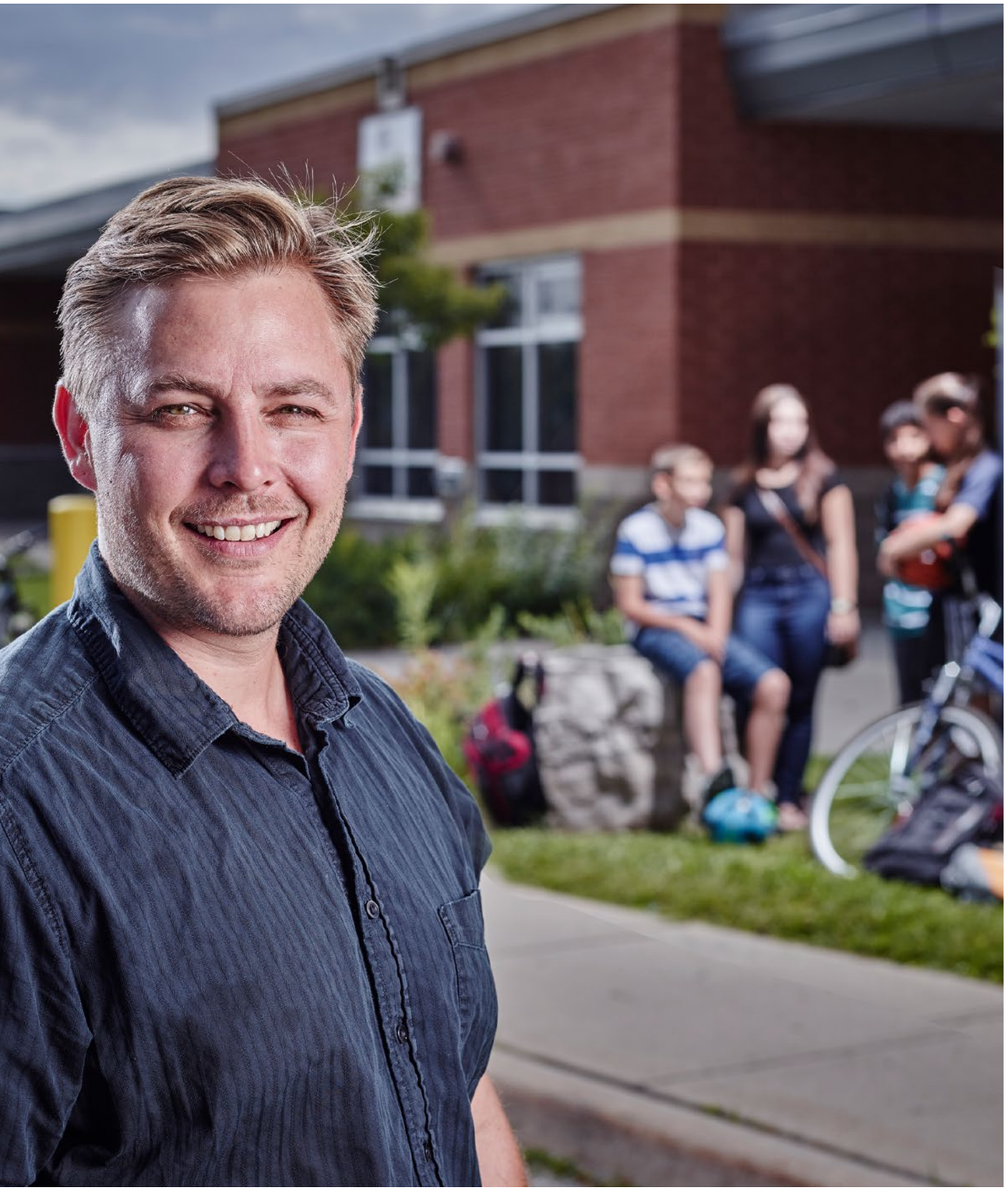


The COMPASS system: using systems science to shape the direction of youth health policy and practice

Professor Scott Leatherdale is an Associate Professor in the School of Public Health and Health Systems at the University of Waterloo, a CIHR-PHAC Chair in Applied Public Health Research, and an inaugural winner of Canada's Trailblazer Award in Population Health Solutions. His work focuses on advancing a systems science approach to chronic disease prevention and designing research infrastructure to facilitate precision public-health decision making.

The vast majority of Canadian students, and likely most youth globally, exhibit multiple modifiable risk factors for developing chronic diseases, such as cancer, diabetes and cardiovascular disease, later in life. Considering the bulk of the chronic disease burden in Canada is due to modifiable behavioural risk factors (tobacco use, alcohol consumption, physical inactivity and unhealthy eating), associated risk conditions (e.g., obesity / being overweight) and perhaps most importantly, the underlying social determinants of health, more effective prevention efforts are required.

Many of these risk factors are often established during adolescence. Also given that a relatively large percentage of an individual's time, regardless of socio-economic status, is spent in school, reaching youth via prevention policy within the school environment can play an important role in shaping the behaviour of youth. Evidence is mounting about the importance of how characteristics of the environments that surround youth, such as the school or local community, can be manipulated to promote and/or inhibit healthier lifestyles amongst the youth populations. We already know that where a Canadian child lives or goes to school impacts his/her likelihood of smoking, binge drinking, being overweight, or using drugs.

Developing research systems to determine how to more effectively shape school and community environments to enable healthy behaviours and determining how to diminish or remove inequities exaberbated by community environments, is what drives Professor Leatherdale's programme of research and applied public health practice.

FOR THE GREATER GOOD

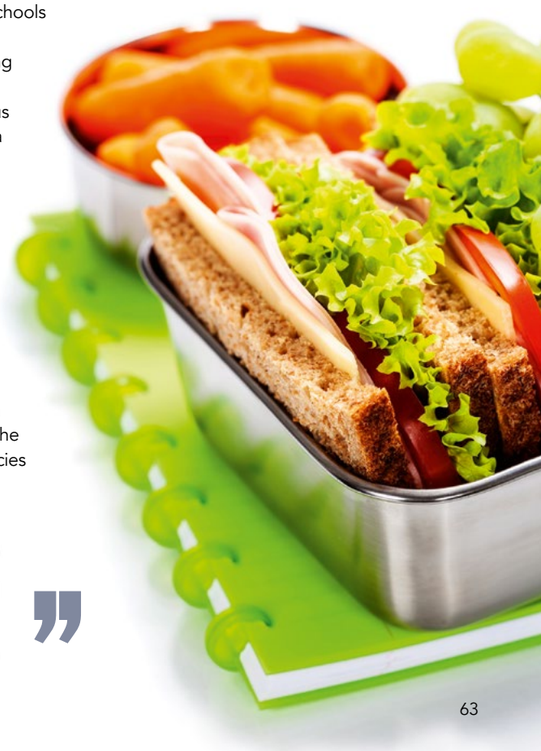
However, comprehensive data surrounding school and community characteristics that may impact development of these health behaviours, such as programmes, policies or built environment resources within schools or in surrounding communities, are rarely collected in a robust or ongoing systematic manner to advance the prevention research agenda. Previous studies have already shown there is a lack of robust data on youth health, especially with respect to policy, as well as an inability to translate what limited evidence we have into practical real-world solutions. In order to further understand the impact that intervention has on youth health, a re-think was required.

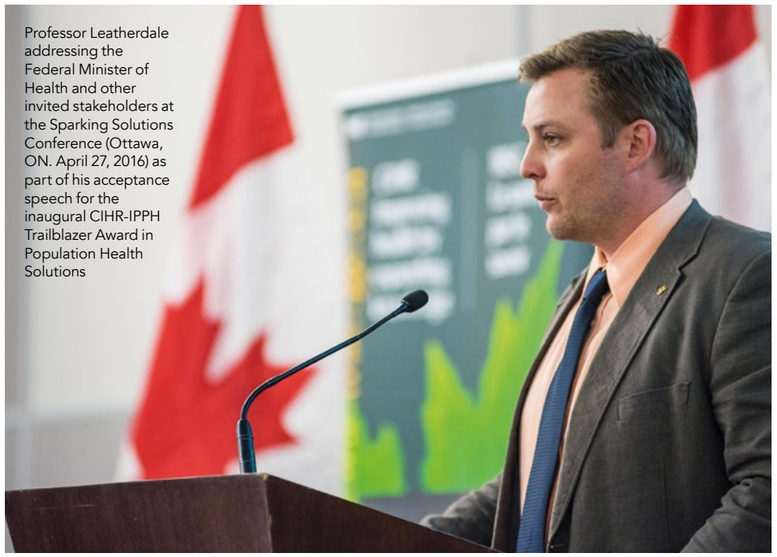
Whilst few researchers have the data required to adequately understand the impact of real-world changes to policies and programmes on youth risk factors and outcome variables, data sharing and the public availability of data is becoming increasingly common. It is a way in which multiple international research groups can utilise the same data. Therefore, knowledge transfer and consideration of the broader impact are imperative for effective, future interventions.

DATA FOR ALL

Professor Leatherdale is a trailblazer on a mission. Not only did he want to develop a simple, robust, and cost-effective system for advancing youth-focused prevention policy and practice research, he also wanted to make those data openly available to researchers and practitioners around the world – hence the development of the COMPASS system. The COMPASS system is an open data resource using data collected from the world's most comprehensive and largest longitudinal school-based natural experiment evaluation project – the COMPASS study. In COMPASS,

A heroic aim with the potential to redefine how we think about the health behaviours of the next generation





Professor Leatherdale addressing the Federal Minister of Health and other invited stakeholders at the Sparking Solutions Conference (Ottawa, ON. April 27, 2016) as part of his acceptance speech for the inaugural CIHR-IPPH Trailblazer Award in Population Health Solutions

Knowledge transfer and consideration of the broader impact are imperative for effective future intervention

hierarchical longitudinal data are now collected annually from over 80,000 students in more than 100 schools and communities across Canada to evaluate how real-world changes to school or community programmes, policies, or built environment resources shape the way youth behaviours and mental health outcomes over time. For example, in July 2018 when Canada legalises the sale of cannabis, what impact does that have on youth cannabis use, mental health outcomes, and co-occuring risk behaviours?

REAL-WORLD DATA

These kinds of real-world data allow researchers to quickly and robustly monitor changes in youth health behaviour over time, to determine how effective prevention policies or programmes are, and to work directly with schools and government stakeholders to implement change based on that timely evidence. For example schools are provided with a detailed annual feedback report, which includes evidence-based recommendations for future health policy and programme improvement. This is the first time in Canada, and indeed in the world, that such a study has been carried out. Moreover, considering COMPASS addresses a variety of domains at once (e.g., substance use, diet and activity, mental health, etc.), with the ability to evaluate local, regional, provincial and national policy changes simultaneously across these domains, this one data system can provide scientifically sound evidence at a fraction of the cost of what governments typically pay to evaluate individual policy changes.

COMPASS can be used to ask questions relating to both longitudinal and cross-sectional samples. Cross-sectional analyses may include identification of high risk individuals or school environments, examining inter-school variability or co-occurrence of different outcomes. Whereas, longitudinal analyses may examine how changes in school-level characteristics are related to individual student-level outcomes over time, or how the trajectory of one outcome is influenced by another outcome (e.g., a decline in physical activity may impact the development of obesity).

The COMPASS resources already provide exciting opportunities to address public health questions spanning different social and physical environments, and tackle health inequalities among high-risk groups. Professor Leatherdale also hopes the system can be used to strengthen the national capacity required for Plan, Act, Evaluate and Adapt strategies to advance youth health in multiple domains, thus generating further practice-based evidence in this area.

However, the COMPASS study does not only provide data. COMPASS knowledge brokers are on hand to facilitate interaction between various stakeholders: the research team, school and community partners, for example. The knowledge brokers aim to use reflective practice focusing on improving population health practices, rather than simply focusing on improving effectiveness. A change in culture is required, rather than simply trying to patch up what already exists.

OPPORTUNITIES FOR COLLABORATION

Although COMPASS has already engaged a pan-Canadian team of over 25 researchers, and over 100 other stakeholders, Professor Leatherdale hopes that his network will continue to expand. In order to recruit additional stakeholders and to foster further engagement by both national and international researchers, a COMPASS Data Usage Application exists on the COMPASS website (https://uwaterloo.ca/compass-system/). The value of the system would be even further strengthened if implemented in additional countries, so Professor Leatherdale encourages those interested internationally to get in touch.

The ultimate goal for Professor Leatherdale is to share the COMPASS assets with whoever is best placed to use the data to drive effective prevention practice to improve the health of the youth population, regardless of what University or Institute they work for and no matter where in the world they are based: a heroic aim with the potential to redefine how we think about the health behaviours of the next generation.

Q&A

What originally sparked your interest in the Canadian youth health system?

When I started my career within the Canadian cancer control system, it would have been easier to work in the basic sciences or treatment end of the cancer spectrum as there are substantially more research resources (both funding and research colleagues) available in those domains. However, despite the paucity of resources available or allocated to cancer prevention research in Canada, I figured if I really want to have an impact, why not focus my skills and unique expertise on building capacity and rigour in the underserviced pillar of the cancer spectrum. I could easily have a larger impact on the future cancer burden by shifting upstream determinants at the population level.

If you could give a school just one piece of advice to improve its youth health behaviours, what would that be?

Schools often don't see the link between health behaviours and academic achievement or student success. As such, the advice I would give is that healthier students do better in school, healthier students do better when they leave school, and healthier students can help build healthier communities. Schools are the gatekeepers of youth at a critical time in their development and independence, why not focus on both improving their knowledge and their well-being. Seems win-win to me.

What do you think is currently the biggest barrier to effectively implementing prevention initiatives in schools?

Competing priorities and a lack of resources. Schools are being increasingly tasked to shape multiple aspects of youth development, yet the resources and evidence to support that ever-increasing mandate are not keeping pace. Moreover, in the Canadian context, as education systems focus more and more on test scores and traditional measures of academic achievement, less focus and effort is being targeted at the other highly important roles the education system can play in successful youth development.

How would you like to see COMPASS develop in the long-term, i.e., will other countries be able to enter data from their own education programmes into the database to allow international comparisons to be made, and authorities to draw upon the experiences of others?

First, it would be great if COMPASS were institutionalised as part of the Canadian education system. COMPASS data are very affordable to collect and low burden on schools (i.e., we can currently collect whole school data from >1,000 students in one 45-minute classroom period). When you consider the knowledge we would gain from evaluating the thousands of programmes and policies that are implemented annually across a variety of behavioural domains at the local, provincial or national level, with such census data, our evidence-base would be staggering. Imagine the financial resources saved by having one system for evaluating thousands of interventions simultaneously rather than in a series of one-off poorly conceived evaluations. Second, if COMPASS data were collected in additional countries, it could be used to evaluate the impact of national policies using the same quasi-experimental design we currently use. Expanding to new countries would dramatically increase the value and impact of the COMPASS system for limited additional resources.

Is there the possibility that systems like COMPASS could be translated to address adult health behaviours too?

Of course. The conceptual thinking behind COMPASS could easily be translated into a variety of different domains targeting different populations. For instance, my wife is currently developing and implementing a conceptually similar system within a series of Canadian mental health and addictions facilities. I am also working with other partners to implement a similar system in Canadian University and College campuses to understand how those contexts impact young adults. I think health care systems could also easily adapt and implement similar systems to this to help generate locally relevant and timely data to shape their practice decisions. I am always happy to chat to those folks who may be interested in exploring future options.

Detail

RESEARCH OBJECTIVES

Prof Leatherdale's research focuses on advancing a systems science approach to primary prevention activities, developing and evaluating population-level health interventions across multiple risk factor domains, and creating research infrastructure to facilitate large population studies in chronic disease prevention.

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COLLABORATORS

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BIO

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CONTACT

Scott Leatherdale, PhD, Associate Professor, CIHR-PHAC Chair in Applied Public Health Research , School of Public Health and Health Systems
University of Waterloo
200 University Ave West, LHS 1617
Waterloo, ON. Canada. N2L 3G1

E: sleather@uwaterloo.ca
T: +1 (519) 888-4567 ext 37812
W: https://uwaterloo.ca/compass-system/
@compass_UW