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Selecting contextually appropriate performance indicators in a circumpolar context: a modified Delphi approach

Rebecca Rich^{1*}, Thomsen D'Hont², Kellie E. Murphy³, Jeremy Veillard⁴ and Susan Chatwood⁵

Abstract

Background: Meaningful performance measurement requires indicators to be scientifically robust and strategically focused. For many circumpolar states, indicators aligned with national strategies may ignore the priorities of northern, remote, or Indigenous populations. The aim of this project was to identify contextually appropriate performance indicators for maternity care in circumpolar regions.

Methods: Fourteen maternity care and health systems experts participated in a modified Delphi consensus process. The list of proposed indicators was derived from a previously published scoping review. Fourteen participants rated each proposed indicator according to importance, circumpolar relevance, validity, and reliability and suggested additional indicators for consideration.

Results: Consensus was achieved after two rounds, as measured by a Cronbach's alpha of 0.87. Eleven indicators, many of which represented physical health outcomes, were ranked highly on all four criteria. Twenty-nine additional indicators, largely focused on social determinants of health, health care responsiveness, and accessibility, were identified for further research. Travel for care, cultural safety and upstream structural determinants of health were identified as important themes.

Conclusions: This study identified the important gaps between current performance measurement strategies and the context and values that permeate maternal-child health in circumpolar regions. The indicators identified in this study provide an important foundation for ongoing work. We recommend that future work encompass an appreciation for the intersectoral nature of social, structural, and colonial determinants of maternal-child health in circumpolar regions.

Keywords: maternal health, infant health, Arctic regions, Indigenous health services, health care quality indicators

Background

Among health systems around the world, performance measurement has become an increasingly popular tool in the pursuit of health care quality, accountability, and value for money [1–4]. This trend has been accompanied by an explosion in the number of available performance

indicators and a dramatic increase in the number of organizations collecting and reporting on health system performance information. In this environment, meaningful performance measurement requires indicators that are scientifically robust and strategically focused. Indicators must be valid, reliable, sensitive to change, and feasible to measure. They must also be aligned with the values and priorities of the system they are intended to evaluate [5–7].

For circumpolar states, those whose political borders encompass the most northern regions of the globe, the

* Correspondence: rich@ualberta.ca

¹Department of Obstetrics & Gynaecology, University of Alberta, Royal Alexandra Hospital, 5S Robbins Pavilion, 10240 Kingsway Avenue, Edmonton, AB T5H 3V9, Canada

Full list of author information is available at the end of the article



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selection of contextually relevant indicators presents unique challenges. Geopolitically, “circumpolar” refers to all of Alaska, Greenland, Iceland, the Faroe Islands, and the northernmost territories of Sweden, Finland, Norway, Russia and Canada. Of course, these regions are diverse in their geography, populations and health systems, and some areas experience more health inequities than others. Despite their differences, they share many challenges such as vast distances, harsh winter climates, and low population densities, all of which make the delivery of health care challenging and expensive. Circumpolar health systems thus rely more heavily on long distance travel of both patients and providers than do their southern counterparts. In addition, many circumpolar regions have large Indigenous populations which comprise up to 90% of the population in some regions. It is thus imperative to consider the historical and ongoing impacts of settler colonialism and the substantial health inequities that exist both within and between circumpolar regions and disproportionately affect Indigenous peoples and communities.

Maternity care provides a useful example of the unique health care landscape in circumpolar regions. While medical evacuation can provide critical access to secondary and tertiary level care and is an important component of all rural and remote health systems, efforts at centralization have also put the sustainability of local birth programs at risk. The resultant practice of routinely evacuating low-risk women for labour and birth has substantial and well-documented consequences for patients, families and communities [8–11]. Where possible, it is considered best practice to provide care for labour and birth closer to home [12, 13]. Being a uniquely rural/remote phenomenon, this issue affects a minority of women in Canada and other circumpolar states and is not often captured in pan-national performance measurement efforts [14, 15]. Canadian maternity care indicators, for example, focus largely on decreasing practice variation with respect to obstetrical interventions, such as induction of labour, operative vaginal delivery and caesarean section. This approach has positioned cost savings and improvements in patient safety through a reduction in intervention as central performance targets [16]. Pan-national indicators such as these are often selected based on the strategic priorities of a dominant southern majority and may ignore or even conflict with the needs and priorities of northern or remote communities. This is particularly relevant for health systems serving Indigenous communities as the importance of including Indigenous knowledge and stakeholder input in the selection of performance indicators has been well documented in the literature [17, 18]. This study attempts to begin filling this gap by identifying performance indicators which are contextually appropriate for circumpolar health systems.

Methods

A two-round modified Delphi consensus study was conducted among circumpolar maternity care experts. The objectives of the study were to establish consensus on indicator priorities and identify contextually relevant perinatal performance indicators. The Delphi method is frequently applied in circumstances where the available evidence is contradictory or insufficient [19] and is a common method for the selection of key performance indicators [1, 20–23].

This study was carried out in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. Particular attention was devoted to Chap. 9, Research Involving the First Nations, Inuit and Métis Peoples of Canada [24]. There was consultation throughout the project with a First Nations Elder, medicine woman and healer who has extensive experience working with health researchers. This study was approved by the University of Toronto research ethics board. Territorial research licenses were obtained from the Aurora and Nunavut Research Institutes.

Participant selection

Participants were selected using purposeful sampling as the quality of results produced by a Delphi panel depends on the expertise of participants [25]. First, an advisory committee was assembled which included experts with extensive circumpolar networks. Each member recommended colleagues for participation. Invited participants were required to be experts in the field of maternal-child health either through clinical work, research, health policy, and/or Indigenous Traditional Knowledge. We sought out a heterogeneous panel to ensure that a wide variety of stakeholder groups were represented. A target sample size of 10–20 was chosen to balance the trade-offs between decision quality and data manageability as well as between panel heterogeneity and the ability to achieve consensus.

Many, but not all, circumpolar regions and types of expertise were represented. The group included two representatives from Alaska, one from the Yukon Territory, two from the Northwest Territories, four from Nunavut, two from Greenland, and three who currently work in southern Canada but have significant expertise in Arctic or circumpolar maternal-child health. The group included physicians, midwives, nurses, and public health researchers. Many of the participating clinicians currently work in research or health policy roles, allowing them to bring multiple areas of expertise to the panel.

Derivation of survey items

The questionnaires used were developed for this consensus process. Survey items were derived from a scoping review, which has been published elsewhere [15]. Sixty-

two unique maternity care performance indicators were identified through this review and subsequently subdivided into the following domains according to a modified version of the OECD Health Performance Framework [26]: Determinants of health, health outcomes, health system effectiveness, safety, responsiveness, accessibility, and cost. It should be noted that the terminology used for each indicator title was maintained from the original source and does not reflect the preferred language of the authors.

Response scale and criteria

Respondents were asked to rate each of the 62 indicators on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree) according to the following four criteria:

- Importance: The level of concern of health care users or policy makers and the degree to which the indicator is susceptible to influence by the health system.
- Circumpolar relevance: The significance of the indicator within the participant's circumpolar context.
- Validity: The degree to which the indicator measures what it intends to measure.
- Reliability: The degree to which the indicator provides stable results across various populations, circumstances, and time points.

In order to allow participants to best assess the validity and reliability of each indicator, a detailed information package was provided to each participant. During the first round, participants were also asked to suggest additional indicators not identified in the literature review. These additional indicators were incorporated into the second-round survey for evaluation by the panel².

Survey administration

The questionnaires were created and distributed electronically. Two researchers piloted the questionnaire to ensure it was clearly worded and the suggested time for completion was appropriate. Responses to the first-round survey were collected over a period of 41 days. Responses were collected and tabulated to create the second-round survey, which included the same 62 indicators along with the 17 additional indicators suggested by participants. Round-two responses were collected over a period of 19 days.

Data analysis

After collection of the first-round responses, measures of central tendency and dispersion (mean, median and standard deviation (SD)) were calculated for each indicator against each criterion. This information was included as structured feedback in the second round of the survey. Consensus among participants was determined by the degree of internal consistency demonstrated by participant responses. This was established using standardized Cronbach's alpha. This method assumes that each indicator possesses a true level of each characteristic. Each participant's response to a given survey question represents a single measurement of that indicator's importance, relevance, validity, or reliability. The internal consistency of responses can thus be considered a measure of agreement among participants. Published thresholds for an appropriate Cronbach's alpha vary in the literature from 0.70 [27] for the determining the inter-rater reliability of a psychometric scale designed to differentiate between groups to 0.90 [28] for use of a diagnostic scale on an individual level. The threshold for determining consensus among experts on a Delphi panel is similarly variable but a cut-off of $\alpha \geq 0.8$ is frequently used [29, 30]. All statistical calculations were performed using SAS University Edition.

Selection of key indicators

After achievement of consensus, indicators for which $\geq 80\%$ of participants selected 6 (agree) or 7 (strongly agree) on all four criteria were identified as a core set of indicators. Using importance and circumpolar relevance as gateway criteria, a second set of indicators was also identified for consideration. The latter group included indicators for which $\geq 80\%$ of participants provided a strong rating (6 or 7) for the criteria of importance and relevance but that did not meet the same threshold for validity and reliability.

Results

Achieving consensus

Twenty-one experts were invited to participate in the Delphi consensus process. Fourteen experts (67%) completed two rounds of the Delphi process. The level of agreement among participants, as measured by standardized Cronbach's alpha, is displayed in Table 1. After two rounds, the level of agreement was very good as demonstrated by a Cronbach's alpha of 0.87. Missing values accounted for 1.3% of all response options.

Selected indicators

Once consensus had been reached, the proportion of responses indicating participant agreement (6 - agree or 7 - strongly agree) was tabulated for each survey statement. Eleven indicators were rated highly on all four

² The second round survey has been included as a supplementary file.

Table 1 Level of Agreement Among Delphi Participants

Round	Participants	Agreement (Cronbach's α)		
		Missing values excluded	Missing values replaced with neutral value (4)	Missing values replaced with mean value
Round 1	14	0.79	0.75	0.79
Round 2	14	0.87	0.86	0.87

Standardized Cronbach's α calculated based on management of missing data. Consensus achieved when $\alpha \geq 0.8$

criteria by $\geq 80\%$ of the participants and have been labeled the "core" indicators (Table 2). This set of indicators primarily focuses on physical health outcomes but does contain four indicators which represent other domains of health system performance. These additional four indicators are as follows: teenage pregnancy and birth, admissions to the neonatal intensive care unit (NICU), presence of a skilled birth attendant, and travel to place of birth.

Twenty-nine additional indicators received high ratings for importance and relevance but lower ratings for reliability or validity, indicating that further study or development of these indicators may be required (Table 3). It is important to note that this group of indicators includes a much greater focus on social determinants of health, health system responsiveness and health care accessibility. Three major themes are represented within this second group of indications: Increased focus on the social determinants of health; the impact of medical travel; and the importance of culturally appropriate care at both provider and system levels.

Discussion

Selected indicators

This study demonstrates the ability of a modified Delphi approach to achieve consensus among a geographically dispersed and professionally diverse group of stakeholders from circumpolar regions. The eleven selected core indicators (Table 2), are largely focused on morbidity and mortality. This is consistent with the findings of our earlier work [15] and reflects the historical dominance of physical health outcomes in performance measurement and health surveillance systems. Physical health outcomes provide the most straightforward opportunity for standardizing definitions, collecting high quality data, and supporting interregional comparisons. The validity and reliability of these indicators is also well established in the literature. However, they capture only a tiny fraction of health system performance. Frameworks, such as the OECD framework utilized in this study, exist in order to capture other domains of health system performance and ensure performance measurement strategies are adequately thorough. It is clear from the

Table 2 Selected "Core" Performance Indicators

Indicator	Ratings ≥ 6 (%)			
	Importance	Relevance	Validity	Reliability
Determinants of health				
Teenage pregnancy & birth	93	93	93	93
Health outcomes				
Anemia in pregnancy	93	93	86	86
Stillbirths	100	93	93	93
Perinatal deaths	100	100	100	100
Preterm birth	100	100	86	86
Maternal Mortality	100	93	100	100
Neonatal mortality	100	100	100	100
Low birth weight	86	93	93	93
Effectiveness				
NICU admissions	100	85	100	100
Accessibility				
Birth attendant	93	93	93	93
Travel to place of birth	92	93	86	86

Indicators for which $> 80\%$ of participants provided a rating of 6 or 7 for each criterion

Table 3 Selected “Additional” Performance Indicators

Indicator	Ratings ≥ 6 (%)			
	Importance	Relevance	Validity	Reliability
Determinants of health				
Maternal education level	93	93	93	79
Domestic violence	93	100	21	7
Smoking during pregnancy	100	100	57	50
Use of illicit drugs during pregnancy	100	93	21	14
Use of alcohol during pregnancy	100	100	29	21
Breastfeeding practices	100	100	64	43
Food insecurity ^a	100	100	-	-
Maternal housing (crowded or under-housed) ^a	93	93	-	-
Health outcomes				
Diabetes in pregnancy	93	93	86	79
Postpartum hemorrhage	93	93	71	50
Postpartum depression	86	93	29	21
Congenital anomalies	86	86	86	79
Small for GA infants	100	100	86	79
Effectiveness				
Neonatal readmission to hospital	86	86	93	79
Safety				
Births without obstetric intervention	93	86	64	64
Transfers for obstetrical indications ^a	92	85	-	-
Unplanned births in the community ^a	100	92	-	-
Responsiveness				
Characteristics of care providers	92	93	69	69
Cultural competency	92	86	46	38
Patient reported unfair treatment based on ethnicity	92	86	57	29
Patient reported support during labour and birth	100	86	50	50
Presence of breastfeeding support programs	92	86	29	14
Patient reported satisfaction with care	100	100	50	36
Accessibility				
Frequency and timing of antenatal care	93	93	79	71
Use of antenatal ultrasound	86	86	93	79
Rate of induced abortions	86	86	86	79
Postpartum visits	100	86	71	64
Maternity care provider in patient's community ^a	100	93	-	-
Maternity care provider who speaks the same language/is from the same culture as the patient ^a	92	93	-	-

Indicators for which $\geq 80\%$ of participants provided a rating of 6 or 7 on the basis of importance and circumlocar relevance

^aDenotes additional indicator suggested by members of the Delphi panel in the first round

narrow selection of core indicators identified in this study, that a complete set of scientifically robust, strategically focused, and contextually appropriate performance indicators does not yet exist for circumlocar maternity care systems.

Consistent with this conclusion, is the identification of 29 additional indicators for further consideration (Table 3). These indicators, which were identified using importance and relevance as gateway criteria, but did not require evidence of strong scientific validity or

reliability, demonstrate the importance of evaluating circumpolar health systems through the domains of social determinants of health, healthcare accessibility, and health system responsiveness. The decision to include an entire second set of indicators based on these gateway criteria rests on their significant importance in concert with the absence of available scientific evidence demonstrating validity and reliability. They therefore provide critical insight into circumpolar priorities while highlighting some of the challenges associated with circumpolar health system performance measurement. The complex nature of some of the suggested constructs, particularly those necessitating patient reported outcomes, introduces the need for rigorous development of these indicators which has yet to be documented in the literature. Additional barriers include a lack of availability of data sources to support these indicators and the reticence of health system leadership to direct resources toward development of indicators for small populations. The critical, value-based themes that weave throughout this list reflect the predominance of travel for care within circumpolar health systems and the limited availability of culturally appropriate care for Indigenous patients and families in many regions.

Social and structural determinants of health such as income, education, social supports, gender, and experiences of racism and colonization are all known to influence health behaviours, health system access and health outcomes [31–34]. In addition, social and structural determinants of health contribute to disadvantage and health inequity in an intersectional fashion. Examples of such interconnected and overlapping determinants of maternal-child health are highlighted in this study and include maternal substance use, maternal education, the presence or absence of intimate partner violence, food insecurity and insecure housing. While there is strong evidence that communities in some circumpolar regions are disproportionately affected by these challenges, they are not routinely included in perinatal health surveillance systems. This is a direct reflection of the fact that health system performance and healthcare quality initiatives are typically siloed from the social and political systems which impact these upstream determinants.

In many circumpolar regions, structural, political, and social determinants of health are further compounded by physical isolation, harsh winter climates, increased industrialization, and changing environmental conditions. These factors contribute to the geographical and logistical barriers that patients face when accessing healthcare. Multiple indicators of healthcare access were highlighted in this study. These include but are not limited to the number of antepartum or postpartum visits a patient is able to attend, the availability of obstetrical ultrasound, and the distance a patient is required to

travel for care. The latter indicator was identified from the Canadian Maternity Experiences Survey [35] and captures the proportion of women who report traveling > 100 km to receive care. It is important to consider the fact that in many circumpolar regions around the world, distances are almost always greater than 100 km. With this in mind, the Delphi panel suggested other measures of travel for care including the proportion of women who can access a maternity care provider (and/or skilled birth attendant) in their community, the number of unplanned births occurring in each community (which generally occur as a result of patients being unable or unwilling to travel for birth), and the number of emergency transfers for obstetrical indications. If “distance” to care is measured within a circumpolar context, we suggest using the number of “days or hours away from home” as a more appropriate reflection of the travel burden. The Delphi panel also suggested that an indicator be developed to capture the proportion of women in a region receiving care in their own language. This, of course, reflects the fact that accessibility is not equivalent to geographical proximity and equitable access to care requires that systems and providers minimize social, financial and systematic barriers to care and ensure the availability of culturally safe care for Indigenous women.

Health system responsiveness is a concept intended to capture the ability of a health system to acknowledge, accommodate, and react to the expectations of the population. It shares many tenants with patient centered care and overlaps with the principle of cultural safety [36]. For Indigenous women, providing culturally appropriate and thus responsive care may necessitate a holistic appreciation of health [37, 38] including physical, mental, emotional, spiritual, and historical considerations. It is well established that racism, colonization, and presence or absence of access to self-determination are important determinants of Indigenous peoples’ health [10, 39, 40]. The Delphi panel demonstrated this critical issue by selecting multiple indicators reflective of cultural competency or safety or other aspects of the patient experience. Their suggestions included a number of patient reported outcomes reflecting the necessity to assess cultural safety through the eyes of the individual, family or community receiving care. This study suggests that health care providers, institutions and health system leaders should not only prioritize efforts to provide culturally safe care, but should also measure and report on their ability to do so. A further critique of how the study findings relate to Indigenous peoples’ health and to cultural safety is included below.

Data sources and feasibility

Beyond the specific indicators identified by the Delphi panel, our findings highlight some important challenges

and opportunities for circumpolar performance measurement initiatives. First, when reporting rare outcomes among small populations, aggregation of data over large regions or timeframes may be required to ensure confidentiality and statistical rigor. Thus, collection and reporting of such indicators within the circumpolar context may not always be feasible and there may be a larger role for process indicators and confidential audits of rare outcomes such as maternal and neonatal mortality. Second, health system performance measurement is only as effective as the data that supports it. In the Canadian territories, for example, there is limited prospective collection of perinatal surveillance data. There is also a marked lack of Indigenous specific identifiers within Canadian health data sources more broadly [41, 42]. The development and implementation of Indigenous health information systems in Canada is essential and must be carried out by and with Indigenous communities and organizations to ensure appropriate indicator selection, data usage and governance [43, 44]. Finally, and most importantly, our findings reinforce the fundamental role of context and values within health system stewardship [6, 17, 45] and the importance of aligning health policy with broader agendas [46]. In Canada, we have seen the recent adoption of the UN Declaration on the Rights of Indigenous Peoples and the release of the final reports of the Truth and Reconciliation Commission and the Inquiry into Missing and Murdered Indigenous Women and Girls [47–50]. In association with these reports, Canadian National bodies have begun to recognize the importance of Indigenous rights and self-governance. Despite this, the commonly used performance measurement systems are still incongruent with these values. Canadian policy makers thus have an opportunity and an obligation to engage with northern stakeholders and Indigenous communities to ensure that health policies and resources are directed appropriately. Furthermore, when developing performance measurement strategies intended to capture and address health inequities, it is critical to recognize the role that defect-based approaches to health surveillance have had and continue to have on the stigmatization of Indigenous peoples within the health literature. Adequate engagement and attention to strengths-based approaches can limit this unintended consequence while simultaneously providing opportunities for health system improvement and management.

Limitations

The authors recognize a number of limitations which we hope will generate important reflection and discussion for future efforts among all who work in this field. While many clinicians, researchers and health policy makers in circumpolar regions communicate regularly in English,

the exclusion of other languages from this study limited the potential pool of Nordic, Russian, Greenlandic, and North American Indigenous participants. Furthermore, because performance measurement efforts are typically centralized in southern centers, and are dominated by non-Indigenous individuals, capacity and expertise among circumpolar and Indigenous experts is limited to a small number of exceedingly busy people. The composition of the Delphi panel was thus heavily weighted toward the North American settler experience, and readers should be aware of the impact this may have on generalizability of the findings.

A discussion of health system performance in circumpolar regions would not be complete without an acknowledgement of the coloniality of health care and of health system performance measurement strategies more broadly. While the project's foundation was heavily influenced by post-colonial and critical race theories, health equity, and *Etuaptmumk* (two-eyed seeing), the authors humbly recognize that this study uses entirely western methodologies and a western health system performance framework. Based on this experience, we offer our reflections on the ideological and practical implications of this approach.

We have previously named experiences of colonization and anti-Indigenous racism as important determinants of Indigenous peoples' health. While this applies directly to the importance of selecting indicators of cultural safety at the level of the patient-provider interaction and within health system structures, it should also be recognized that health system surveillance and health system performance measurement efforts, including the methodologies used in this project, are products of a colonial system. A more ethical, effective, and generalizable approach would have been to, under the direction of the Elders involved in this project, apply Indigenous methodologies and patient/community level engagement alongside or in place of the Delphi consensus process.

Recommendations and future directions

While many of the selected indicators are not ready for implementation as they have been presented here, circumpolar health regions interested in improving their use of contextually relevant performance indicators, may find this a useful resource.

In order to prepare these indicators for use we recommend that further indicator development be carried out in consultation with patients, families, community leaders and other local stakeholders. Concomitant development and application of region-specific or circumpolar health system performance frameworks will help to maintain comprehensiveness and relevance while minimizing indicator redundancy. Where the health and wellness of Indigenous families or communities is

relevant, we recommend performance measurement strategies be developed by and with Indigenous communities and leaders and utilize locally appropriate methodologies for information gathering and interpretation.

While we believe the findings of this study are useful at face value, we hope that the above discussion of the broader colonial context within which it was conducted will help to generate important consideration, reflection, and a collective effort to advance contextually and culturally appropriate, value-based, responsive, and community driven work within circumpolar health system performance measurement.

Conclusions

In this study, we identified eleven scientifically robust maternity care indicators that are important and relevant within the circumpolar context. We also identified many indicators that more broadly reflect the priorities in circumpolar regions and warrant further consideration and development. This finding is demonstrative of the significant gap that currently exists between performance measurement strategies and the context and values in circumpolar regions.

Based on the findings of this study, we recommend that circumpolar health system leaders re-evaluate their current perinatal performance measurement systems to ensure responsiveness and contextual appropriateness. The indicators identified in this study may provide an important foundation for this work, but should not be implemented without robust community and stakeholder engagement at local and regional levels as well as the development and application of circumpolar or region-specific health system performance frameworks.

While we recognize that successful health system performance measurement strategies require centralization and oversight, we recommend that future efforts encompass an appreciation for the intersectoral nature of social, structural, and colonial determinants of maternal-child health in circumpolar regions. The necessity for cooperation between the health and social services sectors and the value of local and Indigenous knowledge cannot be overstated.

It is our hope that ongoing work in this area will ultimately lead to the development of intersectional, value-based, and contextually appropriate maternal-child health indicators which are supported by data systems with appropriate ownership and governance. Only with this approach can we foster continuous quality improvement in circumpolar maternity centers, offer opportunities for inter-regional comparisons, and support evidence-based drivers towards health equity.

Abbreviations

OECD: Organization for Economic Cooperation and Development; NICU: Neonatal intensive care unit; GA: Gestational age; NWT (or NT): Northwest Territories; NU: Nunavut

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-021-06485-2>.

Additional file 1. Delphi Questionnaire Round 2. As outlined in the methods section, and is standard in a Delphi consensus process, the survey instruments used were designed for the purpose of this study. Survey item derivation is described above. This attached additional file includes a copy of the second round questionnaire as well as the associated preamble as it was distributed to Delphi panel members. The second round questionnaire has been included alone as it encompasses the both the contents of the first round questionnaire as well as the summary statistics generated in the first round and the additional indicators suggested by the Delphi panel in round 1. It thus provides a complete representation of the survey items distributed to panel members.

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Authors' contributions

RR designed the study, collected and analyzed the data, and drafted the manuscript. TD contributed to data collection, analysis, and manuscript editing. KM, JV, and SC each contributed substantially to the conception and design of the study, to the interpretation of data. They supervised RR in all other portions of the study in their roles as members of the graduate supervisory committee. All authors have read and approved the manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics of approval and consent to participate

This statement: Ethical Conduct for Research Involving Humans. Particular attention was devoted to Chap. 9, Research Involving the First Nations, Inuit and Métis Peoples of Canada (24). There was consultation throughout the project with a First Nations Elder, medicine woman and healer who has extensive experience working with health researchers. This study was approved by the University of Toronto research ethics board. Territorial

research licenses were obtained from the Aurora and Nunavut Research Institutes. Informed consent was obtained from each participant. The online consent form included the following statement: "By beginning the survey, you acknowledge that you have read this information, have had your questions answered, and freely agree to participate in this study. You may print or retain a copy of this form for your records." Participants demonstrated their consent by initiating responses to the voluntary online survey.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Obstetrics & Gynaecology, University of Alberta, Royal Alexandra Hospital, 55 Robbins Pavilion, 10240 Kingsway Avenue, Edmonton, AB T5H 3V9, Canada. ²Department of Family Medicine, University of Alberta, Suite 205 College Plaza 8215 - 112 St, Edmonton, AB T6G 2C8, Canada. ³Division of Maternal Fetal Medicine, Obstetrics & Gynaecology, University of Toronto, Mount Sinai Hospital, Room 3-918, 700 University Avenue, Toronto, ON M5G 1Z5, Canada. ⁴Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, University of Toronto, 155 College Street, Suite 425, Toronto, ON M5T 3M6, Canada. ⁵School of Public Health, University of Alberta, 3-279 Edmonton Clinic Health Academy, 11405 - 87 Ave NW, Edmonton, AB T6G 1C9, Canada.

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