Concept Mapping: Application of a Community-Based Methodology in Three Urban Aboriginal Populations

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There are striking health and social inequities between Aboriginal and non-Aboriginal people in Canada.[1] For First Nations, Inuit, and Métis people, ill health is directly linked to social determinants of health that include colonization, cultural suppression, family and community dislocation, chronic unemployment, poverty, lower education attainment, and unhealthy environments.[2] In the face of these challenges, it is very important to recognize that nonetheless, many Aboriginal individuals and communities experience good health and well-being, and also demonstrate resilience, celebrate cultural values, and actively transmit cultural knowledge and traditions to younger generations.[3] Research in this context, therefore, must adhere to a framework that upholds local diversity of knowledge systems and resiliencies among indigenous communities and recognizes the continued negative impact of colonization on the health of these populations. Currently, there is a tremendous need to develop the tools,

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knowledge, and systems that support and facilitate community-driven approaches to research, rather than those that reinforce marginalization and exclusion.

In urban areas, Aboriginal communities in Canada may be diasporic and heterogeneous.[4] Specifically, an increasing number of First Nations are moving to urban centers to seek better housing, employment, and health care.[5] We know from the Canadian Census that compared to non-Aboriginal Canadians, First Nations, Inuit, and Métis populations experience ongoing disparities in social determinants of health such as income insecurity, unemployment, low levels of education, decreased food availability, and inadequate housing, and that urban residence exacerbates these disparities. According to the 2006 Census, over 60 percent of Aboriginal people in the province of Ontario live in urban areas.[6] The city of Winnipeg, Manitoba, is home to the largest urban Aboriginal population in Canada. Urbanization is also increasing among Inuit people, with the largest urban population outside of the northern region of Inuit Nunangat residing in the city of Ottawa.[7] In Canada as a whole, nearly seven out of ten Métis and three out of every four people in the off-reserve First Nations population live in urban areas. In other words, according to the census, the most urbanized groups are non-status Indians (73 percent) and Métis (69 percent).

Despite this population's growing size, health outcomes data on First Nations, Métis, and Inuit living in urban areas are very limited. Some of the reasons behind this deficiency are limitations in the current health information system and data collection processes with respect to Aboriginal peoples.[8] In the coverage of data systems, large gaps exist, data are of poor quality, there is little infrastructure or resources to support Aboriginal-specific data processes, and the health indicators themselves are mostly developed externally to Aboriginal communities.[9] Moreover, a history of negative experiences in Canada and other indigenous contexts worldwide has led to mistrust among indigenous communities, researchers, and government bodies, creating a barrier that perpetuates the broader social exclusion of indigenous populations.[10]

Both in Canada and internationally, indigenous people want research and its design to contribute to culturally relevant health measurement systems that incorporate traditional healing frameworks and focus on community wellness.[11] Research developed in this way would enrich people's lives as opposed to exacerbating feelings of oppression or depletion and for many, this is seen as an important aspect of the inherent right to self-determination.[12] Concept mapping, therefore, was selected as a research tool because it supports local knowledge and establishes a conceptual foundation upon which data measurements and systems can be grounded.

Mapping indigenous knowledge around a topic or concern of interest is not a new concept. One form of mapping that has been used in Canadian Aboriginal communities is traditional land-use mapping.[13] Land-use maps

illustrate the knowledge and experiences that indigenous people associate with specific geographic areas and landmarks and also demonstrate how one aspect of the indigenous knowledge held by community members can be mapped in a manner that has meaning for that community. As a very inclusive process requiring input from participants at each stage, the concept mapping process can build community capacity and may have the potential to affect environmental and social policy decisions.[14]

There are several advantages to using concept mapping: encouraging participant groups to stay on task and to lay out a framework for a planning or evaluation study; using the language of the participants rather than terms imposed by an evaluator or planner; increasing group cohesiveness and morale; and generating a graphic representation which not only shows all of the major ideas and interrelationships but also is comprehensible to all of the participants and can be easily presented to other audiences.[15] It was anticipated that concept mapping would be an appropriate tool in urban First Nations, Inuit, and Métis research contexts as it builds on mapping traditions, upholds collective values and opinions, and requires strong community participation. While there is little documentation of concept mapping in an urban Aboriginal research setting, it has been successfully implemented with marginalized groups in urban, community-based research contexts.[16]

In recognition of the diverse historical, cultural, political, and social contexts of the three partner communities, a separate concept-mapping project was completed for each of the three community sites. This was in keeping with current policy and existing literature regarding the need for contextually specific First Nations, Inuit, and Métis research and services in Canada.[17] After a five-year inquiry into the relationship among Aboriginal peoples, the Canadian government, and Canadian culture as a whole, the Royal Commission on Aboriginal Peoples (RCAP) released its report in 1996. Central to the recommendations made by the RCAP was a commitment to respect the historical and legal rights of Aboriginal peoples to self-determination, as well as to develop policies that recognize the diversity of cultures and histories of Aboriginal peoples—a diversity that not only makes them distinctive within Canadian society, but also distinguishes them from one another. [18] Also, as highlighted by several indigenous scholars who employ a decolonizing research framework, it is crucial to recognize the diversity of Aboriginal peoples with respect to cultural and ideological differences in values and lifestyles as well as geographical diversity, particularly in an urban context. [19] As Smylie and colleagues found in their study on pathways of health knowledge in three Canadian Aboriginal communities, the diversity of culture, history, and governance systems within each community informed unique and context-specific practices and social structures that then influenced the pathways of health information.[20]

In the *Our Health Counts* project discussed in this article, concept mapping was selected as a tool for engaging stakeholders in a health needs assessment and database development project carried out in partnership with three distinct urban Aboriginal populations in Ontario.[21] In each of the three communities, the resultant cluster maps were used to directly inform the development of a unique survey tool. Three communities participated: First Nations in Hamilton, Inuit in Ottawa, and Métis in Ottawa. The community partners representing these populations in Hamilton and Ottawa were De dwa da dehs ney>s Aboriginal Health Access Centre (DAHAC) (on behalf of the Hamilton Executive Directors Aboriginal Coalition); Métis Nation of Ontario (MNO); and Inuit Family Health Team (IFHT). Concept-mapping activities were conducted between June and November of 2009.

Methods

Preliminary Project Development and Governance

Preliminary project discussions around the need for a research project to address the gaps in population-based data for urban Aboriginal populations in Ontario began between the executive director of the Ontario Federation of Indian Friendship Centres (OFIFC) and the project research lead at St. Michael's Hospital in 2007. Building on existing research relationships,TIFHT, MNO, and the Ontario Native Women's Association (ONWA) joined the project team over the next several months. In order to formalize partnerships, research agreements and data management/governance protocols were negotiated and signed between the Centre for Research on Inner City Health at St. Michael's Hospital (CRICH), OFIFC, IFHT, MNO, and ONWA. Building on a foundation of existing academic-community research relationships, these agreements explicitly address issues of project governance; community expectations; benefits of the research; ownership, control, access, and possession of research information; and dissemination of project results, including academic publications. In addition, a governance council comprised of representatives from the four core urban Aboriginal provincial organizations was established to oversee all stages of the *Our Health Counts* research process.

Recruitment

Concept mapping was used to engage urban Aboriginal community stakeholders in the three project sites located in southern Ontario. Based on its significant Aboriginal population and strong infrastructure of Aboriginal community health and social services, the city of Hamilton, located 70 km west

of Toronto, was selected as a promising First Nations community project site.[22] Ottawa, Canada's capital city, located 500 km east of Hamilton, was chosen as the Inuit site as it has the largest urban Inuit population in Canada and the principal investigator had a working relationship with the Inuit Family Health Team for more than ten years.[23] Similarly, Ottawa was chosen as the Métis site to build on an existing research relationship and because the provincial office of the Métis Nation of Ontario, located in Ottawa, was able to provide support for the project. Finally, both Hamilton and Ottawa were chosen based on their proximity to the research team in Toronto, which facilitated regular meetings and supported a participatory action research framework.[24]

Front-line health and social service workers from Aboriginal organizations serving these communities were invited to participate in the concept-mapping process. Participant recruitment was led by each of the community site research coordinators and supported by the larger research team. Participants were selected using purposive sampling in order to ensure group diversity with respect to: organizations represented; gender; age; occupation; and community roles (for example, both Aboriginal organizational staff and clients were included). Community members were therefore identified on the basis of addressing the research goal of accessing individuals across different sectors—not with the intention to ensure generalizability.[25]

The research coordinators, who were themselves community members in each of the three community sites, invited participants either in person, or by phone or email. In Hamilton, study participants represented member organizations of the Hamilton Executive Director's Aboriginal Coalition as well as other sectors of the community: students, parents, industrial workers, and health and social service clients. In Ottawa, Métis participants were staff, clients, and/or members of MNO, the National Aboriginal Health Organization, the Métis National Council, and the Ottawa Métis Council. Inuit participants included front line workers and clients from the IFHT as well as artists, elders, and other prominent Inuit community members.

Concept-Mapping Activities

Concept mapping integrates several qualitative and quantitative methods into a series of structured steps.[26] Each participant must complete three data gathering activities: (1) brainstorming, (2) sorting and rating, and (3) map interpretation or diagramming. All data collection activities were clearly decided and agreed upon in the community research agreements and were approved by St. Michael's Hospital Research Ethics Board and the *Our Health Counts* governing council.

In the three community sites, brainstorming activities were conducted in a group session onsite at the participating community organizations. On average,

the brainstorming sessions lasted approximately two hours. All three groups responded to the focal question, "Health and health-related issues and topics in the Hamilton First Nations/Ottawa Métis /Ottawa Inuit community that are prevalent, serious, have the fewest solutions, or are otherwise important include _____."

Following concept-mapping guidelines, the list of non-unique items generated in each brainstorming session was combined into one master list of items by combining repetitive statements and removing duplicates and statements that did not answer the focal question.[27] In Hamilton, two group sessions with a total of sixteen participants yielded a master list of 102 statements. For Inuit in Ottawa, one brainstorming session with twenty-four participants generated forty-four statements. Finally, for Métis in Ottawa, one group session of eleven participants generated eighty-three statements.

For the First Nations in Hamilton and the Métis in Ottawa, the sorting and rating sessions were conducted online using Internet software provided by the Systems Concepts Global package.[28] In order to access the list of statements that were generated at the brainstorming sessions, participants were sent an email that contained their password and login information. Participants were told that the process would take around three hours to complete and that it would be possible to save their work and complete it in several sittings. Additionally, arrangements were made with the participating community agencies and organizations so that individuals could take time during the workday to complete the sorting and rating activities. Finally, a support/help line was provided to participants to answer any questions during regular working hours. In Hamilton, fifteen individuals completed the online sorting and rating. For the Métis community in Ottawa, twenty individuals completed online sorting and rating activities. The online sorting and rating took two weeks to complete. Due to the need for a bilingual session in English and Inuktitut, the sorting and rating for the Inuit in Ottawa occurred in person at the IFHT medical center. The total number of participants was twenty. The session lasted approximately four hours, during which each person completed the sorting and rating.

For both the online and in-person sorting tasks, participants were asked to place the items from the master list into piles that made sense to them and label the piles accordingly. All participants were provided with the following instructions: "each individual statement can only be placed in one pile, all statements can't be placed in the same pile and all statements can't be placed into their own pile." After completing the sorting, participants were asked to rate the statements with respect to the following three areas:

(1) Community Concern: When you consider each of the statements, please rate them according to your degree of concern for the topic within your community. (Where 1= No Concern and 5= Extremely Concerned.)

(2) Health Data and Information: When you consider each of statements, please rate them according to the need for health data and/or information to better understand the problem. (Where 1= No need for health data and 5= Extreme need for health data.)

(3) Service Availability: When you consider each of the statements, please rate the extent to which services are available to address the particular issue. (For First Nations, Where 1=No services available and 5=Services are more than adequate and for Métis and Inuit, Where 1= Services are more than adequate and 5= No services are available.)

Data from online sorting and rating were automatically uploaded into the concept systems software, while data gathered during the group sorting and rating session required manual entry. Concept systems software uses nonmetric multidimensional scaling and cluster analysis to create point and cluster maps reflecting the overall group sort and rate. To develop the concept maps three core data-analysis steps are conducted.[29] First, each participant's sorting data are used to create a similarity matrix that contained information on the number of participants who sorted each pair of item statements together. The second step, multidimensional scaling, is used to position each statement on a point map. The third step involves hierarchical cluster analysis, which converts the point map into a cluster map by grouping similar items into non-overlapping clusters.[30] The resulting maps show the individual statements in two-dimensional (x,y) space: more similar statements are located nearer each other, with the statements grouped into clusters that partition the space on the map.[31]

Prior to the map interpretation sessions, the research group reviewed the configuration of each of the three software-generated maps. Starting with a large number of clusters (twenty), at least three research team members reviewed the stepwise merging of clusters required for progressively smaller cluster solutions. The optimal cluster solution occurs when more than one unique conceptual domain per cluster would result if clusters were merged any further.[32]

All map interpretation sessions were completed at the participating community organizations in a group setting. In Hamilton, there were two map interpretation sessions with twelve participants. In Ottawa, at the Inuit site, there was one map interpretation session with twenty participants and one map interpretation session for the Métis with nine participants. In each map interpretation session, these initial cluster maps were projected onto a screen at the front of the room in clear view of all participants. The statements contained in each cluster were closely examined and discussion was encouraged.

Participants were able to explore the content of each cluster in great detail and were able to challenge the location of an item. The final cluster labels were also determined at these group sessions. A multidimensional scaling diagnostic statistic called a stress value was generated in order to confirm the appropriateness of the number of clusters to appear in the final map.[33]

Results

Each community generated a separate map that was locally grounded and reflective of the diverse sociocultural, geographic, and political contexts in urban First Nations, Inuit, and Métis community sites. Also, the three community sites were comprised of different stakeholders who generated and sorted different statements, ensuring that separate analyses took place.[34] For these reasons, the results are presented below as three distinct concept-mapping projects.

First Nations, Hamilton (fig. 1): 102 statements on the master list were clustered around ten domains that represent the health and health-related issues for this community considered to be not only the most serious and important, but also with the fewest solutions.

Inuit, Ottawa (fig. 2): the Inuit community in Ottawa produced a map with seven clusters representing the forty-four statements around health and health-related priorities for their community.

Métis, Ottawa (fig. 3): the Ottawa Métis community generated a ten-cluster map that represented the eighty-three statements around health and health-related concerns of their community.

Clearly, these maps depict three unique conceptualizations of health priorities in each of the three Aboriginal community settings. The configuration of the maps themselves, the cluster labels, and the degree of concern or rating of each of the health topics are distinct. As priorities for their communities, participants in all three mapping groups emphasized social and political determinants of health such as colonization, discrimination, trauma, and lack of government responsiveness. These determinants of health are not reflected in mainstream research instruments such as the Canadian Community Health Survey, which focus more on health status, health behavior, and health systems outcomes.[35] Tables 1 through 3 below present a summary of the five top-rated map clusters for each of the three rating scales in the three community sites.

Overall, the average ratings for the top five clusters in each community indicate a high level of community concern, a great need for health data and information, and a desire for more services in each setting.

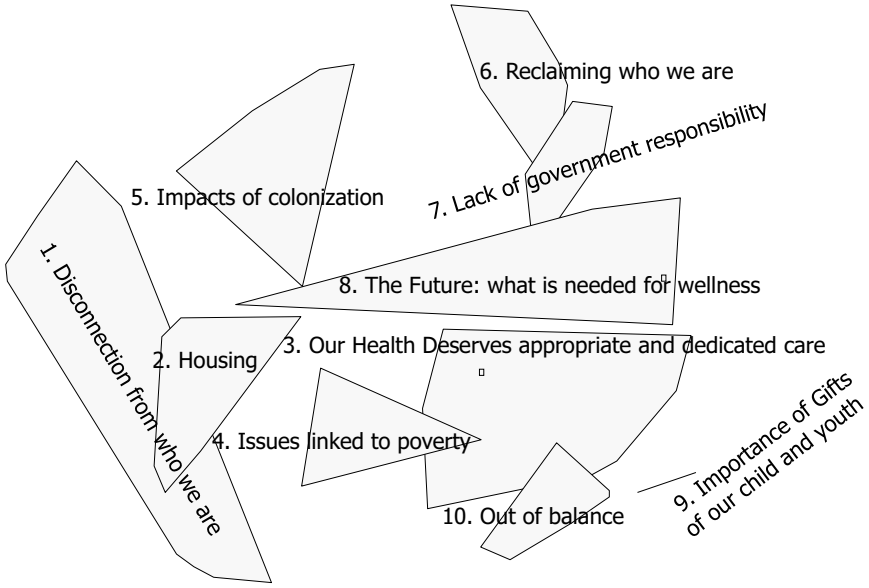

Figure 1. *Concept map for Hamilton First Nations community.*

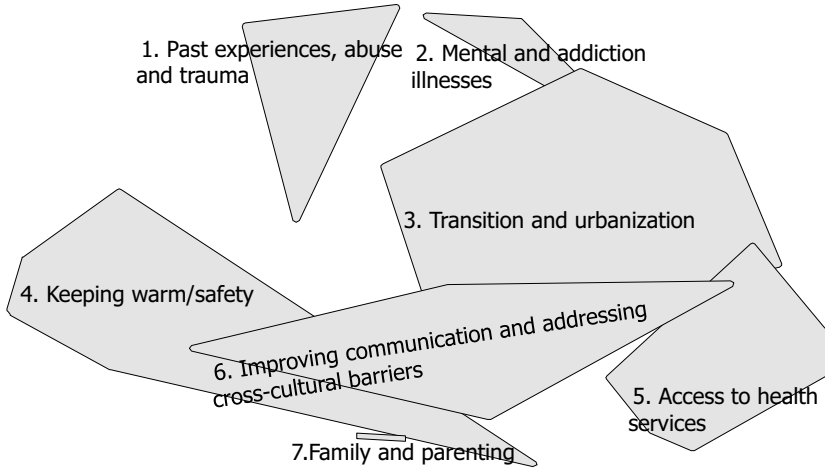

Figure 2. *Concept map for Ottawa Inuit community.*

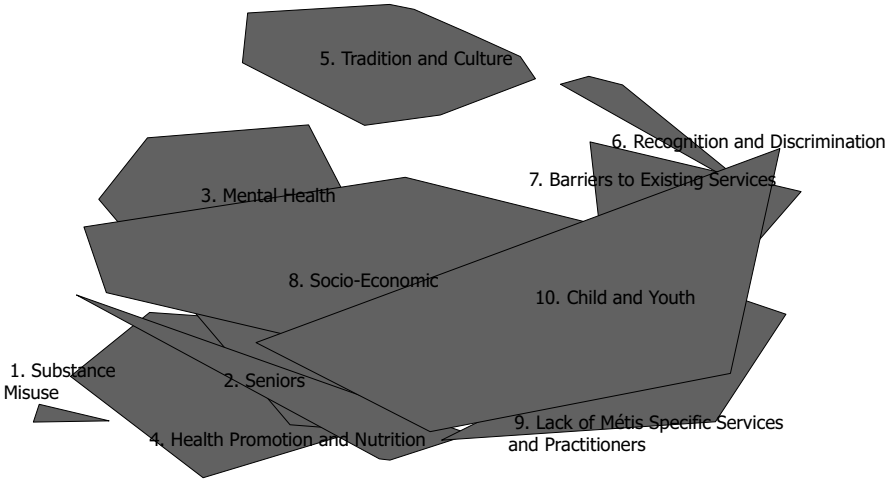

Figure 3. *Concept map for Ottawa Métis community.*

Discussion

Our study demonstrates that concept mapping is a culturally relevant and appropriate community-based methodology for indigenous contexts. Although concept mapping was developed drawing on Euro-western research traditions, it supported the articulation and illustration of indigenous conceptualizations of health when applied appropriately in three diverse Aboriginal community settings. In an illuminating example of concept mapping's efficacy in an Aboriginal community setting, community stakeholders identified and superimposed a medicine wheel onto the concept map. The four-quadrant circle of the medicine wheel can function as a framework for understanding the interconnectedness and interrelatedness of the natural world, including the lived environment and all living things.[36] At the individual human level, the four quadrants can represent the holistic self (mind, body, emotions, and spirit); more collectively, one can superimpose lifecycle stages (child, youth, adult, senior/elder), or levels of society (individual, family, community, nations).[37] During this particular map interpretation session with the First Nations community in Hamilton, the medicine wheel was literally superimposed onto the concept map, with two axes sectioning the circle into four quadrants. The two axes were labeled: "Our Health Deserves Appropriate and Dedicated Care" and "Disconnection from Who We Are."

In addition to supporting the articulation of indigenous ideas, concept mapping is grounded in community engagement and consensus, an approach that corresponds with the expressed desire across diverse Aboriginal

Table 1. Five Top-Rated Clusters for Level of Community Concern in Urban First Nations, Inuit and Métis Community Sites

Community	Cluster Label	Average Rating
Hamilton, First Nations	Issues linked to poverty	4.43
	Disconnection from who we are	4.36
	Impacts of colonization	4.34
	Housing	4.33
	Lack of government responsibility	4.28
Ottawa, Inuit	Mental and addiction illnesses	4.19
	Improving communication and addressing cross-cultural barriers	4.18
	Keeping warm/safety	4.18
	Past experiences, abuse and trauma	4.06
	Access to health services	3.84
Ottawa, Métis	Substance misuse	4.13
	Recognition and discrimination	4.03
	Socio-Economic	3.98
	Lack of Métis specific services and practitioners	3.90
	Health promotion and nutrition	3.85

Table 2. Five Top-Rated Clusters for Need for Health Data and Information in Urban First Nations, Inuit and Métis Community Sites

Community	Cluster Label	Average Rating
Hamilton, First Nations	Impacts of colonization	4.46
	Issues linked to poverty	4.37
	The Future: what is needed for wellness	4.35
	Housing	4.32
	Our Health Deserves appropriate and dedicated care	4.30
	Lack of government responsibility	4.28
Ottawa, Inuit	Keeping warm/safety	4.22
	Improving communication and addressing cross-cultural barriers	4.16
	Past experiences, abuse and trauma	4.00
	Transition and urbanization	3.99
	Mental and addiction illnesses	3.96
Ottawa, Métis	Substance misuse	3.98
	Health promotion and nutrition	3.95
	Seniors	3.83
	Lack of Métis specific services and practitioners	3.81
	Socio-Economic	3.77
	Recognition and discrimination	3.74

Table 3. Five Top-Rated Clusters for Extent to Which Services Are Available to Address this Issue in First Nations, Inuit and Métis Community Sites

Community	Cluster Label	Average Rating
Hamilton, First Nations	Issues linked to poverty	2.12*
	The Future: what is needed for wellness	2.15
	Out of balance	2.57
	Disconnection from who we are	2.64
	Importance of Gift of our child and youth	2.95
Ottawa, Inuit	Improving communication and addressing cross-cultural barriers	4.10
	Keeping warm/safety	3.90
	Transition and urbanization	3.81
	Access to health services	3.64
	Past experiences, abuse and trauma	3.53
Ottawa, Métis	Lack of Métis specific services and practitioners	3.93
	Recognition and discrimination	3.85
	Barriers to existing services	3.79
	Tradition and Culture	3.74
	Seniors	3.62

* Indicates that the rating scale was reversed for First Nations, 1=No service available and 5=Services are more than adequate. Therefore, clusters with lower scores are those that the Hamilton First Nations felt had fewer services available to address these issues.

communities to take a leadership position in research and health policy and practice.[38] Likewise, concept mapping fits with the ethical standards in indigenous research and can facilitate indigenous self-determination and governance of health research processes and outputs, including the "ownership, control, access and possession" model, or OCAP. Broadly concerned with all aspects of information, including its creation and management, OCAP emerged from discussions held by the National Steering Committee of the First Nations Regional Longitudinal Health Survey in response to dominant colonialist research methods and control of information.[39] Many Aboriginal communities have moved beyond OCAP to develop their own models for control and ownership of research. For example, OFIFC developed the "Utility, Self-Voicing, Access, Inter-Relationality (USAI) Research Framework" in 2012 and the Métis Centre of the National Aboriginal Health Organization has established its own "Principles of Ethical Métis Research" as a Métis-specific tool for those engaging Métis communities in research.[40] Similarly, the Inuit Tapiriit Kanatami, the national Inuit organization in Canada, has developed Inuit-specific policies around negotiating research relationships, conducting research, and knowledge governance.[41]Arguably, the procedures and results of concept mapping create the necessary space for Aboriginal initiative and ultimately, self-governance of knowledge processes and outputs. Rather than marginalizing

Aboriginal knowledge and experiences, concept mapping supports the emergence of Aboriginal concepts through broad community participation.

Aboriginal communities are often under a lot of pressure to put forward evidence at different policy and funding tables under tight timelines. For these communities, concept mapping is advantageous in that it efficiently generates a visual picture that can contribute to developing "policy-ready" proposals that are both accessible and easily grounded in a rigorous methodology. A large proportion of health and social services as well as other programs in Canadian Aboriginal communities are funded year-by-year, requiring onerous annual reporting that the auditor general has criticized as excessive.[42] Because these reporting processes focus on accountability of funds, rather than ongoing community planning and evaluation, they tend to marginalize Aboriginal ways of knowing.[43] This focus can also distract from planning and evaluation efforts that are directly accessible, relevant, and useful from a local community service enhancement perspective. Concept mapping helps address this gap by supporting the exploration of complex ideas in a short period of time, using processes in which the participants are themselves driving the data collection, analysis, and interpretation.

Important lessons can be gleaned from the three distinct community maps. Firstly, the Métis in Ottawa generated a map in which most clusters were lying on top of one another. There are several possible explanations for this. There may have been a need for more sorters and raters in the Métis community because of greater variance and heterogeneity in this population: Ottawa Métis represent a culturally diverse group of people, the large majority of whom have migrated to Ottawa from elsewhere in Ontario and Western Canada.[44] In addition, Ottawa Métis are more dispersed than in other parts of the country, more difficult to identify visually, and less present at Métis-specific events.[45] These characteristics may have contributed to the variation in the participants' sorting and rating, and thus made the task of generating map clusters more challenging. Since concept mapping blends or "averages" individual input into a collective picture, there may be limitations to its ability to capture the diversity and richness of individual narrative and experiences.

Overall, the most highly rated map clusters on each of the community's maps were those highlighting social determinants of health. This makes sense given that for Aboriginal people, ill-health is directly linked to social determinants of health such as colonization, cultural suppression, family and community dislocation, chronic unemployment, and unhealthy environments.[46] Poverty, housing, and socioeconomic needs were also rated highly, and we know that when the Canadian Aboriginal population is compared to the non-Aboriginal population, large disparities persist in income security, employment, education, food availability, and adequate housing, and that these disparities are exacerbated with urban residence.[47]

The cluster maps directly informed the development of three distinct *Our Health Counts* health assessment survey tools for First Nations in Hamilton, and Inuit and Métis in Ottawa. The resulting *Our Health Counts* data not only confirmed the 2006 Census findings, but also revealed greater disparities and health and social inequities than those of the Census.[48] In all three communities, both proximal determinants of health such as the physical environment, employment, and education emerged, as well as more distal, indigenous-specific determinants such as colonialism, social exclusion, trauma and recovery, and lack of government responsiveness.[49] Clearly, both historical and present-day experiences need to be addressed when considering health issues in this population. Mental and emotional well-being was also of high importance across the communities. Again, this is not surprising as rates of suicide, depression, family violence, and substance abuse are significantly higher in many Aboriginal communities as compared to the general population.[50]

Interestingly, however, chronic diseases and specific illnesses or disabilities did not surface as the top-priority health issues facing these populations. For example, those chronic diseases that emerged during the brainstorming with First Nations in Hamilton—such as heart disease, diabetes, and cancer, in addition to fetal alcohol syndrome, obesity, HIV, and Hepatitis C—were placed in the cluster labeled "Out of Balance." The Métis in Ottawa placed diabetes, obesity, and allergies within the "Health Promotion and Nutrition" cluster. Finally, for the Inuit in Ottawa, the statement labeled allergies was placed in the cluster "Keeping Warm and Safety." Again, at the individual level, specific conditions and physical health were considered within a broader context of wellness and related social determinants of health. This view of health priorities is in tension with existing Aboriginal policy, service provision, and research, which often focus on chronic disease and downstream interventions.

Yet such emphases are not supported by evidence-based and community-relevant methods of evaluating their impacts in indigenous community contexts.[51] For example, indigenous prenatal and infant-toddler health promotion is a major focus of public health investment in Canada.[52] However, a recent international systematic review of indigenous prenatal and infant-toddler health promotion interventions found only fifteen Canadian published studies with evaluations of adequate rigor to merit study inclusion.[53]

The outcomes of concept mapping built upon indigenous community ways of knowing and doing and laid the conceptual foundation for the development of three health surveys in each of the three communities. The First Nations, Inuit, and Métis communities involved in the *Our Health Counts* project all developed a health assessment survey tool that reflected their unique cluster

maps. The instruments themselves were well received by the communities and implemented successfully with urban First Nations in Hamilton and urban Métis and Inuit in Ottawa. Concept mapping was an effective method for addressing the goals of this study as it embraced the diverse historical, cultural, political, and social contexts of the three participant communities and contributed to theoretically sound domains for each health survey.

A number of study limitations should be addressed. First, given the high level of literacy needed to complete the concept mapping process, there were some challenges, particularly in the Inuit community where sessions needed to be bilingual. Secondly, the qualitative purposive sampling technique generated a relatively small number of participants for each of the concept-mapping activities. As a result of smaller sample sizes, the study populations may not have been representative of all the community health organizations and stakeholders among Hamilton First Nations, Ottawa Inuit, and Ottawa Métis populations. Another limitation with concept mapping is that although cluster maps reveal similarities between cluster items, maps do not provide any data on the relationships between clusters, which perhaps would have shed more light on why so many clusters overlapped in the Métis community map.

Traditionally, epidemiological narratives have portrayed Aboriginal communities as sick and miserable, which contributes to a social construction of Aboriginal identity and the overall public's misperception. Such portraits not only generate an image of ill and disorganized communities but can also reinforce dependency and the power of paternalism.[54] Both research institutions and communities themselves are resisting this type of narrative and developing tools, guidelines, and principles for more ethical, inclusive, and community-based research on health issues. Participating communities were able to describe emerging concepts of health that challenged existing illness and deficit-based narratives; instead, they named external social conditions and inequities as concepts that shape their understandings of their health.

Concept mapping is a mixed-methods approach that provides a structure for multiple voices to be heard and supports community engagement in developing a visual representation of community knowledge and priorities. The findings discussed here have tremendous policy and programming implications for urban Aboriginal people. The concept maps directly informed the development of survey tools that generated population health data not previously available for these populations. For example, data on housing and homelessness status among First Nations people in Hamilton informed the city's housing and homelessness strategy.[55] Unlike research and data processes that maintain social exclusion of Aboriginal people, this study will serve as a model that places community at the center and reduces social inequities.

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