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Creating an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada: insights from citizen panels and a national stakeholder dialogue

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Abstract

Background Health-system leaders are increasingly faced with making decisions about whether and how to use a wide range of current and emerging health-system innovations to address complex system and policy challenges. Health-system innovations can broadly include new ways of doing things at a system level, such as new approaches to govern health systems, care delivery, funding models, health policy or better ways to integrate health and social services. However, Canada has historically struggled with the adaptation and uptake of health-system innovations. This multicomponent study aimed to explore the challenges, approaches and implementation considerations for creating an integrated innovation system that enables the adaptation and uptake of health-system innovations from the perspectives of citizens and health system leaders in Canada.

Methods We synthesized the best-available evidence into an evidence brief and a subsequent plain-language version (a citizen brief) in consultation with a steering committee and key informants, including policymakers, leaders of systems, organizations and professional organizations, industry representatives, citizen leaders and researchers. These briefs informed deliberations in four citizen panels ($n=48$ participants) and a national stakeholder dialogue with health-system leaders ($n=23$ participants) to identify key challenges, approaches, implementation considerations and next steps that could be taken.

Results Citizen panel participants and health-system leaders highlighted barriers such as culture and mind-sets that resist health-system innovations, limited targeted funding for health-system innovations and processes that encourage sustainability, lack of mechanisms to adapt health-system innovation in local contexts and limited health human resources due to competing interests across health systems. Both groups emphasized the need for people-centred approaches to establish shared goals and vision, identify gaps and map what has worked to drive health-system innovations, set priorities and discuss how each stakeholder group can contribute to building

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and reviewing implementation considerations such as resources and funding related for the adaptation and uptake of health-system innovations.

Conclusions The findings provide insight for ongoing efforts to improve the development, implementation and evaluation efforts to enhance and harness health-system innovation to strengthen health systems in Canada. Collaboration from within and between governments and sectors will ultimately help to increase the value gained from health-system innovations.

Keywords Innovation, Health systems, Citizen engagement, Stakeholder dialogue

Background

Health-system leaders are grappling with questions about whether and how to use a wide range of current and emerging innovations to address complex system and policy challenges. Many of these innovations, such as remote-monitoring technologies and tools driven by artificial intelligence (AI), are promising for improving the quality and efficiency of health systems, as well as overall population-health outcomes.

Innovation is often conceptualized as new technologies involving hardware and software, such as new devices to remotely monitor patients at home, technologies to support decision-making by patients and health professionals and new early warning systems to monitor patients in clinical settings. However, this definition may overlook broader aspects of innovation that are important in a health system. The WHO defines innovation as “a new or improved solution with the transformative ability to accelerate positive health impact” [1]. In contrast to the WHO definition, not all health-system innovations can bring transformative change in health systems. Some may simply help to modernize health systems (e.g. sending prescriptions by email instead of fax machines). However, other innovations can be transformative, such as using artificial intelligence (AI) to create patient intake platforms that can screen, recommend and triage patients. Building on this, we defined health-system innovation more broadly for this project to include new ways of doing things at a system level, such as new approaches to govern health systems, care delivery, funding models, health policy or better ways to integrate health and social services. Further, an integrated approach could include coordination between the demand and supply sides of innovation, interoperable systems supporting the innovation and governance, financial and delivery processes that support uptake and spread of innovations.

Despite the potential, Canada has a long history of struggling, and sometimes failing, to effectively adopt health-system innovations. The implementation of electronic medical records, virtual care and new interdisciplinary models of care are examples of innovations that Canadian health-system leaders have found challenging to adopt and scale across the country [2, 3]. One of

the contributing factors is the financing structure (e.g. innovations funded through charitable fundraising or one-time government funding), which can impede the development, evaluation and sustainability of scalable health-system innovations in Canada. Given the importance of this issue, we undertook a multicomponent research project through the AGE-WELL NCE (a Canadian research and innovation network in AgeTech that is federally funded by Networks of Centres for Excellence program) to explore what is needed to enable a more coordinated and sustainable approach to health-systems across the provinces and territories. This research involved developing briefing materials on the basis of best-available evidence and convening citizen panels and a national stakeholder dialogue with system leaders to identify key challenges, approaches and implementation considerations for creating an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada.

Methods

Our project occurred across three phases: (1) development of briefing materials; (2) convening citizen panels; and (3) convening a stakeholder dialogue. Throughout these phases, an interdisciplinary steering committee (comprised of all authors and led by M.G.W.) met regularly to review and revise project materials whilst providing input for planning the citizen panels and stakeholder dialogue.

In the first phase, we developed an evidence brief in which we synthesized the best-available evidence about key challenges related to creating an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada, three elements of a potentially comprehensive approach to address the problem and relevant implementation considerations. An outline was initially developed for the evidence brief in collaboration with the steering committee and was subsequently refined through interviews with key informants with policymakers, leaders of systems, organizations and professional organizations, industry representatives, citizen leaders and researchers. We drew on the insights and feedback from the interviews to identify key resources

and to frame the evidence brief in a policy relevant way. The evidence brief was refined on the basis of evidence syntheses on the topic and a jurisdictional scan (i.e. an environmental scan focussed on notable examples of initiatives to support health-system innovations in Canada and in other countries) [4]. Working collaboratively with our steering committee, we turned the evidence brief into a plain-language citizen brief that was precirculated to citizen panel participants [5].

In the second phase, we convened four virtual citizen panels with a total of 48 citizens, with two panels held on 2 February 2024, one on 8 February, and one on 9 February. Panellists were recruited in collaboration with AskingCanadians™, which includes more than 1 million Canadians affiliated with loyalty programs in Canada and are representative of all the Statistics Canada demographic categories. We aimed to engage 14–16 panellists that were diverse in relation to gender, age, sexual orientation, socioeconomic status, ethnocultural background and geographic residence. We conducted a rapid thematic analysis on the basis of independent detailed notes taken by the facilitators (M.G.W. and K.A.M.) and secretariat (A.R.B., P.D. and J.D.C.) on Microsoft Word (Microsoft Corporation, 2025). The team engaged in collaborative discussions to cross-compare notes and iteratively generate key findings and themes. Audio recordings of the panels were selectively revisited to verify and refine findings as needed. This approach prioritized timely synthesis of data whilst maintaining methodological rigour through the team consensus and iterative review.

Finally, in phase three, we convened a hybrid stakeholder dialogue in a single-day session on 26 March 2024 at the McMaster Health Forum located at McMaster University. The dialogue was informed by the precirculated evidence brief developed in phase one, which included a summary of key messages from the citizen panels. Dialogue participants included health-system leaders, organizational leaders, professional leaders, industry representatives, and academic leaders. A list of potential dialogue participants was first identified by steering committee members and key informants. Our criteria for selecting health leaders included: (1) representation from each province and territory to ensure geographic diversity; (2) those positioned to provide unique insights on the basis of their experiences, views and tacit knowledge about the topic; and (3) those who could champion change within their constituencies. An invitation email was sent to each health leader by the team, where the final list of dialogue participants represented those who were available and interested to attend the hybrid stakeholder dialogue. The dialogue was facilitated by one of us (M.G.W.) with detailed notes and observations taken by the facilitator and secretariat (A.R.B. and

J.D.C.). The stakeholder dialogue used the Chatham House Rule where participants can use the information from a discussion, but not reveal the identity or affiliation of the speaker or other participants, and therefore was not recorded. Deliberations were analysed thematically, and a summary of key themes was shared with participants after the mid-day break and refined at the end of the dialogue.

Note that this paper integrates the methods and results from four publicly available reports (the plain-language citizen brief to inform the citizen panels, the more detailed evidence brief that informed the stakeholder dialogue, the thematic analysis of the citizen panels and the stakeholder dialogue). The focus of the methods presented above, and the results below, are on the key insights from the independent reports. Those interested in additional details can access the reports cited here [4–7].

Results

Characteristics of participants in citizen panels and stakeholder dialogue

The citizen panels convened 48 citizens from across the country and were ethnoculturally and socioeconomically diverse. Participants were also diverse in their perceptions of technology (e.g. from those who are “early adopters” to those who typically wait much longer to adopt new technologies in their lives). Demographic information of panellists is provided in Fig. 1.

The stakeholder dialogue convened 23 participants, consisting of seven federal- and provincial-level policy-makers, six organizational leaders (including four from national organizations and two from provincial health organizations), four professional leaders from health-service provider organizations, two industry representatives, and four academic leaders from universities or research institutes. We summarize below the key insights from the panels and dialogue about the problem and elements of a potentially comprehensive approach to address it, as well as implementation considerations and next steps. Due to Chatham House Rule, demographic information was not collected for the dialogue participants.

Insights about challenges related to the problem

We identified four challenges on the basis of our evidence brief that synthesized local data and evidence, key evidence syntheses and insights from key informants about key challenges related to creating an integrated health-innovation system to enable the adaptation and uptake of health-system innovations in Canada. The identified challenges broadly related to: (1) governments lacking structures to support the ongoing identification, adaptation and uptake of innovations; (2)

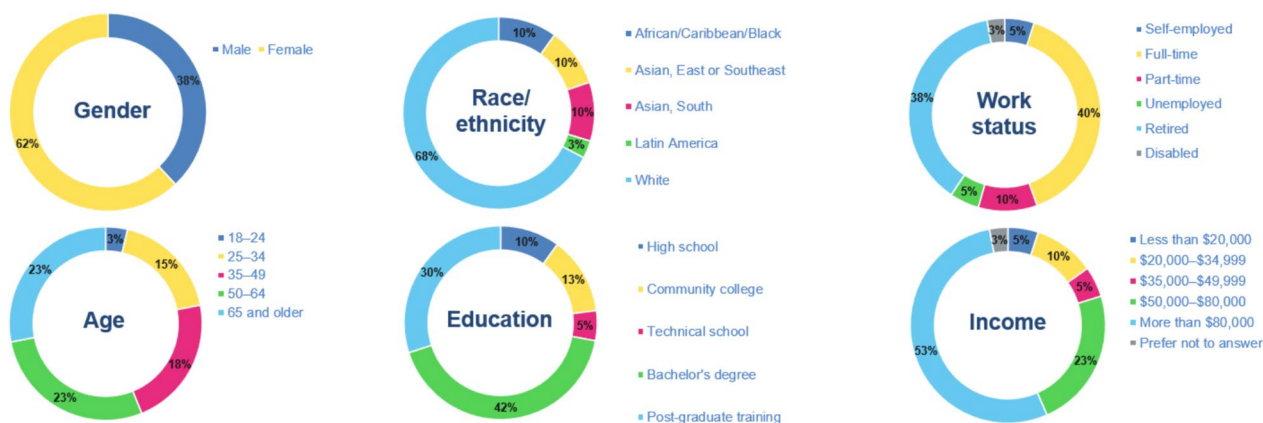


Fig. 1 Demographic information of citizen panellists

some organizations not being welcoming to health-system innovations from the “outside” (e.g. health-system innovations that are not “locally grown” or innovators that do not align with an organization’s structures, policies, process and incentives); (3) limited infrastructure that can help bridge the demand and supply for health-system innovations; and (4) citizens, patients, caregivers and their communities often playing a limited role in health-system innovation.

Building on the framing presented in the citizen brief, citizen panel participants identified four challenges which focus on: (1) a lack of dialogue and coordination across levels of government, as well as a lack of human and fiscal resources invested into health-system innovations; (2) some organizations facing challenges related to a lack of financial incentives and regulatory challenges that result in resistance towards health-system innovations; (3) too much reliance on innovation suppliers rather than demand-side decision-makers and users to set health-system innovation agendas; and (4) citizens, patients and caregivers playing a limited role in health-system innovation and a lack of public dialogue about innovation. Key insights from citizen panel participants about these themes are presented in Table 1.

Dialogue participants agreed with the challenges identified by citizen panellists, and expanded the list to also include three additional challenges. These include:

- (1) a lack of shared vision and set of values at the national-, provincial/territorial- and local-levels (e.g. short-term thinking, the risk of thinking “too big” (of the problem and health-system innovation), and the misalignment of measures (i.e. what we are measuring and what we want to demonstrate) may lead to unattainable goals for the health-system innovation)

- (2) structural and institutional issues (including and beyond governments) (e.g. current institutional structures and processes make it difficult to know when the engagement and role of government is appropriate)
- (3) little focus on capital investments and workforce training for health-system innovations in Canada, which makes it challenging to secure and allocate funds to develop and support health-system innovations, especially amongst smaller organizations and regions.

Insights about elements of a potentially comprehensive approach to address the problem

Citizen panellists and dialogue participants deliberated about three elements of a potentially comprehensive approach to address the problems that were precirculated prior to the deliberations. The elements broadly focussed on: (1) creating structures and process to support the demand for health-system innovation; (2) supporting organizations that could serve as “health-system innovation general contractors” (i.e. individuals who have a strong understanding of the demand for health-system innovations and on the supply of health-system innovations and can work closely with decision-makers to build an in-depth understanding of their challenges and coordinate with innovators to develop and test a solution); and (3) creating structures and processes that could support the supply of health-system innovations. These elements and the evidence about them are detailed in the publicly available evidence brief [4]. Values and preferences from citizen panellists and dialogue participants are summarized in Table 2.

For element one, panellists emphasized the importance of including the perspectives of people who use

Table 1 Summary of citizen’s views of challenges

Challenge	Description
<p>There is a lack of dialogue and coordination across governments, as well as a lack of human and fiscal resources invested into health-system innovation</p>	<ul style="list-style-type: none"> • Panellists noted that there is a lack of dialogue and coordination across governments, sectors and stakeholders (e.g. citizens, patients, providers), and that there is a need for some overarching leadership to promote coordination and share lessons learned • They observed that during the pandemic, a large amount of health-system innovation occurred in a coordinated way under significant time constraints, in large part due to a shared and urgent goal that is generally lacking during non-emergency times • This may result in complacency in non-emergency times that poses a barrier to a coordinated approach to a health-system innovation going forward • At the individual level, the lack of continuity of care experienced by some participants across providers was thought to present a challenge for harnessing health-system innovations in a way that is people centred, as it creates inconsistent and fragmented approaches to adopting health-system innovation • Panellists suggested that the media could play an important role in highlighting ongoing challenges in health systems, encouraging input from citizens and providing transparency about what is being discussed and how it is currently being acted upon • Panellists also noted that human and financial resource constraints present a key barrier to health-system innovation <ul style="list-style-type: none"> • Citizens stressed that innovation cannot be a substitute for proper funding for people, equipment and supplies, and the availability of services must be scaled to accommodate population growth and increasing complexity of health problems • Panellists also emphasized the need to build trust amongst decision-makers, managers and providers to increase willingness to take on risk associated with developing and implementing innovations (e.g., to assuage concerns about accountability and liability) <ul style="list-style-type: none"> • Similarly, building trust with the public was identified as important for communicating the potential value of and addressing concerns about innovations such as AI solutions or new roles for providers such as nurse practitioners, pharmacists, and remote monitoring
<p>Some organizations face challenges related to a lack of financial incentives and regulatory challenges that results in resistance towards health-system innovation</p>	<ul style="list-style-type: none"> • Panellists explained that currently there is a lack of financial incentives to encourage the development, uptake, testing and scale-up of new innovations, and that these incentives are crucial to help break “old habits” and help organizations and individuals become more innovative • Regulatory and other challenges, such as concern over additional administrative responsibilities for family physicians to adapt their practice, cyber security, systems compatibility and extra maintenance can inhibit health-system innovation
<p>We rely too much on health-system innovation suppliers, rather than demand-side decision-makers and users to set health-system innovation agendas</p>	<ul style="list-style-type: none"> • Panellists highlighted that currently, the system relies on “push” (from suppliers) rather than “pull” (demand from decision-makers and users) to drive the health-system innovation agenda <ul style="list-style-type: none"> • This was highlighted as a key part of the problem, with participants noting that health-system innovations are not always attuned to the specific challenges being faced by those involved in or affected by decisions about provincial and territorial health systems • Panellists also noted that the uptake in health-system innovation is more challenging for some than others because of inequitable distribution of hospital infrastructure (e.g. better resourced hospitals in urban centres as compared with rural hospitals that lack the same technological infrastructure to take up new health-system innovations) or user characteristics (e.g. providers uninterested in changing how they practice)

Table 1 (continued)

Challenge	Description
Citizens, patients and caregivers play a limited role in health-system innovation, and there is a lack of public dialogue about health-system innovation	<ul style="list-style-type: none"> • Panellists highlighted that equity issues present a key barrier to the uptake of health-system innovations, reflecting a need to better incorporate diverse perspectives of citizens, patients and caregivers that can benefit from health-system innovation across its development • Some participants noted that innovations cannot be rolled out as a one-size-fits-all approach and that considerations for how to support all communities is important, whilst others also noted that in some cases health-system innovation will always have to start somewhere before it can spread • Panellists also stressed the need to build trust with the public for how and why new health-system innovations are important and can be used to strengthen health systems (e.g. about accommodating AI solutions or new roles for providers such as nurse practitioners, pharmacist prescribing and remote monitoring), which may help with acceptance of more risk taking • They noted that the media needs to play a bigger role in highlighting ongoing challenges in health systems, encouraging input from citizens and providing transparency about what is being said and how it is being acted on

health-system innovations during the development process. They also highlighted the need to accept risk and to “just get on with it” and “try something” to start the process. Creating more opportunities for dialogue and shared learning were also highlighted as key for facilitating health-system innovation. The dialogue participants emphasized the need for people-centred structures that prioritize building trust and fostering collective sense-making amongst key partners across government, academia, industry and other partners at all levels. Similar to the panellists, they also emphasized that a culture that encourages risk-taking, de-risk health-system innovation scenarios and ways to ensure accountability are needed in Canada. Finally, they highlighted the importance of linking health-system innovation systems to evidence-support systems to ensure the right forms of evidence are applied throughout the health-system innovation pipeline.

For element two, citizens generally supported the idea of a “health-system innovation general contractor” (i.e. individuals who have a strong understanding of the demand for and supply of health-system innovations, and who can work closely with decision-makers to build an in-depth understanding of their challenges and coordinate with innovators to develop and test a solution) to serve as an intermediary between health-system innovation supply and demand, but noted the need avoid conflicts of interest. Citizens also encouraged engaging the public through townhalls, panels and/or social media/apps to solicit feedback and provide updates. Creating a roster of organizations and individuals to advance certain health-system innovations was seen as one potential way to help reduce costs and avoid conflicts of interest. The dialogue participants emphasized that the function of

the role is an important focus. Specifically, the role could include individuals or teams with specialized skills that support organizations on the basis of the trajectory of the health-system innovation (e.g. engaging a change management leader during the implementation of the innovation). The dialogue participants indicated that this role would require key skills in procurement, partnerships and change management in future and current health system leaders.

For element three, citizens stressed that even if health-system innovations “fail”, the work is not necessarily a waste as others might adapt and reduce key elements of the health-system innovation. In this way, iterative progress can be made regardless of initial failures. Citizens also stressed the need for innovators to solicit input from health workers, families, patients and caregivers throughout all stages of the health-system innovation process. Finally, the dialogue participants emphasized the need for additional approaches to be incorporated in this element, which included: incentivizing collaboration, clarifying roles of those involved, aligning with the demand side for innovation and creating safe environments for innovation and change in Canada.

Implementation considerations

Citizen panellists identified key barriers they viewed as important to consider towards the goal of creating an integrated health-innovation system, which included: (1) legal and insurance frameworks that perpetuate risk-aversion; (2) limited incentives for health-system innovation; (3) a lack of digital literacy and acceptance of new technologies; (4) potential conflicts between “general contractors” and the groups they work with to supply health-system innovations; and (5) that some “general contractor” models

Table 2 High-level summary of the research evidence and insights from citizens and dialogue participants about three elements of a potential approach to create an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada

Key features of the elements	Supporting research evidence	Citizens' values and preferences	Insights from dialogue participants
<p>Creating structures and processes to support the demand for health-system innovation</p> <ul style="list-style-type: none"> Identifying challenges that could be solved by innovations and prioritizing which ones are most important to address Identifying and prioritizing promising innovations to address challenges, and building business cases that evaluate their potential system-level benefits, costs and risks in a way that helps system decision-makers identify which ones to further pilot, evaluate and adapt for local contexts Supporting and investing in an innovation "backbone" that allows suppliers to "plug into" the system to evaluate innovations (e.g. ensuring interoperable systems and appropriate governance, financial and delivery processes are in place) Implementing decision-making processes about the adoption of innovations on the basis of evidence-informed business cases Supporting the diffusion and uptake of innovations across health systems 	<ul style="list-style-type: none"> We identified five evidence syntheses that described processes for identifying, assessing and prioritizing innovations such as: <ul style="list-style-type: none"> the use of "horizon scanning" of innovations at an early stage of their development [20] health technology agencies' multi-step selection process (e.g. developing a framework with specific criteria (which could include benefits, harms, costs, patient-centredness) identifying and short-listing topics, scoring and ranking, deliberating with relevant stakeholders) [21, 22] the involvement of community members and other relevant stakeholders using participatory approaches (e.g. surveys; focus groups, public dialogues; involvement in advisory councils and meetings) [23] the use of frameworks that typically describe the innovation, the spread and scale-up process, the resource and implementation team, innovation user or organization and broader environmental factors [24] 	<ul style="list-style-type: none"> Citizens called for innovation development to "start with those using it" by gaining insights from users and front-line This was noted as requiring more outreach and feedback processes with citizens to shape innovations on the basis of priorities, preferences and concerns They also highlighted the need to create opportunities for shared learning and best-practice dissemination across the country to create dialogue and share insights Create a "bulletin board" of priority challenges to help focus innovator's efforts Look to other countries (e.g. Germany and France) to see what business cases or other information is available about innovations that have been rolled out to help Canada plan Citizens suggested embedding innovation into medical education to help a new generation of medical professionals advance innovation efforts Panelists identified a need to encourage, empower and expect managers and other health workers to innovate (i.e. innovation does not always need to be a top-down process) Finally, citizens called to promote an acceptance of risk and clearly define who is accountable for taking risk and course correcting innovations, so decision-makers are not as hesitant to take risks that are necessary to strengthen health systems in Canada To this effect, participants often emphasized the need to "just get on with it" and "try something" 	<ul style="list-style-type: none"> The creation of structures and processes to support the demand for innovation needs to be people oriented, where meaningful relationships and trust are built with key partners to achieve collective sense-making (e.g. discuss shared insecurities, priorities and common understanding of the problem; what works well in other jurisdictions; why we need innovation; when is it appropriate to implement or de-implement innovation) They also described that a cultivation of a risk-taking culture, the ability to "de-risk" scenarios and identify ways to incentivize accountability in the development of innovation were generally needed to support the demand for innovation in Canada Some dialogue participants indicated that innovations systems need to be linked to evidence-support systems to allow for the right forms of evidence to be applied (e.g. developing evidence syntheses, system mapping exercises, dashboards of what is currently in the innovation pipeline, playbooks and roadmaps, communities of practice that encourage knowledge sharing on contracts, vendors and procurement policies)

Table 2 (continued)

Key features of the elements	Supporting research evidence	Citizens' values and preferences	Insights from dialogue participants
<p>Supporting organizations that could serve as "innovation general contractors" (i.e. individuals who have a strong understanding of the demand for innovations and on the supply of innovations and can work closely with decision-makers to build an in-depth understanding of their challenges and coordinate with innovators to develop and test a solution)</p> <ul style="list-style-type: none"> Establishing partnerships between those on the demand side (i.e. decision-makers who face pressing and complex health-system challenges that need to be addressed), the supply side (i.e. innovators) for innovation and with citizens, patients, caregivers and their communities Harnessing these partnerships to document needs and challenges, identify and refine priorities, co-design testing and evaluation, support innovation refinement and adaptation, build a business case and use a learning health-system approach 	<ul style="list-style-type: none"> We identified four evidence syntheses that provided insights about this element, including: <ul style="list-style-type: none"> The use of "living labs", which are open innovation ecosystems using iterative feedback processes to create prototypes, test and support the adoption and uptake of innovations (largely used in developing clinical innovations and have engaged vulnerable populations in the processes); however, the level of user engagement and frameworks for evaluating the impact of living labs is limited [25–27] Strategies that policymakers have used to increase the interaction and partnerships such as innovation vouchers (e.g. used to build business partnerships between small and medium-sized companies and post-secondary institutions) and the development of research consortia for bringing activities together in a region (e.g. evaluating innovations, marketing support) [28] 	<ul style="list-style-type: none"> In general, citizens supported the idea of an "innovation general contractor", but stressed the importance of ensuring that they are free from conflict of interest (e.g. shaping priorities and then engaging innovators from whom they may benefit financially from) The process of involving a general contractor needs to be equity sensitive by avoiding one-size-fits-all approaches Some concerns were raised regarding adding another layer of bureaucracy to an already inefficient and fragmented system Some participants noted the need to understand if we need a "contractor" to renovate a house, or a systems architect to build a new one, and how this would affect the nature of this intermediary's work Town halls or panels could allow citizens to be updated about the process and provide feedback, with some participants noting that social media/apps should be leveraged to allow for more citizen input Having a roster or list of individuals/organizations that can be contracted to advance certain innovations on the basis of fit and prior performance could reduce costs by creating competition and avoid conflict of interest 	<ul style="list-style-type: none"> The dialogue participants pointed out that the focus should be on the role's function and not the name Some participants indicated that "innovation general contractors" can bring specialized skills on the basis of the diffusion of the innovation curve or lever (e.g. change management leader, evaluator) The term does not necessarily resonate or reflect the importance of and the ability to build relationships and trust with partners An "innovation general contractor" could be included in broader innovation teams, which could also include "intermediaries" who connect contractors to organizations on the basis of expertise and "internal operators" who can support problem identification and constraints within organizations The dialogue participants indicated that future and current individuals in this role could cultivate skill sets in procurement, partnerships and change management

Table 2 (continued)

	Key features of the elements	Supporting research evidence	Citizens' values and preferences	Insights from dialogue participants
Creating structures and processes that could support the supply of health-system innovation	<ul style="list-style-type: none"> • Responding to decision-maker needs by developing new solutions or adapting existing solutions to meet emerging health-system challenges • Supporting the co-production of innovations (meaning that decision-makers, innovators, citizens and other stakeholders work together in a meaningful way to co-produce innovations) • Refining innovations on the basis of testing in real-world contexts by being able to "plug into" an innovation-system backbone • Providing evidence needed for a business case for innovations, and helping those making decisions about the adoption and uptake of innovations 	<ul style="list-style-type: none"> • Seven evidence syntheses reported that citizens, patients and caregivers often play a limited role in the innovation process, and are more commonly engaged in the earlier stages of innovation (e.g. through workshops, interviews, group discussions and prototype testing) and mostly on service innovations [29–35] • The evidence syntheses revealed that the general public and vulnerable populations can be meaningfully engaged, with benefits reported for using co-design processes for innovations (particularly for idea generation and user testing) 	<ul style="list-style-type: none"> • Many citizens noted that even if innovations "fail", the work is not necessarily a waste because others might adapt and reuse certain elements of the innovation • Citizens emphasized the need to be receptive to the possibility of failing, and be able to build on failure through a commitment to iterative progress (e.g. through rapid-learning and improvement cycles) • Citizens identified the importance of leveraging other health workers in developing and refining innovations, such as nurse practitioners and pharmacists, to address simple issues that do not require a physician • Citizens noted that innovators need to more consistently prioritize input from frontline workers, families, patients and caregivers throughout all stages of the innovation process 	<ul style="list-style-type: none"> • The dialogue participants suggested four main approaches, including: <ul style="list-style-type: none"> • Incentivize an innovation system that encourages collaboration • Identify clear roles and responsibilities of government, academia, industry and other partners at all levels • Focus on how to coordinate with the demand side • Create a safer environment for innovation by involving people in operations who can tolerate change

might be resource intensive. Panel participants also noted four key enablers, including: (1) involvement of citizens, families, caregivers and front-line workers with all three elements and stages of health-system innovation; (2) living labs that are positioned to facilitate learning and improvement cycles for health-system innovations; (3) transitioning out the “old-guard” of health-system decision-makers (in terms of perceptions, not age) to help facilitate new ways of thinking and doing things; and (4) establishing a body to help coordinate health-system innovation efforts across the country.

Similarly, dialogue participants identified several implementation considerations that are likely to affect efforts to champion an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada. These barriers included: (1) current funding structures do not necessarily encourage the sustainability of health-system innovations; (2) collaboration across different levels is challenging without proper incentives; and (3) competing interests in the system impedes concerted efforts (e.g. exhaustion from current strains in the system). They also identified key enablers, such as: (1) existing successes of health-system innovations that could be harnessed and used as momentum; (2) growing interest across Canada to increase the uptake of health-system innovations; and (3) finding value of shared goals, meaningful relationships and collaborations.

Next steps

The dialogue participants were willing to invest in several next steps, including to:

- (1) build the case for “why”, where they will create a roadmap that includes reasons for advancing health-system innovation and why a pan-Canadian role is needed
- (2) establish “what” to focus on, where they will conduct gap analyses and jurisdictional mapping exercises to identify what works well, lessons learned and pain points in different jurisdictions and sectors to establish shared goals and vision
- (3) convene to discuss “how” each organization can continue the conversation on health-system innovation, interoperability, training and partnerships
- (4) understanding “who” leads what, including the roles and responsibilities of each key partner
- (5) review collectively other considerations such as identifying resources and funding

Discussion

Our research examined the challenges and emerging opportunities related to creating an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada. Despite the overall interest in promising health-system innovations by citizens and systems leaders, they identified that Canada continues to face barriers with the adaptation and scalability of health-system innovations. Overall, the findings suggest that a people-oriented approach, supportive governance and financing structures and a shared vision were essential to bridge the demand and supply for health-system innovation.

The insights from citizen panels emphasized the importance of meaningful engagement throughout the health-system innovation process. For example, citizens mentioned that they are generally involved in the early phases of design, however, they are seldom engaged in the evaluation, adaptation and system-level decision-making phases. Consistent and meaningful engagement of citizens, patients, caregivers and communities could facilitate the adaptation and uptake of health-system innovations that acknowledge their lived experiences and directly address their health challenges. Similarly, the stakeholder dialogue participants highlighted the importance of building trust and relationships amongst key partners, such as government, industry and citizens, to reach a shared vision and understanding of what is needed and what works well within the context of their health systems. With collective sense-making, partners can better align efforts and bridge the demand and supply sides of health-system innovation. These could be supported by incentivizing collaborations, clearly defining roles and responsibilities across all levels, and ensuring coordination to drive effective responses to those who use and are involved in health systems. There are examples of initiatives to support health-system innovations at the national, provincial and local levels in Canada, however, many of these examples are focussed on components of a health-system innovation, technology or on specific sectors. Notably, the CAN Health Network is a partnership involving health organizations and companies across Canada that introduces new health-system innovations on the basis of user-defined needs [8]. Additionally, *envisAGE* is a 5-year initiative where *MEDTEQ+* (a leader in accelerating innovation in Canada) and *AGEWELL* (a Canadian research and innovation network in *AgeTech*) collectively provide resources and support to small and medium-sized enterprises to integrate technologies that address ageing in Canada [9]. Finally, *Alberta Innovation Pipeline* is a more formalized process to introduce innovations into the day-to-day

operation of the health system, however, this example is an exception rather than a norm [10].

Citizens and system leaders identified a range of barriers to creating an integrated innovation system to enable the adaptation and uptake of health-system innovations in Canada. Some of these barriers included culture and mindsets that resist health-system innovation (including existing risk-averse legal and insurance frameworks), limited targeted funding for health-system innovation and processes to ensure sustainability, lack of mechanisms for adaptation in local settings and limited health human resources that are strained due to other competing interests in health systems. These contextual barriers highlight that the uptake of health-system innovations is influenced by complex social, political and organizational contexts, which should be considered when designing, implementing, and scaling health-system innovations. Understanding and addressing contextual enablers and barriers can better support the alignment of health-system innovations with local needs, governance structures and resource availability [11–13]. Health leaders in Canada are exploring ways to address research gaps related to these identified contextual barriers, such as finding and aligning innovative health funding models with innovations in care [14].

Despite these barriers, there are windows of opportunity. The coronavirus disease 2019 (COVID-19) pandemic demonstrated that health systems can innovate, coordinate and fund rapidly when there is alignment and urgency across all involved partners. Creating an integrated innovation system to enable the adaptation and uptake of health-system innovations can also be grounded in the recommendations from the Global Commission on Evidence to Address Societal Challenges (GCESC), such as strengthening evidence-support systems [15]. These systems include structures and processes for those who can use evidence to inform decisions and mechanisms to enable coordination between key partners that require the best-available evidence [15]. Specifically, GCESC focusses on supporting international jurisdictions with the contextualization of existing evidence by asking stakeholders to consider the environment for evidence use (e.g. enablers, culture, capacity) and available interface mechanisms (e.g. evidence-demand prioritization and evidence-supply coordination). This link with evidence-support systems can support each phase of development, implementation, evaluation, adaptation, scalability and sustainability of health-system innovations by leveraging the best available evidence and expertise. Finally, there continues to be significant interest in leveraging digital health, data- and AI-driven tools to improve the quality

and efficiency of health systems [16–19]. These opportunities continue the momentum to advance the development of a responsive system that enables the uptake of health-system innovations in Canada.

Strengths and limitations

Our project had several key strengths. First, our evidence-informed, multiphased approach involved the development of comprehensive briefing materials and extensive engagement through the citizen panels and the stakeholder dialogue. This approach allowed our research team to iteratively integrate findings from the best-available evidence (i.e. evidence syntheses, jurisdictional scans, key informant interviews) and the experiences of citizens and health system leaders across Canada. Second, the interdisciplinary steering committee brought diverse perspectives and expertise on the topic, which ensured that our evidence products were both relevant and positioned for real-world impact. Third, we enhanced the transparency of our work by making all of our reports publicly available for different stakeholders (including plain-language summaries). One limitation of our approach for the citizen panels is that whilst we sought to engage Canadian residents who were diverse across gender, age, sexual orientation, socioeconomic status, ethnocultural background and geographic residence, our purposively selected sample of citizens was relatively small, at only 48. This choice reflects our efforts to prioritize in-depth deliberations which, in our experience, tends to yield richer insights compared with limited participation from a greater number of participants. Whilst there was some variation in terms of specific inputs across panels, many of the themes generated from different panels overlapped, suggesting that our sample size was appropriate for our purpose. However, we were unable to engage participants from every province and territory, and the perspectives of Black and Indigenous people, as well as people of colour, may not have been adequately represented relative to Canada's overall demographic make-up. Finally, our analysis used an iterative approach grounded in qualitative methodology, but did not include a fulsome analytical approach that included coding of transcripts. Specifically, for the citizen panels, we iteratively identified key themes within and between panels and used recordings to corroborate detailed notes taken from multiple team members taken during the panels. These findings subsequently informed deliberations in the stakeholder dialogue to ensure that the dialogue was grounded in the experiences, values and preferences of citizens. However, detailed qualitative analysis was not possible for the stakeholder dialogue, as it adopted the Chatham House Rule, which precludes recordings of the deliberation.

Conclusions

The next steps highlighted by stakeholders include establishing shared goals and vision, identifying gaps and mapping what has worked to drive health-system innovation, setting priorities and roles for how different stakeholders can contribute to building and collectively reviewing considerations such as sources of resources and funding. At their core, these next steps contribute to a more coordinated approach to developing, implementing and evaluating health-system innovations in Canada, cross-cutting governments and sectors to ultimately help increase the value gained from health innovations. The emphasis on sharing lessons learned across jurisdictions aligns with recommendations from the GCESC, highlighting the need for coordinated evidence-support systems that can support rapid learning and improvement cycles to support the spread and scale of health systems innovation in Canada.

Abbreviations

AI	Artificial intelligence
GCESC	Global Commission on Evidence to Address Societal Challenges
WHO	World Health Organization

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Author contributions

MGW conceived of the project and oversaw all components. ARB and PD drafted the evidence brief with MGW that informed the stakeholder dialogue, were secretariat for the citizen panels or stakeholder dialogue, co-led the analyses and summaries for the citizen panels and stakeholder dialogues, and co-wrote the manuscript. JDC took notes and co-led the analysis and summaries of the citizen panels and stakeholder dialogue. FPG contributed to establishing the scope of the project, reviewed all project materials and drafted the citizen brief with MGW. SH, JNL, JM, RR, HS and LTW contributed to establishing the scope of the project and reviewed all project materials. KAM contributed to establishing the scope of the project and co-facilitated the citizen panels. All authors were part of the interdisciplinary project steering committee and reviewed and approved the manuscript.

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Availability of data and materials

The datasets generated and/or analysed (i.e. audio recordings of the citizen panels) during the current study are not publicly available due to ethics protocols.

Declarations

Ethics approval and consent to participate

The Hamilton Integrated Research Ethics Board (HiREB) provided approval for the citizen panels (HiREB project # 15193). All participants in the citizen panels provided informed consent. No ethics approval was obtained for the stakeholder dialogue as the Hamilton Integrated Ethics Board has indicated that ethics approval is not required for the meeting as it is not recorded. Ethics approval has been acquired for our ongoing evaluation of stakeholder dialogues (HiREB project # 16021), but those results are not presented here.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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