

Synthesizing evidence and sparking citizen and decision-maker action to address misinformation

Leadership at all levels (government, organizations, professionals and citizens) is needed for championing actions to ensure timely, trustworthy, robust and sustained evidence-based responses to address the pressing societal challenge of misinformation in Canada and globally. Without it, trust in our institutions, public-health and health systems will continue to erode.

Extensive COVID-19-related misinformation (and disinformation that purposefully disseminates information to induce false belief) has led it to be a high-priority global challenge to address.(1-3) This has spurred efforts among leaders at all levels to mitigate the spread of falsehoods and sustain public trust in evidence-based care.(1; 3) Generating action towards addressing a complex and pressing policy issue such as misinformation, requires the creative interplay of, on the one hand, the best-available data and research evidence and, on the other hand, the tacit knowledge and views and experiences of those who will be involved in or affected by the issue.

Our team brings together world-class and interdisciplinary expertise that includes government decision-makers, organizational leaders, professional leaders, citizens and researchers with expertise in misinformation, leadership and communication, evidence synthesis, policy analysis, behavioural science and analysis and citizen and stakeholder engagement to address misinformation. This interdisciplinary team will generate impacts on addressing misinformation by: 1) synthesizing evidence to generate a novel framework for addressing misinformation and routinely update the best-available evidence in the world about the impact of strategies to address misinformation; and 2) sparking action by convening diverse panels of citizens to identify values and preferences for addressing misinformation and convening a national stakeholder dialogue with leaders who can take action.

Background

Increasing digitalization and use of social media is a two-edged sword.(4) It creates opportunities to rapidly communicate and disseminate information to address social challenges, and is therefore an important tool for reaching individuals and communities.(4; 5) However, as emphasized by the United Nations (UN),(3) digital technologies and social media also have the potential of introducing misinformation to citizens.(4) Misinformation, which refers to inadvertent misleading information to which the public may be exposed and share without intent to cause harm, can delay or prevent effective care,(5) affect mental health,(6) lead to misallocation health resources (6) and/or create or exacerbate public-health crises.(6; 7) Disinformation or malinformation are other common terms, but refer to a purposive strategy to induce false belief, channel behaviour, or damage trust and can be very difficult to prove and therefore we use the term misinformation.(7) Misinformation can affect some members of society more than others (e.g., those with lower digital, numerical and health literacy and/or cognitive skills are more vulnerable to misinformation),(8; 9) and therefore more exposed to health threats, leading to greater social and health inequities.(10)

Extensive COVID-19-related misinformation has spurred efforts to mitigate the spread of falsehoods and undermine public trust in evidence-based care. Such efforts were a focus in a report from the Broadband Commission for Sustainable Development (1) and in the [Global Commission on Evidence](#) (see [chapter 4.11](#)).(3) Individuals can engage with misinformation through different sources (see Table 1).(11) In particular, while social-media platforms are a key driver of misinformation,(6; 12) it is not well understood since data is not publicly available for to be analyzed, and that many popular platforms (e.g., Instagram, YouTube, TikTok, and Pinterest), use visual content instead of texts.(11) For example, a study that analyzed 800 vaccine-related Pinterest posts, found that 74% were anti-vaccine in sentiment.(13; 14)

Table 1: Internet sources of misinformation (11)

Source	Description
Direct sources	Individuals can go straight to disreputable online domains to read information regarding health, and/or have misinformation directly disseminated to them
Search engines	Individuals use search engines seeking information, but can be directed to irrelevant webpages

User-generated content sites	<ul style="list-style-type: none"> • Platforms that provide an ecosystem for coproduction and consumption of content by users (e.g., Yelp, Wikipedia) • Social-media platforms (e.g., Facebook, Twitter) • Visual and video platforms (e.g., Instagram, Pinterest, YouTube, TikTok) • Group chats (e.g., WhatsApp), which are less resilient to misinformation
Mobile apps	The proliferation of mobile health apps has largely been without oversight or regulation, and the quality of these apps is highly variable

Although vaccines were the most common topic of misinformation before COVID-19,⁽¹⁵⁾ other common topics for misinformation include reproductive health, substance use or smoking, non-communicable diseases, pandemics, eating disorders, and medical treatments.⁽¹⁵⁾ Governments have employed a variety of strategies designed to debunk misinformation, including monitoring and fact-checking, economic incentives, and legislative policies.⁽¹⁶⁾ These strategies must be assessed and compared in terms of impacts and effects on health outcomes and behaviour change. For instance, one older evidence synthesis found that correcting misinformation has a moderate influence on belief in misinformation, rebuttals are more effective than forewarnings, and appeals to coherence are more effective than fact-checking and appeals to credibility.⁽¹⁷⁾ However, the rapid evolution of platforms for information sharing, and growth and innovation of misinformation actors means that previous synthesized evidence may no longer be valid to understand current misinformation challenges. Given this, **there is a need for new high-quality and routinely updated evidence syntheses from trusted sources that assess the comparative impact of different strategies.**

In 2020, the International Telecommunication Union (ITU) and United Nations Educational, Scientific and Cultural Organization (UNESCO), sponsored the Broadband Commission for Sustainable Development. This Commission developed a report about countering digital misinformation while respecting freedom of expression.⁽¹⁾ The report provides a framework explaining the stages in the misinformation process (Table 2). In addition, it provides a framework for ten potentially effective responses to misinformation and the possible intersections with freedom-of-expression rights,⁽¹⁾ which is outlined in Table 3 along with a classification of five categories of governmental strategies to address COVID-19 misinformation identified in a non-systematic review conducted in 2021.⁽¹⁸⁾

Table 2: Five stages of the misinformation cycle (1)

Stage	Description of questions that arise
Instigators and beneficiaries	Motivation and goals
Agents	Techniques (e.g., bots, fake accounts or false identities)
Messages	Formats, with three of the common ones including: <ul style="list-style-type: none"> • Emotive claims and narratives, which often mix emotional language, lies or incomplete information, personal opinions, and elements of truth • Fabricated, de-contextualized or fraudulently altered images, videos or audio • Fabricated websites and polluted datasets
Intermediaries	Platforms (e.g., dark web, social media, messaging, and news media) and the platform features that are being exploited (e.g., algorithms and business models)
Targets and interpreters	Who is affected (e.g., citizens, scientists, politicians and journalists; organizations such as research centres and news agencies; communities such as Black communities and Indigenous peoples; and systems such as electoral processes) and how they react (e.g., ignoring or sharing to debunk the misinformation)

Table 3: Potential responses to misinformation (1; 18)

Response/strategy	Description	Purpose of the strategy	Intersections with freedom-of-expression rights

Monitoring and fact-checking	Ongoing monitoring and timely exposing misinformation (e.g., debunked claims) and fact-checking new claims Judgement of trained professionals employed by independent organizations, even when helped by automation	Mitigating dissemination of disinformation, false information, and misinformation	Can mitigate the risk of infringing on freedom-of-expression rights
Counter-misinformation campaigns	Specialized units to develop counter-narratives to challenge misinformation and mobilizing online communities to spread high-quality evidence	Disseminating and increasing access to accurate information	
Credibility labelling	Content-verification tools, web-content indicators, signposting to credible evidence sources, and website-credibility labeling		
Educational	Develop citizens' media/information literacy for critical-thinking and digital-verification, and journalists' information literacy		
Curatorial	Point users to credible evidence sources, which can be used by news media, social media, messaging and search platforms	Restricting access to inaccurate information	
Narrative	Public condemnations of misinformation and recommendations to address it, often by political and societal leaders		
Technical and algorithmic	Ranges from human learning to machine learning and other artificial-intelligence approaches to identify misinformation, provide additional context, and limit spread	Addressing commercial fraud	Can be misused as a form of private censorship
Economic	Advertising bans, demonetizing specific content (e.g., for COVID-19) and approaches to remove misinformation incentives	Criminalizing expressions of disinformation	Can be misused to weaken legitimate journalism and infringe on freedom-of-expression rights
Legislative and other policy	Criminalize acts of misinformation, directing Internet communication companies to take down content, and providing material support for credible information sources		
Investigative	Examine instigators, degree and means of spread, money involved, and affected communities		Can inform legislative and other responses

Goals

Our overarching objective is to **synthesize and continually update empirical evidence** on strategies to address health-related misinformation in different settings and lessons learned, including how it varies by groups and contexts populations **and use it to generate actions to address misinformation**. To do this, our specific and inter-connected goals are to:

- 1) generate a novel framework that explains factors, intersections, and mechanisms for addressing health misinformation in real time;
- 2) synthesize and routinely update the best-available evidence to assess the impact of strategies to mitigate misinformation in diverse settings, and across diverse populations;
- 3) identify values and preferences of ethnoculturally and socioeconomically diverse citizens about strategies to address health misinformation in different settings; and
- 4) spark action among health-system leaders to address misinformation.

Approach

Our projects will be guided by our interdisciplinary team of government decision-makers, organizational leaders, professional leaders, citizens and researchers to ensure a co-design approach and interdisciplinary analysis, interpretation and knowledge translation. For goals 1 and 2, we will use innovative approaches to synthesizing evidence through a critical interpretive synthesis (CIS) to generate a novel framework (goal 1), and a living evidence synthesis (a novel design that routinely updates and synthesizes evidence from trusted sources as it emerges) to assess the impact of strategies to mitigate misinformation (goal 2). Lastly, we will mobilize the evidence generated from the evidence syntheses to spark action towards strengthening efforts to address misinformation by convening a series of panels with ethnoculturally and socioeconomically diverse Canadians to identify citizens' values and preferences to address misinformation (goal 3); and convening a stakeholder dialogue with leaders from Canada and globally who can champion change to address misinformation (goal 4).

Project 1: Generate a novel framework that explains factors, intersections, and mechanisms for addressing health misinformation

We will use critical interpretive synthesis (CIS), which is used to build theory using systematic review and qualitative inquiry approaches. We selected a CIS given that it is most appropriate for answering research questions that need to draw on a heterogeneous body of literature that is not particularly well developed or focused,(19; 20) which is the case with the literature related to factors, intersections, and mechanisms for addressing health misinformation.(18)

Search strategy: We will search 11 databases (from inception onwards): MEDLINE, EMBASE, CINAHL, PsycINFO, COVID-END inventory of best evidence syntheses, ACCESSSS, HealthEvidence, Health Systems Evidence, Epistemonikos, and medRxiv. Grey literature will be identified using Google Scholar, Open Science Framework, and governmental websites. We have developed a pilot search strategy (Appendix 1) in collaboration with a library scientist on our team (Tamara Navarro).

Article selection: Two reviewers will independently screen all search results for inclusion. We will include original articles without language restrictions that address one or more of the factors, intersections, and mechanisms outlined in Tables 1-3 for addressing health misinformation. We will include experimental, quasi-experimental, observational studies, evidence syntheses, and qualitative studies for any populations, settings and diseases, and we will not limit to only COVID misinformation. We will assess the titles and abstracts of the references to classify them as “potentially relevant” or “exclude,” with disagreement resolved by consensus. We will retrieve the full text of all potentially relevant articles, and two researchers will independently review them to make a final inclusion assessment. Any disagreement at this stage will be resolved by consensus.

Conceptual mapping and data extraction: We will conceptually map the included papers using a structured form. The form includes categories for document features and for variables of interest, including: type of misinformation addressed based on those outlined in Table 1; the stages of the mis/malinformation cycle outlined Table 2; type of responses to mis/malinformation using categories presented in Table 3; outcome(s) measured (e.g. change in attitudes/behaviour), and effects identified (e.g. benefits, harms, costs). We will also extract key insights from all included full-text articles by developing a summary of key findings and conclusions related to the same areas.

Purposive sampling: We will use conceptual mapping to identify areas that are conceptually rich and those with conceptual gaps. We will then conduct purposive searching and sampling to fill conceptual gaps. In this process we will aim to identify additional articles (if needed) that are conceptually rich (i.e., those address and highlight intersections between several factors included in the conceptual mapping and which describe and provide in-depth analysis or discussion about addressing misinformation).

Data synthesis: To allow for an interpretive synthesis, we will use qualitative methods to analyze and synthesize data from a purposively selected set of included studies. To do this, we will use a constant comparative method throughout our analysis to develop an explanatory framework of factors, intersections, and mechanisms for addressing health-related misinformation.

Project 2: Synthesize and routinely update the best-available evidence to assess the impact of strategies to mitigate mis/mal information in diverse settings, and populations

We will conduct a *living evidence synthesis* (LES) with citizen engagement that will include a systematic review of effects updated semi-annually, for a total of four versions over two years. A ‘living’ approach to evidence synthesis is a novel design that routinely updates and synthesizes evidence as it emerges. It has been a key innovation in systematic review methods during the COVID-19 pandemic,(3) as it provides decision-makers with rigorous evidence (because all relevant research evidence has been identified, appraised and synthesized) that is also up-to-date.(21) LESs are particularly important for topics, such as misinformation, where evidence is rapidly emerging, and where there is uncertainty for some interventions. In these situations, a living approach to evidence synthesis is best poised to inform policy or practice.(21) Therefore, our LES will provide an evolving understanding of what is known about the evolving misinformation literature, including how strategies to address it may vary by contexts and groups, including those who are more vulnerable to misinformation.

Search strategy and study selection criteria: We will use the search strategy proposed for the Project 1, and two reviewers will independently screen all search results for inclusion. We will include original articles without language restrictions that evaluate one or more of the potential responses to health-related misinformation presented in Table 3. We will include experimental, quasi-experimental and observational studies for any populations, settings and diseases (i.e., we will not limit to only COVID misinformation). Qualitative studies will be excluded in this synthesis but included in the CIS to inform the development of the conceptual framework. We will exclude evidence syntheses but will review their references to identify additional studies. Our process will conform to PRISMA guidelines.(22)

Appraisal of evidence: We will assess included studies for risk of bias and certainty of evidence. For risk of bias, we will use the Cochrane risk of bias tool for any experimental studies and an adapted version of ROBINS-I for observational study designs. We will also use the GRADE approach for assessing the certainty of evidence for the outcomes identified. Two reviewers will independently conduct the assessments, with discrepancies solved through reconciliation. Our detailed approach is provided in Appendix 2.

Data extraction: Two reviewers will independently extract findings from each included study using the standardized form provided in Appendix 3. Reviewers will use a pilot exercise before independently extracting data. The extraction form includes bibliographic information (e.g. title, authors, year of publication); study design information; disease focus (COVID-19 or other focus); location of study; population addressed (e.g., age of participants, users of different social-media or other information platforms, gender and sex of participants); equity considerations (e.g., age of participants, those with lower literacy levels, rural/urban residents, gender and sex of participants); type of misinformation addressed based on those outlined in Table 1; the stages of the misinformation cycle outlined Table 2; type of responses to misinformation using the framework presented in Table 3; outcome(s) measured (e.g. change in attitudes/behaviour); and effects identified (e.g. benefits, harms, costs).

Data synthesis: Data analysis will involve quantitative analysis if meta-analytical pooling is possible, which will be based on heterogeneity (assessed with I²) being ≤50%. We anticipate that individual studies will vary in effects observed and will estimate the pooled mean effect size using the random effects model. We will use two indicators of publication bias (Rosenthal’s Fail-Safe N and Duval and Tweedie’s trim and fill procedure).(22) For interpretation and imprecision assessment, we will use a minimally contextualized approach that considers whether the 95% CI includes the null effect, or when the point estimate is close to the null effect. We will present sub-group estimates of effect and certainty of the evidence if we observe

significant differences between subgroups (a priori we will analyze COVID-19 and non-COVID-19 oriented strategies). If meta-analytical pooling is not possible, we will synthesize quantitative data according to outcomes and interventions addressed and present a narrative summary of findings using tables and charts, and disaggregating by sex, irrespective of whether or not differences were found.

Updating: We will produce the first version by the end of month 6 of the grant and update the searches semi-annually with updated versions in months 12, 18 and 24 for a total of four version in two years. The search strategy will be adapted to include new knowledge about strategies, outcomes, and sources of information to guarantee we capture all the relevant scientific evidence regarding misinformation. In the updates of the living evidence synthesis, authors will review new studies and decide upon inclusion using the previous criteria. The synthesis will be updated accordingly.

Projects 3 and 4 (citizen panels and a national stakeholder dialogue to spark action)

Our approach is underpinned by the notion that designing any evidence-informed strategy to address complex societal issues requires the creative interplay of, on the one hand, the best available data and research evidence and, on the other hand, the tacit knowledge and views and experiences of those who will be involved in or affected by the specified approaches.(23; 24) We will use the McMaster Health Forum’s ‘tried and tested’ approach to convening five ‘virtual’ citizen panels (71 panels addressing 39 topics since 2013) and stakeholder dialogues (70 dialogues convened since 2009), which we summarize in Table 4.

Table 4: Project components for convening citizen panels and a national stakeholder dialogue

Project components	Description of activities
<p>Engaging in a co-design process with an interdisciplinary project team to integrate decision-maker and citizen perspectives</p>	<p>Our interdisciplinary team of government decision-makers, organizational leaders, professional leaders, citizens and researchers will work closely to:</p> <ul style="list-style-type: none"> • Support the process of iteratively refining the citizen and evidence briefs • Develop criteria to recruit panels of socioeconomically, ethnoculturally and geographically diverse citizens • Identify dialogue participants who can champion the actions needed to address misinformation, and • Provide feedback and interpretation for the thematic analyses of the citizen panels and the stakeholder dialogue
<p>Packaging the best-available data and evidence to provide citizen-friendly and policy relevant summaries about the problem, policy and programmatic options and implementation considerations to inform deliberations to spark action towards addressing misinformation</p>	<p>Iterative development and refinement</p> <ul style="list-style-type: none"> • Develop the terms of reference (TOR), which outlines the problem, policy and programmatic options and implementation considerations that will be addressed in a plain-language citizen brief to inform the citizen panels and the evidence brief that will inform the stakeholder dialogue • Conduct 15- 20 key informant interviews (e.g., policymakers, managers of healthcare organizations, health professionals and researchers) to review and provide input on the TOR <p>Searches and evidence synthesis</p> <ul style="list-style-type: none"> • Available research evidence about the problem, strategies to address misinformation and implementation considerations will be included from the CIS in project 1 and the living evidence synthesis in project 2 <p>Preparing the citizen and evidence briefs</p> <ul style="list-style-type: none"> • Use the insights and feedback from key informant interviews to ensure the briefs are framed in a policy relevant way • Use the framing from the TOR to summarize key findings from local data and evidence, the CIS from project 1 and the living evidence synthesis from project 2 to highlight key challenges that need to be addressed, options to address the challenges and implementation considerations

	<ul style="list-style-type: none"> • Produce a plain-language version of the evidence brief (in collaboration with our project team and particularly our citizen-leader partner) that includes questions to guide deliberations during the citizen panels (both briefs will be translated in French) • Prepare a high-level summary of the key findings from the citizen panels that provides key themes related to experiences and challenges with misinformation and values and preferences for addressing it, which will be included in the evidence brief to ensure dialogue participants are informed by the best-available evidence and citizens' values and preferences <p>Merit review</p> <ul style="list-style-type: none"> • The evidence brief will undergo review by the steering committee and by three reviewers (policymaker, stakeholder, researcher) to ensure context relevance and scientific accuracy • The citizen brief will undergo review by the steering committee and merit review by at least one citizen to ensure readability and citizen relevance
<p>Identifying citizens' values and preferences for actions that should be taken to address misinformation in Canada</p>	<p>Recruitment</p> <ul style="list-style-type: none"> • To ensure a robust approach to sampling, we will recruit participants for each of the five citizen panels (with one conducted in French) in collaboration with AskingCanadians™, which has a panel with more than 900,000 Canadians who are affiliated with loyalty programs in Canada and are profiled by more than 500 demographic, psychographic, behavioural and attitudinal variables • For each panel, we will engage 14-16 panellists who are diverse in terms of gender, age, sexual orientation, socioeconomic status, ethnocultural background and geography <p>Convening the panels</p> <ul style="list-style-type: none"> • Panellists will receive the citizen brief one-week prior to each panel along with supplementary material, including a short video from teams that compiles insights from decision-makers and leaders (e.g., Thomas Piggott and Mustafa Hirji) and experts (e.g., Tim Caulfield) on our team • The deliberations will be facilitated by the PI (Wilson) in collaboration with our citizen leader co-investigator (Maureen Smith) and the McMaster Health Forum's Senior Scientific Lead of Citizen Engagement (François-Pierre Gauvin, who will facilitate the French-language panel) with detailed notes taken by 2-3 secretariat (PhD students) • Deliberations will focus on identifying experiences and challenges with misinformation and values and preferences for addressing misinformation • We will conduct an integrated thematic analysis of the panels using our detailed notes and audio recordings, which will highlight areas of consistency and divergence in the panels
<p>Sparking action for addressing misinformation in Canada by convening a stakeholder dialogue with government decision-makers, organizational leaders, professional leaders and citizens</p>	<p>Recruitment</p> <ul style="list-style-type: none"> • The steering committee will identify dialogue participants based on their ability to bring unique insights about the issue, as well as their ability to champion change following the dialogue with the aim of convening key leaders from across Canada involved in or affected by future decisions related to addressing misinformation <p>Convening the dialogue</p> <ul style="list-style-type: none"> • The stakeholder dialogue will: <ul style="list-style-type: none"> ○ Be informed by a pre-circulated evidence brief (see above) ○ Be informed by a discussion about the full range of factors that can inform how to approach the problem and possible options for addressing it ○ Engage a facilitator (PIs Wilson and/or Lavis) to assist with deliberations ○ Allow for frank, off-the-record, deliberations using the Chatham House rule • Not aim for consensus (but it will be embraced if it emerges)
<p>Providing a roadmap for decision-makers to pursue actions</p>	<ul style="list-style-type: none"> • Produce a thematic summary of the deliberations and commitments made by stakeholders (Dialogue Summary) • The dialogue is intended to support action for change through the development of partnerships and collaborative relationships

- | | |
|--|--|
| | <ul style="list-style-type: none"> • Dialogue attendees will be asked to identify next steps for their constituencies and encouraged to leverage connections from the day and build on partnership opportunities that surfaced throughout deliberations |
|--|--|

Gender-based analysis

Gendered misinformation can impact anyone of any gender. However, misinformation disproportionately impacts women, trans, and nonbinary people. For instance, a report published by Plan International Australia (25) shows that those groups are bombarded with stereotypes and misleading facts about their bodies and their health. The report found that 1 in 5 girls interviewed felt unsafe because of online health information, and that due to misinformation, 1 in 4 questioned whether to get COVID-19 vaccines. The study reported that many participants “said they had concerns about fake events advertised on social media placing them at physical risk, or unreliable medical advice that could harm their health or impact their confidence in legitimate medical advice”.

We will therefore consider sex and gender representation in all of our projects. First, we will extract information about sex and gender from all studies included in the evidence syntheses planned for projects 1 and 2. Second, we will document whether included studies comment on the inclusion or absence of sex and gender, gender identity or other relevant factors in the demographic description of participants, recruitment strategies, presentation of results or discussion. Third, we will disaggregate data for analysis, and present findings by sex, irrespective of whether differences were found. Fourth, we will discuss the differences in misinformation according to sex and gender and highlight relevant sex and gender research gaps and convey this information in the briefs used to inform the citizen panels and stakeholder dialogue. Last, we will ensure representation of women and men in our research team, and in the citizen panels and stakeholder dialogue.

Timeline

Our project will be completed in a two-year (24-month) timeline. The identification of evidence, data extraction and analysis for project 1 will be completed within the first six months of the project and the living evidence synthesis will be launched by the end of year 1 with three updates at six-month intervals. The citizen panels proposed in project 2 will be conducted starting at 12-15 months (following ethics approval) so that data from projects 1 and 2 can be used to inform the panels. The conclusions of the panels will be incorporated into the evidence brief for project 4 starting at 16 months. The evidence brief and stakeholder dialogue will be prepared, organized and convened from months 17-21 with final analysis, manuscripts and dissemination occurring in the final three months of the grant.

Project team

Our project will be led by and coordinated at the McMaster Health Forum by co-PIs [Michael Wilson](#) (Assistant Director) and [John Lavis](#) (Director) and a senior research associate ([Marcela Vélez](#), Senior Lead, Innovative Evidence Products and Spanish Outreach). The Forum is a WHO Collaborating Centre in Evidence-informed Policymaking and the co-lead for the Global Commission on Evidence and the COVID-19 Evidence Network to support Decision-making (COVID-END), which has coordinated evidence responses to COVID-19 globally and nationally. Through these and many other initiatives, the Forum brings an extensive track record that uses an agile, collaborative and impact-oriented approach to research, which means that we focus on research that is policy relevant, robust and delivered in a timely way. We do this by convening interdisciplinary teams and networks designed to go farther, faster in addressing pressing policy challenges by harnessing the strengths, expertise and experiences of those engaged.

Our full project team is designed to be an interdisciplinary team of government decision-makers, organizational leaders, professional leaders, citizens and researchers with world-class expertise in:

- **addressing misinformation** (Tim Caulfield, Mustafa Hirji and Thomas Piggott, Gabrielle Plamondon);
- **training and education for health professionals around science communication and combatting misinformation** (Teresa Chan)
- **leadership and communication** (Kelly Grimes, Wendy Nicklin and Bill Tholl)

- **evidence-synthesis methods** (Mike Wilson, John Lavis, Alfonso Iorio, Marcela Vélez);
- **policy analysis and interpretation** (Mike Wilson, John Lavis, Marcela Vélez, Nina Jetha, Tim Caulfield, Bill Tholl, Mustafa Hirji and Thomas Piggott);
- **behavioural science and analysis** (Jamie Brehaut, Heather Devine and Justin Pesseau); and
- **citizen and stakeholder engagement** (Mpho Begin, Maureen Smith, Jude Porter Mike Wilson and John Lavis)

The team will meet regularly to ensure an integrated approach to knowledge translation (KT) where the producers and users of research work collaboratively throughout all project stages.

Government decision-makers: We have engaged a team of government decision-makers from the Public Health Agency of Canada in the Office of Public Confidence ([Gabrielle Plamondon](#), Senior Policy Analyst), Office of Behavioural Science and analysis ([Heather Devine](#), Senior Lead and Co-founder) and the Public Health Intelligence and Knowledge Translation Division ([Nina Jetha](#), Director) who will act as the liaison with their respective divisions in PHAC to support analysis and interpretation and use of findings from the project.

Organizational leaders: [Kelly Grimes](#) (Executive Director, Canadian Health Leadership Network - CHLNet), [Wendy Nicklin](#) (a healthcare leader with over 35 years of experience, including president of Accreditation Canada from 2004-2016 and with expertise in accreditation, quality of healthcare, leadership, governance and patient safety), [Bill Tholl](#) (founding Executive Director, CHLNet with over 20 years as a senior executive in health sector) and [Graham Dickson](#) (senior research advisor to the Canadian Society of Physician Leaders CHLNet will work closely with the 43 partners of CHLNet across Canada to ensure the findings include insights and from and actions for health-system leaders.

Professional leaders: Jennifer Kitts (Vice President, Advocacy and Policy, Canadian Medical Association) provides national leadership perspective from physicians, and [Mustafa Hirji](#) (Acting Medical Officer of Health and Commissioner, Public Health, Niagara Region, Ontario) and [Thomas Piggott](#) (Medical Officer of Health and Chief Executive Officer, Peterborough Public Health) provide strong local public-health leadership perspective combined with research and practical expertise in addressing misinformation.

Citizen leaders: [Maureen Smith](#) has championed efforts for citizen engagement in evidence syntheses through COVID-END, Global Commission on Evidence and the Cochrane Consumer Network and will provide this expertise for the project team. She will lead a citizen team that also includes three additional citizen partners (Mpho Begin in Manitoba, Cynthia Lisée in Quebec and Jude Porter in Nova Scotia).

Researchers: [Michael Wilson](#) (Assistant Director, McMaster Health Forum and Associate Professor, McMaster University), [John Lavis](#) (Tier 1 Canada Research Chair in Evidence-Support Systems, Director, McMaster Health Forum and Professor, McMaster University) and [Marcela Vélez](#) (Senior Lead, Innovative Evidence Products and Spanish Outreach) bring expertise in evidence synthesis and support, policy analysis and an extensive track record in leading interdisciplinary teams. In addition, [Tim Caulfield](#) (Tier 1 Canada Research Chair in n Health Law and Policy) brings world-leading expertise in research about public representations of science and public health policy. [Alfonso Iorio](#) brings extensive evidence synthesis expertise, particularly in living reviews as he has led the routine updating every two weeks of a living evidence synthesis about the [effectiveness of available COVID-19 vaccines](#) for adults, including variants of concern (this review has now been updated 40+ times). [Jamie Brehaut](#) and [Justin Pesseau](#) bring behavioural-analysis expertise along with strong track records in evidence synthesis in that field to the team. In addition, an experienced library scientist (Tamara Navarro) from the Health Information Research Unit at McMaster University will execute all of the searches for the CIS and living evidence synthesis.

Knowledge translation

Our KT plan will be deployed continuously throughout the project. The project itself will develop a communications strategy and brand that will harmonize its communication both within the team and for

external stakeholders. We will develop an internal communication hub via a closed social-media platform via MS Teams and also open social media presence via a number of influential platforms targeting Twitter (for lay persons and health professionals), and LinkedIn (for healthcare leaders). This strategy will harness existing websites and platforms of our interdisciplinary project team. This will allow for an approach to integrated KT and a multi-faceted dissemination strategy designed to help decision-makers at all levels to address health-related misinformation. We will accomplish this by:

- 1) publishing each version of the living evidence synthesis through the Global Commission on Evidence and COVID-END and disseminating it through their extensive global networks;
- 2) publishing the findings at the end of the project in a peer-reviewed journal;
- 3) developing plain-language summaries, an infographic, short videos in English, Spanish and French and key audio-dissemination platforms (e.g., McMaster's MacPFD Spark Podcast, which co-investigator Teresa Chan co-hosts) to convey the findings in user-friendly and engaging formats;
- 4) disseminating the findings from these sources through the extensive networks of the team to reach government policymakers, organizational leaders, professional leaders and citizens (e.g., through the [Global Commission on Evidence](#), [COVID-END](#), [CHLNet](#) (a not-for-profit network of 40+ Canadian health organizations), and [ScienceUpFirst](#); and
- 5) disseminating directly to: a) government decision-makers through our project collaborators at the Public Health Agency of Canada; b) organizational leaders (through CHLNet and the additional extensive networks of our organizational leader team members; c) professional leaders (through the Canadian Medical Association through our project collaborator Jennifer Kitts and through the Public Health Agency of Canada and local public-health networks of Thomas Piggott and Mustafa Hirji), and d) citizen leaders (with plain-language summaries, infographics and audio dissemination platforms, which will be led by our team of citizen leaders).

Potential challenges and mitigation strategies

We have identified several challenges for our project along with plans to mitigate them. For the CIS and living evidence synthesis, we will face the challenge of having to draw insights from both qualitative and quantitative evidence and to produce syntheses with meaningful evidence in an extensive domain of research. We have proposed to conduct a CIS to ensure that we include all forms of evidence and draw insights from it to inform the framework we will produce. This framework will provide a roadmap for decision-makers to use in addressing misinformation and underpin the analysis of the quantitative evidence in the living evidence synthesis that will provide decision-makers the evidence they need about what works. The key challenges for the citizen panels will be ensuring that we recruit participants who are diverse in terms of socioeconomic status, gender, ethnocultural background and geography. The McMaster Health Forum has a long track record of working with AskingCanadians to recruit diverse panels of participants. Lastly, the most important challenge in convening a stakeholder dialogue is ensuring that those who are positioned to champion change participate in the stakeholder dialogue. We already have an engaged core group of decision-makers at all levels who are committed to engaging other leaders across the country to ensure the stakeholder dialogue will spark action for addressing misinformation in Canada.

Impact statement

We will use an integrated approach to KT where our interdisciplinary team of researchers and knowledge users (including citizen leaders) will work closely throughout the project. Our approach will provide a comprehensive, policy relevant and evolving understanding of what is known, including how strategies to address misinformation may vary by contexts and groups of population, including those who are more vulnerable to misinformation. This will be essential to inform the efforts of decision-makers at all levels (government policymakers, organizational leaders, professional leaders and citizens) about addressing misinformation. We will harness the power of social media to break down barriers between researchers and stakeholders throughout the research progress.(26; 27) This will contribute to strengthening public-health systems in Canada, facilitate responsive and evidence-informed decision-making on key public-health issues,

and ultimately, improve population-health outcomes and equity through addressing misinformation about health threats affecting everyone and the most vulnerable groups of the population.