NOVEL INDIGENOUS-LED APPROACH TO POPULATION SEGMENTATION & ATTRIBUTION TO INFORM POPULATION HEALTH PLANNING

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Introduction

Ontario Health Teams (OHTs) were introduced in 2019 by the Ontario Ministry of Health (MOH) as a new way of integrating care delivery. They were developed to enable patients, families, and cross-sectoral groups of providers and organizations to work together to create a coordinated continuum of care that is better connected to patients in their local communities. At maturity, OHTs will be clinically and fiscally responsible and accountable for a defined population. Therefore, how this population is defined is critical for Indigenous Peoples to reduce and eliminate harms and ensure that appropriate, safe models of care are accessible through appropriate planning, accountability measures and resource/funding allocation.

This work is about creating a better path forward by working together in a good way. It is important to note that a one-size fits all approach will not work for the IPHCOs across Ontario. Each community has a unique culture, territory, history, relationships, and strengths to build on, and challenges to face. Each community may choose to do things differently, however improving Indigenous health and wellness must remain the goal regardless of where individuals live. Implementing a segmentation or attribution model that ensures community ownership and that Indigenous communities are served by Indigenous organizations provides access to culturally safe and appropriate care. This requires that Indigenous organizations and providers are funded accordingly and measured by appropriate accountabilities and consideration for self-determination and sovereignty; elements critical for transformation and improvements to health outcomes to occur.

Population health is a key component of OHTs and at maturity they are expected to organize and deliver care using a population health management approach. Key to this approach is knowing and understanding specific population characteristics and dynamics. For this approach to be effective, population health management must apply "*population health concepts and measurements*" to a specific patient population to shift the "*population curve from unhealthy to healthy … in a way that respects each person's autonomy*".

For the Indigenous Primary Health Care Council (IPHCC) and its members, this means a wholistic and strategic approach to managing Indigenous health and wellbeing. This population health management approach proactively addresses the accessibility and availability of services that account for and address geography, jurisdictional issues, infrastructure, and communications. It also includes how health delivery systems and services embrace Two-Eyed Seeing (respect for traditional and western methods of care), cultural safety, traditional healing services and medicines, and other promising practices for providing care within Indigenous populations. This refers to a community-driven approach based on strong & trusting relationships.

The approach to successful population health management must also incorporate and embed Indigenous measures and indicators within the health systems' performance framework for *all providers*. These measures are crucial for accountability and improving system performance because using a population segmentation and/or attributable population approach is necessary for implementing population health management appropriately within a health system.

This paper details two methods that are similar and ensure population management can be achieved for Indigenous Peoples in Ontario. One method attributes an entire population to an Indigenous-led OHT and the other segments Indigenous populations within OHTs. It also provides a review of the literature and policy levers that examine and support these approaches. To this point, case studies are presented (see Appendix) that demonstrate self-determination and the power of Indigenous health in Indigenous hands to plan, design, deliver, evaluate, and ultimately control health services.

The Indigenous Primary Health Care Council (IPHCC) has developed a guide for Indigenous health systems transformation. This document describes foundational components for Indigenous health transformation and its underlying concepts and terms to help inform the development of an OHT provincial framework (IPHCC, 2022). Foundational to this work is the establishment of a Provincial Indigenous Integrated Health Hub (Hub), which will enable the IPHCC to assist its' members and Indigenous organizations and communities, requesting support, to build meaningful and informed health system transformation plans that are rooted in culturally appropriate population health management approaches and best practices. This Hub allows for Indigenous health to be central to planning and delivery. Further, the Hub establishes a forum to tackle all health system issues using the strengths of an Indigenous informed lens to ensure these issues do not get lost in the broader system.

It is important to note that equitable funding means accurate and sufficient funding and resource allocation needs to be distributed based on logistics faced by Indigenous Peoples. There are several factors that negatively impact the equitable ratio and distribution of each dollar, such as geographic barriers, access to service, complexity of health care services, and more. To date, funding has been allocated to meet physical and mental health needs; however, IPHCOs deliver care through the Model of Wholistic Health and Wellbeing, which also incorporates spiritual and emotional aspects of health-service delivery. For years, IPHCOs have been allocated funding to deliver services that fall under mainstream primary health care service delivery models (e.g., FPs, RNs, NPs), while traditional and culture-based services and programs have been significantly underfunded. The result is IPHCOs having to overstretch resources and funding to deliver wholistic care to their patients and clients. The IPHCC, along with members, partners, and government can collaboratively work together to transform health systems so that Indigenous health outcomes are improved. To achieve this, transformation should be rooted in mutual respect, understanding, equitable funding, shared accountability, and reciprocity so that disparities in health outcomes are eliminated and every community is supported for optimal health and wellness (IPHCC, 2022).

Background

Ontario is home to the largest population of Indigenous people in Canada with 409,590 living in Ontario (Statistics Canada, 2021). It is well documented that Indigenous Peoples around the world experience poorer health status in comparison to non-Indigenous populations. A considerable extant body of evidence shows that these health disparities are linked to complex interactions between historical and contemporary structural, social, political, economic, and environmental factors that influence populations across their life span – the social determinants of health (Kim, 2019; George, Mackean, Baum, & Fisher, 2019; Jackson Pulver, Waldon, & Harris, 2015; Jones et al., 2019; Lines & Jardine, 2019; Reading & Wien 2013). For Indigenous Peoples, these disparities have proven to be deep, enduring, and resistant to government efforts to address them (Angell, 2017). While there have been some global achievements related to improving population health, the continued poorer health status of Indigenous Peoples around the world illustrates the impact of systematic, socially produced, and unfair policies and practices on the presence of disease, health outcomes, and access to health care (Anderson et al., 2016; Kirmayer, & Brass, 2016).

Loss of self-determination and control over the matters that affect the daily lives of Indigenous peoples' is another feature of colonization that has contributed to their poorer health outcomes and remains an ongoing barrier to improving outcomes (Saulnier, 2014; Chandler & Lalonde, 1998, 2008; Kirmayer, Brass, & Tait, 2000). Greater self-determination can empower Indigenous communities to take control of their health and well-being. It can foster ownership that will lead to better healthcare services and health outcomes (Auger, Howell, & Gomes, 2016; Chandler & Lalonde, 1998; Murphy, 2014). While self-determination does not necessarily mean that Indigenous Peoples have full control over the delivery of healthcare services in their communities, it does mean they have the right to decide the level of control they wish to have (AFNHP, 2016).

Indigenous Peoples have long advocated for the right and responsibility to design, deliver, manage, evaluate and, ultimately, control their own health programs and services, which many believe is key to closing existing gaps in health outcomes between Indigenous and non-Indigenous populations (Assembly of First Nations, 2017; Australian Government, 2015; Gottlieb, 2013; Harfield, Davy, McArthur, Munn, & Brown, 2018). Self-determination is one of the most important determinants of Indigenous health and well-being (Reading & Wien, 2013). It is considered essential for empowering and enabling communities to build capacity and gain control over the wide-ranging forces that affect health and well-being at individual and collective levels (Garces-Ozanne, Ikechi Kalu, & Audas, 2016) and we need to move beyond rhetoric - while social determinants of Indigenous health and Indigenous rights to self-determination are often discussed, few examples of action exist (George et al., 2019, p. 1).

To achieve equitable outcomes, Indigenous Peoples must be given full access to high-quality, responsive, comprehensive, culturally relevant, and coordinated health and social services that target the diverse determinants of health, including individual and community self-determination (AFN, 2017; Greenwood, 2019; Jones et al., 2019).

Self-Determination: Indigenous Health in Indigenous Hands

Self-determination ensures that "human beings, individually and as a group, are equally entitled to be in control of their own destinies" (Anaya, 2009). A recent study that included Indigenous communities across Canada, heard loudly and often, that the problem of inadequate funding needed to be addressed, particularly when considering the need to address the existing gaps and inequities between Indigenous and non-Indigenous Peoples' health. It was also highlighted that Indigenous communities cannot exercise self-determination over the health and wellness of their communities without equitable, adequate, sustainable, inclusive, and flexible funding. Current funding arrangements is paternalistic, complex, and burdensome.

The result of the aforementioned factors is that Indigenous communities and people continue to experience ongoing harms due to systemic racism and discrimination, which impacts the overall health and wellbeing of Indigenous Peoples (Browne et al., 2016; Allan & Smylie 2015). Many Indigenous peoples avoid accessing health care services due to racism and discriminatory practices that they experience; thereby leading to unresolved health issues and poorer health outcomes (Phillips-Beck et al. 2020).

> The IPHCC has described the following mechanisms that support self-determination:
> - Ability to 'design, deliver, manage and ultimately control health programs and services.
> - Ensuring Indigenous resources and services are delivered by Indigenous peoples.
> - Ensuring the portability of rights for Indigenous people regardless of where they live.
> - Empowering Indigenous peoples and communities to have a voice in and control over the forces and solutions that affect their health and wellbeing.
> - Access to health services that are wholistic, culturally safe, and free from discrimination and systemic racism, culturally relevant and encompass a Two-Eyed seeing approach (traditional and western), and reflect coordinated health and social services which address the determinants of health; and,
> - Equitable and sustainable resources to deliver, measure and improve Indigenous health and wellbeing.

Indigenous self-determination in health care – the ability to control and fully participate in all realms of health care planning and delivery is one of the most significant determinants of individual and collective health and well-being (Halseth & Murdock, 2020). Opportunities to exercise self-determination within a health care system does not only include design and delivery, but also includes active participation in the health policy cycle, including problem identification, policy formulation, decision making, implementation, evaluation, and priority setting to influence how and what care is delivered (Howlett et al., 2015). In addition, it is imperative to establish accountability mechanisms for the broader system to ensure all players in the system are working towards improving population health outcomes, especially for those experiencing the largest disparities.

Self-government is often linked to specific reserve communities and self-government in an urban context is 'complex and fraught with difficulties associated with bringing together diverse groups of people (Browne et al., 2009); however, it is necessary to understand the value of self-government models in the development of health service delivery in urban Indigenous contexts (Browne et al.,

2009). It is a challenge, but it is not a challenge that cannot be overcome with appropriate engagement and strategies.

Ontario's Urban Population and Mobility Patterns

When determining the attributed population for Ontario Health Teams it is critical to think about northern and rural Indigenous communities as well as First Nations, Inuit and Métis (FNIM) living in urban settings, and their continued connection to rural and/or northern communities they still consider home. In some instances, FNIM living in urban settings travel to receive care on territory, and FNIM living on territory often must travel to urban settings to receive care. Under the original OHT attribution model, this results in Indigenous populations being attributed to an OHT that does not accurately reflect where they live, and healthcare dollars are misaligned. Therefore, it is critical that this alternative segmentation and attribution model be used to inform proper resource and funding allocation that meets the needs of Indigenous healthcare organizations and partners for Indigenous-led health system planning and delivery.

Ontario's Indigenous population living in urban settings continues to increase, mirroring the national trend, with approximately 85.5% living off-territory (reserve) (MOH, 2018). Indigenous Primary Health Care Organizations (IPHCOs) provide care both on and off-territory, rural, remote, and urban settings across the province, and are constantly adapting to the changing environment of community needs, including meeting complex challenges and pressures on service delivery and infrastructure required to meet the needs of FNIM provincially. It is important to note that 94% of Indigenous Primary Health Care Organizations (IPHCOs) supply care on territory as mandated by their First Nation communities.

Interestingly, many Indigenous Peoples move to cities for health-related reasons (i.e., proximity to health services) since most health services, especially specialized services, are usually located in urban centres (Peters, 2004). Despite this seemingly overt access to health services, Indigenous Peoples living in urban settings often feel confronted by systemic barriers (stigma, racism, lack of respect, and unacceptance) and as a result, have unmet health care needs.

A study found that Indigenous Peoples who move to cities to access medical services often face a series of challenges, including a lack of financial and transportation support, suitable housing near medical services, and isolation from their community social support networks (Lavoie and Forget, 2008). In addition, affordable childcare, support for single parents, responsibilities at home, a lack of private insurance and complexities accessing Non-Insured Health Benefits (NIHB) are added barriers. Many who live in the city keep close ties to their ancestral homelands and remain in frequent contact with their families living in community – an integral part of sustaining their traditional cultural practices and identities which is why mobility is critical to consider in health care planning and funding allocations.

Indigenous populations living in in urban settings are relatively mobile with much of this movement happening between rural and urban areas, and from one urban centre to another (Graham and Peters 2002). Although mobility between rural and urban locations is often driven by the desire to keep close ties with rural and reserve communities (Browne et al, 2009), the migration patterns are neither

straightforward nor unidirectional. As Peters (2004) points out, 'the migration picture is complicated. Net migration (differences between in and out migration) varies by place (reserves, rural places, smaller and larger cities) and by Indigenous group (registered Indian, non-status Indian, Metis and Inuit). Reserves have a net inflow, rural areas and smaller cities a net outflow, and larger cities have experienced both net inflow and net outflow. There is "circulation between reserves/rural areas and urban areas (Graham and Peters, 2002).

The remote, rural, and reserve communities play a vital role in in the lives of Indigenous Peoples as cornerstones to social and cultural connection. Graham and Peters (2002) make a key point, "from a policy perspective, it is crucial that we recognize that the urban indigenous population in Canada is not distinct from the non-urban. They are interconnected in terms of mobility, culture, and politics." In other words, the mobility of the population between rural/reserve communities and urban areas should be recognized as a necessary dynamic to stay connected with family, territory, and culture. Given these high rates of mobility, existing attribution models are not suitable for developing Indigenous health care systems. Therefore, policies and programming must include new attributable population data that considers mobility and community ties.

Federal and Provincial Policy Levers

Indigenous health care in Canada is best described as a "patchwork" of loosely woven together legislation, policies, treaties, and agreements between and across provincial, territorial, federal, and Indigenous governments, and jurisdictional boundaries (Lavoie et al., 2011). Policy research has long documented the outcomes to such jurisdictional confusion, repeatedly citing issues of sufficient gaps in service delivery, and inequitable access to necessary care that is both timely and culturally appropriate for Indigenous Peoples and communities (Lavoie, 2018; Lavoie et al., 2015, 2016; Walker et al., 2018).

Health care policies and legislation across the many health systems in Canada articulate their responsibilities in Indigenous health in various ways, with the health care needs and priorities of non-status First Nations, Inuit, and Métis Peoples in urban environments often falling through the cracks (Walker et al., 2018). Despite administrative, policy, and financial barriers, many Indigenous communities across Canada continue to assert inherent rights to self-government. For health care policy, this tends to be grounded in public health and health protection, and by reclaiming authority over the administration and delivery of on-reserve health services (Heiltsuk Indian Band, 2020; Mashford-Pringle, 2013; Snuneymuxw First Nation, 2020).

Several important governmental commitments and policy levers exist that centre on Indigenous health governance and Indigenous sovereignty and aim to improve Indigenous health and wellness throughout Ontario Health Teams. *Although this policy review is not exhaustive, it does present several policy levers that support Indigenous ownership over health planning, funding, delivery, and accountability, factors that demand a re-examination of the current attributed/segmented population structures to ensure health equity for Indigenous Peoples.*

Distinctions-based Indigenous Health Legislation

In January 2021, the federal government announced its plan for a new distinctions-based Indigenous Health Legislation to improve access to high quality, culturally safe, and relevant health services free of racism and discrimination (ISC, 2022d). The legislation is being co-developed with national and regional Indigenous organizations; including provincial, territorial, and self-governing Indigenous governments; health professionals; and the public through a series of engagement events and dialogue. This announcement came as a response to repeated incidences of structural and systemic anti-Indigenous racism within Canada's health care systems, notably marked by the deaths of Brian Sinclair in 2008 and more recently, Joyce Echaquan in 2020 (ISC, 2022).

UN Declaration on the Rights of Indigenous Peoples (UNDRIP)

Canada formally endorsed UN Declaration on the Rights of Indigenous Peoples (UNDRIP) on November 12, 2010, after many years of debate. Indigenous peoples in Canada have long supported the declaration, specifically its provisions aimed at advancing self-determination (Belanger, 2011). UNDRIP is a non-binding document containing 46 articles that establishes the essential standards for the recognition and protection of the collective rights and individual rights of Indigenous peoples. Many of the articles pertain to health and wellness, including Articles 21, 23, and 24, which state Indigenous peoples have the right to access all social and health services and use their own traditional medicines and healing practices without any discrimination.

In 2016, Canada officially adopted UNDRIP, however, it has not been implemented throughout all provinces at the same rate. BC was the first jurisdiction in Canada to introduce its own legislation to implement the UNDRIP and other provinces and territories have since followed suit and are in the early stages of implementation. The federal *United Nations Declaration on the Rights of Indigenous Peoples Act* later came into force in June 2021. The Act provides a framework for implementation, and reconciliation between Indigenous and non-Indigenous peoples and governments. The Act also states that all laws in Canada must align with UNDRIP, and that progress must be monitored through annual reporting to Parliament *(United Nations Declaration on the Rights of Indigenous Peoples Act,* 2021).

Royal Commission on Aboriginal Peoples

The Royal Commission on Aboriginal Peoples (RCAP) issued its final report in November 1996 and included 5 volumes and 440 recommendations. The report centred on a vision of a new relationship, founded on the recognition of Aboriginal peoples as self-governing nations. It set out a 20-year agenda for change, recommending new legislation and institutions, additional resources, a redistribution of land and the rebuilding of Aboriginal nations, governments and communities. Since its release, all levels of government continue to steadily work towards and implement RCAP recommendations, although many recommendations have yet to be addressed (Boyer et al., 2021).

Joyce's Principle

Joyce's principle was created by Atikamekw Nation in November 2020, and it was a guarantee to all Indigenous people the right of equitable access, without discrimination, to all social and health services, as well as the right to enjoy the best possible physical, mental, emotional and spiritual health.

Joyce's Principle requires the recognition and respect of Indigenous people's traditional and living knowledge in all aspects of health. (Atikamekw Nation, 2020). Federal and provincial governments were presented with Joyce's Principle and urged to develop and implement response strategies. In February 2022, an open dialogue event took place to hear from Indigenous academics, students, Knowledge Keepers, health care professionals, and others involved in Indigenous health and well-being, to inform the content, structure, and development process of the health legislation (ISC, 2022a; ISC, 2022d).

Truth and Reconciliation

The findings of the Truth and Reconciliation Commission (TRC) were released in 2015, along with a set of 94 Calls to Action, intended to "redress the legacy of residential schools and advance the process of Canadian reconciliation" (TRC, 2015, p. 1). The Calls to Action touch on many sectors of Canadian society, including health. Calls to Action 18-24 provide direction to improve access to culturally safe and responsive healthcare services, and to develop an Indigenous-led health policy.

Ontario Specific Policies and Legislation

The Aboriginal Health Policy was developed collaboratively between the Ministry of Health and Long-Term Care and First Nations and Indigenous organizations in 1994. It is a broad guideline for Indigenous involvement in planning, design, implementation, and evaluation of programs and services directed at Indigenous communities that include principles related to relationship building, recognition, timely communication, and knowledge exchange and coordination, which stresses a collaborative relationship to determine proper processes of co-development and consultation.

This policy highlights *respect and mutuality and self-determination* which acknowledges the inherent rights of Indigenous People to freely determine their own pathways and to make decisions about all aspects of their communities and livelihoods. To support this principle in the context of this guideline, community-based Indigenous organizations need to be provided with the opportunity to lead or influence relevant decision-making processes that will impact Indigenous people and communities and facilitate greater opportunities for Indigenous control over health.

Of particular significance, this policy was developed prior to the Indigenous Primary Health Care Council (IPHCC) being incorporated in 2019, which may have far reaching implications. The IPHCC was designed as a culture-based, Indigenous governed, and Indigenous informed organization. IPHCC's key mandate is to support the advancement and evolution of Indigenous primary health care services throughout Ontario. IPHCC works with 23 Indigenous primary health care organizations (IPHCOs) across Ontario, as an Integrated Health Hub, to address the physical, spiritual, emotional, and mental wellbeing of First Nations, Inuit, and Métis (FNIM). Therefore, any policy that omits reference to the IPHCC and its' members must be reviewed within that context.

In 2018, the province released the **Relationship with Indigenous Communities Guideline**. This framework for health care professionals outlined fundamentals of forming meaningful and respectful relationships with Indigenous partners in the province (Ministry of Health and Long-Term Care, 2018). The guidebook is described as a preliminary tool to inform readers on Indigenous determinants of health, community governance structures, engagement approaches, and relationship models in health care.

In the preamble to legislation guiding the creation of **Ontario Health**, the province asserted recognition of "the role of Indigenous peoples in the planning, design, delivery and evaluation of health services in their communities" (*Connecting Care Act*, S.O. 2019, c. 5, s. 1). Indigenous Health Planning "entities" are also expected to inform the reform process (s. 44(2)(a)).

In 2021, the Ministry of Health and the Indigenous Primary Health Care Council, in consultation with the Indigenous Primary Health Care organizations in Ontario, finalized and approved an Indigenous specific funding agreement. In that agreement, the province committed to achieving reconciliation with Indigenous peoples and recognized that relationships based on principles of mutual respect, trust, non-discrimination, justice, co-operation, and collaboration must be at the forefront.

The agreement, highlighted that the province and each Indigenous Primary Health Care Organization were equally committed to providing high quality, integrated, and wholistic care through the Model of Wholistic Health and Wellbeing. This model is rooted in culture as healing and is foundational; health care planning is based on population needs; and excellence in Indigenous health is informed by Indigenous evaluation approaches and leading practices validated by the sector.

Current Population Attribution Model in Ontario Health Teams

The method for attributing Ontario patients to OHTs is based on a study first conducted by ICES (Stukel et al, 2014). ICES identified 80 'naturally occurring networks' in Ontario. These networks describe the linkages among Ontario residents, physicians and hospitals and reflect how people seek care (and/or are provided care). This initial work established the foundation for the attribution of the population to OHTs.

Although the foundations of this work appear well grounded, a deeper dive identifies gaps in the model. Important to this project, patient attribution to a network was not based on geography, or where one lives, but rather on where and with whom one accesses care. The glaring issue and limitation with this approach for Indigenous communities and individuals is that they are often forced to travel for care outside of their communities, and not by choice. Time and again it has been stated "where people live is less important than where they are choosing to access care" -- this is only true when one has been given a choice.

In January 2021, the OHT Attribution Models database (OHTAM) was shared with ICES by the Ministry of Health (MOH). This model involves three steps, which devalue and segregate Indigenous populations and other minority groups by linking everyone by means criteria lacking equity.

The Ministry's modified attribution method involves three steps:

1) Patients are linked to primary care providers through enrollment or their health care use, irrespective of where they live. There are a few exceptions to this.

a. Where a patient is not enrolled with a primary care provider, they are assigned based on the primary care provider with whom they accessed the plurality of their primary care over a three-year window.

b. Residents not associated with a network through a primary care provider since they have not used primary care in the three-year window are assigned to a network covering the geographic area where they live.

c. The ministry used an 80/20 rule to keep physicians associated with a patient enrollment model (PEM) network associated to the same network. If 80% or more of the patients enrolled in a PEM were referred to hospitals or specialists within an OHT network (s), all physicians in that PEM network are assigned to that network.

2) A primary care provider is then linked to the hospital where most of their patients are admitted for non-maternal medical care; and,

3) Specialists are then linked to the hospital where they perform the most inpatient services.

This method results in Indigenous populations being assigned to OHTs that do not reflect where they live, and funding being distributed to the OHT that may not be close to home. The process is not fair and perpetuates inequities and barriers to culturally safe health care. This issue is further worsened by including Indigenous individuals in mainstream datasets, where they become invisible within the OHTs and thus are not considered in service delivery planning, financing, and performance.

A glaring omission with this method is that it does not capture any Indigenous Primary Health Care Organizations, including patients who receive services from Indigenous Nurse Practitioner-Led Clinics (NPLCs), Indigenous Community Health Centres (CHCs), Aboriginal Health Access Centres (AHACs), and Indigenous Interprofessional Primary Health Care Teams (IIPCTs), now collectively referred to as Indigenous Primary Health Care Organizations (IPHCOs). All data collected by IPHCOs is not submitted through Ontario Health Insurance Plan, which could drop people from being attributed to any OHT. This is especially true for those living on territory (reserve) who access care via band services or via limited mobile primary health care services. These issues to do not consider the added disparity realized because of attribution inconsistencies because of the provincial and federal health care dichotomy. The gap widens when federally funded health services are considered because they are separate from OHIP funded services, which are often delivered by nurse practitioners, or when unable to staff, by expanded scope nurses with virtual or intermittent visiting physicians that rotate through communities.

Considering these findings and recognizing that communities have unique needs; two methodologies are described in this paper.

1. The first methodology relies on population segmentation, which allows health care providers and organizations to separate populations into subgroups so they can better assess each group's wants, needs, and health priorities.

2. The second is an attributed population methodology that uses linked administrative data (including data from Indigenous Primary Health Care Organizations) that ensures proper attribution to Indigenous-led OHTs and/or the IPHCC's Provincial Indigenous Integrated Health Hub, and IPHCOs not currently part of an OHT but working in parallel.

As discussed, the current attribution model does not reflect patient realities; therefore, current funding models are inaccurate also. To rectify this problem, accurate identification and segmentation is critical. Proper attribution will ensure that future funding is planned and directed equitably across OH regions. This funding should be distributed directly to the IPHCO's, or through the Indigenous Integrated Health Hub thereby ensuring Health System Transformation is self-determined and that Indigenous Health is in Indigenous Hands.

Population Segmentation and Attributable Population Methods: A New Approach

As demonstrated in this report, there is strong evidence and policy that highlights the importance of Indigenous involvement in planning, design, delivery, and evaluation of Indigenous healthcare. The current OHT attribution methods do not support these activities, despite legislative commitments from the provincial government (*Connecting Care Act, 2019*), suggesting new methodologies are required where appropriate.

This next section will describe the data governance, strategies, and datasets required to create an attributable population focused on membership to specific First Nations communities. This method was co-designed with an Indigenous-led OHT, the Ontario Ministry of Health, and Institute for Clinical and Evaluative Sciences (ICES).

As an independent, not-for-profit research institute encompassing a community of research, data and clinical experts, and secure and accessible health-related data, ICES is well positioned to inform these processes. Their data consists of record-level, coded and linkable health data sets, including demographic and administrative records, registries, laboratory data and survey Data. Included in these datasets is the Indian Register System (IRS). For several years, ICES has been working closely with Indigenous partners to develop unique partnerships that include data governance and data sharing agreements in support of Indigenous-driven analyses, such as this project.

Data Governance

In Canada, First Nations established the principles of ownership, control, access and possession (OCAP®) in 1998. OCAP® is an expression of First Nations jurisdiction over information about their communities and its community members, while operating as a set of First Nation principles. Future analyses focused on other Indigenous communities should follow guidelines outlined in the Indigenous Governance Framework (IPHCC, 2023).

There are 133 First Nations communities in Ontario, with populations living inside and outside of those communities (Walker et al., 2018). The First Nations communities work collectively through the Chiefs of Ontario (COO). In 2012, a data governance agreement (DGA) was established between COO and ICES. ICES also entered DGAs with Grand Council Treaty #3 (Treaty #3) and the Kenora Chiefs Advisory (KCA), which established data access request processes where their Peoples are directly identified in ICES

projects or third-party research. The established processes ensure that the appropriate First Nations leadership organization(s) and/or Community(ies) evaluate requests for, and grant permission to, access to their information. Depending on the geographic region and nature of the data used to identify First Nations Peoples or communities, these processes may require research ethics approval, an application form, band, or tribal council resolutions, and/or presentations on intended research. In all instances, written approval from COO, Treaty #3, and/or KCA must be provided to ICES before an ICES project or third-party research project be granted access to their data. At the same time, individual First Nations communities can access their data directly.

ICES holds other Indigenous data and Indigenous identifiers through Data Sharing Agreements. Other Indigenous data available at ICES include self-identifiers, Indigenous survey data, and Indigenous health service data, geographic codes (which can identify populations living within First Nations communities). Access request and/or use policies and procedures related to other Indigenous data have been developed in collaboration with ICES' First Nations, Métis, and Inuit Partners.

One such example is the Data Governance and Data Sharing Agreement between the Métis Nation of Ontario (MNO) and ICES. This agreement governs MNO (e.g., the Métis Citizenship Registry) and Métis (i.e., self-identifiers) data at ICES.

Principles

A series of inclusion criteria has been established to ensure the following groups of people are included:

1) People being served by Indigenous Primary Health Care Organizations (including Aboriginal Health Access Centres, Indigenous-led Family Health Teams, Indigenous Community Health Centres, and Indigenous Nurse Practitioner-Led Clinics)

2) Indigenous people living within a specified geography

3) People who have been attributed to other attributable populations (#, % and location/OHT currently attributed to)

The Attributable Population Model within Indigenous-led OHTs, are developed with the underlying principle of membership and ensures that Indigenous Peoples and their families are associated with an Indigenous-led OHT, where appropriate. Multiple administrative databases holding information on First Nations registration, primary health care involvement, hospital and other physician services will be linked using unique, anonymized, encrypted identifiers for patients and physicians.

These inclusion criteria for the population segmentation and attributed population models will not work for all communities but should be seen as one potential model that can be modified as appropriate. To complete this work the following data sources will be used:

Data Sources

Indian Register

The Indian Register (IR) contains information on all First Nations persons in Canada who have registered status, living both within and outside of First Nations communities. The eligibility criteria that define who is registered is set out in the Indian Act (Gov't of Canada, 1985). These data are only accessible for ICES Projects if written approval has been provided to ICES per the processes and protocols developed out of the data governance agreements between ICES and COO, Treaty #3, and the KCA. These agreements enable community driven use of the IR. The federal IR data were first linked to the Registered Persons Database at ICES in 2014 (Walker et al., 2018).

Some significant limitations with these data exist, such as excluding non-status First Nations people and missing new registrants past 2014. In addition, these data likely under-estimate the number of people who experience homelessness (Walker et al., 2018) or who live in urban environments. For example, Census data undercounts Indigenous Peoples living in cities by 2 to 5 times (Rotondi et al., 2017).

Registered Persons Database (RPDB)

The RPDB provides basic demographic information about anyone who has ever received an Ontario health card number (i.e. anyone who is, or who has ever been, eligible for health care in Ontario dating back to April 1, 1990). It contains basic demographic information and a unique health card identifier, enabling linkage with other health utilization data.

An important aspect to note is that the responsibility for health care for First Nations people in Canada is shared between the Federal and Provincial/Territorial governments while Provincial/Territorial governments hold the sole responsibility for health care for the general population. This dichotomy results in underrepresented healthcare usage data for individuals living in far Northern and remote First Nation communities in Ontario. Nonetheless, those who have (or have ever received) an Ontario health card number will be in the ICES RPDB, regardless of where they live (Walker et al., 2018).

Ontario Health Insurance Plan (OHIP) Claims Database

The Ontario Health Insurance Plan (OHIP) database provides comprehensive information on the services provided by all fee-for-service physicians in Ontario. The database records each billable patient encounter, including the fee code for the service performed, the date of service, the diagnosis, and number of services performed.

Indigenous Primary Health Care Data

ICES and the Indigenous Primary Health Care Council (IPHCC) are committed to supporting Indigenous Primary Health Care Organizations (IPHCOs) in the linkage and use of their information for the purposes of improving health and health service delivery. Since 2013, Aboriginal Health Access Centres (AHAC) data have been held at ICES for limited purposes and ICES is supporting IPHCC's efforts to engage with these IPHCOs to facilitate new sharing of data or broader use of data at ICES, including for OHT development.

Indigenous primary health care data are extracted from electronic medical records into the Business Intelligence Reporting Tool (BIRT) nightly. This data includes all registered clients that are provided care

within the IPHCOs and includes primary health care but also traditional healing and services from other interprofessional team members that are consistent with the wholistic model of health and wellbeing (IPHCC, 2022a). These data are routinely sent to ICES for data linkage with ICES data holdings. This data includes coded, standardized information for each client encounter, including visits to all health professionals, the date of services, the diagnoses and the services, and procedures performed. This is an important addition to the project because it will ensure that all people receiving salary-based comprehensive primary health care from Indigenous-led organizations are included.

Client Agency Program Enrolment (CAPE)
The CAPE registry includes all patients rostered to a primary care model.

Community Health Centre (CHC) Dataset (if applicable)
CHC data are extracted from electronic health records and linked with ICES data holdings. It includes information for each client encounter, including visits to all health professionals, the date of services, the diagnoses and the services and procedures performed. This is an important addition to the project because it will ensure that people receiving comprehensive salary-based primary health care from CHCs are included.

Discharge Abstract Database (DAD)
The DAD includes hospital discharge information for individuals receiving inpatient care in a non-mental health designated bed. Each record holds patient demographic data, clinical and administrative data about the hospitalized individual, including the diagnosis resulting in hospitalization, comorbidities, and treatment(s) received.

National Ambulatory Care Reporting System (NACRS)
NACRS includes the data for hospital-based and community-based ambulatory care including day surgeries, outpatient and community-based clinics and emergency departments. Each record contains patient demographic data, clinical and administrative data including presenting problem, diagnosis and intervention.

Postal Code Conversion File
The Postal Code Conversion File plus (PCCF+) provides a crosswalk between Canada's six-character postal codes and Statistics Canada's standard geographic areas. Through the link between postal codes and standard geographic areas, the PCCF allows the integration of data from various sources. It also allows for the calculation of socioeconomic status proxies, such as neighborhood-level income quintiles.

Analyses
All analyses will be conducted at ICES. The eligible population includes all First Nations people residing in Ontario and/or receiving primary health care from an Indigenous-led primary health care organization. Linkage of the population will be done to explore health care utilization patterns to understand 'joint attribution'.

Characteristics of the network will be produced that include:

- the number of people in the Indigenous-led OHT (based on membership to the community and/or Indigenous-led primary health care organization)
- the number of people who are receiving services in multiple OHTs due to mobility or health care need (demonstrating 'joint attribution'). Plans must be developed to differentiate between OHTs if centralized hospital is part of multiple OHTs, and distance within OHTs should be captured within intra-OHT touchpoints.
- ongoing metrics required for QIP and other OHT reporting

Data Reporting

All data reports will be released to the Indigenous-led OHT or IPHCC network. The Ministry and OH will receive aggregate data reflecting the denominator and numerator for all OHT measures and reporting based and will be specifically tailored to one of the following two approaches: data segmentation or population attribution.

Limitations

This methodology is limited to Indigenous-led OHTs and is **only** applicable to a small number of regions where this is appropriate and/or desired. The ICES databases also excludes people that should be included in the above databases (e.g. Inuit population). This method does not account for Indigenous Primary Health Care Organizations that are not in an OHT. Based on these limitations, an **Indigenous Data Segmentation method** is described below that provides segmented population data to inform health service planning, funding and program delivery through the Provincial Indigenous Integrated Health Hub and will be applicable throughout Ontario

Indigenous Data Segmentation Method

With very few Indigenous-led OHTs on the horizon, Indigenous Data Segmentation is an optimal approach to ensuring Indigenous Health remains in Indigenous hands, and although the data segmentation methods will not be specific to Indigenous-led OHTs, it can help inform all OHTs and the Provincial Indigenous Integrated Health Hub, supported by IPHCC, and IPHCOs in the planning, funding, and delivery of services for Indigenous Peoples.

We know that population health management is paramount to the success of all OHTs. By collecting and analyzing more accurate data, we can glean new insight about the population health and well-being, identify the main health and social needs of the community, and adapt services accordingly. But, to accomplish this, it is necessary to identify the numbers of people in communities across Ontario where they are not part of an Indigenous-led OHT or IPHCC's network (e.g., MOHT). This is critical to ensuring that Indigenous health is tailored, culturally safe and when possible planned and delivered by Indigenous Peoples.

Equity-driven data segmentation ensures that through self-identification and other available data, Indigenous Peoples can be identified and counted outside of the broader population to ensure appropriate planning, service delivery, and funding. The IPHCC has developed an Indigenous self-

identification approach that is currently being pilot tested and will be critical for the success of data segmentation. This is a voluntary, confidential self-identification process for people who identify as Indigenous: First Nations, Inuit or Métis. To facilitate the process, the IPHCC has established a training curriculum with accompanying resources and tools to support adoption of the self-identification process across the system. The IPHCC has also engaged the Canadian Institute for Health Information (CIHI) to harmonize and align the self-identification questions across the sector (CIHI, 2022).

Segmentation is about ensuring the right care is delivered to the right population (Population Health Alliance, 2012). There are multiple ways to create population segmentation however we know that the usual sources of data do not accurately count the Indigenous population; therefore, the self-identification data will be critical to ensure all community members who self-identify as First Nation, Métis, or Inuit at IPHCOs, and other Health Services are included in the population segments. Only then will this accurately inform program planning and ensure funding and program delivery are tailored to ensure Indigenous Health in Indigenous Hands. Data collection for the self-identification will include all IPHCOs and in the future other health service providers. This data will be immediately available in Business Intelligence Reporting Tool (BIRT), or other eventual reporting tool with reporting and business intelligence capabilities, and every IPHCO will be able to quantify the number of people receiving care (not just rostered). In the future the data collected in other sectors (e.g., hospitals) will be available through data linkage.

Indigenous Attributable Population Method

We know the current OHT attribution methods do not support the planning, funding, and delivery of healthcare activities, suggesting new attributable/segmentation methodologies are needed.

We recognize that this attributed population model will not work for all communities but should be considered where appropriate. The Attributable Population Model was conceived with the intent of having multiple Indigenous-led OHTs across the province; however, the current landscape has 57 OHTs with one or two being Indigenous-led. **Therefore, we suggest the Indigenous Data Segmentation method be explored by all OHTs** to ensure IPHCOs within their catchment area (whether members of the OHT or not) have had the opportunity for Indigenous Peoples' to be attributed to an Indigenous-led health system whether this is an Indigenous-led OHT, the Integrated Indigenous Health Hub, or non-OHT IPHCOs working in parallel, so that Indigenous health remains in Indigenous Hands. Moreover, all funding and accountability must account for 'joint attribution'. This can be done by examining utilization patterns over time. Over time, both methods will utilize the same data and the attributable population will include people who self-identify, and the Indigenous Data Segmentation method will improve due to data being included at ICES permitting greater data linkage

The following principles must be considered within all OHTs, especially for Indigenous-led OHTs and for IPHCOs that wish to participate in health system transformation efforts through the Indigenous Integrated Health Hub, with support from the IPHCC:

- The attributable population does not exclude people from being served in another community or by other health service providers. The attributable population cannot disrupt existing relationships in neighbouring communities or for residents who live elsewhere.
- All data reflecting the cohort list will be provided back to the community while respecting data governance, data sharing agreements, and aggregate or pre-approved data will only be sent to other stakeholders when approved and agreed upon by the community.
- The funding model and accountability shall account for people attributed based on membership but who may live far away (and may be accessing services in multiple places reflecting the need for a 'shared allocation' model). This will require an ongoing understanding of service use within the attributable population.
- Only aggregate data will be provided to the Ministry of Health or Ontario Health until legislation allows sharing of Personal Health Information (PHI)
- The collection of self-identifiers is important for planning and service delivery and will continue to inform attribution/segmentation models and subsequent funding to IPHCOs.

Toolkit

The population segmentation and attributable populations toolkit is a living document that will include templates, sample Band Council agreements, Data Sharing Agreements, self-identification templates that will be helpful when establishing an Indigenous-led attributable population or when using the segmentation approach. Once developed, this toolkit will enable the IPHCC to support its' members and Indigenous partners and organizations to use these methodologies to inform population health management approaches.

Conclusion and Next Steps

The IPHCC is calling on the provincial government to invest in a Provincial Indigenous Integrated Health Hub. This will allow the required infrastructure, resources, and supports to be put in place to advance this work across Ontario. Without these necessary and targeted supports for Indigenous Primary Health Care Organizations, and all Indigenous organizations and communities that will use them, we will continue to see structural inequities and perpetuate barriers to advancing self-determined Indigenous health services across the province. The Hub will lead, and support implementation of the attributed population and segmentation approaches described in this document and summarized below.

Scenarios	Details
Option 1 – Indigenous Population Segmentation Approach	Whether IPHCOs are leading or participating in an OHT, or not, segmenting Indigenous populations by community, region and/or OHT will be useful to identify how IPHCOs will work across the continuum of care to meet Indigenous population health needs. With the Hub in place, once population health needs are determined, appropriate and meaningful planning can take place to determine the appropriate care pathways that need to be developed or improved to ensure Indigenous Peoples across the province are receiving

Scenarios	Details
	safe and appropriate care, no matter where they reside. The IPHCC Data Governance Framework can be used by IPHCOs/Teams to guide their data collection and reporting methods, aligned with Indigenous data sovereignty principles and the STORIES OF STRENGTH endorsed framework.
Option 2 – Indigenous Population Attribution Model	Indigenous population attribution model used by Indigenous Ontario Health Teams. The IPHCC, through Hub supports will work with teams to support implementation efforts. The IPHCC Data Governance Framework can be used by IPHCOs/Teams to guide their data collection and reporting methods, aligned with Indigenous data sovereignty principles and the STORIES OF STRENGTH endorsed framework.

Case Studies

The three case studies below describe three innovative examples of Indigenous health in Indigenous hands. Each case describes a different level of system transformation and enrollment/registration into the system ranging from full attribution to registration through self-identification.

1. The first case study is a newly developed attribution model for Indigenous-led Health System Transformation that will pave the way for other Indigenous-organizations and communities. The Provincial Indigenous Integrated Health Hub and the in-development toolkit will support IPHCOs and our partners with advancing this work.

2. The second example is an agency that plans, delivers and funds health services for Indigenous People in the US.

3. The third example is NUKA, a whole health system that plans, delivers and funds health services and is producing exemplary outcomes for the entire southcentral Alaskan Indigenous community.

Case Study 1: Indigenous-led Health System Transformation Attribution Model

As the Provincial Indigenous Health Hub and other self-determined Indigenous-led Health System Transformation efforts advance, Indigenous-led approaches to population attribution for health system planning are critical. Indigenous-led efforts are important to address the equity and access issues that were being experienced by community members through the mainstream healthcare system.

The goal is to expand services to the entire attributed population and ensure all Indigenous Peoples and residents are aligned and accurately accounted for. It is therefore critical to define an attributed population that reflects the Indigenous communities that are being served based on service delivery patterns. This has required a revision to the mainstream attributed population methodology.

IPHCOs provide services to Indigenous Peoples and residents in diverse communities, including rural, remote and urban settings, as well as both on and off territory. A new methodology had to be

developed that would ensure that all the people living and/or associated with the communities identified will be included in population health planning.

Therefore, the new attribution methods required three steps:
1. the creation of the attributed population
2. re-assignment of people from the OHT in which they were originally assigned
3. to critically look at utilization patterns to ensure that mobility among the community members was accounted for

Where applicable, IPHCOs work with communities to ensure all respective First Nation resolutions are endorsed, and formal resolutions are appropriately obtained through existing governance structures.

IPHCOs and associated stakeholders demonstrate the principal of shared accountability with core partners through community-specific protocol agreements and memorandums of understanding relating to program and service delivery. These agreements clearly outline how programs and services will be delivered in collaboration, speaking specifically to accountability, joint funding, governance, program and support services within the defined 'circle of care', collaborative shared program delivery responsibilities, financial management, staff scheduling, planning, communications, and conflict resolution. The IPHCC has developed digital tools and resources, including templated Indigenous-reviewed DSAs and other agreements that members can use throughout this process.

The IPHCC also has pilot programs ongoing with hospitals to implement a "self-identification" process upon admission. Individuals who identify as First Nation, or a resident from one of their member First Nations will generate a connection to appropriate navigation and/or community-supports.

All performance metrics and funding will be aligned to the attributable population ensuring that health system planning, improvement efforts and accountability is in the hands of Indigenous-led organization(s) and communities, ultimately ensuring that Indigenous health is in Indigenous hands.

Case Study 2: Phoenix Area Indian Health Services (Agency Model)

The Phoenix Area Indian Health Service (PAIHS) Office in Phoenix, Arizona, oversees the delivery of health care to Native American users in the tri-state area of Arizona, Nevada and Utah. They provide health care and community health services to approximately 180,000 American Indians/Alaska Natives. Through ten Service Units including two Youth Regional Treatment Centers and a network of heath care facilities, they are a health care partner to over forty tribes. They are one of twelve Indian Health Service (IHS) agencies in the US. The Phoenix Area IHS serves a large population and provides comprehensive services that range from primary care (inpatient and outpatient) to tertiary care and specialty services. In addition, they offer dental services, behavioral health, public health nursing, health education, and environmental health services. The communities served reflect urban and rural/remote and include on and off tribal land.

The goal of the IHS is to ensure comprehensive, culturally appropriate personal and public health services are available and accessible to American Indian and Alaska Native people (Kunitz, 1996). Eligibility for health services is determined by membership to one of 574 federally recognized tribes

throughout the US and limited criteria for eligible non-Indians (IHS Profile, Fact Sheets 2021). Since 1992, the IHS has entered into agreements with tribes and tribal organizations to plan, conduct, and administer programs, and currently over 60% of the ongoing funding is administered by tribes, primarily through self-determination contracts.

Much of the narrowing of health disparities between American Indian/Alaska Native populations and other racial and ethnic groups in the United States is attributable to the activities of the IHS. However, health disparities persist, influenced by the history of trauma and racism, chronic underfunding and insufficient human resources, and ongoing needs for methods to support Tribal control of programs and services and for culturally sensitive services, given the diversity of settings and populations they serve.

One key strategy identified is to ensure that stakeholders at all levels are involved to develop solutions to adequately fund and build the capacities of diverse communities to create community-level solutions to overcome health disparities with programs strengthened by cultural values and traditions (Kruse et al., 2022). The IHS model has identified challenges including issues related to chronic underfunding, the provision of health services to members of unrecognized tribes (currently left ineligible for services), personnel recruitment and demographic shifts to urban areas (Levison, 2016; Kruse et al., 2022).

Case Study 3: The NUKA Model (Community Model)

Nuka is an Alaska Native word that means strong, giant structures and living things. It is the name given to Southcentral Foundation's (SCF) whole health care system, which provides medical, dental, behavioral, traditional and health care support services to more than 65,000 Alaska Native and American Indian people. SCF is a not-for-profit health system, located in Anchorage, Alaska and owned and run by Alaska Native people for Alaska Native people.

It delivers a broad spectrum of services including the following:
- primary care,
- dentistry,
- behavioral health (including residential and day treatment programs),
- pediatrics,
- obstetrics,
- complementary medicine,
- traditional healing,
- domiciliary services and education.

It also co-owns and co-manages a 150-bed hospital, the Alaska Native Medical Centre, providing inpatient, specialist and tertiary services. There has been a multitude of papers written about SCF due to the transition from having among the worst health outcomes in the United States to being recognized as one of the most successful examples of health system redesign within the US and internationally (Collins, 2015). The Nuka System of Care incorporates the patient medical home with multidisciplinary teams providing integrated health and care services in primary care centres and the community, coordinating with a range of other services. This is combined with a broader approach to improving family and community wellbeing that extends well beyond the co-ordination of care services.

The Southcentral Foundation, from conception did not view itself as merely a health care provider, but as an organization fulfilling a much broader social purpose. Its corporate goals commit to pursuing 'wellness that goes beyond the absence of illness or prevention of disease'. South central's barometer for success is 'whether the community is able to experience multidimensional wellness, and if improvements in wellness are experienced from one generation to the next'.

Important to this paper, SCF's improvement journey began with the decision to transfer funding from the Indian Health Services (IHS) to Southcentral Foundation. All responsibilities for services shifted entirely from government to local people. Transformation was driven by leaders, staff and the community when given the authority and freedom to act (Southcentral Foundation, 2023). Alaska Native leaders and community members saw the need for change and chose to take ownership over their own health care (Southcentral Foundation, 2023). Since the beginning of the assumption of services, SCF instituted significant philosophical and other changes in the design and administration of these programs. Southcentral Foundation instituted a total system wide transformation of care, increasing the quality and adaptability of programs —and more importantly—the accountability of providers and customers alike. Alaska Native people oversee designing and delivering health care. In the first years of transformation, per capita accident and emergency use reduced by more than 45 per cent, hospital admissions by 53 per cent, referrals to hospital specialists by more than 60 per cent, and visits to primary care doctors by 36 per cent (Collins, 2015).

The focus on relationships extends beyond health care delivery. To ensure whole system transformation, each key work system was redesigned including the following:
- workforce development
- compliance
- human resources
- finance

This was done to ingrain an organization-wide focus on relationship-building and shared decision-making. The NUKA model is an example of a whole system re-design that has led to visions and principles that are being replicated worldwide.

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IPHCC Contacts

Name, Title	Contact
Caroline Lidstone-Jones, Chief Executive Officer	clidstone-jones@iphcc.ca
Marlon Cole, Director of IT/IM, Communications	mcole@iphcc.ca
Allie Kinnaird, Director of Policy & Government Relations	akinnaird@iphcc.ca
Nicole Blackman, Director of Integrated Care & Clinical Services	nblackman@iphcc.ca
Curtis Hildebrandt, Senior Advisor, Health Systems Strategy	childebrandt@iphcc.ca

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