Developing Indigenous Health Indicators for Cumulative Effects Management

by

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Abstract

Resource development projects impact Indigenous communities' health, leading to increased chronic conditions prevalence and reduced access to health services. Through an analysis linking colonization on Turtle Island, ongoing industrial development, and the social determinants of health in an Indigenous context, this research aims to identify culturally relevant indicators that can give early signals of increased chronic conditions prevalence and reduced access to health services for the Metlakatla First Nation. This research took place within the Metlakatla Cumulative Effect Management Program, a community-partnered resource management system for monitoring the status of Metlakatla values and responding proactively to cumulative change in Metlakatla Territory. To identify indicators, a thematic analysis of qualitative data gathered through three focus groups with Metlakatla members and staff (n = 6) and five interviews with health experts (n = 8) was carried out using a collaborative approach. Additionally, the Metlakatla Membership Census provided quantitative data to corroborate the indicators identified. Results suggest that the most appropriate indicators linking resource development impacts to increased chronic conditions prevalence and limited access to health services for the Metlakatla First Nation include Social and Cultural Connectedness (metric: Sense of Connectedness to Metlakatla Culture, Community, History, and Traditional Lands and Waters), Continuity of Care (metric: Presence of a Primary Care Provider), and a food-related indicator (metric: further investigation required). Our findings emphasize the importance of engagement and collaboration with Indigenous peoples to ensure cultural relevance and appropriateness of health indicators in a resource development context.

Keywords: Indigenous health indicators; social determinants of health; cumulative effects management; chronic conditions; access to health services

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Preamble

How healthy we are depends on how much love we receive throughout our entire life, especially during our childhood.

Main insight from twenty months of reflection
Clémentine Bouche

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List of Acronyms

ACSC	Ambulatory Care Sensitive Conditions
BC	British Columbia
CEM	Cumulative Effects Management
EIA	Environmental Impact Assessment
HIA	Health Impact Assessment
HSDA	Health Service Delivery Areas
MMC	Metlakatla Membership Census

List of Supplemental Documents

The following documents are referred to in this project report. Documents #1-6 are supplemental to this report and specifically relate to the methods and/or results of the CEM Program research on health:

1. Access to Health Services Indicator Guide Sheet (2015)
2. Diabetes and Hypertension Prevalence Indicator Guide Sheet (2015)
3. Summary Report of Health Focus Groups (2021)
4. Summary Report of Health Interviews (2021)
5. 2020 Metlakatla Membership Census Results Summary Report (2021)
6. CEM Health Indicators Final Report (2021)

Chapter 1. Introduction

Chapter 1 presents the research context, study objectives, project report structure, and positionality statement.

1.1. Research Context

Health is not defined by the presence of diseases or absence of symptoms but is concerned with holistic well-being (World Health Organization, 1948). The latter encompasses physical, mental, emotional, and spiritual aspects of well-being (Aalhus et al., 2018; Kryzanowski & McIntyre, 2011). In many Indigenous worldviews, humans are healthy when in balance between their body, mind, heart, spirit, as well as with their families, communities, Nations, and with nature (First Nations Health Authority, 2021; Methot, 2019).

Nature, however, is impacted by human activities. Industrial projects can damage the environment, directly affecting human health. The impact of industrial development on the environment is commonly assessed in Environmental Impact Assessments (EIA), and the impact of industrial development on health is usually analyzed through Health Impact Assessments (HIA) (Westwood & Orenstein, 2016). Nonetheless, health impacts can also be measured through EIAs.

EIAs and HIAs, although likely created with the best of intentions, have significant shortcomings. There are three notable issues with impact assessments. First, most EIAs and HIAs focus on the impacts of a specific project rather than considering the cumulative effects of industrial activities. In this context, *cumulative* alludes to the "synergistic, interactive, or unpredictable outcomes of multiple land-use practices or development projects that aggregate over time and space, and that result in significant consequences for people and the environment" (Johnson, 2016, p. 25). In this report, *effect* refers to a change in the environment, whereas *impact* points to the consequence of such change (Johnson, 2016); in other words, *effect* is defined as the difference in the condition of a parameter, whereas *impact* refers to the estimated social value of the *effect* (Noble, 2015). Second, health is rarely assessed in a holistic manner, as EIAs and HIAs often solely focus on physical dimensions (e.g., exposure to contaminants), or conduct physical disease-based measures (e.g., cancer rates), or evaluate socio-economic impacts alone (Gregory et al., 2016; Shandro & Jokinen, 2018). Third, HIAs do not usually take local Indigenous values into consideration (Gregory et al., 2016; Shandro & Jokinen, 2018).

The Metlakatla Cumulative Effects Management (CEM) Program was created to fill these gaps. The CEM Program is a resource management system that monitors and manages the status of priority Metlakatla values and responds proactively to cumulative change in Metlakatla Territory over time. It was designed specifically for the Metlakatla First Nation, who faces multiple industrial development projects on its Territory. It is supported by academic researchers and the Metlakatla First Nation. In 2015, the CEM Program identified three health indicators that would help assess and mitigate adverse effects of development on the community's health. In 2020, the CEM Program decided to revisit these indicators. The process and findings of the research, detailed in this paper, emphasize the importance of engagement and collaboration with Indigenous peoples to ensure the cultural relevance and appropriateness of health indicators in a resource development context.

Another report presenting these findings, called the *CEM Health Indicators Final Report*, was prepared for the Metlakatla First Nation to inform Metlakatla leadership and managers' decisions on how to assess and monitor Metlakatla members' health status, with the possibility of implementing management actions at a later stage of the CEM Program. The project team supporting this report includes Clémentine Bouche (Master's Student Intern), Katerina Kwon (SFU Project Support and SFU Ph.D. candidate), Taylor Zeeg (Metlakatla Project Support), and Dr. Clifford Atleo (SFU Supervisor).

1.2. Research Objectives

The goal of this research is to revise and identify Indigenous health indicators for the Metlakatla First Nation, whose Traditional Territory is heavily impacted by resource extraction activities. To reach this goal, three research objectives have been defined:

- Validate priority health values (Chronic Health Conditions and Access to Health Services) and condition indicators for Chronic Health Conditions
- Identify or revise stressor indicator(s) for Chronic Health Conditions
- Identify or revise condition indicator(s) and barriers for Access to Health Services

A background on the objectives will be provided in Chapter 3: Metlakatla First Nation Case Study.

1.3. Project Report Structure

This project report is divided into five chapters. Chapter one provides the research context and preliminary information regarding the research project. Chapter two summarizes the academic and grey literature linking colonization on Turtle Island, ongoing industrial development, and the social determinants of health in an Indigenous context. Chapter three gives an overview of the Metlakatla First Nation case study, including an introduction to the Metlakatla First Nation and the CEM Program and a summary of past work on Metlakatla's health values within the CEM Program. Chapter four provides an overview of the current CEM health research objectives and methodology. Chapter five presents the findings for Chronic Health Conditions and Access to Health Services, including value background and validation, indicator background and rationale for selection, and related health results from the 2020 Metlakatla Membership Census (MMC). Chapter six offers recommendations for the continuation of this health research in the CEM Program. Chapter 7 discusses the findings from this study, including lessons learned, research implications, limitations, contextualization, and conclusion.

1.4. Positionality Statement

Considering the context (Canada) and topic (Indigenous health) of this research project, its introduction would not be complete without a positionality statement explaining where my perspective is situated in space and time. I am a French student working towards the completion of my master's degree in Resource and Environmental Management in Canada. I studied on the unceded territories of the xʷməθkwəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and Sə̓lílwətaɬ (Tsleil-Waututh) Nations. I currently reside on the territories of the Tsuut'ina Nation, Îyârhe Nakoda (Stoney Nakoda) Nation, including the Chiniki, Bearspaw, and Wesley First Nations, as well as the Siksikaitsitapi (Blackfoot Confederacy), including the Piikani (Scabby Robe), Kainai (Blood Tribe), and Siksika Nations, and the Métis People of Alberta Region 3. I have come to this land to learn and to settle. I identify as a white settler in this country and recognize that these lands were inhabited by people long before my ancestors arrived. These people have been called the 'Native,' 'Indigenous,' or 'Aboriginal' peoples of Canada as they carry ancestral ties to the land that go beyond times we can define. The terms mentioned above convey the idea of oppression, a structure and attitude that my ancestors have unfairly benefited from and that I continue to benefit from today. I am an uninvited guest on these lands as, although I intend to come in the gentlest and most open state of my being, I do not know if the host nations are willing to accept me.

This acknowledgment connects me to the histories and present of the lands I stand on, of the people around me, and explains how I have come to be here. I was raised and born in a social world crafted in my image, and after which my image is crafted. Through this work, I intend to deconstruct the worldview that shapes my thinking by analyzing my roots and social position: I am a white, privileged, able-bodied, cis-gendered, university-educated woman raised in a wealthy, catholic-minded, non-diverse environment. Yet, this acknowledgment brings no pride. On these unceded lands, I feel ashamed of my ancestors' detrimental actions and frustrated by my inability to change the past. I hope to have some ability to heal the wounds created by history; yet, how can I present myself to Indigenous peoples? I am not an invited guest on these lands and will never be. I am hoping that these uncomfortable feelings, accompanied by reflection and action, guided by respect and desire to learn, and redirected by Indigenous peoples, could be transformative for me and the society I live in.

My positionality statement must also mention my perspectives as a researcher, student, and individual regarding this specific study. First, as a researcher, I come as an outsider to the Indigenous community I work with. This position may allow me to begin with few emotional ties and consequent biases to the conversations I enter. However, I lack the 'insider knowledge' of living in the community; thus, I may lack the necessary social and cultural knowledge to understand the sayings and assumptions of the members I work with. Yet, although I am a foreigner, stranger, and outsider to the Metlakatla community, I immensely benefit from the lasting relationships of trust and respect built with members through the CEM Program. Second, as a graduate student in Resource and Environmental Management, I have little background and knowledge of health and well-being. The knowledge presented here is the result of this sole research project. My work intends to be as holistic as possible, linking understandings and experiences from many fields. Nonetheless, the findings of this research and subsequent conclusions are limited to the knowledge accessible to me and bound by the objectives of the CEM Program, which frame the research. Third, as an individual, I seek to achieve 'empathetic neutrality,' a process through which I aim to be as objective as possible by letting go of the socially constructed biases that shape my reasoning. However, any work will always be affected by various human epistemological subjectivities.

Chapter 2. Literature Review

In this literature review, I offer a background on the social determinants of health to better understand the diverse elements affecting one's health, with a focus on Indigenous peoples' health. I also introduce the impacts of colonization and resource extraction on Indigenous peoples' wellbeing, which is necessary to comprehend Indigenous perspectives on wellbeing in Canada today.

2.1. Social Determinants of Indigenous Health

The social determinants of health can be used as a lens to understand the numerous and intricate pathways affecting the overall health of Indigenous peoples. The social determinants of health are the broad social, physical, and economic aspects of an individual's life (Auger, 2016; Loppie Reading & Wein, 2009; Nelson & Wilson, 2017). They influence all health variables through direct and indirect pathways, encouraging or inhibiting health maintenance during an individual's lifetime (Loppie Reading & Wein, 2009; Nelson & Wilson, 2017; Shandro & Jokinen, 2018). The social determinants of health can be classified into three dimensions: the proximal, intermediate, and distal determinants of health (Loppie Reading & Wein, 2009). Figure 1 illustrates the various dimensions of the social determinants of health.

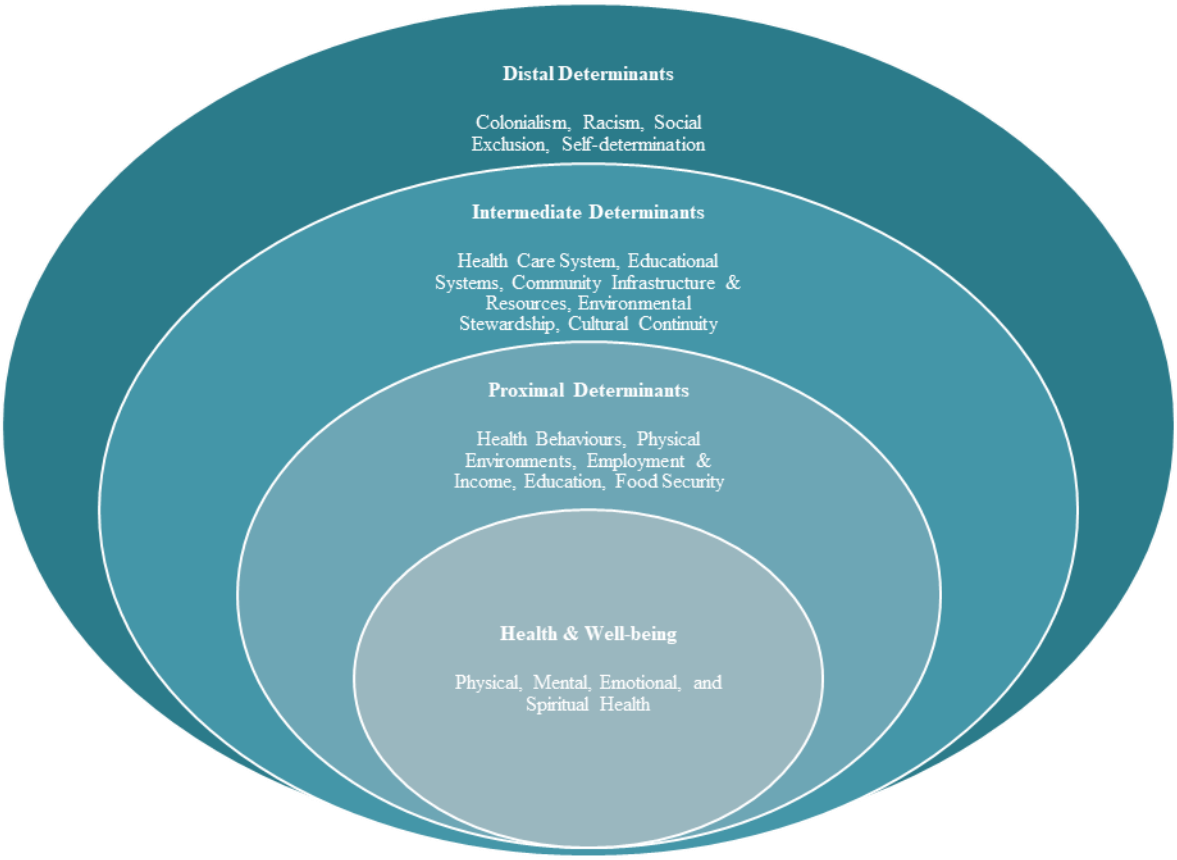

Figure 1: The social determinants of health framework. Adapted from the work of Loppie Reading and Wien (2009).

2.1.1. Distal Determinants

The distal determinants of health represent the dominant social, economic, and political contexts in which the intermediate and proximal determinants are constructed (Loppie Reading & Wein, 2009). They comprise colonialism, racism and social exclusion, and self-determination (Aalhus et al., 2018; Loppie Reading & Wein, 2009). The impact of distal determinants, although indirect, affects individuals in all aspects of their lives and during all life phases. For example, in an Indigenous context, the legacy of colonialism, including government policies and the residential school system, impacts Indigenous peoples' mental, emotional, spiritual, and physical health at the individual, familial, and community levels (Hackett et al., 2016; Loppie Reading & Wein, 2009; Marrone, 2007). This collective emotional and psychological harm inflicted over centuries to Indigenous communities is characterized as intergenerational trauma or historical trauma (Mitchell et al., 2019). In addition, ongoing colonialism leads to an unfair distribution of resources, power, freedom, and control (Loppie Reading & Wein, 2009), hindering Indigenous peoples' ability to

recover from past traumas. Links between colonization and health will be detailed in section 2.2. Colonization.

2.1.2. Intermediate Determinants

The intermediate determinants represent the social and physical contexts in which individuals grow. They are embedded in the distal determinants and are the origins of the proximal determinants (Loppie Reading & Wein, 2009). The intermediate determinants of health include health care systems, educational systems, community infrastructure, resources, and capacities, as well as environmental stewardship and cultural continuity (Aalhus et al., 2018; Loppie Reading & Wein, 2009; Shandro & Jokinen, 2018). Cultural continuity can be defined as the maintenance and transmission of cultural and social cohesion within a community (Auger, 2016; Loppie Reading & Wein, 2009). The impact of the intermediate determinants is often indirect and only visible in the long term (Loppie Reading & Wein, 2009). For example, a lack of community infrastructure and resources limits the number of programs that could encourage social cohesion, emotional support, and healthy behaviours (Loppie Reading & Wein, 2009). Likewise, low cultural continuity leads to negative emotional responses such as low self-esteem, pride, sense of belonging, sense of purpose, empowerment, a fragile identity, and a low capacity to cope with stress, grief, and loss (Auger, 2016; Oster et al., 2014). Ultimately, these emotional responses affect physical health (Auger, 2016; Methot, 2019; Oster et al., 2014; Pressman et al., 2013). Some of the pathways between the intermediate determinants and Indigenous peoples' health will be expanded on in section 2.3 Resource Extraction.

2.1.3. Proximal Determinants

The proximal determinants of health are the conditions that directly impact mental, emotional, and physical well-being (Government of Canada, 2015; Loppie Reading & Wein, 2009). They encompass health behaviours (i.e., tobacco, drugs, and alcohol consumption, diet, physical activity, sleep, and sexual behaviour), physical environments (e.g., housing), employment and income, education level, and food security (Loppie Reading & Wein, 2009). By way of illustration, health behaviours can be explicitly linked to physical well-being; an unhealthy behaviour such as smoking is unequivocally associated with cancer. Similarly, other proximal determinants can directly affect emotional well-being; for example, a low income reduces access to material resources such as safe housing and is tied to social exclusion, which in turn leads to insecurity, low self-esteem, anxiety, and feelings of hopelessness. The result is increased psychosocial stress—a

form of stress that emerges in social situations that are emotionally and psychologically demanding for the individual, such as social evaluation or exclusion (Kogler et al., 2015). This psychosocial stress may prevent an individual from seeking social support, health care services, education, employment, and lead to poor health behaviours. These consequences may aggravate that person's health (Kogler et al., 2015) and strengthen the social trap in which individuals find themselves (Monteiro, 1973).

2.2. Colonization

2.2.1. Colonization in Canada

Apprehending colonization and its legacy is essential to understanding the health of contemporary Indigenous peoples in Canada. Canada's history is a long chronicle of genocide. Before the arrival of Europeans around 1500, there were an estimated 100 million Indigenous peoples in what are now called North and South America (Denevan, 1992). During the first two hundred and fifty years, approximately ninety percent succumbed to epidemic diseases, slavery, war, famines, and mass extermination processes (Union of BC Indian Chiefs, 2005). Many survivors were then forced into assimilation, a procedure further breaking the social, economic, cultural, and political structures that shaped Indigenous lives and communities. To describe the impact of assimilation, Methot (2019) states that "the trauma inflicted on survivors is almost unimaginable; the genocide unprecedented" (p. 10).

2.2.2. Colonialism and Dis-ease

Indigenous peoples "are stuck in the disruption and disharmony created by colonialism. This has resulted in dis-ease that will continue to affect contemporary Indigenous peoples until it is addressed" (Methot, 2019, p. 17). Methot's statement means that Indigenous peoples have not yet recovered from the loss of their people and the changes due to colonialism; current statistics of high chronic diseases rates, depression rates, and crime rates tell the same story (Methot, 2019). Methot writes 'dis-ease' instead of disease, thereby emphasizing the root and meaning of the word. The prefix 'dis' means apart or away in Latin. 'Ease' means freedom from pain. Having a 'dis-ease' means being out of balance; out of balance with one-self, others, and the world. This out-of-balance state leads people to feel troubled and in pain, mentally, emotionally, spiritually, and physically. This 'dis-ease' results from the ongoing trauma of colonization (Methot, 2019).

2.2.3. Trauma

The trauma experienced by First Nations in Canada is intergenerational, complex, continuous, and chronic. (Methot, 2019; Mitchell et al., 2019).

The trauma is *intergenerational* because it is bequeathed from one generation to the next. Methot (2019) explains how trauma is transferred:

> According to Kellerman, trauma can be transmitted across generations by four distinct but sometimes overlapping means: psychodynamic processes, sociocultural processes, the family system, and biological processes. When trauma is transmitted through psychodynamic processes, the anger, fear, and repressed grief of parents is externalized and projected onto their children, leading subsequent generations to engage in behaviours without insight or awareness as to the unconscious processes behind those behaviours. When intergenerational trauma is transmitted through socio-cultural processes, the younger generation is socialized through behaviours modelled by the older generation and comes to believe things about themselves and the world around them via their parents' parenting style. When the family system is the vehicle of transmission, children become enmeshed in the emotional issues of their parents; this lack of boundaries encourages children to ignore their own emotional needs in favour of meeting the parent's needs, resulting in problems with the child's development as an individual. Biological processes describe the physiological and genetic means by which trauma is transmitted across generations. (p. 19)

The trauma is *complex* because it harms people mentally, emotionally, spiritually, and physically and affects Indigenous communities at the individual, familial, community, and national levels (Mitchell et al., 2019).

The trauma is *continuous* as it was prolonged after the first few decades of direct extermination (through disease, land theft, and starvation) via the use of policies that rendered cultural, spiritual, and social practices illegal (Mitchell et al., 2019). Historical processes and ongoing systems of control perpetuate the trauma in contemporary society. Those include but are not limited to: forced relocation into remote reserves, often on unknown and non-viable land; mandatory assimilation via residential schooling (where children suffered physical, sexual, and emotional abuse or neglect) and the Sixties Scoop (process though which Indigenous children were coercively taken to white families); interference with Indigenous governance, via the imposition of the band council system; use of control systems such as the prison and health care systems, which often ignore Indigenous values and healing methods (Mitchell et al., 2019); and ongoing appropriation and exploitation of the land (Hackett et al., 2018; Methot, 2019).

The trauma is also *chronic* as it can constitute single traumatic incidents, like the racism individuals face daily or the loss of a community member due to suicide (Methot, 2019). Chronic trauma stems from both the original experience and the inherited outcomes of that experience, such as the loss of self-esteem and hope due to racism or the appearance of chronic health issues in adulthood due to maltreatment in childhood (Methot, 2019).

2.2.4. The Contemporary Impact of Trauma

A salient impact of colonization is disconnection (Methot, 2019). Methot (2019) emphasizes that "People who experience trauma within the context of control [i.e. colonization] are left with an altered sense of identity and self-perception, a lack of personal agency, and a lack of faith in the value and meaning of their own lives" (p. 43). Therefore, colonial trauma leads individuals to be disconnected from themselves, their families, communities, culture, spirituality, and the natural world (Methot, 2019). This disconnection leads to feelings of hopelessness, powerlessness, and voicelessness (passive acceptance of powerlessness), low self-esteem, feeling of inferiority or aversion towards white people, fear of change and healing, unresolved grief and loss, chronic widespread anger and rage, dysfunctional relationships and conflict at the familial and community level, unhealthy copying mechanisms (e.g., isolation, substance use), patterns of neglect and abuse (physically, sexually, psychologically, and emotionally), and finally, mental and physical chronic illnesses (Methot, 2019).

2.3. Resource Extraction

Most resource extraction and industrial development today continue to exacerbate colonial relations and trauma in Indigenous peoples' territories. Harming the land is harming Indigenous peoples as their relationship with the land is the foundation of their economic, social, cultural, and spiritual practices, and as such, the foundation of their identity. However, in a world dominated by market capitalism, the land is considered a commodity (Methot, 2019). By fragmenting the land, depleting and contaminating resources, and sometimes expelling and dispossessing Nations from their territories, industrial development and resource extraction can impede First Nation self-determination, thereby contributing to the systematic oppression of Indigenous peoples and generating negative health impacts at the macro and micro levels (Schrecker et al., 2018). Some of the preeminent impacts of industrial development on Indigenous communities' health are detailed below.

2.3.1. Environmental Alteration

Resource extraction projects often lead to fragmentation, contamination, and loss of land and marine areas in Indigenous territories.

Contamination can expose individuals to chemical pollutants through food, water, and air, which leads to development issues and chronic diseases such as cancers (Schrecker et al., 2018; Westwood & Orenstein, 2016). For instance, toxic by-products from mining and oil extraction, such as hydrocarbons and heavy metals (e.g., cadmium, copper, lead, chromium, mercury, etc.), can be improperly disposed of and seep into the soil, watersheds, and reservoirs (Schrecker et al., 2018). Pollutants accumulate in the food web (i.e., bioaccumulation), becoming more prominent across each trophic level (i.e., biomagnification) (Das et al., 2014). Therefore, humans, who are at the top of the food chain, absorb large quantities of pollutants through food, water, and air, and as such, may suffer from a wide array of health issues (Das et al., 2014).

Food and water insecurity increases as industrial activities damage the land and water, often impacting community members' ability to hunt, fish, and harvest (Aalhus et al., 2018; Amnesty International, 2016; Schrecker et al., 2018; Westwood & Orenstein, 2016). Perceived pollution can also lead to increased stress and anxiety, and as a result, avoidance of traditional foods (Westwood & Orenstein, 2016). The latter may erode well-being and heighten reliance on store-bought foods (Westwood & Orenstein, 2016), which often provide less nutritious items than traditionally gathered foods (Aalhus et al., 2018). These processes are also exacerbated by increased living costs and full-time employment in these industries, which prevents people from spending time on the land.

Changes in the visual landscape affect mental wellbeing as the local population experiences a loss, grief, and distress because of environmental change, a process called "solastalgia" (Harder, 2016). Additionally, aesthetic devastation can diminish the potential for economic diversification—like tourism—in some areas (Schrecker et al., 2018).

2.3.2. Social Changes

The arrival of transient resource sector workers often has a significant impact on communities.

Economic disparity increases as high wages from resource extraction sectors create sharp inequalities by driving up housing, food, and services costs for the local community (Aalhus et al., 2018; Gamu et al., 2015; Schrecker et al., 2018; Westwood & Orenstein, 2016); those who cannot benefit from the resource sectors' wages, such as women or people with disabilities, suffer from increased economic precariousness (Amnesty International, 2016).

Social cohesion at the family and community levels is often impaired as new faces enter the region. The arrival of a typically young, single, male, usually misogynist and racist workforce is associated with an increase in substance abuse, domestic violence, intentional harm (e.g., assaults) and unintentional injuries (e.g., road accidents) (Aalhus et al., 2018; Amnesty International, 2016; G. R. Halseth, 2016; Parkes, 2016). Particularly vulnerable to this influence is the teenage population; generally, men might be pulled out of high school early to work, while women might become the primary victims of physical abuse and sex trade (The Firelight Group, 2017).

Cultural continuity becomes fragmented as employment takes time away from community gathering and traditional practices (Aalhus et al., 2018). The fragmentation and loss of land and marine areas also impede traditional practices and activities as areas of cultural significance are transformed, thus reducing opportunities for education, recreation, exercise, and social connections (The Firelight Group, 2017; Westwood & Orenstein, 2016). Concurrently, conflicting values and lifestyles reduce social well-being at the individual and community levels (Aalhus et al., 2018). For instance, workers often find themselves in a double-bind situation where financial welfare comes at the expense of their land and culture and, thence, expression and continuation of their identity as Indigenous peoples.

2.3.3. Pressure on the Health Care System

Industrial activities can add pressure to the local health care systems because of a rapid population increase, a higher risk of acute injuries due to the nature of the work, rising contaminant exposure leading to chronic health issues, heightened food insecurity, and greater mental and emotional health needs due to the changing social landscape (Aalhus et al., 2018; Schrecker et al., 2018; Westwood & Orenstein, 2016).

2.4. Literature Review Summary

Indigenous peoples' health is affected by the legacy of colonial trauma and the resulting systems of oppression that persist today. Resource extraction that is often led and controlled by non-Indigenous peoples is one of the main practices that continue to impede Indigenous peoples' ability to heal by limiting their sovereignty on their territories. A first step towards healing is to assess and manage Indigenous peoples' wellbeing through community-based indicators. The case study introduced in the following chapters uses the knowledge presented above to meet the study's objectives: finding Indigenous-based health indicators for a community heavily impacted by resource extraction activities in its territory.

Chapter 3. Metlakatla First Nation Case Study

In this chapter, I offer an introduction to the Metlakatla First Nation, provides context to the study by detailing current industrial development in Metlakatla Territory, and gives an overview of the CEM Program, which is the foundation of this research project.

3.1. The Metlakatla First Nation

The Metlakatla First Nation is a progressive community living in Northwest British Columbia (B.C.), Canada (Metlakatla Stewardship Society, 2019). Metlakatla Territory is a diverse area of approximately 20,000 square kilometres in the Great Bear Rainforest, B.C., with about 2,575 km of shoreline (Figure 2). It has been occupied and used for over 8,000 years for subsistence, economic, cultural, social, spiritual, and ceremonial purposes. The major city in the Territory is Prince Rupert. Metlakatla Village, home to approximately 110 members, is a boat-accessed community located five kilometres northwest of Prince Rupert. The Metlakatla First Nation has about 1,000 members and is one of seven Tsimshian communities in the North Coast region of B.C.

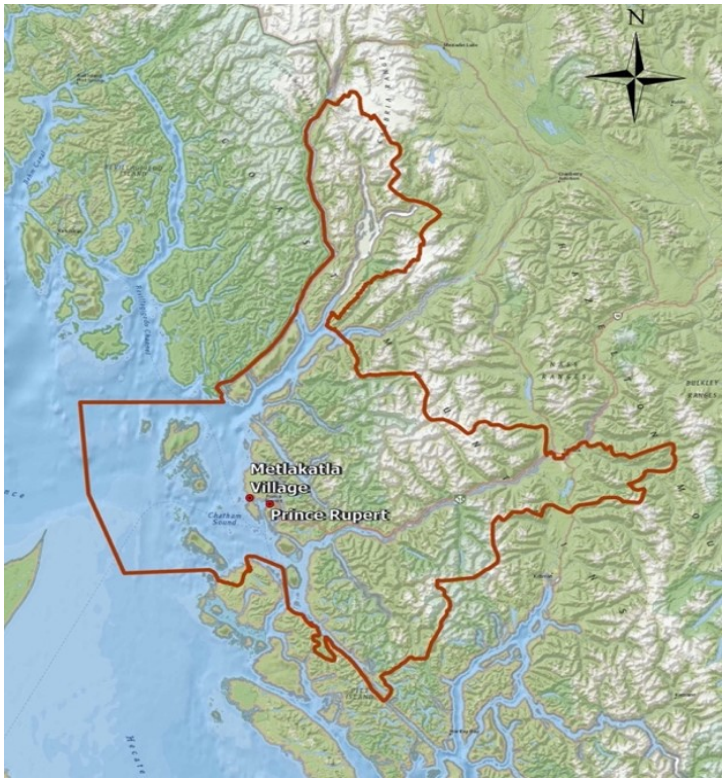

Figure 2: Metlakatla First Nation Territory in the Northwest Region of British Columbia (Source: Metlakatla First Nation).

3.2. Development in Metlakatla Territory

According to the British Columbia Major Projects Inventory, there are currently fifty-nine major projects on the North Coast as of June 30th, 2021 (B.C. Ministry of Advanced Education and Skills Training, 2021). The Major Projects Inventory comprises projects valued at $15 million (Can.) or more, with statuses identified as: 'proposed,' 'under construction,' 'completed,' or 'on hold.' Project information is gathered from public and private information sources. The Inventory counts neither the numerous projects estimated at a lower value nor those whose details are not published for confidentiality reasons.

Out of the fifty-nine projects, valued at a total of $166.4 billion, approximately sixteen are located on Metlakatla Territory, and around twenty-eight are situated just outside of Metlakatla Territory. These projects include oil and gas extraction, mining, energy, transportation, and other projects, as shown in Table 1. While it allows the area to develop economically, development has irreversible impacts on the ecosystem and affects local communities' ability to live healthily in the region. Long-term repercussions need to be carefully evaluated (G. R. Halseth, 2016).

Table 1: Number of major projects, per sector, in and near Metlakatla Traditional Territory.

PROJECTS	IN METLAKATLA TRADITIONAL TERRITORY	NEAR METLAKATLA TRADITIONAL TERRITORY	TOTAL
Oil and Gas	7	13	**20**
Mining	0	3	**3**
Energy (electricity, hydroelectricity, biocoal, etc.)	2	5	**7**
Transportation	7	3	**10**
Others	0	4	**4**
Total	**16**	**28**	**44**

* Data coded and calculated from the Major Projects Inventory Database (B.C. Ministry of Advanced Education and Skills Training, 2021)

The large number of proposed industrial projects prompted Metlakatla leadership to ponder the full extent of benefits and impacts on its lands and people. Therefore, Metlakatla leadership decided to assess and mitigate cumulative effects, a mandate that began in 2014 and is supported by the Metlakatla Stewardship Society.

3.3. The Metlakatla Cumulative Effect Management Program

3.3.1. CEM Program Overview

In 2014, the Metlakatla First Nation initiated the CEM Program through a research partnership with the School of Resource and Environmental Management at Simon Fraser University. The Metlakatla CEM Program is a resource management system designed to inform and support Metlakatla decisions on assessing, monitoring, and managing the status of priority Metlakatla values and responding proactively to cumulative change in Metlakatla Territory over time; it was proposed in response to multiple industrial development projects in Metlakatla Territory. Its goal is to improve the condition of priority Metlakatla values. The CEM Program focuses on five pillars: Environmental, Economic Prosperity, Social/Health, Cultural Identity, and Governance. Each pillar includes one or several priority values, which are aspects of the human and natural environment that Metlakatla cares about. The status of each value is monitored using indicators. The information gathered through the CEM Program then informs and supports Metlakatla's decision-making at multiple levels. Figure 3 illustrates the Metlakatla CEM Program's process.

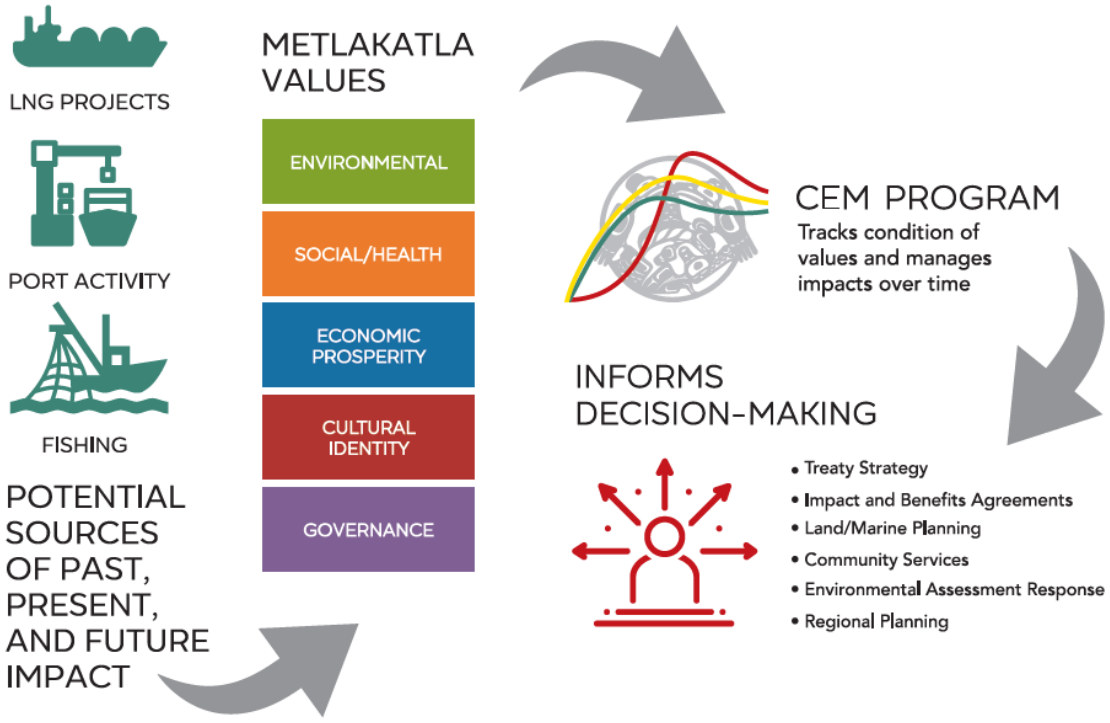

Figure 3: Metlakatla CEM Program Overview (Source: Metlakatla Stewardship Society, 2019)

The CEM Program framework uses a four-phase approach (Figure 4) to connect monitoring information to decision-making by outlining mitigation, monitoring, and management strategies. This research revisited the work done in 2015 during Phase 1.

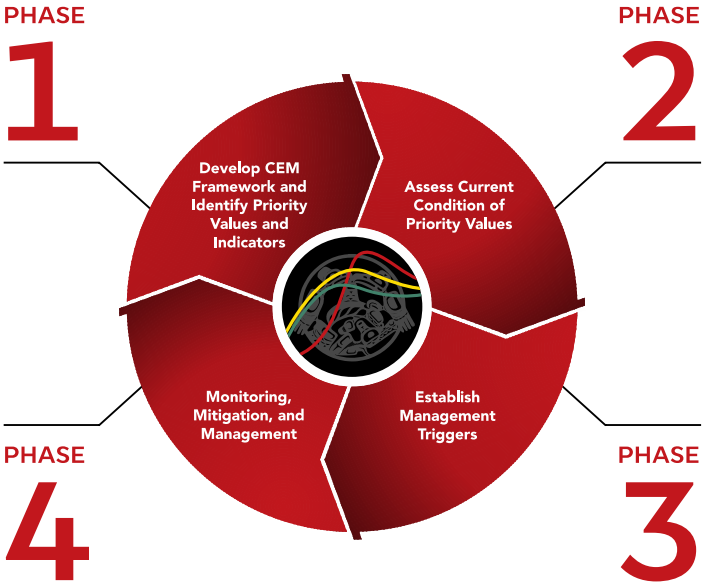

Figure 4: Phases in the Metlakatla Cumulative Effects Management Program. Adapted from the work of the Metlakatla Stewardship Society (2019)

3.3.2. Previous Metlakatla CEM Health Research Overview

In 2015, the Metlakatla First Nation identified Chronic Health Conditions (i.e., health conditions that persist in time or are recurring) and Access to Health Services (i.e., the timely, high-quality, and appropriate delivery of health care) as priority values under the health pillar in the Metlakatla CEM Program. The rationale for selecting the priority health values is shown in Table 2.

Table 2: Selection rationale for health values in the Metlakatla CEM Program

PRIORITY HEALTH VALUE	RATIONALE FOR SELECTION
Chronic Health Conditions	• Important for understanding Metlakatla's physical, mental, and spiritual health outcomes • Chronic health conditions can have far-reaching consequences beyond the illness themselves
Access to Health Services	• Important factor for reducing health impacts from chronic diseases such as diabetes, heart disease and mental health • Concerns about effects of growing population on primary health care services in Prince Rupert • Major projects contribute to pressures on primary health care services

Diabetes and hypertension prevalence were identified as two condition indicators for the Chronic Health Conditions value. ACSC was chosen as the condition indicator for the Access to Health Services value. The indicators, their unit, and description and rationale are detailed in Tables 3 and 4. The Metlakatla First Nation then developed and administered three iterations of the MMC (Metlakatla Membership Census) in 2015, 2016, and 2017 to collect consistent socio-economic data on Metlakatla members aged 15 and older living in the traditional territory. All iterations of the MMC asked questions related to general health (physical, mental, and emotional health), diabetes prevalence, hypertension prevalence, health concerns, and barriers to accessing health services. The 2015 MMC also attempted to collect baseline data for the ACSC indicator but determined that this information would be more accurate if collected from administrative health data.

Table 3: 2015 Chronic Health Conditions indicators

CONDITION INDICATORS	UNIT	DESCRIPTION / RATIONALE
Diabetes (Type 2) Prevalence	Percentage of members with Type 2 diabetes	Prevalence is the percentage of the population at a given time that has diabetes. Incidence is the number of new cases of diabetes, typically in a year. Both are important indicators to track the efficacy of health initiatives and the allocation of health resources.
Hypertension Prevalence	Percentage of members with hypertension	As above, except with regards to hypertension. This indicator does not include individuals diagnosed with hypertension during pregnancy.

Diabetes and hypertension prevalence have been determined as good overall condition indicators for physical health; however, these indicators tend to be 'lag' indicators. Through initial data collection efforts for these indicators, the CEM Program identified the need for 'lead' indicators that are more responsive to current and future change. 'Lag' indicators (condition indicators) inform about the condition of a value, whereas lead indicators (stressor indicators) inform about the drivers of the condition (Shandro & Jokinen, 2018). In other words, condition indicators help track the overall status of a value, whereas stressor indicators measure the underlying factors that exert pressure on the condition of a value (i.e., they capture the effect of specific activities on a value) (Metlakatla Stewardship Society, 2019). For example, diabetes prevalence can be considered a condition indicator as it informs about a person's health condition, and diet can be considered a stressor indicator as it can lead to or prevent diabetes to some extent. Stressor indicators are necessary to identify action areas that can be addressed early to avert chronic health conditions from developing (Shandro & Jokinen, 2018). Both types of indicators are essential to the CEM Program as they provide an overview of the community's health landscape (Metlakatla Stewardship Society, 2019).

Table 4: 2015 Access to Health Services indicator

CONDITION INDICATOR	UNIT	DESCRIPTION / RATIONALE
Ambulatory Care Sensitive Conditions (ACSC)	ACSC per 100,000 in Prince Rupert younger than 75 years old	ACSC is a measure of the degree to which chronic and reoccurring medical conditions are treated through traditional and/or primary care, thereby preventing the need for treatment within a hospital. Chronic and reoccurring medical conditions include Grand mal status and other epileptic convulsions, chronic obstructive pulmonary disease, asthma, heart failure and pulmonary edema, hypertension and angina, and diabetes. A low rate can be interpreted as people's primary health care needs being adequately addressed, and a higher rate is presumed to reflect problems in accessing primary healthcare.

The indicator selected as a condition indicator for Access to Health Services in 2015 was ACSC. The indicator measures the extent to which chronic illnesses are being treated in emergency care instead of being treated in primary care services (Compass Resource Management Ltd., 2015a). However, as previously determined by the CEM Program and confirmed through this research, using ACSC as a condition indicator for Access to Health Services is not recommended

because this indicator presents many limitations. For instance, ACSC data is limited to Health Service Delivery Areas (HSDA), in this case to the Northwest HSDA (Compass Resource Management Ltd., 2015a). In an HSDA, ACSC values are not reported by ethnicity, making it difficult to determine if the ACSC values for the Northwest HSDA are representative of the ACSC values for Prince Rupert and, more specifically, the Metlakatla population (Compass Resource Management Ltd., 2015a). Consequently, regional data is used to represent the community and fails to describe the specific pathways and impacts affecting Metlakatla and other local communities that are each facing particular challenges (Shandro & Jokinen, 2018). ACSC also presents clerical limitations; the code assigned to the visit may not be representative of the health issue (Compass Resource Management Ltd., 2015a). In addition, accessing data for this indicator is challenging as it must be obtained through the HSDA rather than through self-reported survey data, such as through the MMC.

Detailed information about previous health research conducted through the CEM Program can be found in the Access to Health Services Indicator Guide Sheet (Compass Resource Management Ltd., 2015a) and the Diabetes and Hypertension Prevalence Indicator Guide Sheet (Compass Resource Management Ltd., 2015b).

Chapter 4. Research Methodology

In 2020, the CEM health research project team began revising and developing indicators for the Chronic Health Conditions and Access to Health Services values of the CEM Program. The research objectives and research steps are detailed below.

4.1. Current CEM Health Research Objectives

The objectives of the CEM health indicators research project are to:

- Validate priority health values (Chronic Health Conditions and Access to Health Services) and condition indicators for Chronic Health Conditions
- Identify or revise stressor indicator(s) for Chronic Health Conditions
- Identify or revise condition indicator(s) and barriers for Access to Health Services

4.2. Research Process

The research steps included reviewing relevant academic literature, health reports, and CEM Program findings, as well as conducting focus groups with Metlakatla staff and members, and engaging with subject-matter experts through interviews. The findings were used to refine the health influence diagram, identify and confirm health values and indicators, and design survey questions for the 2020 MMC. The research steps are illustrated in Figure 5 and summarized below.

Figure 5: Research steps taken in the 2020 health indicators research project

4.2.1. Step 1: Literature Review and Exploratory Interviews

The first step in identifying indicators was to conduct a literature review and exploratory interviews with key informants in June and July 2020. The research was grounded in a review of previous reports and findings from the Metlakatla CEM Program. Literature on health impact assessments, Indigenous health, and community-based health research was also examined, with a focus on the adverse health effects of development. The literature review identified key health challenges faced by Indigenous peoples and best practices for health indicator identification, selection, and use. Exploratory interviews with health experts from the Yukon Government and B.C. Northern Health Authority also provided context and information used in the development of indicators. Information from the literature review, past health-related work from the CEM Program, and key informants was used to revise the Health Influence Diagram. The latter and its description can be found in Appendix A.

4.2.2. Step 2: Indicator Identification

After completing the literature review, a list of potential health indicators was compiled in August 2020. Hundreds of indicators are available to measure health; however, this list focused on indicators that best fit the needs of the Metlakatla First Nation in the context of the Metlakatla CEM Program. The CEM Program has outlined four criteria to identify and select indicators, which were adapted from the B.C. Environmental Assessment Office's (2013) *Guidelines for the Selection of Valued Components and Assessment of Potential Effect* (Metlakatla Stewardship Society, 2019). The criteria are:

- **Accuracy**: the indicator accurately reflects changes in the value and is appropriate to the spatial scale of the value.
- **Practicality**: the indicator is feasible to monitor and unambiguous for users.
- **Sensitivity**: the indicator is sensitive to development and possible mitigation efforts.
- **Relevance**: the indicator can inform the work of Metlakatla Departments.

As previously mentioned, the CEM Program has selected diabetes and hypertension prevalence as condition indicators for the Chronic Health Conditions value. Thus, stressor indicators should reflect changes in these condition indicators. As for Access to Health Services, the selected condition indicator should reflect changes in the value itself. An additional criterion to consider during the health indicator selection process is the data collection method. It can be

difficult to obtain data specific to the Metlakatla First Nation from Health Authorities, so some health data to date has been gathered through the MMC. The CEM Program aims to collect most, if not all, of its socioeconomic data through the MMC. Thus, data compatibility with survey data collection methods is an important criterion for evaluating candidate health indicators.

In the list of potential indicators, indicators were categorized into themes and sub-themes (Appendix B). Themes include physical health, behavioural health, mental, emotional, and spiritual health, and access to health services. From a list of approximately sixty indicators, a shortlist of twenty indicators (roughly one for each sub-theme) was created (Appendix C). Approximately ten indicators were drawn from this shortlist and discussed during focus groups and interviews, and used to initiate discussion around health indicators for Metlakatla (Appendix C – see indicators highlighted in blue).

4.2.3. Step 3: Focus Groups with Metlakatla Staff and Members

Focus groups are open-ended small-group discussions guided by a facilitator and sometimes a moderator. Three focus groups were conducted between September and October 2020. Focus Group 1 was conducted with Metlakatla staff, Focus Group 2 with Metlakatla members (non-staff), and Focus Group 3 with Metlakatla staff and members who had participated in the previous two focus groups. The goals of the focus groups were to elicit information on health issues encountered by Metlakatla staff and members, as well as identify and select indicators for each health priority value. More details about the focus group methodology can be found in the *Summary Report of Health Focus Groups (2021)*.

4.2.4. Step 4: Interviews with Health Experts

Group and individual interviews were conducted with health experts from B.C. Northern Health Authority in October 2020 to revise the methodology for collecting data on health indicators, discuss the indicators identified with Metlakatla members and staff and explore metrics for the selected indicators. More details about the interview methodology can be found in the *Summary Report of Health Interviews (2021).*

4.2.5. Step 5: Designing MMC Questions

Next, MMC questions were designed based on findings from the literature review, focus groups, and interviews. The MMC project team reviewed the proposed census questions before incorporating them into the census. The 2020 MMC included questions on general health in addition to questions related to the selected indicators (see Appendix D for the 2020 MMC health questions).

4.2.6. Step 6: 2020 MMC Data Collection and Analysis

The 2020 MMC was administered from November 9 to December 7, 2020. The target population for the MMC was a reported 321 members understood to be living in Metlakatla Territory aged 15 years and older, primarily in Metlakatla Village or Prince Rupert. The response rate for the 2020 MMC was 61.2%. After survey responses were collected, responses were entered, anonymized, and cleaned. The main data results from the health section of the MMC were provided to the health indicator research project team for interpretation and to support the findings in this report. Relevant results are presented in this report.

4.2.7. Step 7: Key Findings Analysis from Focus Groups and Interviews

The key findings from the focus group and interview transcriptions were analyzed in January and February 2021. After transcribing the recordings, general themes from the discussion were identified through a reflexive thematic analysis using a deductive approach. Those included: Nutrition/Food; Cultural, Social, Historical, Land and Water Connectedness; Access to Health Services and Traditional Medicines; Chronic Conditions and Mental Health; Trauma; Research and Communication with Metlakatla (i.e., health influence diagram and holistic thinking); Research Methods and Metrics; and Other Relevant Topics. Sections that were relevant to the research objectives were retained and summarized in this paper. More information regarding other findings can be found in the *Summary Report of Health Focus Groups (2021)* and *Summary Report of Health Interviews (2021)*.

4.2.8. Step 8: Report Writing

Results and recommendations from this research project were summarized in the *CEM Health Indicators Final Report* and introduced to the CEM Advisory Committee in Fall 2021.

4.2.9. Step 9: Presentation to Metlakatla Governing Council

The findings from this research will be presented to the Metlakatla Governing Council for approval in the CEM Program in 2022.

Chapter 5. Research Findings

Chapter 5 presents the CEM health research findings intended to validate priority health values and identify or revise condition and stressor indicators for each value. The findings are divided into two main sections: Chronic Health Conditions and Access to Health Services.

5.1. Chronic Health Conditions

The Chronic Health Conditions findings section offers a brief background on chronic health conditions and then discusses results specific to two types of indicators: condition indicators and stressor indicators. The following information is presented for each section on indicators: stressor/condition indicator background, indicator validation/identification, indicator limitations, and census results regarding the indicator. However, Metlakatla Membership Census data is confidential to the Metlakatla First Nation. Therefore, census results have been described qualitatively in this report.

5.1.1. Background on Chronic Health Conditions

Chronic health conditions are health conditions that persist in time or are recurring. Chronic conditions cannot be prevented by vaccines or cured by medication and are major causes of admissions to hospitals, lifelong disabilities, and pre-mature death in Indigenous communities (Compass Resource Management Ltd., 2015b). The distal, intermediate, and proximal social determinants of health influence one's risk of developing chronic health conditions. Industrial activities, which affect the intermediate and proximal determinants, are intrinsically tied to the risk of developing chronic conditions (Westwood & Orenstein, 2016). This risk is affected by the duration and strength of each determinant (e.g., earning low income for many years will have a higher impact on one's health than receiving a medium income for several months) (Braveman & Gottlieb, 2014). As a result of the numerous interactions between health determinants over time, chronic conditions are more likely to develop in later adulthood (Braveman & Gottlieb, 2014).

Much research has been conducted on the relative contributions of health determinants on health outcomes. Understanding determinants' contributions can help inform decision-making regarding which health determinants should be targeted during health interventions or management actions. Research suggests that socioeconomic factors (e.g., housing, income, education, food security, etc.) contribute to 25-50% of health outcomes. Health behaviours (e.g., diet, exercise, etc.)

contribute to approximately 30% of health outcomes. Medical care (e.g., accessibility and quality) contributes to 10-25%, genetics to 15-20%, and the physical environmental (e.g., clean environment, well-designed cities, etc.) to 5-10% (Choi & Sonin, 2017; Park et al., 2015; PwC, 2018). In light of these findings, researchers emphasize the importance of looking at both upstream interventions (i.e., interventions targeting socioeconomic factors, medical access, and the physical environments) and downstream interventions (i.e., behavioural changes) simultaneously to improve an individual's and community's health in the long term and reduce health inequities. However, some researchers suggest that downstream interventions, like behavioural health promotion strategies, are inadequate for disadvantaged groups (Baum & Fisher, 2014; Kelly & Barker, 2016). These groups typically face a wide array of risk factors because their numerous life constraints (e.g., lack of social and economic resources) make it difficult for them to change their behaviours (Baum & Fisher, 2014). These findings informed the choice of indicators for Chronic Health Conditions.

Value Validation

The first objective of the CEM health indicators research project included validating priority health values. Chronic Health Conditions was confirmed by focus group participants and health experts as an important health value to assess and manage in the CEM Program.

5.1.2. Condition Indicators

Background on Condition Indicators

Chronic health conditions include diabetes, hypertension, obesity, cancer, cardiovascular and respiratory diseases (including asthma), and arthritis, among others (Government of Canada, 2019). Chronic conditions are usually diagnosed by general practitioners or health specialists.

Diabetes is an important indicator of individual health because it has far-reaching consequences beyond diabetes. Complications include heart disease and stroke, hypertension, vision problems, kidney failure, nerve damage (Compass Resource Management Ltd., 2015b) and cognitive complications (Ryan et al., 2016). Like diabetes, hypertension has numerous implications, including diabetes, cardiovascular issues, metabolic issues (Compass Resource Management Ltd., 2015b), and cancers (Government of Canada, 2015). Thus, diabetes and hypertension prevalence are essential to track because they are high-order indicators; managing these conditions may prevent the rise of other serious conditions. Diabetes and hypertension were

chosen for the CEM Program because of their estimated high prevalence among Metlakatla members (Compass Resource Management Ltd., 2015b).

Condition Indicators Validation

Part of the first objective of the CEM health indicators research project was to approve Chronic Health Conditions indicators. Diabetes and hypertension prevalence were validated by focus group participants as important physical health conditions to assess and manage in the community (Table 5). Cancer was suggested by focus group participants and health experts as the next most important chronic health condition to track over time.

Table 5: Chronic Health Conditions – Confirmed condition indicators, unit, description, and rationale

INDICATOR / UNIT	DESCRIPTION	RATIONALE
Diabetes (Type 2) Prevalence – Percentage of members with Type 2 diabetes	Prevalence is the percentage of the population at a given time that has diabetes. Incidence is the number of new cases of diabetes, typically in a year.	**COMMUNITY AND EXPERT INPUT** • Metlakatla members' feedback: Diabetes and hypertension are important health conditions to track for Metlakatla members. • Health experts' feedback: Diabetes and hypertension are important to track. • Literature findings: Indigenous peoples experience a disproportionate risk of developing diabetes and hypertension than other populations in Canada, making it an important issue to monitor (Harris et al., 2013; Rosella et al., 2020).
Hypertension Prevalence – Percentage of members with hypertension	As above, except with regards to hypertension. This indicator does not include individuals diagnosed with hypertension during pregnancy.	**CEM PROGRAM INDICATOR CRITERIA** • Accurate: Yes, captures the overall status of chronic health conditions and is appropriate to the population scale of the value. • Practical: Yes, can be tracked through self-reported data in the MMC. • Sensitive: No, not sensitive to development or mitigation efforts because diabetes and hypertension prevalence are influenced by numerous social determinants (Braveman & Gottlieb, 2014); symptoms develop slowly (National Institute of Diabetes and Digestive and Kidney Diseases, 2015); and they are irreversible health conditions. They should be tracked alongside stressor indicators. • Relevant: Yes, type 2 diabetes and hypertension continue to be priorities for Metlakatla health department; important for tracking the efficacy of health initiatives and the allocation of health resources.

Condition Indicators Limitations

As mentioned earlier, diabetes and hypertension are irreversible conditions (i.e., they cannot be cured). Thus, assessing diabetes and hypertension prevalence may help track the impact of industrial activities on Metlakatla members and the effectiveness of health interventions in the long term, but it cannot provide information on members' overall health in the short term. Additionally, diabetes and hypertension prevalence data represents diagnosed diabetes and hypertension; there may be undiagnosed cases of diabetes and hypertension because of limited healthcare capacity (Compass Resource Management Ltd., 2015b).

Condition Indicators Results

In the 2020 MMC, participants were asked, "Do you have type 2 diabetes?" with yes or no as possible answers. The sub-question was "If yes, did you find out from a doctor last year (i.e., in 2019)?" with yes or no as possible answers.

With regard to hypertension, participants were asked, "Do you have hypertension (also known as high blood pressure)?" with yes or no as possible answers. Sub-questions included "If yes, did you find out from a doctor last year (i.e., in 2019)?" and "If yes, was the high blood pressure related to pregnancy?" with yes or no as possible answers.

When comparing MMC census results from 2015, 2016, 2017, and 2020, diabetes and hypertension prevalence among Metlakatla members are slowly increasing over the years.

Metlakatla diabetes prevalence is slightly higher than the 2015 diabetes prevalence in Prince Rupert's local health area (BC Provincial Health Services Authority, 2021). When comparing at a larger scale, Metlakatla 2020 type 2 diabetes prevalence is similar to the 2021 Canadian average of type 2 and type 1 diabetes prevalence combined (Diabetes Canada, 2021), in which type 2 diabetes represents 90-95% of the cases (Halseth, 2019).

Metlakatla hypertension prevalence is considerably lower than the 2015 hypertension prevalence in Prince Rupert's local health area (BC Provincial Health Services Authority, 2021). Metlakatla 2020 hypertension prevalence is slightly lower than the 2016 Canadian national average (Canada Hypertension, 2016).

5.1.3. Stressor Indicators

Background on Stressor Indicators

Stressors indicators for chronic health conditions regularly focus on emotional health and behavioural health. Emotional health indicators can include current life satisfaction, sense of self-esteem, community cohesion, etc. (Auger, 2016; Buse et al., 2018). Behavioural health indicators can include diet, food security, physical exercise, sleep, sexual behaviour, as well as tobacco, alcohol, and drug consumption (Anderson et al., 2006; Buse et al., 2018). Targeting emotional health in health assessment and interventions is as important as targeting behavioural health (Aalhus et al., 2018). The indicator list created in September 2020 (Appendix B) includes the potential emotional and behavioural health indicators under consideration by the focus groups.

Information on measuring and collecting qualitative data for emotional and behavioural health indicators is limited. One possible way to obtain such data is through self-reported ratings (e.g., low/medium/high; poor/good/excellent, etc.) (Hartley, 2014). However, the data collected could be inaccurate depending on participants' trust in the research, as participants may not be willing to disclose personal information (Shandro & Jokinen, 2018). The accuracy of the data is also contingent on participants' self-awareness; yet assessments of what constitutes poor/good/excellent are often left to the participant's perception (Street & Epstein, 2008). Perceptions of feelings and emotions are also related to life phases (i.e., feelings vary according to age, employment situation, family situation, etc.) (Loppie Reading & Wein, 2009).

Stressor Indicator Identification: Mental, Emotional, and Spiritual Health

Four potential stressor indicators were presented for mental, emotional, and spiritual health during the focus groups with Metlakatla members and staff. Those included *Sense of Empowerment* (i.e., how much control people feel they have over their life), *Social and Cultural Connectedness* (i.e., how connected people feel to their community and culture), *Life Satisfaction* (i.e., how happy people are about their life and life forecast), and *Community Cohesion* (i.e., how the community values have changed). Participants highlighted that all stressor indicators were essential and interconnected.

Social and Cultural Connectedness is the indicator that most resonated with Metlakatla members and staff. According to focus group participants, culture has the potential to serve as a healing tool and eliminate many health issues. Bringing back culture can restore balance among spiritual, emotional, mental, and physical health for members, as cultural connections influence

how people socialize, exercise, eat, and conduct their daily lives. It also brings a sense of identity, which is fundamental to a healthy life for Metlakatla members. These findings were confirmed by the literature, which emphasized that cultural continuity is a protective factor for health and brings balance to all aspects of health, including physical, mental, emotional, and spiritual health (Auger, 2016; Oster et al., 2014). Additionally, social connections promote health equity through support systems (Peterson et al., 2020) and is a commonly used indicator in Indigenous health assessments (Blanchard & Emery, 2016; Reid et al., 2016; Reilly et al., 2008; Rountree & Smith, 2008). Participants suggested adding 'History,' 'Traditional Lands,' and 'Traditional Waters' to the Social and Cultural Connectedness indicator. During the group interview, health experts agreed that the indicator Social and Cultural Connectedness would provide essential information about Metlakatla members' health.

The stressor indicator selected for mental, emotional, and spiritual health is Social and Cultural Connectedness, which considers members' connectedness to Metlakatla culture, community, history, and traditional lands and waters (Table 6).

Table 6: Chronic Health Conditions – Confirmed stressor indicator, unit, description, and rationale

INDICATOR / UNITS	DESCRIPTION	RATIONALE
Social and Cultural Connectedness – Percentage of members who are moderately or very connected to Metlakatla • Culture (including language and cultural traditions, practices, and activities) • Community (all Metlakatla members*)	A high rate for this indicator can be interpreted as members having their mental, emotional, and spiritual health needs met, whereas a low rate is presumed to reflect issues in building cultural, social, historical, and territorial connections, with adverse effects on mental, emotional, and spiritual health and overall well-being.	**COMMUNITY AND EXPERT INPUT** • Metlakatla members' feedback: This indicator is critical for members' mental, emotional, and spiritual health. Being strongly connected to their culture gives members a sense of identity, belonging, empowerment, and self-esteem. Bringing back culture can restore balance among spiritual, emotional, mental, and physical health for members, as cultural connections influence how people socialize, exercise, eat, and conduct their daily lives. • Health experts' feedback: This indicator would provide essential information about Metlakatla members' health.

INDICATOR / UNITS	DESCRIPTION	RATIONALE
• History (including Tsimshian and Metlakatla identity, history, and knowledge) • Traditional Lands and Waters		• Literature findings: Cultural continuity is a protective factor for health (Auger, 2016; Oster et al., 2014). Community connection promotes health equity through support systems (Peterson et al., 2020) and is a commonly used indicator in Indigenous health assessments (Blanchard & Emery, 2016; Reid et al., 2016; Reilly et al., 2008; Rountree & Smith, 2008). **CEM PROGRAM INDICATOR CRITERIA** • Accurate: No, does not capture the overall status of chronic health conditions and should be tracked alongside condition indicators. • Practical: Yes, can be tracked through self-reported data in the MMC. • Sensitive: Yes. Development and other activities bring changes to the biophysical, socio-economic, and cultural environments of Indigenous communities (Hackett et al., 2018; Schrecker et al., 2018; Westwood & Orenstein, 2016), which can affect members' sense of social and cultural connectedness. Actions can be identified and implemented to improve members' sense of connectedness; the indicator is sensitive to mitigation efforts as it is based on members' regular reporting through the MMC. • Relevant: Yes, it is an essential indicator for members; it was identified as a priority for the Metlakatla First Nation.

*Including members living in Alaska, and elsewhere in Canada and the United States

Stressor Indicator Limitations

The indicator Social and Cultural Connectedness is complex and nuanced. The qualitative data collected may not accurately represent individual health in some cases, as interpretations of the words 'connected,' 'culture,' and 'community' and understandings of the relationship between each element might vary among Metlakatla members. Focus group participants warned the research team that, although "How connected do you feel to Metlakatla culture, community, history and traditional lands and waters?" is an essential question to ask, it would be a difficult one for members to answer. Inquiring about 'What is missing?' might reopen wounds among Metlakatla members. They will need to feel safe in the process. Researchers will need to gain people's trust to obtain honest answers. In addition, renewing and strengthening cultural continuity is a lengthy process whose effect on overall health and chronic conditions will only be perceived in the long term. As suggested by a participant, members should be informed that healing "will be a long haul." Hence, there may be a considerable time lag between assessing the indicator, building management actions, and seeing the results of management actions. Finally, all four elements (culture, community, history, and traditional lands and waters) are for now equally weighted, based on feedback from the focus groups. However, weights attributed to each element may vary over time. The CEM Program has yet to decide if the four units should be kept separate or weighted and summed into one number.

Stressor Indicator Results

In the 2020 MMC, four questions were asked regarding *Social and Cultural Connectedness,* they were: "Do you feel connected to your [element]?" Each question focused on one element of cultural and social connectedness, including:

- Culture (including language and cultural traditions, practices, and activities)
- Community (all Metlakatla members)
- History (including Tsimshian and Metlakatla identity, history, and knowledge)
- Traditional Lands and Waters

Participants could rate their answer on a scale of 0 to 4, where:

- 0 = Not relevant to my well-being
- 1 = Not at all connected
- 2 = Somewhat connected

- 3 = Moderately connected
- 4 = Very connected

Most respondents felt somewhat connected to Metlakatla culture, Metlakatla community, Metlakatla history, and Metlakatla lands and waters. The Cultural and Social Connectedness element that Metlakatla members felt most connected to was Traditional Lands and Waters.

The 2020 MMC results show that most members feel somewhat connected to all aspects of Metlakatla culture, whereas few members feel moderately and very connected to aspects of Metlakatla culture. Additionally, youth and adult respondents appear to feel less connected to aspects of Metlakatla culture than Elder respondents.

Stressor Indicator Identification: Behavioural Health

During focus groups with Metlakatla members and staff, three potential stressor indicators for behavioural health were presented: nutrition/food, physical activity, and substance use. Participants said that all were connected to their health. Although a lack of physical activity and alcoholism were identified as significant issues within the community, participants agreed that foods, especially traditional foods, were the most important aspect of behavioural health. The literature confirmed the clear connection between food and Indigenous well-being (First Nations Health Authority et al., 2013). One participant summarized that "nutrition is huge on our health, and traditional foods, and healthy, organic foods affect our health a lot." In 2015, members had already mentioned that the biggest concern for their children was "eating healthy and proper nutrition" (CEM Program, 2015, p. 13). Participants pointed out the difficulty of accessing traditional and other healthy foods due to a lack of financial means, transportation, and awareness about healthy eating, which are barriers listed here by importance.

During interviews, health experts mentioned several factors related to food and diet that could be considered in the CEM Program, including food, nutrition, eating competence, attitudes about food and eating, food acceptance skills, internal regulation skills (e.g., recognizing appetite and hunger), contextual food skills (e.g., ensuring there is food in storage space), food security, and food systems. Given that many other social determinants influence the development of chronic conditions, like diabetes, experts recommended that the focus be on food affordability rather than food intake because it is a higher-level indicator (i.e., looking at upstream causes of the problem). Diabetes cannot be linked to a single food; looking at the barriers, supporters, or solutions to obtaining food seems more relevant. Furthermore, evaluating the number of healthy meals per week

(our primary metric suggestion) is difficult—because healthy eating is a pattern, it is not defined by one meal—and requires a definition of healthy; yet what healthy foods mean may differ for each individual, culture, and Nation. Experts suggested inquiring about food security, which includes food affordability. A common question used by the Northern Health Authority is: 'Do you worry about running out of food before you have enough money to buy more?'

Stressor Indicator Limitations and Suggestions for Future Assessment

Food/nutrition/diet is a complex indicator, and there are countless metrics to assess it. Food intake is one avenue to collect data on food. However, food intake measures are challenging to conduct due to time and resources constraints and potential recall inaccuracies. Food recalls may be under- or over-estimated, and even when correctly estimated, recalls may present an inaccurate picture of the nutritional value of the foods eaten (B.C. Centre for Disease Control, 2019; Pérez-Escamilla & Segall-Corrêa, 2008). In addition, there seems to be little consensus on the most appropriate food intake metrics for an Indigenous community. For instance, research points out that diabetes-inducing foods in western diets include processed foods, very sweet and salty foods, and red meat (Schulze et al., 2003; Srour et al., 2020; Vang et al., 2008). Other works show that in Indigenous diets, high-carbohydrates might be the leading risk factor for diabetes (Feinman et al., 2015; Mark et al., 2016). Many researchers suggest investigating the overall diet rather than specific food items (Liese et al., 2009).

Another way to collect data on food is through food security indicators. There are numerous food security indicators, which consider food availability (i.e., production and distribution), food access (i.e., affordability, allocation, and cultural acceptability), food utilization (i.e., nutritional value, dietary diversity, food safety, food preparation and consumption), and the stability of all three variables (Aborisade & Bach, 2014; FAO, 2008). However, food security indicators do not always account for the frequency and duration of the insecurity experienced and do not systematically consider the use of traditional foods in Indigenous contexts (B.C. Centre for Disease Control, 2019). A high number of measurements for nutrition/food/diet are available, and the choice of the most accurate, practical, sensitive, and relevant indicator for the CEM Program is a complicated decision.

To guide the selection of a food security indicator, Figure 6 provides a conceptual representation of food security dimensions over time as well as food security barriers and promoters. However, this framework simplifies complex relationships. Notably, the importance of each food security dimension may vary in time for each community (e.g., 'cultural acceptability'

might be more important than the 'safe to consume' factor in an Indigenous context). The CEM Program will need to investigate these elements before selecting metrics that meet Metlakatla's needs and the CEM Program's purposes. Three key questions to consider are: What component(s) of food security do we intend to measure (e.g., food availability, food access, food utilization, or food stability)? At what point in the causal pathway (see Figure 6) does the measurement fall? At what scale do we need to measure food security (community, household (HH), individual)? These recommended questions were extracted from the work of Jones et al. (2013).

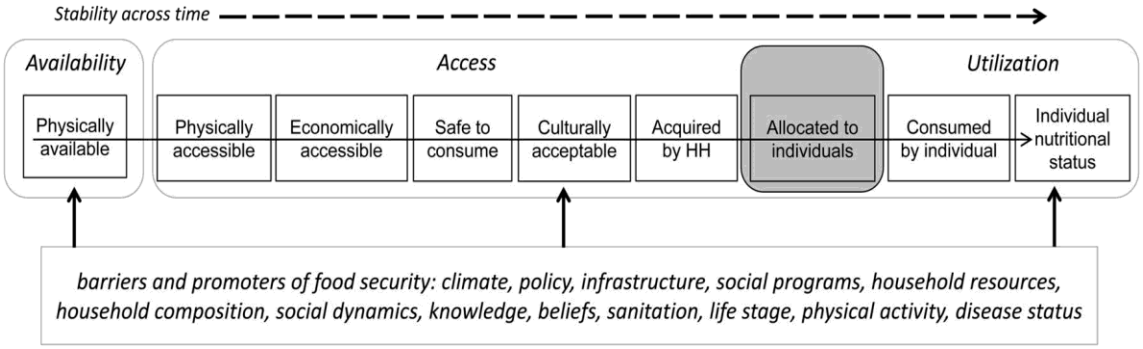

Figure 6: Conceptual framework of food security dimensions and food security barriers and promoters (Jones et al., 2013).

Another option to collect data on food would be to look at the barriers to food access rather than a single indicator, in the same way that the CEM Program collects data on barriers to health services. Last, food sovereignty indicators have not been explored during this project but could provide a lens through which food can be assessed. Food sovereignty embodies "the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems" (Forum for Food Sovereignty, 2007). Examples of indicators include one's *Ability to hunt* (Noreen et al., 2018) and one's *Capacity to cultivate edible plants at home* (García-Sempere et al., 2019), etc.

Stressor Indicator Results

The census question initially suggested to focus group participants regarding food was "How many healthy meals do you eat per week?" which was adapted from the 2015 census question: "On average, how often do you eat healthy foods?" Participants noted that not all members know what healthy is. It was also suggested that the number of strictly traditional meals be asked in a separate survey question. Some questions raised during the third focus group include:

- Are we really going to get to the baseline of what people are eating with such a question?

- Would it be relevant to ask about specific foods eaten (i.e., determining food intake patterns)?
- How truthful will answers be? The accuracy of responses is highly dependent on the participant's knowledge of healthy eating.
- How could we include an education piece?

We were not able to reach a consensus on a census question for food during focus groups.

Recommendations for a Food Indicator

A clear link exists between food and well-being. Assessing and mitigating development impacts on food security and food-related factors may reduce the development of chronic health conditions like diabetes. There are many ways to look at food and evaluate and improve members' food resources. However, this topic has not sufficiently been explored to determine which avenues the CEM Program should take and which food indicator is best for Metlakatla. Future work on Metlakatla's health values to explore food-related issues and interventions is recommended.

5.2. Access to Health Services

The findings section on Access to Health Services starts with a brief background on the Access to Health Services value, completed by a recapitulation of the value validation and condition indicator rejection processes, a summary on barriers identification, and census results on barriers. Then, the Access to Health Services section discusses results specific to the selected condition indicator, *Continuity of Care*, and is organized as follows: indicator background, indicator identification, indicator limitations, and census results on the indicator.

5.2.1. Background on Access to Health Services

Access to health services can be defined as the timely, high-quality, and appropriate delivery of health care (Cameron et al., 2014; Institute of Medicine, 1993). Access to health services results from complex and interconnected relationships dependent on economic, physical, and social resources. Indigenous peoples in Canada face more barriers to health care than their non-Indigenous counterparts (Loppie Reading & Wein, 2009; Peiris et al., 2008; Wardman et al., 2005).

The barriers to access health services are often structural. There can be a limited number of doctors, specialists, and nurses, which leads to a considerable lag between ambulatory care appointments (i.e., care administered without the need for an overnight stay in a medical facility).

Patients may receive fragmented and disconnected care (lack of continuity of care), which leads to inconsistencies in the advice and services provided. Health services' geographical location may limit patient access as there is little to no transportation to reach them, preventing a timely use of health services (Matthews, 2017; Wardman et al., 2005). People may have limited coverage, and health services' financial cost is a common impediment to accessing health (Wardman et al., 2005). Barriers also include the difficulty in understanding the health care system's mechanisms and identifying all the services available (Peiris et al., 2008; Wardman et al., 2005).

One of the most significant barriers to health services faced by Indigenous peoples in Canada is the lack of cultural safety. Culturally safe care takes into consideration Indigenous peoples' history and cultures and remains free of racism. A lack of cultural safety can be linked to poor communication, either due to language barriers or differing frames of reference that impede sharing and understanding of health information (Loppie Reading & Wein, 2009; Peiris et al., 2008). In addition, epistemic racism, the rejection of knowledge from a specific culture, contributes to the invisibility of Indigenous methods of healing in the health system by preventing traditional healers from practising their profession and dictating allocation of health resources (e.g., resources are directed to technology upgrades rather than sweat lodges) (Matthews, 2017). The absence of culturally safe care may lead people to avoid health services (Cameron et al., 2014; Loppie Reading & Wein, 2009; Peiris et al., 2008).

As a result of these numerous impediments, the perceived benefits of seeking and receiving health care might be lower than the perceived barriers to using the services (Champion & Skinner, 2008). Consequently, individuals may avoid seeking care or may not receive the sought care on time. Thus, general access to health care services for Indigenous peoples is often limited, and the multiple facets of the issue make it difficult to assess and monitor accurately.

Value Validation

As previously mentioned, the first objective of the CEM health indicators research project was to validate priority health values. Focus group participants and health experts confirmed Access to Health Services as an important health value to assess and manage in the CEM Program.

Condition Indicator Rejection

Objective three of the research focused on revising the Access to Health Services condition indicator (ACSC) and revising barriers to health care access. The research team decided not to move forward with the ACSC condition indicator because the data can only be obtained through

health administrative data, and the indicator may not accurately represent Metlakatla members' access to health. Consequently, the research focused on understanding barriers to access to health care for Metlakatla members, in order to identify a new condition indicator.

Barriers Identification

Barriers are elements that the CEM Program tracks but does not build management actions on. Barriers may become stressor or condition indicators in the future, which means that the CEM Program would then commit to building management actions that mitigate the impact of industrial development on the value assessed by the indicator. Barriers were identified through the literature review (see section 5.2.1 Background on Access to Health Services) as well as focus groups with Metlakatla staff and members, and interviews with health experts.

Focus group participants mentioned that very few services are available in Metlakatla Village and several important services are unavailable in Prince Rupert. There has been a consolidation of provincial services in regional centers; thus, many essential health services are moving away from Prince Rupert. Access to traditional medicines and healing (e.g., plants, safe cultural spaces, Elders, community gatherings, knowledge, etc.) is nonexistent or very limited. Both community members and health providers often overlook the importance of traditional medicine. Access to alternative medicine like massage therapists and chiropractors is difficult in Prince Rupert. There is a lack of information regarding health services; people do not know what services they may need, and which ones are available. Racialized discrimination (lack of cultural safety) highly discourages Metlakatla members from using the Prince Rupert Emergency Services. Transportation issues (lack of ferries) were mentioned several times during focus groups as the main barrier to health services, particularly for members living in Metlakatla Village.

During the group interview, health experts emphasized the importance of collecting data around the patient experience in health services. For example, experts suggested including an indicator or question concerning cultural safety. Health experts also recommended inquiring about emergency care in addition to routine and ongoing care.

Barriers Results

In the 2020 MMC, participants were asked, "In the past 12 months, did you ever experience any difficulties getting routine or ongoing care?" followed by "If yes, what type of difficulties did you experience?". Participants could identify barriers from the following list. Options added to the

2020 MMC (based on insights from focus groups and health experts and the literature review) are bolded:

- Do not have a personal/family doctor
- Wait times are too long
- Service or appointments unavailable
- Transportation problems
- Cost
- **Racialized discrimination when using health services**
- **Unaware of available services and where to find them**
- Unable to leave the house because of a health problem
- **No access to traditional medicine (including herbal remedies, spiritual therapies, assistance from Elders or healers, or other practices specific to Metlakatla)**
- Other (please specify): _____

The census question regarding barriers mainly assesses barriers to primary care. However, access to traditional medicine should not be regarded as primary care but as complementary care. If the CEM Program decides to focus on access to primary care, the 'access to traditional medicine' option should be removed from the census questions on barriers. Nonetheless, traditional medicine may be an essential component of health for Metlakatla members and could be investigated as a separate indicator or value.

Nearly a fifth of 2020 MMC respondents reported experiencing difficulties receiving routine or ongoing care in the past 12 months. This result is a slight increase from 2016. Approximately 10% of respondents in 2020 reported 'not applicable.' The top 3 barriers for receiving routine or ongoing care as reported by 2020 MMC respondents were:

1. Wait times are too long
2. Service or appointments unavailable
3. Transportation problems

The top 3 barriers mentioned in 2020 were the same as in 2015 and 2016.

5.2.2. Condition Indicator

Background on Continuity of Care

Continuity of care ensures that patients receive appropriate and ongoing care that allows for the prevention and early treatment of health issues. Some essential attributes of continuity of care include receiving ongoing and lasting care, developing a relationship between an individual patient and a care team, implementing a swift and complete information transfer and care team coordination, and meeting patients' changing needs (Hu et al., 2020).

The literature suggests that improving continuity of care ameliorates health outcomes and patient satisfaction (Cheng et al., 2011; Hu et al., 2020; Van Walraven et al., 2010), notably among patients with chronic health conditions (Health Quality Ontario, 2013). The presence of a primary care provider or family doctor (i.e., patients having a main general practitioner to refer to) as an indicator of health care access is commonly used in health assessments (Anderson et al., 2006; Buse et al., 2018; First Nations Centre, 2007; Loppie Reading & Wein, 2009).

Condition Indicator Identification

The identification of a condition indicator for Access to Health Services was based on findings from the literature and interviews with health experts. This indicator was not explored in depth with Metlakatla members and staff during focus groups.

Health experts recommended investigating continuity of primary care as health care patients can experience fragmented or inconsistent care. A question could be 'Do you have a primary care provider?' (technical language) or 'Are you seeing only one doctor?' (common language). Experts suggested inquiring about the role or position of members' primary care providers. The person overseeing patients' primary care is usually the most responsible clinician, like a doctor or a nurse practitioner, or someone of that rank within the health care system. It is sometimes considered to be anybody in a patient's health circle, such as a social worker or pharmacist, so it may be worth exploring who typically fills the primary care provider role for Metlakatla members.

Continuity of Care as measured by the presence of a primary care provider was selected as a potential condition indicator for the Access to Health Services value because having a primary care provider prevents patients from suffering from a fragmented or inconsistent service (Table 7).

Table 7: Access to Health Services – Confirmed condition indicator, unit, description, and rationale

INDICATOR / UNIT	DESCRIPTION	RATIONALE
Continuity of Care – Percentage of members who have a primary care provider	A high rate for this indicator can be interpreted as members receiving consistent care, hence having their primary health care needs adequately addressed. A low rate is presumed to reflect problems in obtaining access to primary health care.	**COMMUNITY AND EXPERT INPUT** • Metlakatla members' feedback: This indicator was not discussed in detail during focus groups with staff and members. We recommend reviewing this indicator with leadership as part of the value and indicator selection process. • Health experts' feedback: Having a primary care provider prevents patients from suffering from a fragmented or inconsistent service. It is presumed to improve health outcomes and patient satisfaction. The person overseeing patients' primary care should be a doctor, nurse practitioner, or nurse • Literature findings: Continuity of care is an essential component of quality of care (Alazri et al., 2007; Pollack et al., 2016). Improving continuity of care ameliorates health outcomes and patient satisfaction (Cheng et al., 2011; Hu et al., 2020; Van Walraven et al., 2010), notably among patients with chronic health conditions (Health Quality Ontario, 2013). **CEM PROGRAM INDICATOR CRITERIA** • Accurate: Yes, captures the overall status of members' access to health services and is appropriate to the population scale of the value. • Practical: Yes, can be tracked through self-reported data in the MMC. • Sensitive: No, not sensitive to development or mitigation efforts as the availability of primary care providers depends on health care programming. However, the obtainability and use of care providers (see Appendix A for interpretation) may change due to development or mitigation efforts. • Relevant: To be confirmed with Metlakatla members and decision-makers.

Condition Indicator Limitations

Continuity of care is an essential component of quality of care (Alazri et al., 2007; Pollack et al., 2016) but presents challenges that may not be represented in the *presence of a primary care provider* metric. For instance, continuity of care is influenced by demographic factors (e.g., geographical location, mobility, etc.), factors related to patients and healthcare professionals (i.e., patient preferences), patient-healthcare professional relationship (i.e., trust), inter-professional factors (i.e., communication and coordination within the health organization), and other organizational factors (Alazri et al., 2007). Thus, having a primary care provider does not ensure flawless disease prevention, diagnosis, and treatment (Alazri et al., 2007; Pollack et al., 2016). Additionally, socioeconomic disparities endure even with equal continuity of care (Begley et al., 2011; Menec et al., 2005; Newacheck et al., 2003), which points to the importance of targeting populations and individuals with lower socioeconomic statuses for preventive care (Menec et al., 2005).

Condition Indicator Results

The question regarding members' continuity of care that was included in the census was:

1. Do you have a primary care provider, someone on your health team that is responsible for ensuring that you receive continuous care?

   Continuous care is concerned with the quality of care over time provided by health care professionals. It means that you are receiving the care that you need by accounting for patient satisfaction, interpersonal aspects of care and coordination of care.

a. If yes, what is the role of that person on your health team?

- Family doctor
- Nurse or nurse practitioner
- Social worker
- Pharmacist
- Traditional healer
- Community health worker
- Other (please specify): _____

Less than half of 2020 MMC respondents reported having a primary care provider, approximately one third reported not having a primary care provider, and approximately one third reported 'not applicable.' Further investigation may be needed to understand why respondents reported 'not applicable.'

In a follow-up question, the census questionnaire asked about the role of the primary care provider on their health team. In our current understanding of the role of a primary care provider, that person should be a doctor, nurse practitioner, or nurse. Census results confirm that 92% of these providers are doctors, nurse practitioners, or nurses among participants who have a primary care provider. Therefore, primary care providers' status may not need to be explored in the next iterations of the census.

5.3. Research Findings Summary

The findings achieved the three research goals. Regarding the first objective, both priority values (Chronic Health Conditions and Access to Health Services) were validated, and condition indicators for Chronic Health Conditions were approved (diabetes and hypertension prevalence). With respect to the second objective, two new stressor indicators were identified (Social and Cultural Connectedness and a food-related indicator). Regarding the third objective, the Access to Health Services condition indicator was invalidated (ACSC), a new condition indicator was identified (continuity of care), and barriers were refined.

Chapter 6. Recommendations

The report presents seven recommendations for the Health Pillar of the CEM Program. They are based on the literature review, the analysis of findings from focus groups with Metlakatla staff and members and interviews with health experts, and the analysis of the results from the 2020 MMC. The findings and recommendations are provided for Metlakatla decision-makers to address health issues in the Metlakatla community. They will be presented to Chief and Council in 2022 and approval will be requested to move forward with data collection and setting of management triggers for these values and indicators.

Additionally, many of the recommendations presented in the *Access to Health Services Indicator Guide Sheet* (2015a) and the *Diabetes and Hypertension Prevalence Indicator Guide Sheet* (2015b) under Potential Management Strategies (p.9 and p.10, respectively), prepared by Compass Resource Management Ltd. for the CEM Program in 2015, are still valid today.

6.1. Recommendations for the CEM Program

6.1.1. Diabetes and hypertension prevalence should be kept as condition indicators for the Chronic Health Condition value of the CEM Program

Diabetes and hypertension are still considered important chronic conditions for the Metlakatla community. Therefore, the Metlakatla CEM Program should keep diabetes and hypertension prevalence as condition indicators for the Chronic Health Condition value and continue to track these indicators among Metlakatla members through the MMC every five years. These condition indicators should be tracked alongside key stressor indicators that may respond more quickly to changes in Metlakatla Territory and mitigation efforts.

6.1.2. Social and Cultural Connectedness should be added as a stressor indicator for the Chronic Health Conditions value of the CEM Program

Social and Cultural Connectedness, which considers members' connectedness to Metlakatla Culture (including language and cultural traditions, practices, and activities), Community (all Metlakatla members), History (including Tsimshian and Metlakatla identity, history, and knowledge), and Traditional Lands and Waters was chosen by Metlakatla focus group

participants as an important stressor indicator for the Chronic Health Conditions value. Social, cultural, and land connectedness are also highly recognized in the literature as essential health indicators for Indigenous Nations (Blanchard & Emery, 2016; Buse et al., 2018; Reid et al., 2016; Reilly et al., 2008; Rountree & Smith, 2008). It is recommended that Social and Cultural Connectedness be used as a stressor indicator for the Chronic Health Conditions Value of the CEM Program and be assessed through the MMC every two years. The Social and Cultural Connectedness has four units of measurements (Culture, Community, History, Traditional Lands and Waters), which are equally weighted. Further investigation may be needed to verify if these elements should remain equally weighted and if they should be summed or kept separate.

6.1.3. A food-related indicator should be added as a stressor indicator for the Chronic Health Conditions value of the CEM Program

A clear link exists between food and well-being (First Nations Health Authority et al., 2013). Foods, healthy foods, and traditional foods were selected by Metlakatla focus group participants as one of the most critical aspects of their health. Assessing and mitigating impacts on foods may reduce the development of chronic health conditions such as diabetes. No specific food-related metric has yet been determined for the CEM Program. There are many ways to look at food and assess and improve members' food resources. However, the research team has not sufficiently explored this topic to determine which avenues the CEM Program should take and which food-related indicator is best for Metlakatla. Future work is recommended on health values to explore food-related issues and interventions and further investigate food indicators and metrics.

6.1.4. Remove Ambulatory Care Sensitive Condition as a condition indicator for Access to Health Services, but continue to track the barriers to health services as part of the Access to Health Services value

Access to health services is the timely, high-quality, and appropriate delivery of health care (Cameron et al., 2014; Institute of Medicine, 1993). Using ACSC as an indicator is inappropriate for the CEM Program as data to measure this indicator is difficult to obtain and may not accurately represent Metlakatla members' access to health. However, tracking the barriers to health services helps identify the cause of the difficulties met when seeking health care. Census results suggest that access to routine and ongoing health care was difficult for nearly a fifth of 2020 MMC respondents. The top three barriers were long wait times, service appointments unavailable, and transportations

problems. The CEM Program should continue to track the difficulty of accessing health services and related barriers through the MMC every two years.

6.1.5. Continuity of Care should be added as a condition indicator for the Access to Health Services value

The CEM Program could consider using Continuity of Care—measured through the presence of a primary care provider, who can be a doctor, nurse practitioner, or nurse—as a condition indicator for the Access to Health Services value. This indicator could be assessed every five years. If individuals have a primary care provider, they have someone on their health team responsible for ensuring that they receive continuous care. Thus, the presence of a primary care provider is an indicator of continuous care and ensures high-quality service. 2020 MMC results suggest that less than half of Metlakatla respondents have a primary care provider. The primary care provider is a family doctor for over 90% of these respondents.

6.1.6. Consider investigating the importance of traditional medicine and members' access to traditional medicine

Traditional medicine (including herbal remedies, spiritual therapies, assistance from Elders or healers, or other practices specific to Metlakatla) is complementary to primary care. If the CEM Program decides to focus solely on access to primary care, the 'access to traditional medicine' option should be removed from the census question on barriers to health services. Nonetheless, access to traditional medicine is an important component of health for Metlakatla members and could be investigated as a separate indicator or value. As a focus group participant mentioned, "Our traditional medicines have a huge impact on our physical, mental, and emotional condition. It's often overlooked […]. I tried to find someone to help with more traditional medicines, and that was impossible to find."

6.1.7. Intergenerational trauma should be incorporated into the CEM Program

Colonization and its legacy have weakened Indigenous peoples' ties to their culture, community, history, environment, values, and identities (Methot, 2019). Intergenerational colonial trauma affects all aspects of health, including physical, mental, emotional, and spiritual health (Methot, 2019). When assessing and managing chronic conditions, health behaviours, and other health agents, we are treating the symptoms of a Nation's illness. When assessing and managing

healing from historical trauma, we are treating the root of the issue (Methot, 2019). The influence of intergenerational trauma on Metlakatla members' health and the community's health was mentioned by Metlakatla members and staff in several instances during focus groups. Participants indicated that trauma is the biggest issue affecting the community, impacting every individual. Metlakatla members and staff also discussed the lack of healing support and capacity.

Intergenerational trauma and its impacts should be incorporated into the CEM Program. As an overarching issue, intergenerational trauma could be considered and addressed through each pillar of the Program, or it could be an area for specific management actions under the Health Pillar. Focus group participants suggested some actions for community healing: building a longhouse, which would serve as a safe cultural space for all Metlakatla members (a space where people can gather with their family, bond with their ancestors, connect to their spirituality, and practice their culture); increasing access to traditional healers; creating space for cultural activities such as dancing or regalia making; and creating some form of programming around trauma (e.g., counselling, workshops, support groups, etc.) to raise the issue and begin the recovery process as a community. It was important to participants that such counselling be open to all in the community, potentially with different approaches for different age groups. Particular attention should be given to young people (under 24 years old). Members mentioned that therapists, counsellors, or Elders could lead this programming.

6.2. Indicators Recommendations Summary Tables

Tables 8 and 9 summarize findings on indicators considered for the Chronic Health Conditions and Access to Health Services values of the health pillar for the CEM Program. The tables include information about the indicator type, unit, description, rationale, limitations, and recommended action. indicators that should be continued or added are colour-coded in blue, indicators that have been considered or need further investigation are colour-coded in yellow, and indicators that should be discontinued are colour-coded in red.

The final health values and indicators recommended for the Metlakatla CEM Program are:

- Chronic Health Conditions
    - Diabetes (Type 2) Prevalence
    - Hypertension Prevalence
    - Social and Cultural Connectedness

    - Food-related indicator (metric to be determined through future work)
- Access to Health Services
    - Continuity of Care

Table 8: Chronic Health Conditions – Condition and stressor indicators, unit, description, rationale, limitations, and action

INDICATOR / UNIT	DESCRIPTION	RATIONALE		LIMITATIONS	ACTION
CONDITION INDICATORS					
Diabetes (Type 2) Prevalence – Percentage of members with Type 2 diabetes	Prevalence is the percentage of the population at a given time that has diabetes.	**COMMUNITY AND EXPERT INPUT** 1. Metlakatla members' feedback: Diabetes is an important health condition to track for Metlakatla members. 2. Health experts' feedback: Diabetes is important to track. 3. Literature findings: Indigenous peoples experience a disproportionate risk of developing diabetes than other populations in Canada (Harris et al., 2013; Rosella et al., 2020), making it an important issue to monitor.	**CEM PROGRAM INDICATOR CRITERIA** 1. Accurate: Yes 2. Practical: Yes 3. Sensitive: No 4. Relevant: Yes	Lag indicator. Only represents diagnosed cases. Irreversible condition.	**Continue**
Hypertension Prevalence – Percentage of members with hypertension	As above, except with regards to hypertension. This indicator does not include individuals diagnosed with hypertension during pregnancy.	As above, except with regards to hypertension.		Lag indicator. Only represents diagnosed cases. Irreversible condition.	**Continue**
STRESSOR INDICATORS					
Food – More research needed	To be determined	Healthy foods, especially traditional foods, have been identified as a key element of members' mental, emotional, and spiritual health. There are multiple metrics possible to look at food. Food indicator(s) for Metlakatla could belong to any of the four food security dimensions: food availability (i.e., production and distribution), food access (i.e., affordability, allocation, and cultural acceptability), food utilization (i.e., nutritional value, dietary diversity, food safety, food preparation and consumption), and food stability (stability of all three variables). See report recommendations on food indicator selection.		Each metrics presents its own limitations. Further investigation is needed to determine the best food indicator for Chronic Health Conditions.	**Add - more research needed**

INDICATOR / UNIT	DESCRIPTION	RATIONALE		LIMITATIONS	ACTION
***Physical Activity** – See the Indicators List for possible metrics (Appendix B)	Not applicable	Physical activity (e.g., walking, dancing, harvesting, etc.) is one of the health behaviours that may help prevent chronic health conditions.		More research needed	Considered
***Substance Use** – See the Indicators List for possible metrics (Appendix B)	Not applicable	Limiting substance use is one of the health behaviours that may help prevent chronic health conditions.		More research needed	Considered
Social and Cultural Connectedness – Percentage of members who are moderately or very connected to Metlakatla 1. Culture (including language and cultural traditions, practices, and activities) 2. Community (all Metlakatla members) 3. History (including Tsimshian and Metlakatla identity, history, and knowledge) 4. Traditional Lands and Waters	A high rate for this indicator can be interpreted as members having their mental, emotional, and spiritual health needs met, whereas a low rate is presumed to reflect issues in building cultural, social, historical, and territorial connections, with adverse effects on mental, emotional, and spiritual health and overall well-being.	**COMMUNITY AND EXPERT INPUT** 1. Metlakatla members' feedback: Social and Cultural Connectedness is a key element of members' mental, emotional, and spiritual health. Being strongly connected to their culture gives members a sense of identity, belonging, empowerment, and self-esteem. Bringing back culture can restore balance among spiritual, emotional, mental, and physical health for members, as cultural connections influence how people eat, exercise, and conduct their daily lives. 2. Health experts' feedback: Social and Cultural Connectedness would provide essential information about Metlakatla members' health. 3. Literature findings: Cultural continuity is a protective factor for health (Auger, 2016; Oster et al., 2014). Community connections promote health equity through support systems (Peterson et al., 2020) and is a commonly used indicator in Indigenous health assessments (Blanchard & Emery, 2016; Reid et al., 2016; Reilly et al., 2008; Rountree & Smith, 2008).	**CEM PROGRAM INDICATOR CRITERIA** 1. Accurate: No 2. Practical: Yes 3. Sensitive: Yes 4. Relevant: Yes	Complex and nuanced indicator; interpretation may vary for each individual. Data collected may vary in time. Time lag in seeing the results of management strategies.	**Add**

INDICATOR / UNIT	DESCRIPTION	RATIONALE	LIMITATIONS	ACTION
***Sense of empowerment** – Percentage of members who report having a strong sense of empowerment and life control	Not applicable	Sense of empowerment indicates how much control one has over their life decisions. A sense of empowerment can stem from social, cultural, and lands and waters connectedness but also from education, employment, and other socioeconomic factors.	More research needed	Considered
***Current life satisfaction** – Percentage of members who report feeling satisfied and fulfilled about their current life	Not applicable	Current life satisfaction is a self-reported indicator of general well-being at a certain point in an individual's life.	More research needed	Considered

*Indicators presented to Metlakatla members and staff during focus groups

Table 9: Access to Health Services – Condition indicators, unit, description, rationale, limitations, and action

INDICATOR / UNIT	DESCRIPTION	RATIONALE	LIMITATIONS	ACTION
CONDITION INDICATORS				
Ambulatory Care Sensitive Conditions (ACSC) – ACSC per 100,000 people in Prince Rupert younger than 75 years old	A low rate can be interpreted as people's primary health care needs being adequately addressed, and a higher rate is presumed to reflect problems in accessing primary healthcare.	ACSC measures the degree to which chronic and reoccurring medical conditions are treated through traditional and/or primary care, thereby preventing the need for treatment within a hospital. Chronic and reoccurring medical conditions include grand mal status and other epileptic convulsions, chronic obstructive pulmonary disease, asthma, heart failure and pulmonary edema, angina, hypertension, and diabetes.	ACSC data in the Northwest HSDA may not be representative of the ACSC values. ACSC presents clerical limitations. Data collection is difficult and reliant on administrative health data.	Discontinue

INDICATOR / UNIT	DESCRIPTION	RATIONALE		LIMITATIONS	ACTION
Continuity of Care – Percentage of members who have a primary care provider	A high rate for this indicator can be interpreted as members receiving consistent care, hence having their primary health care needs adequately addressed. A low rate is presumed to reflect problems in obtaining access to primary health care.	**COMMUNITY AND EXPERT INPUT** 1. Metlakatla members' feedback: This indicator was not discussed in detail during focus groups with staff and members. We recommend reviewing this indicator with leadership as part of the value and indicator selection process. 2. Health experts' feedback: Having a primary care provider prevents patients from suffering from a fragmented or inconsistent service. It is presumed to improve health outcomes and patient satisfaction. The person overseeing patients' primary care should be a doctor, nurse practitioner, or nurse. 3. Literature findings: Continuity of care is an essential component of quality of care (Alazri et al., 2007; Pollack et al., 2016). Improving continuity of care ameliorates health outcomes and patient satisfaction (Cheng et al., 2011; Hu et al., 2020; Van Walraven et al., 2010), notably among patients with chronic health conditions (Health Quality Ontario, 2013).	**CEM PROGRAM INDICATOR CRITERIA** 1. Accurate: Yes 2. Practical: Yes 3. Sensitive: No 4. Relevant: To be confirmed	Continuity of care is influenced by a myriad of factors, and, as such, having a primary care provider does not ensure flawless disease prevention, diagnosis, and treatment.	**Add**

Chapter 7. Discussion, Limitations, and Conclusion

Chapter 7 provides a discussion of the study, including thoughts on Indigenous versus non-Indigenous visions of health, lessons from the research process, and implications of the research. I also discuss the limitations of the study, contextualize the work, and offer a conclusion on the research conducted.

7.1. Discussion

7.1.1. Indigenous Versus Non-Indigenous Visions of Health

There are important differences between Indigenous and Western visions of health. Many Indigenous peoples in Canada view health in a holistic way, where health is related to everything, and wellbeing stands at the intersection of the emotional, mental, physical, and spiritual aspects of one's life (Buse et al., 2018; First Nations Health Authority, 2021; Kryzanowski & McIntyre, 2011; Methot, 2019). In many First Nations' views, everything is one, meaning that everything is connected (Atleo, 2005; Methot, 2019). On the contrary, non-Indigenous peoples view individuals' aspects of life and health as disconnected (Methot, 2019). This perspective can lead non-Indigenous people to treat the symptoms of an illness rather than the root of the imbalance. I believe that Western people could learn from Indigenous peoples' holistic vision of life and health. It would allow us, non-Indigenous peoples, to understand that every action we take in any area of life (e.g., politics, economics, environmental, social, cultural) will, in the end, affect us. Any action we take will impact our wellbeing and that of others around us.

Furthermore, I consider that accepting and acknowledging the possible truths in various human perspectives, cultural values, and sources of knowledge would make our societies healthier. Western health science is quite advanced, but so is Indigenous health knowledge—a wisdom that has yet to be recognized. As phrased by Atleo (2005), "These visitors have made their gifts of science and technology evident and recognizable to all, while our gifts of relationality and *isaak* (respect for all life forms) have only now begun to emerge. Hopefully, in an increasingly fragmented world, these gifts can help us all to *tloo-qua-nah*" (p. 134). A simple interpretation of *tloo-qua-nah* is "to remember reality" (Atleo, 2005, p. 40). This statement leads me to conclude that, by understanding and remembering that everything is connected, non-Indigenous peoples and Indigenous peoples together could create much healthier societies.

7.1.2. Suggested Changes to the Research Methodology

If I were to conduct this research again, would I change the approach used? The simple answer is no. The process of, one, understanding the context via the literature; second, gathering First Nation members' thoughts, ideas, and insights for indicator selection; third, validating our theories through discussions with experts; and last, confirming our findings using many members' inputs via the census is one of the most collaborative approaches that could have been chosen for this research. The selected methodology meets the criteria outlined by Milne and Oberle (2005) on rigour in qualitative descriptive studies, encompassing authenticity (attention to the voices of participants and accurate portrayal of their thoughts), credibility (focus on capturing the emic perspective of participants), criticality (reflection on the decisions made during the research process), and integrity (reflection on the researchers' biases and probity). Although there might be ways to further reconcile the study process and findings with Indigenous practices, the CEM research team has made every effort possible—with the available resources—to gather Metlakatla members' knowledge and insights on their community's health in order to contribute to indicators developed by the community, for the community.

However, when reflecting on my project and potential missing elements, a few recommendations for the CEM Program come to mind. First, in future projects within the CEM Program, I highly encourage in-person engagement, which would not only allow researchers to build stronger connections with members sharing their knowledge but would also provide them with a deeper understanding of where participants' perspectives are situated in space and time. Considering the context in which our research took place (i.e., in the midst of the COVID-19 pandemic), virtual engagement was the most appropriate method of gathering input at this point in time.

Second, I would recommend the CEM Program foster collaboration between the researchers working within different pillars of the Program. Notably, students working under the health and cultural pillars could find synergies to build indicators that meet objectives for Health values and Food, Social, and Ceremonial activity values. The Program should also encourage collaboration with other Metlakatla departments to build a strong body of knowledge for Metlakatla and avoid potential research duplications. For instance, CEM health researchers could work closely with the Metlakatla's Health Department, Aquatic Resources Department, and Culture, Language and Heritage Department, which are working on food-related issues.

Third, the Program should ensure that, as recommended by the health experts interviewed, researchers follow a strength-based and resilience approach, one in which the study focuses on the assets of the community rather than the deficits (Gan & Ballantyne, 2016). For instance, in the health pillar, a community asset could be 'the number of traditional healers,' whereas a deficit would be 'the prevalence of cancers.' A strength-based approach would enable the CEM Program to build on resources, competencies, and solutions existing in the community.

Fourth, the CEM Program should take the time to reflect on the research tools it utilizes. For instance, in the first focus group (with Metlakatla staff), participants highlighted that the health influence diagram presented—the main visual tool for the discussion—was linear and atomistic. They suggested using a more circular, holistic, and cyclical concept to engage with Metlakatla members. Following these insights, we used the medicine wheel as the key communication aid during the second focus group (with Metlakatla members). Although the medicine wheel remains a Western conceptualization appropriating an Indigenous concept, participants engaged easily with it, connected with the topic at hand, and provided meaningful insights stemming from the medicine wheel. Therefore, I recommend the CEM Program to continuously evaluate its methods and tools and discuss possible changes with Metlakatla members. Reflective questions may include: can non-Indigenous peoples reconcile the tools through which they gather Traditional Knowledge with Indigenous values? Are there less colonial techniques to collect qualitative data? Are there Indigenous methods to gather quantitative information about an entire community? Are there visuals instruments that would promote a better understanding of the research among community members and encourage more meaningful connections between participants and researchers? Those are reflections that I have not explored in depth but recommend the CEM Program to consider. With regards to the health pillar, if future researchers are to employ the medicine wheel again, one study participant suggested using the medicine wheel concept developed by the University of Victoria and Indigenous researchers, which is based on the Haida model and might be more culturally relevant to Metlakatla members than the commonly used black, yellow, red, and white medicine wheel. Other visual instruments should also be examined. To summarize, research tools and visuals must be carefully selected to increase engagement from participants, and foster meaningful relationships between participants and researchers.

Fifth, the CEM Program could use a backcasting approach when building management actions for the health pillar. Following such an approach, researchers would inquire about Metlakatla members' vision for their community and consequently build actions ensuring that this desired future becomes a reality. The CEM Program may already be applying this approach when

building management actions for each priority value; I would encourage also utilizing it at the 'pillar level.' This suggestion implies focusing on what a healthy community would resemble rather than concentrating on what a community with few chronic conditions and good access to health care would look like.

More context and details regarding potential changes to the health research approach can be found in the *Summary Report of Health Focus Groups (2021)*.

7.1.3. Implications

All three research objectives were met; the CEM Program can now continue to expand the work completed under the health pillar. This section elaborates on the implications of the research findings for the CEM Program, the larger body of literature, and health practitioners.

Implications for the CEM Program – Elaborating on the Findings

This research advanced the work of the CEM Program within the health pillar. Developing indicators will allow the Program to track and assess the conditions of the priority health values before creating management actions that will help mitigate the impact of industrial development on the conditions of the values (measured through conditions indicators) and the underlying factors affecting the conditions of the values (measured through stressor indicators). This research also identified potential future indicators (i.e., the new barriers to Access to Health Services could become indicators) and future areas of work (i.e., Intergenerational trauma and healing).

Implications for the Larger Body of Literature – Replicating the Process

The essential part of this study is the process followed to develop Indigenous-based indicators. I hope that it could be replicated by any Indigenous Nation across Canada who wishes to identify appropriate indicators for their members. Other researchers may also employ this process to build community-based indicators in collaboration with Indigenous peoples.

Implications for Health Practitioners and Health Assessments – Adopting the Findings

The findings of this work (the condition and stressor indicators developed) could be employed today by other Indigenous Nations. For instance, if a Nation wishes to use Indigenous-based indicators but lacks the means to create indicators using the research process that we followed, that Nation could adopt the indicators identified. Therefore, if appropriate, the indicators developed with Metlakatla could be used to benefit other Indigenous peoples.

Additionally, the indicators identified could be used in health assessments in non-Indigenous contexts. This suggestion stems from the idea that most humans have a connection to their community, culture, history, and geographical location; consequently, the Social and Cultural Connectedness indicator could give insights into people's wellbeing in non-Indigenous contexts. Notably, this indicator offers a different (non-Western) perspective on health, one that is holistic and may be applicable in various locations. Likewise, the importance of foods and traditional foods, or cultural foods, may be relevant to diverse communities and cultures worldwide.

However, I acknowledge that my findings are context-based (specific to that Nation and culture and shaped by the structural health challenges faced by the Metlakatla community) and place-based (relevant to that location). Therefore, the wider replicability suggested above is a hope I have rather than a statement I am making.

7.2. Limitations

The work in this paper represents an initial exploration of Metlakatla members' health concerns and priorities. The indicator preferences may not be definitive or representative of all members' values and priorities. Community health concerns and priorities may change as demographics, experiences, and context change. Participants' indicator preferences could be based on their initial instincts on what should be measured and kept track of. Indicator preferences could evolve with more information provided to participants on how development projects may potentially affect their health. Therefore, these results should only be used to initiate and facilitate discussion around health indicators for the Metlakatla community. The context in which the focus groups took place was specific to the CEM Program; hence, the findings should not be extrapolated or misinterpreted in other contexts. Finally, health is unique and can take different meanings for different individuals. The focus groups covered personal topics, and individuals spoke of their own experiences and knowledge and discussed their personal views on health. Thus, when applying these results, caution should be taken not to generalize about Metlakatla membership. Finally, this research was conducted during the COVID-19 pandemic, and the COVID-19 events may have influenced Metlakatla members' views on health.

7.3. Contextualization and Conclusion

The research took place in a changing context, one moving from a time during which Indigenous peoples were denigrated, denied, and annihilated, to one in which Indigenous

perspectives are valued on an equal footing with Western values and Indigenous rights are being respected—to some extent. Federal and provincial governments are making efforts to repair the harm done to Indigenous peoples and promote equal, healthy, and mutually beneficial relationships between Indigenous and non-Indigenous peoples. As a conclusion and opening for discussion, the following paragraphs link this work on Indigenous health to the broader context, including Canadian reconciliation and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Nation-wide efforts to answer the Truth and Reconciliation Commission of Canada Calls to Action are also highlighted.

7.3.1. Reconciliation

The Truth and and Reconciliation Commission of Canada (2015) defines Canadian reconciliation as:

> To the Commission, reconciliation is about establishing and maintaining a mutually respectful relationship between Aboriginal and non-Aboriginal peoples in this country. In order for that to happen, there has to be awareness of the past, acknowledgement of the harm that has been inflicted, atonement for the causes, and action to change behaviour. (p. 6)

The study contributes to reconciliation in three ways. First, the work acknowledges the harm inflicted on Indigenous peoples by explicitly linking colonization to Indigenous peoples' health and expressing the impacts of intergenerational trauma. Second, the research process intends to maintain a mutually respectful relationship between Aboriginal and non-Aboriginal peoples by encouraging collaboration between university academics and a First Nation and placing Indigenous perspectives at the center of the work. Third, this work is a first step to creating action to change behaviour, as the data collected from the indicators will serve to build management actions for the Metlakatla community.

7.3.2. UNDRIP

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) was adopted by the United Nations General Assembly in 2007; the UNDRIP Act (Bill C-15**)** came into force in Canada in 2021. The Act states that Canada will take all measures necessary to ensure the laws of this country are consistent with the Declaration, which presents forty-six articles detailing the rights of Indigenous peoples. My research contributes to answering three of the UNDRIP articles at the level of the Metlakatla First Nation.

Article 23 states that "Indigenous peoples have the right to be actively involved in developing and determining health […] and social programmes affecting them and, as far as possible, to administer such programmes through their own institutions" (United Nations, 2007, p. 18). Article 24 mentions that "Indigenous peoples have the right to their traditional medicines and to maintain their health practices […] and also have the right to access, without any discrimination, to all social and health services. Indigenous individuals have an equal right to the enjoyment of the highest attainable standard of physical and mental health" (United Nations, 2007, p. 18). Article 29 highlights that "States shall also take effective measures to ensure, as needed, that programmes for monitoring, maintaining and restoring the health of indigenous peoples, as developed and implemented by the peoples affected by such materials, are duly implemented" (United Nations, 2007, p. 21).

The research responds to these articles by involving Indigenous Peoples in developing and determining health (Article 23), by bringing up issues regarding Indigenous peoples' difficulties in accessing traditional medicine, quality care, and non-discriminatory services (Article 24), and by building actions or programs that seek to restore the health of Indigenous peoples, programs that will be implemented jointly by the CEM Program and the Metlakatla First Nation (Article 29).

7.3.3. Calls to Action

In 2015, the Truth and Reciliation Commission (2015) presented ninety-four Calls to Action aiming to advance Canadian reconciliation. Call 22 declares that:

> We call upon those who can effect change within the Canadian health-care system to recognize the value of Aboriginal healing practices and use them in the treatment of Aboriginal patients in collaboration with Aboriginal leaders and Elders, where requested by Aboriginal patients. (p. 3)

Work has been done to answer this Call: the Federal Government has provided funding to improve Indigenous health and access to health; Indigenous Healing practices are incrementally being addressed in Provinces and Territories; numerous preeminent medical organizations have made commitments to ensure and protect Indigenous Health and Healing; the Institute of Indigenous People's health created an Indigenous Peoples' Health Strategic Plan and started to implement diverse initiatives promoting Indigenous health and wellness (CBC News, 2022; Indigenous Watchdog, 2022).

7.3.4. Conclusion: Final Thoughts on Indigenous Health and Healing

With regards to the above-mentioned milestones at various levels of government in Canada, I am tempted to conclude that *there is hope*. Today, there is hope that Indigenous peoples will recover from intergenerational trauma. There is hope that Indigenous peoples will receive quality and culturally-sensitive care everywhere in Canada. There is hope that Indigenous peoples will regain power over their health and wellness practices. There is hope that Traditional Knowledge on healing and wellbeing will become available to all Indigenous peoples. There is hope that, in a few generations, Indigenous peoples will feel connected to their communities, culture, history, and traditional lands and water for the improvement of their wellbeing. There is hope that all Indigenous peoples will be in balance with their emotional, mental, physical, and spiritual health. There is hope that Indigenous individuals, families, communities, and Nations will soon be thriving on Turtle Island.

References

Aalhus, M., Oke, B., & Fumerton, R. (2018). *The social determinants of health impacts of resource extraction and development in rural and northern communities: A summary of impacts and promising practices for assessment and monitoring*. *6106*(January), 1–76. https://www.northernhealth.ca/sites/northern_health/files/services/office-health-resource-development/documents/impacts-promising-practices-assessment-monitoring.pdf

Aborisade, B., & Bach, C. (2014). Assessing the Pillars of Sustainable Food Security. *European International Journal of Science and Technology*, *3*(4), 117–125. www.eijst.org.uk

Alazri, M., Heywood, P., Neal, R. D., & Leese, B. (2007). Continuity of care: Literature review and implications. *Sultan Qaboos University Medical Journal*, *7*(3), 197–206. /pmc/articles/PMC3074883/

Amnesty International. (2016). *Out of Sight, Out of Mind*.

Anderson, M., Smylie, J., Anderson, I., Sinclair, R., & Crengle, S. (2006). *First Nations, Métis, and Inuit Health Indicators in Canada*. *March*, 1–38. http://www.medicine.uottawa.ca/SIM/data/Images/Aboriginal_health_indicators.pdf

Atleo, U. E. R. (2005). *Tsawalk: A Nuu-chah-nulth Worldview*. UBC Press.

Auger, M. D. (2016). Cultural continuity as a determinant of Indigenous peoples' health: A metasynthesis of qualitative research in Canada and the United States. *International Indigenous Policy Journal*, *7*(4). https://doi.org/10.18584/iipj.2016.7.4.3

B.C. Centre for Disease Control. (2019). *Food Security Indicators: Review of Literature*. BC Centre for Disease Control, Population & Public Health. http://www.bccdc.ca/our-services/service-areas/population-public-health

B.C. Environmental Assessment Office. (2013). Guidelines for the Selection of Valued Components and Assessment of Potential Effect. In *External Information Session, September 11, 2013* (Vol. 2013).

B.C. Ministry of Advanced Education and Skills Training. (2021). *British Columbia Major Projects Inventory Second Quarter 2021*. https://www2.gov.bc.ca/gov/content/employment-business/economic-development/industry/bc-major-projects-inventory

Baum, F., & Fisher, M. (2014). Why behavioural health promotion endures despite its failure to reduce health inequities. *Sociology of Health and Illness*, *36*(2), 213–225. https://doi.org/10.1111/1467-9566.12112

BC Provincial Health Services Authority. (2021). Prince Rupert Community Health Profile. In *Notes and Queries*. https://doi.org/10.1093/nq/s11-II.29.56-a

Begley, C. E., Basu, R., Lairson, D., Reynolds, T., Dubinsky, S., Newmark, M., Barnwell, F.,

Hauser, A., & Hesdorffer, D. (2011). Socioeconomic status, health care use, and outcomes: Persistence of disparities over time. *Epilepsia*, *52*(5), 957–964. https://doi.org/10.1111/j.1528-1167.2010.02968.x

Blanchard, C., & Emery, G. (2016). *Provincial Health Services Authority Indigenous Health*.

Braveman, P., & Gottlieb, L. (2014). The Social Determinants of Health: It's Time to Consider the Causes of the Causes. *Public Health Reports*, *129*(SUPPL. 2), 19–31. https://doi.org/10.1177/00333549141291s206

Buse, C., Cornisk, K., Parkes, M., Harder, H., Fumerton, R., Rasali, D., Oke, B., Loewen, D., & Aalhus, M. (2018). *05 Towards more robust and locally meaningful indicators for monitoring the social determinants of health related to resource development across Northern BC*. 1–127. https://www.northernhealth.ca/sites/northern_health/files/services/office-health-resource-development/documents/nh-unbc-indicators-report.pdf

Cameron, B. L., Carmargo Plazas, M. D. P., Salas, A. S., Bourque Bearskin, R. L., & Hungler, K. (2014). Understanding inequalities in access to health care services for aboriginal people: A call for nursing action. *Advances in Nursing Science*, *37*(3). https://doi.org/10.1097/ANS.0000000000000039

Canada Hypertension. (2016). *Hypertension in Canada 2016 Fact Sheet*. https://hypertension.ca/wp-content/uploads/2018/12/HTN-Fact-Sheet-2016_FINAL.pdf

CBC News. (2022, April 5). *Beyond 94* . https://newsinteractives.cbc.ca/longform-single/beyond-94??&cta=&cta=22

CEM Program. (2015). *Metlakatla Membership Census 2015 |Health Summary*.

Champion, V., & Skinner, C. (2008). The Health Belief Model. In Karen Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health Behavior and Health Education* (4th ed., pp. 45–66). Jossey-Bass.

Cheng, S. H., Hou, Y. F., & Chen, C. C. (2011). Does continuity of care matter in a health care system that lacks referral arrangements? *Health Policy and Planning*, *26*(2), 157–162. https://doi.org/10.1093/heapol/czq035

Choi, E., & Sonin, J. (2017). *Determinants of Health*. https://www.goinvo.com/vision/determinants-of-health/

Coleman, J. (2007). Emotional Health and Well-being. In John C. Coleman, John Coleman, Leo B. Hendry, & Marion Kloep (Eds.), *Adolescence and Health* (pp. 42–44). https://books.google.ca/books?hl=en&lr=&id=IKoWhg5co_IC&oi=fnd&pg=PA41&dq=definition+emotional+health&ots=OLmlf-X5kW&sig=KXk6DDhCUlk7df0Fp60LYBr5hBo&redir_esc=y#v=onepage&q=definition emotional health&f=false

Compass Resource Management Ltd. (2015a). *Access to Health Services Indicator Guide Sheet*. Unpublished report.

Compass Resource Management Ltd. (2015b). *Diabetes and Hypertension Prevalence Indicator Guide Sheet*. Unpublished report.

Denevan, W. M. (1992). *The Native population of the Americas in 1492* (W. M. Denevan (ed.); Second Rev). University of Wisconsin Press.

Diabetes Canada. (2021). *Diabetes in Canada: Backgrounder*. https://diabetes.ca/DiabetesCanadaWebsite/media/Advocacy-and-Policy/Backgrounder/2020_Backgrounder_Canada_English_FINAL.pdf

FAO. (2008). An Introduction to the Basic Concepts of Food Security. In *FAO Food Security Program*. file:///C:/Users/cleme/AppData/Local/Temp/al936e.pdf

Feinman, R. D., Pogozelski, W. K., Astrup, A., Bernstein, R. K., Fine, E. J., Westman, E. C., Accurso, A., Frassetto, L., Gower, B. A., McFarlane, S. I., Nielsen, J. V., Krarup, T., Saslow, L., Roth, K. S., Vernon, M. C., Volek, J. S., Wilshire, G. B., Dahlqvist, A., Sundberg, R., … Worm, N. (2015). Dietary carbohydrate restriction as the first approach in diabetes management: Critical review and evidence base. *Nutrition*, *31*(1), 1–13. https://doi.org/10.1016/j.nut.2014.06.011

First Nations Centre. (2007). *Understanding Health Indicators*. National Aboriginal Health Organization.

First Nations Health Authority. (2021). *First Nations Perspective on Health and Wellness*. https://www.fnha.ca/wellness/wellness-for-first-nations/first-nations-perspective-on-health-and-wellness

First Nations Health Authority, British Columbia Ministry of Health, & Health Canada. (2013). *A Path Forward: A Provincial Approach to Facilitate Regional and Local Planning and Action*. http://www.fnhc.ca/pdf/FNHA_MWSU.pdf

Forum for Food Sovereignty. (2007, February 27). *Declaration of Nyéléni* . Nyéléni Forum for Food Sovereignty. https://nyeleni.org/spip.php?article290

Gamu, J., Le Billon, P., & Spiegel, S. (2015). Extractive industries and poverty: A review of recent findings and linkage mechanisms. *Extractive Industries and Society*, *2*(1), 162–176. https://doi.org/10.1016/j.exis.2014.11.001

Gan, C., & Ballantyne, M. (2016). Brain injury family intervention for adolescents: A solution-focused approach. *NeuroRehabilitation*, *38*(3), 231–241. https://doi.org/10.3233/NRE-1601315

García-Sempere, A., Morales, H., Hidalgo, M., Ferguson, B. G., Rosset, P., & Nazar-Beutelspacher, A. (2019). Food Sovereignty in the city?: A methodological proposal for evaluating food sovereignty in urban settings. *Agroecology and Sustainable Food Systems*,

43(10), 1145–1173. https://doi.org/10.1080/21683565.2019.1578719

Government of Canada. (2015, April 9). *Chronic Disease Risk Factors*. https://www.canada.ca/en/public-health/services/chronic-diseases/chronic-disease-risk-factors.html

Government of Canada. (2019, January 14). *A-Z Chronic Diseases*. https://www.canada.ca/en/public-health/services/chronic-diseases/a-chronic-diseases.html

Gregory, R., Easterling, D., Kaechele, N., & Trousdale, W. (2016). Values-Based Measures of Impacts to Indigenous Health. *Risk Analysis*, *36*(8), 1581–1588. https://doi.org/10.1111/risa.12533

Hackett, C., Feeny, D., & Tompa, E. (2016). Canada's residential school system: Measuring the intergenerational impact of familial attendance on health and mental health outcomes. *Journal of Epidemiology and Community Health*, *70*(11), 1096–1105. https://doi.org/10.1136/jech-2016-207380

Hackett, P., Liu, J., & Noble, B. (2018). Human health, development legacies, and cumulative effects: environmental assessments of hydroelectric projects in the Nelson River watershed, Canada. *Impact Assessment and Project Appraisal*, *36*(5), 413–424. https://doi.org/10.1080/14615517.2018.1487504

Halseth, G. R. (2016). Cumulative Effects and Impacts: Introducing a Community Perspective. In M. P. Gillingham, G. R. Halseth, C. J. Johnson, & M. W. Parkes (Eds.), *The Integration Imperative: Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments* (pp. 83–117). Springer.

Halseth, R. (2019). The Prevalence of Type 2 Diabetes among First Nations and Considerations for Prevention. In *National Collaborating Centre for Aboriginal Health*. https://www.nccih.ca/34/Publication.nccih?pillar=7&search=diabetes

Hartley, J. (2014). Some thoughts on Likert-type scales. *International Journal of Clinical and Health Psychology*, *14*(1), 83–86. https://doi.org/10.1016/S1697-2600(14)70040-7

Health Quality Ontario. (2013). Continuity of care to optimize chronic disease management in the community setting: An evidence-based analysis. *Ontario Health Technology Assessment Series*, *13*(6), 1–41. http://www.hqontario.ca/en/mas/mas_ohtas_mn.html.

Hu, J., Wang, Y., & Li, X. (2020). Continuity of care in chronic diseases: A concept analysis by literature review. *Journal of Korean Academy of Nursing*, *50*(4), 513–522. https://doi.org/10.4040/jkan.20079

Indigenous Watchdog. (2022, April 4). *Call to Action # 22 - Indigenous Watchdog*. https://www.indigenouswatchdog.org/cta/call-to-action-22/

Institute of Medicine. (1993). *Access to Health Care in America* (P. D. Michael Millman (ed.)). The National Academies Press. https://doi.org/10.17226/2009

Johnson, C. J. (2016). Defining and Identifying Cumulative Environmental, Health, and Cumulative Impacts. In M. P. Gillingham, G. R. Halseth, C. J. Johnson, & M. W. Parkes (Eds.), *The Integration Imperative: Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments* (pp. 21–45). Springer. https://doi.org/10.7591/cornell/9781501707599.003.0002

Jones, A. D., Ngure, F. M., Pelto, G., & Young, S. L. (2013). What are we assessing when we measure food security? A compendium and review of current metrics. *Advances in Nutrition*, *4*(5), 481–505. https://doi.org/10.3945/an.113.004119

Kelly, M. P., & Barker, M. (2016). Why is changing health-related behaviour so difficult? *Public Health*, *136*, 109–116. https://doi.org/10.1016/j.puhe.2016.03.030

Kogler, L., Müller, V. I., Chang, A., Eickhoff, S. B., Fox, P. T., Gur, R. C., & Derntl, B. (2015). Psychosocial versus physiological stress - Meta-analyses on deactivations and activations of the neural correlates of stress reactions. *NeuroImage*, *119*, 235–251. https://doi.org/10.1016/j.neuroimage.2015.06.059

Köster, E. P. (2009). Diversity in the determinants of food choice: A psychological perspective. *Food Quality and Preference*, *20*(2), 70–82. https://doi.org/10.1016/J.FOODQUAL.2007.11.002

Kryzanowski, J. A., & McIntyre, L. (2011). A holistic model for the selection of environmental assessment indicators to assess the impact of industrialization on indigenous health. *Canadian Journal of Public Health*, *102*(2), 112–117. https://doi.org/10.1007/bf03404158

Liese, A. D., Weis, K. E., Schulz, M., & Tooze, J. A. (2009). Food intake patterns associated with incident type 2 diabetes: The insulin resistance atherosclerosis study. *Diabetes Care*, *32*(2), 263–268. https://doi.org/10.2337/dc08-1325

Loppie Reading, C., & Wein, F. (2009). Health Inequalities and Social Determinants of Aboriginal Peoples' Health. *National Collaborating Centre for Aboriginal Health*, 1–47. http://www.nccah-ccnsa.ca/docs/social determinates/nccah-loppie-wien_report.pdf

Mark, S., du Toit, S., Noakes, T. D., Nordli, K., Coetzee, D., Makin, M., van Der Spuy, S., Frey, J., & Wortman, J. (2016). A successful lifestyle intervention model replicated in diverse clinical settings. *South African Medical Journal*, *106*(8), 763–766. https://doi.org/10.7196/SAMJ.2016.v106i8.10136

Marrone, S. (2007). Understanding barriers to health care: a review of disparities in health care services among indigenous populations. *International Journal of Circumpolar Health*, *66*(3), 188–198. https://doi.org/10.3402/ijch.v66i3.18254

Matthews, R. (2017). The cultural erosion of indigenous people in health care. *Cmaj*, *189*(2), E78–E79. https://doi.org/10.1503/cmaj.160167

Menec, V. H., Sirski, M., & Attawar, D. (2005). Does continuity of care matter in a universally insured population? *Health Services Research*, *40*(2), 389–400. https://doi.org/10.1111/j.1475-6773.2005.0p364.x

Methot, S. (2019). *Legacy: Trauma, Story, and Indigenous Healing*. ECW Press.

Metlakatla Stewardship Society. (2019). *Methods, Results, and Future Direction of a First Nation-led CEM Program*. https://metlakatlacem.ca/wp-content/uploads/2020/04/Metlakatla_CEM-Synopsis_Apr28_2020.pdf

Milne, K., & Oberle, K. (2005). Enhancing Rigor in Qualitative Description. *Journal of Wound, Ostomy and Continence Nursing*, *32*(6), 413–420. https://oce-ovid-com.proxy.lib.sfu.ca/article/00152192-200511000-00014/PDF

Mitchell, T., Arseneau, C., & Thomas, D. (2019). Colonial Trauma: Complex, continuous, collective, cumulative and compounding effects on the health of Indigenous peoples in Canada and beyond. *International Journal of Indigenous Health*, *14*(2), 74–94. https://doi.org/10.32799/ijih.v14i2.32958

Monteiro, L. A. (1973). Expense Is No Object...: Income and Physician Visits. *Journal of Health and Social Behavior*, *14*(2), 99–115.

National Institute of Diabetes and Digestive and Kidney Diseases. (2015). *Type 2 Diabetes*. https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/type-2-diabetes

Nelson, S. E., & Wilson, K. (2017). The mental health of Indigenous peoples in Canada: A critical review of research. *Social Science and Medicine*, *176*, 93–112. https://doi.org/10.1016/j.socscimed.2017.01.021

Newacheck, P. W., Hung, Y. Y., Park, M. J., Brindis, C. D., & Irwin, C. E. (2003). Disparities in Adolescent Health and Health Care: Does Socioeconomic Status Matter? *Health Services Research*, *38*(5), 1235–1252. https://doi.org/10.1111/1475-6773.00174

Noble. (2015). *Introduction to environmental impact assessment: a guide to principles and practice* (3rd ed.). Don Mills, Ontario Oxford University Press cop. 2015.

Noreen, W., Johnson-Down, L., Jean-Claude, M., Lucas, M., Robinson, E., & Batal, M. (2018). Factors associated with the intake of traditional foods in the Eeyou Istchee (Cree) of northern Quebec include age, speaking the Cree language and food sovereignty indicators. *International Journal of Circumpolar Health*, *77*(1). https://doi.org/10.1080/22423982.2018.1536251

Oster, R. T., Grier, A., Lightning, R., Mayan, M. J., & Toth, E. L. (2014). Cultural continuity, traditional Indigenous language, and diabetes in Alberta First Nations: A mixed methods study. *International Journal for Equity in Health*, *13*(1), 1–11. https://doi.org/10.1186/s12939-014-0092-4

Park, H., Roubal, A. M., Jovaag, A., Gennuso, K. P., & Catlin, B. B. (2015). Relative Contributions of a Set of Health Factors to Selected Health Outcomes. *American Journal of Preventive Medicine*, *49*(6), 961–969. https://doi.org/10.1016/j.amepre.2015.07.016

Parkes, M. (2016). Cumulative Determinants of Health Impacts in Rural, Remote, and Resource-Dependent Communities. In M. Gillingham, G. Halseth, C. Johnson, & M. Parkes (Eds.), *The Integration Imperative: Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments* (Springer I, pp. 117–149). Springer. https://doi.org/10.7591/cornell/9781501707599.003.0002

Peiris, D., Miph, M., Brown, A., Mph, B., & Mbbs, A. C. (2008). *for Indigenous People*. *179*(10), 985–986.

Pérez-Escamilla, R., & Segall-Corrêa, A. M. (2008). Food insecurity measurement and indicators. *Revista de Nutrição*, *21*, 15s-26s.

Peterson, A., Charles, V., Yeung, D., & Coyle, K. (2020). The Health Equity Framework: A Science- and Justice-Based Model for Public Health Researchers and Practitioners. *Health Promotion Practice*. https://doi.org/10.1177/1524839920950730

Pollack, C. E., Hussey, P. S., Rudin, R. S., Fox, D. S., Lai, J., & Schneider, E. C. (2016). Measuring care continuity : A comparison of claims-based methods. *Medical Care*, *54*(5), e30–e34. https://doi.org/10.1097/MLR.0000000000000018

Pressman, S. D., Gallagher, M. W., & Lopez, S. J. (2013). Is the Emotion-Health Connection a "First-World Problem"? *Psychological Science*, *24*(4), 544–549. https://doi.org/10.1177/0956797612457382

PwC. (2018). *The case for intervening upstream*. file:///C:/Users/cleme/AppData/Local/Temp/the-case-for-intervening-upstream.pdf

Reid, J., Varona, G., Fisher, M., & Smith, C. (2016). Understanding Maori 'lived' culture to determine cultural connectedness and wellbeing. *Journal of Population Research*, *33*(1), 31–49. https://doi.org/10.1007/s12546-016-9165-0

Reilly, R. E., Doyle, J., Bretherton, D., Rowley, K. G., Harvey, J. L., Briggs, P., Charles, S., Calleja, J., Patten, R., & Atkinson, V. (2008). Identifying psychosocial mediators of health amongst Indigenous Australians for the Heart Health Project. *Ethnicity and Health*, *13*(4), 351–373. https://doi.org/10.1080/13557850801903046

Rountree, J., & Smith, A. (2008). Strength-Based Well-Being Indicators for Indigenous Children And Families: A Literature Review of Indigenous Communities' Identified Well-Being Indicators. *American Indian and Alaska Native Mental Health Research*, *23*(3), 206–220.

Ryan, C. M., van Duinkerken, E., & Rosano, C. (2016). Neurocognitive consequences of diabetes. *American Psychologist*, *71*(7), 563–576. https://doi.org/10.1037/a0040455

Schrecker, T., Birn, A. E., & Aguilera, M. (2018). How extractive industries affect health: Political economy underpinnings and pathways. *Health and Place*, *52*(June), 135–147. https://doi.org/10.1016/j.healthplace.2018.05.005

Schulze, M. B., Manson, J. E., Willett, W. C., & Hu, F. B. (2003). Processed meat intake and

incidence of Type 2 diabetes in younger and middle-aged women. *Diabetologia*, *46*(11), 1465–1473. https://doi.org/10.1007/s00125-003-1220-7

Shandro, J., & Jokinen, L. (2018). A Guideline for Conducting Health Impact Assessment for First Nations in British Columbia, Canada. In *Tsimshian Environmental Stewardship Authority*.

Srour, B., Fezeu, L. K., Kesse-Guyot, E., Allès, B., Debras, C., Druesne-Pecollo, N., Chazelas, E., Deschasaux, M., Hercberg, S., Galan, P., Monteiro, C. A., Julia, C., & Touvier, M. (2020). Ultraprocessed Food Consumption and Risk of Type 2 Diabetes among Participants of the NutriNet-Santé Prospective Cohort. *JAMA Internal Medicine*, *180*(2), 283–291. https://doi.org/10.1001/jamainternmed.2019.5942

Street, R., & Epstein, R. (2008). Key Interpersonal Functions and Healh Outcomes: Lessons from Theory and Research on Clinician-Patient Communication. In K. Glanz, B. Rimer, & K. VIswanath (Eds.), *Health Behavior and Health Education* (4th ed., pp. 237–263). Jossey-Bass.

The Firelight Group. (2017). *Indigenous Communities and Industrial Camps: Promoting Healthy Communities in Setting of Industrial Change* (Issue February). https://doi.org/10.4324/9781315115238-19

Truth and Reconciliation Commission. (2015). Truth and Reconciliation Commission of Canada: Calls to Action. In *Truth and Reconciliation Commission of Canada*. http://nctr.ca/assets/reports/Calls_to_Action_English2.pdf

Truth and Reconciliation Commission of Canada. (2015). Honouring the Truth, Reconciling for the Future. In *Truth and Reconciliation Commission of Canada*.

Union of BC Indian Chiefs. (2005). *Stolen Lands, Broken Promises Researching the Indian Land Question in British Columbia*. Union of British Columbia Indian Chiefs.

United Nations. (2007). The United Nations Declaration on the Rights of Indigenous Peoples. In *United Nations* (Vol. 24, Issue 2). https://doi.org/10.1111/j.1467-8322.2008.00569.x

Van Walraven, C., Oake, N., Jennings, A., & Forster, A. J. (2010). The association between continuity of care and outcomes: a systematic and critical review. *Journal of Evaluation in Clinical Practice*, *16*(5), 947–956. https://doi.org/10.1111/j.1365-2753.2009.01235.x

Vang, A., Singh, P. N., Lee, J. W., Haddad, E. H., & Brinegar, C. H. (2008). Meats, processed meats, obesity, weight gain and occurrence of diabetes among adults: Findings from adventist health studies. *Annals of Nutrition and Metabolism*, *52*(2), 96–104. https://doi.org/10.1159/000121365

Wardman, D., Clement, K., & Quantz, D. (2005). Access and utilization of health services by British Columbia's rural Aboriginal population. *International Journal of Health Care Quality Assurance Incorporating Leadership in Health Services*, *18*(2–3). https://doi.org/10.1108/13660750510594864

Westwood, E., & Orenstein, M. (2016). *Resource Kit for HIA Practitioners: HIA for Industrial Projects*. https://static1.squarespace.com/static/562c532fe4b079eaf38b7ed0/t/581100b15016e1a017835aff/1477509340274/Resource+Kit+HIA+Industrial+Projects.pdf

World Health Organization. (1948). Constitution of the World Health Organization. *Bulletin of the World Health Organization*, *80*(12), 983–984. https://apps.who.int/iris/handle/10665/268688

Appendix A.

Health Influence Diagram

Health Influence Diagram Introduction

In order to understand how Metlakatla's health is affected by the social determinants of health and industrial activities in Metlakatla Territory, the CEM Program created a Health Influence Diagram (see Figure A.1 below) during Phase 1 work (see Figure 4: Phases in the Metlakatla Cumulative Effects Management Program). An influence diagram is a tool to visualize and isolate the pathways through which the Metlakatla health priority values are affected by cumulative industrial development. The Health Influence Diagram links the activities that occur in Metlakatla Territory (left side, pink) to the Metlakatla priority health values (right side, green). The Program's pillars, which also represent some of the intermediate and proximal social determinants of health, are coloured in purple. The boxes with blue diamonds and blue circles contain the indicators considered during this research project. The Heath Influence Diagram below is a streamlined version of the diagram presented in the *CEM Health Indicators Final Report* prepared for the Metlakatla First Nation.

Health Influence Diagram Purpose

The Health Influence Diagram is a simplified representation of the numerous factors that affect health. All determinants are connected through a myriad of complex pathways. Some determinants may be more influential than others in an individual's health outcome; for example, one's education may be more influential than one's genes (Braveman & Gottlieb, 2014). However, the purpose of the influence diagram in the CEM Program is not to capture each cause-and-effect pathway between activities in Metlakatla Territory and priority values. It is primarily a communication tool for mapping potential interactions to facilitate a discussion among Metlakatla staff and community members on values and indicators selection.

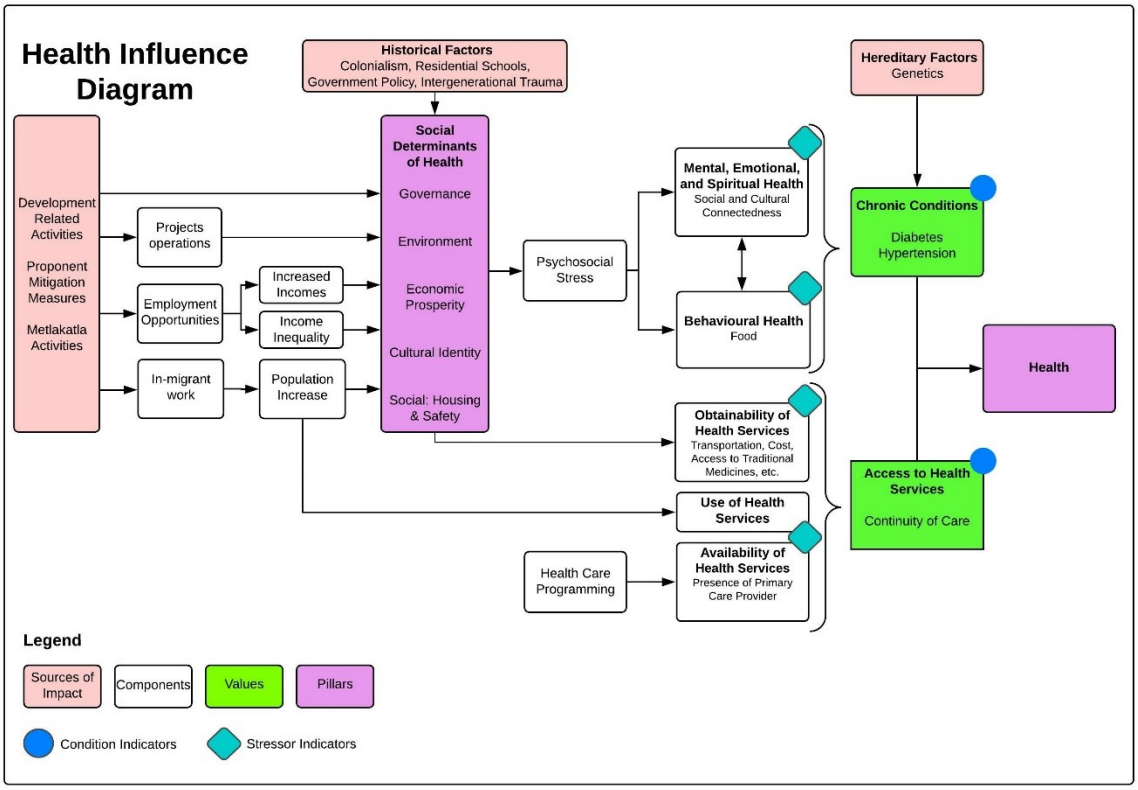

Figure A.1: Revised Health Influence Diagram. Revised from Compass Resource Management Ltd. (2015a, 2015b).

Development Related Activities and Social Determinants of Health

Development-related activities, proponent mitigation measures, and Metlakatla activities affect the intermediate and proximal social determinants of health through several pathways. The most relevant pathways are highlighted in the diagram. They are linked to the pillars of the CEM Program: Governance, Environment, Economic Prosperity, Cultural Identity, and Social/Health (health is placed at the end of the causal pathway, rather than with the other pillars of the Program, as the diagrams identifies the components of health). For instance, project operations (see diagram), because of their extractive nature, directly impact the environment. By creating employment opportunities, industrial activities can bring more income to the region, which can lead to increased incomes but can also create income inequalities, thereby impacting the economic prosperity of Metlakatla First Nation and its members. The influx of temporary workers (in-migrant workforce) leads to population increase, which will likely affect the cultural identity of Metlakatla Village and Prince Rupert, as well as local housing and safety conditions.

As mentioned in the literature review, the intermediate and proximal social determinants of health (in purple) are affected by the distal determinants of health, represented here as the historical factors, in pink (*factor* is used as a synonym of *determinant*). These include colonialism, government policies that impact Indigenous peoples' self-determination, and the legacy of residential schools, which resulted in intergenerational trauma. Changes in the condition of these intermediate and proximal social determinants of health lead to high psychosocial stress (i.e., stress that emanates from social situations that are emotionally and psychologically demanding) for Metlakatla members.

Chronic Health Conditions

The added psychosocial stress, with time, may modify a person's health and well-being. On the diagram, the boxes marked with blue diamonds represent potential health indicators, which have been divided into two categories: the indicators linked to mental, emotional, and spiritual health and the indicators linked to behavioural health (mentioned in the literature review as 'health behaviours'). Someone who is emotionally healthy is able to assess, understand, and manage their own emotions and that of others in ways that help one understand social interactions and build social connections (Coleman, 2007). Someone who practices healthy behaviours can respond to the needs and desires of their bodies in ways that improve rather than deteriorate their physical, mental, and emotional status in the long run. Behavioural choices are the outcomes of interactions between automatic responses to the environment, conscious decision-making, and habits (Köster, 2009). They are influenced by the larger social, cultural, physical, economic, and political context (Baum & Fisher, 2014; Kelly & Barker, 2016). More information on the selected indicators is provided in Chapter 4. These indicators report on the status of the Chronic Health Conditions priority value in the Metlakatla CEM Program.

The health diagram also highlights the hereditary factors (genetics) that impact chronic health conditions. However, we recognize that genetics and epigenetics (the alteration of the genetic code during one's lifetime) are also connected to the social determinants of health through direct and indirect pathways.

Access to Health Services

Development-related activities also alter Metlakatla's access to health services. As represented in the diagram, the social determinants of health influence peoples' obtainability of health services, which is the ease with which people access health care. In addition, a large

population increase due to the influx of temporary workers may augment the use of health services. The latter may place a burden on health services available to all Metlakatla members. Lastly, the regional health care programming commands the availability of health services (i.e., the quantity, quality, and variety of services offered in Prince Rupert and Metlakatla Village). More information on the selected indicators is provided in Chapter 4. These indicators report on the Access to Health Services priority value status in the Metlakatla CEM Program.

Appendix B.

Indicators List – September 2020

This indicators list is a comprehensive inventory of potential indicators that could be considered in this project. The list was finalized in September 2020 before focus groups and interviews. Indicators colored in light blue were shown in the Health Influence Diagram and presented during focus groups. Table B.1 includes the indicators and Table B.2 provides the reference list for the indicators presented in Table B.1.

Table B.1: List of potential indicators for the CEM health research, including indicator theme, sub-theme, name, type, unit, and information source

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
Physical Health	**Chronic issues**	Diabetes (Type 2) Prevalence	Condition	% of members with Type 2 diabetes	Buse et al., 2018; Jeffery et al., 2010; Loppie Reading & Wien, 2009; First Nations Centre, 2007; Anderson et al., 2006
		Hypertension Prevalence	Both*	% of members with hypertension	Buse et al., 2018; Loppie Reading & Wien, 2009; WHO, 2018; Anderson et al., 2006
		Obesity	Both*	% of members with obesity	Buse et al., 2018; Jeffery et al., 2010; Loppie Reading & Wien, 2009; WHO, 2018; Anderson et al., 2006
		Cancer	Condition	% of members with any cancer	Buse et al., 2018; Jeffery et al., 2010; First Nations Centre, 2007; WHO, 2018 (cancer incidence, per cancer)
		Heart disease	Condition	% of members with any heart disease	Anderson et al., 2006; Buse et al., 2018
		Hyperlipidemia	Both*	% of members with obesity	
	Non-chronic issues	Self-reported overall health	Both*	% of members who report their health as good or excellent (on a scale of poor/good/excellent)	Anderson et al., 2006; Buse et al., 2018; First Nations Centre, 2007

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
		Communicable diseases	Condition	% ofmembers who have had one or more communicable diseases in the past year	Anderson et al., 2006; Buse et al., 2018
		Accidents and Acute injuries	Condition	% of members who have had one or more acute injuries linked to construction operations, traffic, or social interactions in the past year	Buse et al., 2018
Behavioural health	**Food**	Food cost	Stressor	% of households that have members who do not have enough to eat at times/who cannot access healthy foods	Buse et al., 2018; Jeffery et al., 2010
		Food assistance	Stressor	% of members using food assistance programs	Buse et al., 2018; Jeffery et al., 2010
		Access to a healthy diet	Stressor	% of members who report having access to a safe, culturally acceptable, and nutritionally adequate diet	Buse et al., 2018 (indicator: % of members with no access to healthy foods); Jeffery et al., 2010 (indicator: cost, demand, availability of healthy foods); BC Centre for Disease Control, 2019 (indicator: access to healthy foods)
		Intake of fruits and vegetables	Stressor	% of members who report eating five or more servings of fruits and vegetables per day	Anderson et al., 2006; Buse et al., 2018; BC Centre for Disease Control, 2019
		Change in diet	Stressor	% of members who report benefiting/suffering from a change in diet due to a change in access/availability	Buse et al., 2018
	Physical activity	Daily practice	Stressor	% of members who exercise at least 30 min per day, doing moderate to intense activity	Buse et al., 2018

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
		Weekly practice	Stressor	% of members who exercise at least 2.5h per week, doing moderate to intense activity	Buse et al., 2018; Jeffery et al., 2010 (indicator: amount of physical activity, in undetermined free time); First Nations Centre, 2007 (physical activity)
	Sleep	7h sleep	Stressor	% of members who report obtaining at least 7 hours of uninterrupted sleep per night	Touma & Pannain, 2011
	Alcohol	Alcohol sales per capita	Stressor	Alcohol sales per capita as reported by all liquor sales outlets (i.e., public and private stores, restaurants, bars and clubs coded by the postal code of the vendor to the geographic region)	Buse et al., 2018; WHO, 2018 (indicator: total alcohol consumption per capita)
		Prevalence of hazardous drinking	Stressor	% of members aged 15+ who report drinking five or more drinks on at least one occasion per month in the past 12 months	Buse et al., 2018; Anderson et al., 2006
		Youth drinking	Stressor	% of members who first consumed alcohol before age 15 and regularly drink since	Buse et al., 2018
	Tobacco & drug use	Daily use of tobacco or drug substance	Stressor	% of members who report using these substances at least once a day	Buse et al., 2018; Jeffery et al., 2010; Loppie Reading & Wien, 2009; Anderson et al., 2006
		Second-hand exposure	Stressor	% of households in which one or more members use any tobacco product	Buse et al., 2018; Loppie Reading & Wien, 2009; First Nations Centre, 2007; Institute of Medicine (US) Committee on Leading Health Indicators for Healthy People, 2010; Anderson et al., 2006

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
	Substance use	Overall substance use	Stressor	% of households who feel that a household member has been hurt by the effects of tobacco, drugs, or alcohol use within the last year	Buse et al., 2018; First Nations Centre, 2007; Anderson et al., 2006
	Sexual activity	Incidence rate of sexually transmitted infections (STI)	Stressor	% of members who have been diagnosed with an STI in the past year	Buse et al., 2018; First Nations Centre, 2007; WHO, 2018
		Rate of teenage pregnancy	Stressor	% of teenage girls who have begun a pregnancy in the past year	Buse et al., 2018; Jeffery et al., 2010
	Community behaviour	Community hazardous behaviour change	Stressor	% of members who feel that there has been a significant change in drinking, tobacco & drug consumption, and violence within the community in the last year	Buse et al., 2018 (indicator: perception of changes in drinking and violence in community)
Emotional, Mental, and Spiritual health	**Mental health**	Perceived mental health	Stressor	% of members who perceive their mental health as good or excellent (on a scale of poor/good/excellent)	Buse et al., 2018
		Depression rate	Condition	% of members who have been diagnosed with depression	Buse et al., 2018; Loppie Reading & Wien, 2009 (indicator: % of people who suffered a major depressive episode in past 12 months); Anderson et al., 2018 (indicator: self-reported risk of depression)
		Frequency of thought of ending life	Stressor	% of members who report having regular thoughts of ending their lives	Harpham et al., 2003; Australian Institute of Health and Welfare, 2009
		Perceived exposure to stressful events	Stressor	% of members who report being regularly exposed to stress	Buse et al., 2018; Anderson et al., 2006

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
		Perceived exposure and vulnerability to violence	Stressor	% of members who report being exposed to violence (home, school, or street violence) and feel vulnerable	Haas, 2008 (indicator: exposure to violence)
	Emotional health	Sense of self-esteem & self-confidence	Stressor	% of members who report having a good sense of self-esteem (on a scale of poor/good/excellent)	Buse et al., 2018; Loppie Reading & Wien, 2009 (indicator: impact of racism on self-esteem); Healey et al., 2016; Auger, 2016
		Sense of identity and pride	Stressor	% of members who report having a good sense of identity (on a scale of poor/good/excellent)	Auger, 2016
		Internal balance	Stressor	% of members who report having a good internal balance, i.e., have a harmonious relationship between their mind, body, spirituality, and external environment	Auger, 2016
		Sense of purpose	Stressor	% of members who report having a good sense of purpose	Auger, 2016
		Sense of belonging	Stressor	% of members who report having a good sense of belonging (to their social group)	Buse et al., 2018 (indicator: community cohesion – a shared sense of belonging); Auger, 2016
		Sense of empowerment/life control	Stressor	% of members who report having a good sense of empowerment and life control	Loppie Reading & Wien, 2009; Chandler & Lalonde, 2009
		Current life satisfaction/self-	Stressor	% of members who report feeling satisfied and fulfilled in their current life	Buse et al., 2018

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
		assessed quality of life			
		Fear of contamination from industrial activities	Stressor	% of members who report frequent (frequency to determine) feelings of fear of contamination (through land, water, air) from industrial projects	Buse et al., 2018
		Perceived capacity to cope with stress, grief, and loss	Stressor	% of members who report feeling capable of dealing with daily feelings of stress and potential feelings of loss and grief	Auger, 2016; Halseth, 2016 (indicator: 'the ability to cope' as key for resiliency)
		Perceived cultural/social/land connectedness	Stressor	% of members who report feeling connected to their culture, social environment (community), or their land	Blanchard & Emery, 2016; Reid et al., 2016; Reilly et al., 2008; Rountree & Smith, 2008
		Perceived access to emotional support from peer-group	Stressor	% of members who report having access to an emotional support group	Buse et al., 2018 (indicator: % of children with an adult they could turn to if faced with a serious problem); Anderson et al., 2006 (indicator: % of people with healthy connections); Healey et al., 2016
	Community cohesion	Perceived changes in community values	Stressor	% of members who report feeling that community values have been negatively affected by industrial development in the past year	Buse et al., 2018
		Perceived change in conflict among community members	Stressor	% of members who report feeling that community conflict has increased in the past year	Buse et al., 2018
		Levels of volunteerism	Stressor	Annual breakdown of volunteering and giving within a community	Buse et al., 2018; Jeffery et al., 2010

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
		Perceived frequency of racist encounters	Stressor	% of members who report being the center of or witnessing racist encounters in the past year (through violence, hatred, or discrimination on the basis of racial identity)	Buse et al., 2018
		Satisfaction with personal relationships	Stressor	% of members who feel satisfied with their relationships (on a scale from 1-5 or poor/good/excellent)	Buse et al., 2018 (mentions relationship between elders and youth)
Access to Health Services	**Availability**	Number of providers for every 1,000 members	Condition	Number of providers for every 1,000 members	Buse et al., 2018 (indicator: number of doctors/certified health care professionals within a community)
		Presence of a family doctor	Condition	% of households who report having a family doctor	Loppie Reading & Wien, 2009 (indicator: having a regular doctor); First Nations Centre, 2007 (indicator: having a regular physician); Anderson et al., 2006; Buse et al., 2018
		Perceived time to appointment	Stressor	Average number of days before next available appointment	Threnhauser, 2019
		Perceived availability of culturally relevant physician	Stressor	% of members who report being able to access culturally relevant health care when needed (for mental or physical health)	Threnhauser, 2019; Buse et al., 2018 (indicator: availability and use of traditional healers and medicines)
	Transportation	Perceived available transportation	Stressor	% of members who report having easy access to transportation to health services	Buse et al., 2018 (indicator: public transportation utilisation)
		Perceived travel time	Stressor	Average number of minutes travelled to access health services	Threnhauser, 2019

THEME	SUB-THEME	INDICATOR	TYPE OF INDICATOR	UNIT	DATA SOURCES
	Cost	Insurance	Condition	% of population covered by insurance	Buse et al., 2018 (several indicators related to insurance); Threnhauser, 2019
		Cost of health care in annual family budget	Condition	% of cost of health care in the annual family budget	First Nations Centre, 2007 (indicator: health expenditures)
	Accessibility	Number of physician visits per person per year	Condition	Number of physician visits per person per year	Buse et al., 2018 (indicator: total patient visits to health care centres); Loppie Reading & Wien, 2009; (indicator: contact with a health professional in last 12 months, per professional); Institute of Medicine (U.S.) et al., 1993 (frequency of visit)
		Ambulatory Care Sensitive Conditions	Condition	ACSC per 100,000 in Prince Rupert younger than 75 years old	Buse et al., 2018; Anderson et al., 2018
		Self-reported Access to Primary Care	Condition	% of members with an ongoing source of primary care	Institute of Medicine (US) Committee on Leading Health Indicators for Healthy People, 2010; Anderson et al., 2006 (indicator: self-reported ease of access)

**Both* indicates that, depending on what other indicators we compare this indicator to, this indicator can be either a condition or stressor indicator. For instance, hypertension prevalence can be a stressor indicator for cardiovascular complications, but it is also considered a chronic condition.

Table B.2: References for the list of potential indicators for the CEM health research

REFERENCES FOR INDICATORS LIST	
Anderson et al., 2006	Anderson, M., Snylie, J.m Anderson, I., Sinclair, R., Crengle, S. 2006. Discussion Paper no. 18. First Nationsm Inuit and Metis Health Indicators in Canada. A Background Paper for the Project 'Action-oriented indicators of health and health systems development for Indigenous Peoples in Australia, Canada and New Zealand'. http://onemda.unimelb.edu.au/sites/default/files/docs/dP18.pdf
Auger, 2016	Auger, M. D. (2016). Cultural Continuity as a Determinant of Indigenous Peoples' Health: A Metasynthesis of Qualitative Research in Canada and the United States. *International Indigenous Policy Journal, 7*(4). doi:10.18584/iipj.2016.7.4.3
Australian Institute of Health and Welfare, 2009	Australian Institute of Health and Welfare. (2009). Measuring the social and emotional wellbeing of Aboriginal and Torres Strait Islander Peoples. Cat. No. IHW 24. Camberra: AIHW
BC Centre for Disease Control	BC Centre for Disease Control. (2019). *Food Security Indicators: Review of Literature*. BC Centre for Disease Control, Population & Public Health. http://www.bccdc.ca/our-services/service-areas/population-public-health
Blanchard & Emery, 2016	Blanchard, C., & Emery, G. (2016). *Provincial Health Services Authority Indigenous Health*.
Buse et al., 2018	Buse, C. G., Cornish, K., Parkes, M. W., Harder, H., Fumerton, R. Rasali, D., Li, C., Oke, B., Lowen, D. Aalhus, M. (2018). Towards more robust and locally meaningful indicators for monitoring the social determinants of health relate to resource development across Northern BC. Report prepared for Northern Health. Prince George, BC: University of Northern British Columbia.
Cameron et al., 2014	Cameron, B. L., Carmargo Plazas, M. del P., Salas, A. S., Bourque Bearskin, R. L., & Hungler, K. (2014). Understanding Inequalities in Access to Health Care Services for Aboriginal People: A Call for Nursing Action. Advances in Nursing Science, 37(3), E1–E16. https://doi.org/10.1097/ANS.0000000000000039
Chandler & Lalonde, 2009	Chandler, M. & Lalonde, C. (2009). Cultural Continuity as a Moderator of Suicide Risk among Canada's First Nations. In Kirmayer, L. and Valaskakis, G. (Eds.), Healing Traditions: The Mental Health of Aboriginal Peoples in Canada (pp. 221-248). Vancouver: UBC Press.
First Nations Centre, 2007	First Nations Centre. (2007). Understanding Health Indicators. Ottawa: National Aboriginal Health Organization.
Haas, 2008	Haas, S. (2008). Trajectories of functional health: The 'long arm' of childhood health and socioeconomic factors. Social Science & Medicine, 66(4), 849–861. https://doi.org/10.1016/j.socscimed.2007.11.004
Halseth, 2016	Halseth, G., R. (2016). Cumulative Effects and Impacts: Introducing a community Perspective. In M. P. Gillingham, G. R. Halseth, C. J. Johnson, & M. W. Parkes (Eds.), The Integration Imperative (pp. 83–116). Springer International Publishing. https://doi.org/10.1007/978-3-319-22123-6_5
Harpham et al., 2003	Harpham, T., Reichenheim, M., Oser, R., Thomas, E., Hamid, N., Jaswal, S., Aidoo, A., Aidoo, M. (2003). Measuring mental health in a cost-effective manner. *Health Policy and Planning*, *18*(3), 344–349. https://doi.org/10.1093/heapol/czg041

REFERENCES FOR INDICATORS LIST	
Healey et al., 2016	Healey, G. K., Noah, J., & Mearns, C. (2016). The Eight Ujarait (Rocks) Model: Supporting Inuit Adolescent Mental Health With an Intervention Model Based on Inuit Ways of Knowing. *International Journal of Indigenous Health, 11*(1), 92. doi:10.18357/ijih111201614394
Institute of Medicine (U.S.), 1993	Institute of Medicine (U.S.), Committee on Monitoring Access to Personal Health Care Services, & Millman, M. L. (1993). Access to health care in America. National Academy Press
Institute of Medicine (U.S.) et al., 1993	Institute of Medicine (U.S.), Committee on Monitoring Access to Personal Health Care Services, & Millman, M. L. (1993). Access to health care in America. National Academy Press.
Jeffery et al., 2010	Jeffery, B., Abonyi, S., Hamilton, C., Lidguerre, T., Michayluk, G., Throassie, E., Anthony, B., Bird, S., Denecheshe, M., Thomas, L., Whitecap, Z. (2010). Community Health Indicators Toolkit. University Of Regina and Universoty of Saskatchewan: Saskatchewan Population Health and Evaluation Research Unit
Loppie Reading & Wien, 2009	Loppie Reading, C., Wien, F. (2009). Health Inequalities and Social Determinants of Aboriginal People's Health. National Collaborating Center for Aboriginal Health. Retrieved from: nccah-ccnsa.ca/docs/social determinates/nccah-loppie-wien_report.pdf
Metlakatla Membership Census, 2016	Metlakatla Membership Census [MMC], 2016. Health Results Summary. Obtained from Metlakatla CEM Program.
Nelson & Wilson, 2017	Nelson, S. E., & Wilson, K. (2017). The mental health of Indigenous peoples in Canada: A critical review of research. *Social Science & Medicine, 176*, 93-112. doi:10.1016/j.socscimed.2017.01.021
Reilly et al., 2008	Reilly, R. E., Doyle, J., Bretherton, D., Rowley, K. G., Harvey, J. L., Briggs, P., Charles, S., Calleja, J., Patten, R., & Atkinson, V. (2008). Identifying psychosocial mediators of health amongst Indigenous Australians for the Heart Health Project. *Ethnicity and Health*, *13*(4), 351–373. https://doi.org/10.1080/1355785080190304
Reid et al., 2016	Reid, J., Varona, G., Fisher, M., & Smith, C. (2016). Understanding Maori 'lived' culture to determine cultural connectedness and wellbeing. *Journal of Population Research*, *33*(1), 31–49. https://doi.org/10.1007/s12546-016-9165-0
Rountree & Smith, 2008	Rountree, J., & Smith, A. (2008). Strength-Based Well-Being Indicators for Indigenous Children And Families: A Literature Review of Indigenous Communities' Identified Well-Being Indicators. *American Indian and Alaska Native Mental Health Research*, *23*(3), 206–220.
Threnhauser, 2019	Threnhauser, S. (2019, August 15). How Do You Measure Access? Retrieved August 28, 2020, from https://www.openminds.com/market-intelligence/executive-briefings/how-do-you-measure-access/
Touma & Pannain, 2011	Touma, C., & Pannain, S. (2011). Does lack of sleep cause diabetes? Cleveland Clinic Journal of Medicine. 78. 549-58. 10.3949/ccjm.78a.10165
Wardman et al., 2005	Wardman, D., Clement, K., & Quantz, D. (2005). Access and utilization of health services by British Columbia's rural Aboriginal population. *Leadership in Health Services, 18*(2), 26-31. doi:10.1108/13660750510594864
WHO, 2018	World Health Organization. (2018). Global Reference List of 100 Core Health Indicators (plus health-related SDGs). Geneva: World Health Organization, 2018.

Appendix C.

Indicators Shortlist – September 2020

The Indicators Shortlist is an inventory of potential indicators that could be considered in this project. The shortlist was finalized in September 2020. Within each sub-theme in the list (Appendix B), indicators that met the most criteria were chosen for the shortlist. The shortlist includes no more than two indicators per sub-theme. Then, within each sub-theme in the shortlist, indicators that met the most criteria were presented during focus groups and interviews. Indicators colored in light blue were shown in the Health Influence Diagram and presented during focus groups. The evaluation of criteria was based on the researcher's perception (mine) after the literature review.

HIA is the acronym for Health Impact Assessment(s).

Table C.1: Shortlist of potential indicators for the CEM health research, including indicator theme, sub-theme, name, type, unit, accordance with the CEM criteria (accuracy, practicality, sensitiviy, relevance), abiliy to be self-reported, and appreciation of commonness in the HIA literature

Theme	Sub-Theme	Indicator	Type of Indicator	Unit	Accurate	Practical	Sensitive	Relevant	Self-Reported	Common in HIA literature
Physical Health	Chronic issues	Diabetes (Type 2) Prevalence	Condition	% of members with Type 2 diabetes	✓	✓	✓	✓	✓	✓
		Hypertension Prevalence	Both	% of members with hypertension	✓	✓	✓	✓	✓	✓
	Non-chronic issues	Self-reported overall health	Both	% of members who report their health as good or excellent (on a scale of poor/good/excellent	✓	X	✓	✓	✓	X

Theme	Sub-Theme	Indicator	Type of Indicator	Unit	Accurate	Practical	Sensitive	Relevant	Self-Reported	Common in HIA literature
Behavioural health	Food	Access to a healthy diet	Stressor	% of members who report having access to a safe, culturally acceptable, and nutritionally adequate diet	Indirectly	Clarification needed for users	✓	Indirectly	✓	X
		Intake of fruits and vegetables	Stressor	% of members who report eating 5 or more servings of fruits and vegetables per day	Indirectly	✓	✓	Indirectly	✓	✓
	Physical Activity	Weekly practice	Stressor	% of members who exercise at least 2.5h per week, doing moderate to intense activity	Indirectly	X	X	Indirectly	✓	✓
	Sleep	7h sleep	Stressor	% of members who report obtaining at least 7 h of uninterrupted sleep per night	Indirectly	✓	✓	Indirectly	✓	X
	Alcohol use	Prevalence of hazardous drinking	Stressor	% of members aged 15+ who report drinking five or more drinks on at least one occasion per month in the past 12 months	Indirectly	✓	✓	✓	Difficult	X

Theme	Sub-Theme	Indicator	Type of Indicator	Unit	Accurate	Practical	Sensitive	Relevant	Self-Reported	Common in HIA literature
	Tobacco & drug use	Daily use of tobacco or drug substance	Stressor	% of members who report using these substances at least once a day	Indirectly	✓	✓	Indirectly	Difficult	X
	Substance use	Overall substance use	Stressor	% of households who feel that a household member has been hurt by the effects of drugs/alcohol use within the last year	Indirectly	X	✓	✓	Difficult	✓
	Sexual activity	Incidence rate of sexually transmitted infections (STI)	Stressor	% of members who have been diagnosed with an STI in the past year	Indirectly	✓	✓	Indirectly	Difficult	✓
Emotional, Mental, and Spiritual Health	Community behaviour	Community hazardous behaviour change	Stressor	% of members who feel that there has been a significant change in drinking, tobacco & drug consumption, and violence within the community in the last year	Indirectly	X	✓	Indirectly	Difficult	X
	Mental health	Perceived mental health	Stressor	% of members who perceive their mental health as good or excellent (on a scale of poor/good/excellent)	X	X	✓	✓	✓	✓

Theme	Sub-Theme	Indicator	Type of Indicator	Unit	Accurate	Practical	Sensitive	Relevant	Self-Reported	Common in HIA literature
	Emotional Health	Perceived cultural/social/land connectedness	Stressor	% of members who report feeling connected to their culture, social environment (community), or their land	Indirectly	X	✓	✓	✓	✓
	Community cohesion	Perceived changes in community values	Stressor	% of members who report feeling that community values have been negatively affected by industrial development in the past year	Indirectly	X	✓	Indirectly	✓	X
Access to Health Services	Availability	Presence of a family doctor	Condition	% of households who report having a family doctor	✓	X	X	✓	✓	✓
		Perceived availability of culturally relevant physician	Stressor	% of members who report being able to access culturally relevant health care when needed (for mental or physical health)	Indirectly	X	✓	✓	✓	
	Transportation	Perceived available transportation	Stressor	% of members who report having easy access to transportation to health services	✓	X	X	Indirectly	✓	X

Theme	Sub-Theme	Indicator	Type of Indicator	Unit	Accurate	Practical	Sensitive	Relevant	Self-Reported	Common in HIA literature
	Cost	Insurance	Condition	% of population covered by insurance	X	✓	X	Indirectly	✓	✓
	Accessibility	Self-reported Access to Primary Care	Condition	% of members with an ongoing source of primary care	Indirectly	X	✓	✓	✓	X

Appendix D.

MMC 2020 Questions on Health

1. How has your overall health changed this year due to the COVID-19 (Coronavirus) pandemic? **Please select <u>one.</u>**

Worsened A Lot	Worsened Slightly	Stayed Same	Improved Slightly	Improved A Lot

2. For the following types of health, in general, compared to other people your age, would you say that your health is:

	Excellent	Very Good	Good	Fair	Poor
Physical Health					
Mental Health					
Emotional Health*					
Spiritual Health					

* *Emotional health includes feelings of love, loneliness, stress, etc.*

The following questions ask about health conditions. We recognize that health conditions are sensitive, personal information; however, please note that your answers will remain anonymous and will help guide Metlakatla's approach to improving members' health and wellbeing.

3. Do you have type 2 diabetes? ○ Yes ○ No

   a. **If yes,** did you find out from a doctor last year (i.e. in 2019)? ○ Yes ○ No

4. Do you have hypertension (also known as high blood pressure)? ○ Yes ○ No

   a. **If yes,** did you find out from a doctor last year (i.e. in 2019)? ○ Yes ○ No
   b. **If yes,** was the high blood pressure related to pregnancy? ○ Yes ○ No

5. Do you feel connected to your <u>culture</u> (including language and cultural traditions, practices and activities)? **Please select on a scale of 1 to 4. If connection to culture is not relevant to your overall well-being, please select 0.**

Not Relevant to My Well-Being	Not at All Connected	Somewhat Connected	Moderately Connected	Very Connected
0	1	2	3	4

6. Do you feel connected to your community (all Metlakatla members)? **Please select on a scale of 1 to 4. If connection is not relevant to your overall well-being, please select 0.**

Not Relevant to My Well-Being	Not at All Connected	Somewhat Connected	Moderately Connected	Very Connected
0	1	2	3	4

7. Do you feel connected to your history (including Tsimshian and Metlakatla identity, history and knowledge)? **Please select on a scale of 1 to 4. If connection to history is not relevant to your overall well-being, please select 0.**

Not Relevant to My Well-Being	Not at All Connected	Somewhat Connected	Moderately Connected	Very Connected
0	1	2	3	4

8. Do you feel connected to your traditional waters and lands? **Please select on a scale of 1 to 4. If connection to waters is not relevant to your overall well-being, please select 0.**

Not Relevant to My Well-Being	Not at All Connected	Somewhat Connected	Moderately Connected	Very Connected
0	1	2	3	4

9. How has your access to health services (e.g., doctor, appointments, pharmacy, nurse, etc.) changed this year due to the COVID-19 (Coronavirus) pandemic? **Please select one.**

Decreased A Lot	Decreased Slightly	Stayed Same	Increased Slightly	Increased A Lot

10. Do you have a primary care provider, someone on your health team that is responsible for ensuring that you receive continuous care?
Continuous care is concerned with the quality of care over time provided by health care professionals. It means that you are receiving the care that you need by accounting for patient satisfaction, interpersonal aspects of care and coordination of care.

    ○ Yes
    ○ No **(skip Question 29a)**
    ○ Not applicable **(skip Question 29a)**

    a. **If yes,** what is the role of that person on your health team? **Please select one.**
        ○ Family doctor

○ Nurse or nurse practitioner
○ Social worker
○ Pharmacist
○ Traditional healer
○ Community health worker
○ Other (please specify): _____

11. In the past 12 months, did you ever experience any difficulties getting routine or ongoing care?
    ○ Yes
    ○ No **(skip Question 30a)**
    ○ Not applicable **(skip Question 30a)**

    a. **If yes,** what type of difficulties did you experience? **Please <u>select all</u> that apply.**
        ○ Do not have a personal/family doctor
        ○ Wait times are too long
        ○ Service or appointments unavailable
        ○ Transportation problems
        ○ Cost
        ○ Racialized discrimination when using health services
        ○ Unaware of available services and where to find them
        ○ Unable to leave the house because of a health problem
        ○ No access to traditional medicine (including herbal remedies, spiritual therapies, assistance from Elders or healers, or other practices specific to Metlakatla)
        ○ Other (please specify): _____