

Towards more robust and locally meaningful indicators for monitoring health and the social determinants of health related to resource extraction and development across Northern BC

A report produced as the result of a research collaboration between Northern Health, the University of Northern British Columbia and the BC Provincial Health Services Authority



Cumulative Impacts
Research Consortium



Office of Health and
Resource Development



BC Centre for Disease Control
An agency of the Provincial Health Services Authority

About this Report:

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List of Acronyms

BC EAO – British Columbia Environmental Assessment Office

CLISMP – Community-level Infrastructure and Services Management Plan

EA – Environmental Assessment

LNG – Liquefied Natural Gas

NH – Northern Health

PHSA – Provincial Health Services Authority

RA – Research Assistant

SDoH – Social determinants of Health

UNBC – University of Northern British Columbia

Executive Summary

Resource extraction and development is a principle driver of social and economic development across much of northern Canada. Northern British Columbia (BC) is home to a diverse array of resource sectors including mining, oil and gas, forestry, commercial fishing, industrial agriculture and livestock, renewable energy, and tourism. However, tracking positive and negative impacts of these activities on human health and well-being has proven challenging in both formal regulatory processes (i.e. the BC Environmental Assessment (EA) process) and community driven monitoring initiatives (e.g. health impact assessments). This has partly been a result of limited guidance on suitable indicator development for impacts to health and the social determinants of health.

To provide clarity on identifying and selecting health and social determinants of health indicators related to resource extraction and development, this report describes an analysis of a purposeful maximum variability sample of provincial EA documents (N=11) and grey literature reports (N=7) that focused on existing or proposed resource extraction and development activities across Northern British Columbia. First, we extracted and defined indicators from our sample documents and listed data sources for indicators. Those which do not have regularly collected public data were flagged. Second, we compiled all indicators in a table and categorized them according to several broad social determinants of health (SDoH) categories or to specific impacts to human health and health service delivery. Third, we coded and quantified indicators according to their location on the 'effects pathway' (as defined by the BC Environmental Assessment Office (EAO)), whether they represent proportion or count type data, and the level of analysis at which each indicator is directed (e.g. population vs. individual). Fourth, we ranked each indicator according to six criteria of indicators as described by the BC EAO. Our results are as follows:

- A total of 552 indicators were collected through a scoping review of selected provincial EAs and supporting grey literature documents. The total list of thematically organized indicators and their corresponding definitions can be found in Appendix A, and instructions on how to use the table is included in Appendix B;
- The indicators are clustered thematically according to 10 themes, broadly related to the SDOH:
 - Demographics
 - Housing
 - Education
 - Infrastructure and services
 - Agriculture and food

- Health/wellbeing and health service delivery
- Work environment and conditions
- Economy and politics
- Indigenous culture and identity, and
- Community and social value.
- Nearly 80% of all indicators extracted have publicly available data.
- The indicators under the headings of “health/well-being and health service delivery”, “demographics”, and “community and social value” held the majority of the indicators with 170 (30.8%), 110 (19.9%), and 66 (12.0%), respectively.
- Themes with the fewest indicators included “agriculture and food” with 23 (4.2%), “infrastructure and services” with 20 (3.6%) and “work environment and conditions” with 19 (3.4%).
- The majority of the indicators within our sample (83.2 percent) were characterized as ‘tertiary’ whereby they are indicative of community impacts from resource extraction and development that are mediated through indirect and diffuse causal pathways.
- Only 74 of the total 552 indicators were obtained directly from provincial EA documents. The remaining indicators were identified from the supporting literature which provide alternative and nuanced ways to monitor impacts of resource extraction and development on health and the social determinants of health.
- Three recommendations are made, including:
 - To further explore the applicability of current EA indicator selection criteria for monitoring social and health impacts to better inform existing and future regulatory and assessment processes;
 - Future work in this field should seek to clarify expectations and provide guidance on appropriate social science methodologies to help improve meaningful and inclusive community engagement practices that may assist with identifying, selecting, measuring and monitoring SDoH and health indicators in natural resource management processes; and
 - A “parallel streams” approach should be considered for assessing and monitoring health and SDoH impacts, relying on a combination of publicly accessible standardized data and community driven and derived, locally important data.

This report is likely to be useful for industry proponents, government agencies and both Indigenous and non-Indigenous communities in supporting the identification, selection and utilization of indicators to monitor the SDoH and health impacts of resource extraction and development. Ultimately, this report and the work it represents raises important questions surrounding leading and emerging practices on SDoH and health indicator use in practice. To that end, suggestions for future research are provided to

better respond to community concerns around engagement processes that may be more likely to accurately capture the nuances of northern and rural, resource-dependent communities. The recommendations provided here can also contribute to supporting and enhancing the conceptualization, monitoring and continued development of SDoH indicators with the aim of supporting sustainable, healthy and just resource extraction and development activities.

Background and Disclaimer

This report builds on the findings of a previous report issued by Northern Health and the Provincial Health Services Authority, titled “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”(1) (“the initial report”). The initial report synthesized available literature to better understand impacts of resource extraction and development operations on the social determinants of health (SDoH). The SDoH include the suite of social conditions in which people live, work and play and therefore reflect all social, political and economic factors that define individual socioeconomic position, ultimately influencing access to health-promoting resources and specific health outcomes.(2,3)

The initial report (1) identified and described SDoH that have the potential to be impacted or modified by a variety of resource development and extraction activities present across northern BC. This includes extraction, transport, processing and export of natural resources from industries such as oil and gas, forestry, mining, and renewable energy, among others. Potential impacts identified in the initial review included those across the following categories:

- employment and income;
- formal and informal economic activities within a community or region;
- work conditions and labour dynamics;
- food security;
- housing and the cost of living;
- educational attainment;
- connections to land and water;
- cultural preservation;
- life control, self-determination and self-governance;
- social relationships and dynamics within communities;
- mental health, substance use and associated family dynamics;
- community safety and crime;
- sexual health, sex work and sex-trafficking; and
- gender and gender relations.

In addition to conceptualizing ways in which these health determinant categories may be modified and impacted by resource extraction and development activities, the initial report also provided a background on various impact assessment policies, frameworks and leading practices to assess, monitor and evaluate SDoH impacts over time (e.g. environmental assessments, social impact assessment; health impact assessment; cumulative effects assessment; socio-ecological frameworks).

Accordingly, this report does not detail the evidence on the SDoH related to resource extraction and development, nor does it articulate existing policy or assessment

frameworks. For a more comprehensive review of SDoH impacts resulting from resource extraction and development, and existing policy and assessment frameworks (e.g. EAs), we recommend reading the initial report. This report is an extension of this initial work and begins to conceptualize and define an array of possible indicators, provides examples of existing data sources, and identifies associated knowledge gaps.

1 Introduction

Resource development and extraction is a principle driver of social and economic conditions across much of northern Canada. The northern half of the province of British Columbia (BC) has a long history of resource development and extraction activities including oil and gas, mining, forestry, hydroelectric, fisheries, ranching and agriculture, all of which have historically contributed to the provincial economy and been a crucial component to regional economic development.(4,5) While resource extraction and development can increase employment opportunities, generate regional economic growth and provide earning potential for individuals and families living and working in resource-rich regions, it has also been linked to a multitude of community health and well-being impacts (6–11), as further explored in the initial report.(1)

Many determinants of health are indirectly modified or impacted by resource development and extraction often making causal relationships difficult to establish.(12,13) This challenge is compounded in contexts where health outcomes and the social determinant of health (SDOH) are impacted by multiple projects simultaneously operating across multiple sectors, timescales and geographic contexts—such as in northern BC—which in turn result in *cumulative impacts*.(14,15) Specific sub-regions and sub-populations may be experience impacts of resource extraction and development differently, depending on the myriad ways in which these activities interplay with the SDoH and resulting health outcomes.

For all of these reasons, adequately measuring and monitoring social, cultural and economic health impacts of resource development and extraction has proven to be a difficult task.(16,17) Currently, there are few formal processes in BC that assess the impacts of major development projects on the SDoH and health outcomes. The regulatory mechanisms to assess the health impacts of resource development and extraction of major projects are principally found in provincial environmental assessment (EA) (18) The BC EA process aims to provide an “integrated process for identifying, mitigating and evaluating the potential significant adverse environmental, economic, social, heritage, and health effects that may occur during the life of a reviewable project” (EAO User Guide - <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/eao-guidance-eao-user-guide.pdf>). The *Environmental Assessment Act* provides the legal framework for the BC EA process and is heavily focused on identifying and minimizing the potential for significant adverse effects. The process only applies to large industrial, mining, energy, water management, waste disposal, food processing, transportation and resort development projects that meet or exceed certain thresholds, such as area or production volume, as defined in the *Reviewable Projects Regulation*. The EAO oversees and coordinates the process, convening an advisory working group of provincial and federal agencies with the mandates and skill sets relevant to review a

proposed project. The advisory group also includes representatives of potentially affected First Nations and local government representatives. Project proponents and their consultants collect and analyze the majority of the information that is included in the EA certificate application. The EAO summarizes the findings of the review into an assessment report which is referred, along with the Application, to provincial ministers for a decision about the project. All assessment related information for specific projects can be accessed through the BC EAO's Project Information and Collaboration System (see: <https://www.projects.eao.gov.bc.ca>). A more fulsome overview of provincial EA can be found in the initial report. The provincial EA process is currently being revitalized; the outcomes of which may see changes to the current process. In spite of recent efforts to capture diverse values under the provincial EA process, several authors have identified that health is still inadequately incorporated into EA processes across Canada and internationally.(19–21) To date, there have been few reviews of how the SDoH and health impacts are conceptualized or monitored through Provincial EA processes across northern BC, and what indicators might exist to track changes to the modification of SDoH that result in changes to health status. In order to better conceptualize the assessment of health and the SDoH in both the formalized Provincial EA process and independent studies, this report endeavors to provide additional understanding of multiple indicators related to health outcomes and the SDoH.

In the context of this report, indicators refer to information on the state or condition of a particular impact of resource development and extraction on health and the SDoH.(16) In the language of EA, indicators “are metrics used to measure and report on the condition and trend of a specific Valued Component”.(18) Valued components are components of the natural and human environment that are considered by those involved in the assessment process to have importance.(18) Thus, indicators tend to be *proxy measures* of higher level concepts (i.e. valued components) which may be identified or agreed upon with or without the direct involvement of populations impacted by a particular development project. According to the BC EAO *Guidelines for the Selection of Valued Components and Assessment of Potential Effects* report, indicators should be:

- **relevant** and relate directly or indirectly to a valued component identified as important in the EA process;
- **practical** and able to be measured through achievable data;
- **measurable** so as to reflect changes to valued components over time;
- **responsive** to the effects of a project;
- **accurate** in reflecting changes over time; and
- **predictable** in terms of their response to a project.(18)

This report conceptualizes a variety of possible indicators that may be reflective of valued components identified by EA practitioners and other parties engaged in

assessing and monitoring the impacts of resource development on health and the SDoH. In doing so, it aims to explore existing indicators that have been deployed through EA and independent assessment processes. To that end, this report generates an exploratory list of health and SDoH indicators that may be useful in driving future assessment processes by demonstrating the breadth of possible indicators and associated data sources that are available to EA practitioners, health authorities and other government agencies, industry proponents and impacted communities.

2 Purpose

The study that led to this report was a seed-grant-funded project for a tripartite research collaboration among the Provincial Health Services Authority (PHSA), Northern Health (NH), and the University of Northern British Columbia (UNBC). The goal of this seed grant funding is to enable researchers and knowledge users at these institutions to initiate new research projects that focus on improving the quality of health services and population health across northern BC. The seed grant for this project ran from May 2016 to October 2017, and is intended to be an exploratory analysis of indicators and existing data sources that can help inform NH recommendations during the EA process, support potential indicator and data selection for proponent and community-driven assessment processes and identify areas where further research, knowledge and work is needed. This project was built on an array of existing work, and applies understandings of the SDoH to situate human health and wellness in relation to a variety of social, economic, cultural and environmental conditions.(1)

This report reviewed a variety of information sources including grey literature and selected provincial Environmental Assessments for major projects located within the Northern Health region—an area comprising approximately 600 000 km² and over 300 000 residents.(23) Specifically, this project asks: “What kinds of SDoH and health indicators related to resource development are utilized in existing assessment processes, and are additional indicators available to better understand the inherently localized impacts of development operations?” This research question is animated by the following research objectives:

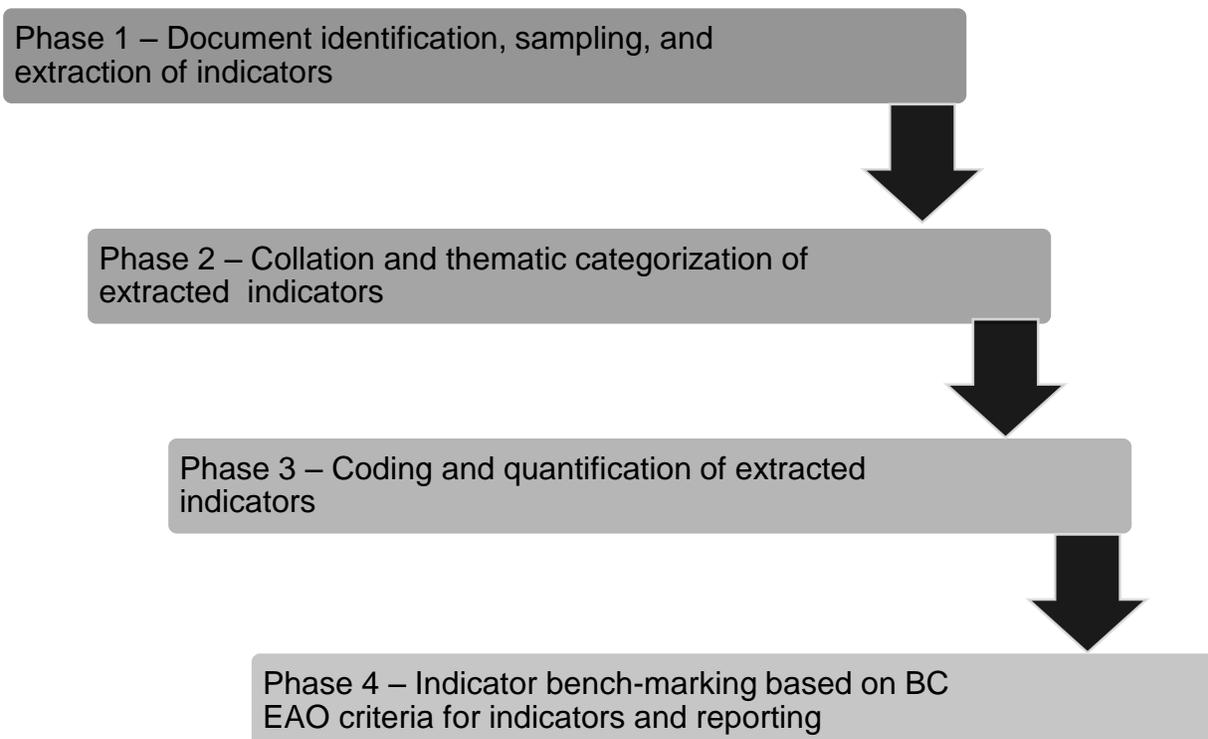
- **Research Objective 1:** Explore and identify a variety of possible socio-economic and health indicators to support industry, communities, and government agencies to track SDoH and health impacts of resource development over time;
- **Research Objective 2:** Characterize the use of SDoH and health indicators from a sample of regulatory and independent assessment processes for natural resource projects operating in the Northern Health region;

- **Research Objective 3:** Identify knowledge and data gaps to support future research and data collection efforts relevant to environmental assessments and associated initiatives seeking to monitor the SDoH throughout the Northern Health region; and
- **Research Objective 4:** Make recommendations on how to improve monitoring of the social, economic and health impacts of resource development operations across northern BC, and in other resource-rich regions.

3 Research Methods, Data Sources and Analysis

The authors utilized a four-stage iterative approach to extracting, defining and analyzing possible SDoH and health indicators (see **Figure 1**).

Figure 1. Methodological approach for SDoH and health indicator identification and analysis



First, we reviewed a variety of EA documents for specific projects across the Northern Health Region, and selected a purposeful random sample of EAs, ensuring we captured a diversity of projects according to their resource sector and geographic location. Projects were first stratified by resource sector and geographic locations before being randomly sampled. We also selected several grey-literature documents to identify

indicators being utilized across the region and indicators being proposed by relevant stakeholders (e.g. project proponents, local governments, health agencies), Indigenous rights holders and community members to serve as a comparator. We extracted indicators from these documents and compared them to publicly available data sources, flagging those which do not have public data available. Second, we compiled all indicators in a table and categorized them according to several broad SDOH categories or as specific impacts to human health and health service delivery. Third, we coded and quantified indicators according to where they are situated on effect pathways, whether they represent proportion or count data, and the level of analysis at which each indicator is directed (e.g. population vs. individual). Fourth, we ranked each indicator according to the six criteria of indicators as described by the BC Environmental Assessment Office.(18)

3.1 Data Sources

The project began with a purposeful sample of EA documentation for a variety of projects within Northern British Columbia at different points in the EA certification process (privileging those documents that had recently received certification). A total of eleven Provincial EA documents (see below) were chosen from three sectors of natural resource development: mining, liquefied natural gas (LNG) extraction and transportation, and renewable energy projects. A review was conducted of proposed socio-economic and health values identified in formal assessment processes. In most cases we reviewed two principle documents: [1] the application materials prepared by the proponent, and [2] the formal assessment report prepared by the EAO where possible, depending on the status of the project. Projects for which documents were reviewed include: Wolverine Coal,(24) Murray River Coal,(25) Mount Milligan,(26) Blackwater Gold (27) and the Site C Dam.(28) The four LNG projects included Pacific NorthWest LNG,(29) Coastal GasLink Pipeline,(30) Grassy Point LNG,(31) and the LNG Canada Export Terminal.(32) The projects selected for this purposeful sample were chosen to reflect the diversity of industries for which EAs are required, the geographic diversity of projects located within the Northern Health region, and a range of publication dates between 2004 and 2016.

During our scoping of this project, we also identified grey literature documents that rearticulated the challenge of assessing and monitoring socio-economic and health trends related to resource development and extracted indicators from these documents that were produced outside of formal regulatory assessment processes. The purpose of reviewing these documents was to surface indicators identified by stakeholders, community driven processes and Indigenous communities to enable an exploratory comparison between what these groups identify as critical areas of concern in relation

to what is being measured within the EA process by project proponents. A full list of all sampled projects and documents is provided in **Table 1**.

Table 1: Description of sampled documents

Document Origin (Total Documents Reviewed)	Project Title	Documents Reviewed (Date of Publication)
BC EAO Project Information and Collaboration System (N=16)	Wolverine Coal Project	Application Documents (2002); Assessment Report (2004)
	Mt Milligan Copper-Gold	Application Documents (2008); Assessment Report (2009)
	Coastal GasLink Pipeline	Application Documents (2014); Assessment Report (2014)
	Pacific Northwest LNG	Application Documents (2014); Assessment Report (2014)
	Site C Clean Energy	Application Documents (2013); Assessment Report (2014)
	LNG Canada Export Terminal	Application Documents (2013); Community-level Infrastructure and Services Management Plan (2016)
	Murray River Coal	Application Documents (2013); Assessment Report (2015)
	Grassy Point LNG Project	Pre-application Documents (2016)
Grey Literature Documents (N=6)	Blackwater Gold	Application Documents (2016)
	Takla Lake First Nation Socio-Economic Study for the Proposed Prince Rupert Gas Transmission Project(33)	Community-driven assessment Report (2014)
	Health impact assessment of the 2014 Mount Polley Mine tailings dam breach: Screening and scoping phase report(34)	First Nations Health Authority Assessment (2014)
	Northern Caucus Overview of Sub-Regional Engagement Sessions: Health & Resource Development(36)	Northern Health Consultation Document (2015)

Interim Support for Developing Health Baselines for Projects in the Prince Rupert Area(37)	Northern Health Report(2016)
Priority Health Equity Indicators for British Columbia(38)	Provincial Health Services Authority Report (2016)
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(1)	Northern Health Report (2017)

3.2 Extraction of Indicators and Inclusion/Exclusion Criteria

Both EA documents and the supporting literature were scanned and indicators pertaining to health and the SDOH were extracted, categorized and defined using Microsoft Excel. Indicators that were excluded from the parameters of this project include those pertaining to the physical environmental impacts that result from resource extraction activities, unless there was a specified cultural or social connection of those changes. Examples of indicators excluded from our analysis include ambient light and noise, ecosystem changes, and acid rock drainage. Physical and biochemical changes to the natural environment—while important—fall outside the parameters of this study. The collected indicators were grouped thematically based upon existing frameworks for understanding the SDOH (3,16,39–41) and designed to build off the SDOH impacts conceptualized in the initial report.(1) Indicators were collected regardless of whether there was existing supporting data or a standardized process in place to measure the phenomena. Indicators that were worded differently but measured the same phenomena were grouped together to avoid duplication.

3.3 Data Coding and Reporting

The core investigative team created a basic data coding schedule for indicators extracted from our data sources. Indicators extracted into Microsoft Excel were coded according to several criteria of interest. A coding value of “1” indicated the presence of criteria of interest, whereas a “0” reflected the absence of coding criteria of interest.

Inspired by a similar coding system applied to the SDoH(42), we utilized three categories in our coding scheme: primary, secondary, and tertiary. To allow indicators to be coded according to their effect pathways—defined as “the cause-effect linkage between a project and a valued component” or indicator representing that valued component.(18) A primary pathway reflects a direct pathway between a change initiated by resource development activities and impacts experienced within a population (e.g. increases in respiratory disease resulting from poor air quality associated with industrial operation). Secondary pathways refer to how resource development activities may mediate or modify processes or systems which influence health (e.g. limiting the capacity of health service delivery in rural and remote regions that see large influxes of temporary workers). A tertiary pathway was characterized by indirect or diffuse causal mechanisms with effects that may be separated from an original cause across time and space (e.g. changes to water temperature and flow rates from a hydroelectric dam which affect salmon populations and Indigenous rights and title to practice traditional livelihoods).

Indicators were also coded based on whether they could be considered a population level or an individual level indicator. Population level indicators refer to indicators that reflect characteristics of groups of people (e.g. average income of a community), whereas individual-level indicators refer to information that pertains to a single person (e.g. a person’s household income). The third level of coding classified the indicators in terms of whether they are displayed as counts or proportions. Counts refer to the sum total of a phenomenon of interest (e.g. the number of people in a community with a high school diploma), whereas proportions refer to the distribution of particular characteristics or variables of interest across a broader population (e.g. % of the entire population in a region with a high school diploma). Indicators were also coded based on their origin; that is, whether they were extracted from an EA document, from the supporting literature, or whether they were present across multiple sources.

The final set of coding determined how well indicators met the BC EAO attributes of indicators criteria, described above, which include relevance, practicality, measurability, responsiveness, accuracy and predictability.(18) This coding process rated indicators out of a possible six points. Zero points describe an indicator that is neither relevant, practical, measurable, or responsive, accurate, or predictable while six points describes an indicator that demonstrates all of these qualities.

It should be noted that while some indicators in the sample were found to have available data, they were not coded as measurable based on the BC EAO attributes of indicators coding criteria. *Measurable* refers to the degree to which the selected indicator generates useful data that informs our understanding of the potential effects on the greater value component. While coding, the members of the research team considered the following criteria for measurability:

- whether the indicator has a reliable source of published and available data;
- the schedule by which that data is collected; and
- whether additional local or regional data sources were available.

3.4 Analysis

The coding was completed by one research assistant (RA) and reviewed by members of the core investigative team, following the coding process described above. In the event that there was uncertainty on behalf of the RA around the coding of an indicator, the indicator was flagged for review by a member of the core investigative team. A decision was then made between the RA and the researcher for indicators that did not clearly fit within a coded category. All coding was performed manually without the assistance of any auxiliary coding software. Codes were then totalled for reporting purposes, and in the case of BC EAO indicator criteria, we conducted a mean analysis of indicator criteria scores at the level of the overall theme and sub-theme of all indicators for our sample.

3.5 Limitations

This project was funded by a small seed grant, and is intended to be an exploratory analysis of indicator use, by looking at diverse ways in which indicators are conceptualized and monitored. Therefore, there are a number of typical limitations that arise in projects with limited budgets and short project timelines. First, we chose a targeted sample of provincial EA documents from 2004 to 2016 for past, present and future resource development projects. While these projects provide a small sample, they do offer a snapshot of the provincial EA landscape across a variety of industry sectors in Northern BC within this timeframe. However, both time and financial resources limited the number of EA documents that could be examined during this seed grant, and at the time of writing this, there were 64 projects across the Northern Health region that had received EA certification and posted required assessment reports and supporting documentation to the BC EAO Project Information and Collaboration System's on-line repository. Thus, some EAs could have taken a different approach to conceptualizing health and SDoH impacts and related indicators relative to those reviewed. Nonetheless, we did find general consistency in terms of indicators selected across the projects we reviewed, indicating that a full review of all 64 active projects would not necessarily yield appreciably different approaches to indicator selection.

Second, we extracted indicators from a variety of grey-literature documents that had utilized either select community-engagement processes to identify locally-relevant SDoH values or indicators present in other grey or scholarly literature. Given that these sources of information were already available in a published format, we did not complete an additional review of the scholarly literature to extract indicators nor did we engage in a comprehensive community engagement process across the Northern

Health region. Thus, we do not claim that the list of extracted indicators is based on a systematic review of the literature or that it represents the diversity of voices, perspectives and experiences across Northern BC.

Third, this report does not intend to comment on the legal basis of ‘consultation’ and ‘accommodation’, as well as the potential infringement of Indigenous rights and title, or the nature of those rights under Section 35 of the *Canadian Constitution*, or the various legal discourse in relation to the issue of consulting with Indigenous communities and nations. We wish to acknowledge that these are important issues, and that the indicators extracted in our review are not intended to be a ‘one-size-fits-all’ solution to developing indicators that apply to either or both Indigenous and settler communities across Northern BC. Accordingly, we strongly encourage project proponents, government agencies and Indigenous and settler communities conducting their own third-party monitoring initiatives to consider the *United Nations Declaration on the Rights of Indigenous People* and that processes of engagement with Indigenous communities follow protocols to ensure free, prior and informed consent prior to the beginning of a development on traditional territories.(43)

Fourth, the coding of indicators according to BC EAO criteria is ultimately subjective, both within the context of a formal EA process and in this report. We describe this limitation in greater detail in the discussion section of this document and seek to provide further guidance on criteria for indicator selection to redress this limitation.

Fifth, while our list of indicators extracted from our data sources is extensive, it is by no means exhaustive or comprehensive. Indeed, there are myriad ways in which to measure and monitor SDoH and health impacts from various health stressors, including resource development. Our findings only represent the targeted sample of EAs and supporting literature examined throughout this exploratory analysis to illustrate the complexity and diversity of ways that indicators and valued components are conceptualized and assessed. Thus, we provide this list as an exploratory guide to further indicator development that could be useful for future monitoring initiatives by industry proponents, government agencies, and Indigenous and non-Indigenous communities alike.

4 Results

This section reports on the results of our research process described above. We first outline the characteristics of the full list of indicators extracted from the documents that comprised our review. We then provide information on the results of our coding process accounting for risk pathways, level of analysis, and whether indicators represented count or proportion data, before detailing the results from coding variables according to BC EAO criteria for selecting valued components and indicators.

4.1 Identification of SDoH and Health Indicators and Data Sources

A total of ten overarching themes emerged from our sample with a total of 552 unique indicators being identified across these themes (see Appendix A for the full list of extracted indicators, their definitions and available data sources, with instructions for how to use this table found in Appendix B). We started by identifying indicators from source documents and used these to get a sense of how indicators cluster together to represent a theme. The 10 themes that were identified include: demographics; housing; education; infrastructure and services; agriculture and food; health, wellbeing and health service delivery; work environment and conditions; economy and politics; Indigenous culture and identity; and community and social value. While these concepts are helpful to better understand particular social and health values, we found that the breadth of indicators within these categories would benefit from additional categorization for the purpose of clarity. To that end, we further organized indicators into sub-themes. **Table 2** provides the summary statistics for the distribution of indicators across the themes and sub-themes uncovered in our review.

Table 2. Summary of indicator themes, sub-themes and counts and distributions

Theme	No. of indicators (% of total)	No. of indicators with available data sources (% within theme)	Sub-theme categories	No. of indicators in sub-theme (% of sub-theme indicators by overall theme)
Demographics	110 (19.9%)	108 (98.2%)	Social Assistance	12 (10.9%)
			Employment	7 (6.4%)
			Income	10 (9.1%)
			Family Dynamics	14 (12.7%)
			Population	30 (27.3%)
			Demographics	24 (21.8%)
			Health	13 (11.8%)
Housing	39 (7.1%)	36 (92.3%)	Safe Housing	4 (12.3%)
			Housing	6 (15.4%)
			Maintenance	7 (17.9%)
			Social Housing/ Homelessness	9 (23.1%)
			Home Ownership	13 (33.3%)
Education	36 (6.5%)	29 (80.6%)	Grade School (K-12)	23 (63.9%)
			Post-Secondary	13 (36.1%)

Infrastructure and Services	20 (3.6%)	19 (95.0%)	Water	7 (35.0%)
			Utilities and Waste Removal	4 (20.0%)
			Transportation	7 (35.0%)
			Infrastructure	2 (10.0%)
Agriculture and Food	23 (4.2%)	5 (21.7%)	Access/Availability	8 (34.8%)
			Land Use	4 (17.4%)
			Traditional food systems	11 (47.8%)
Health, Well-being, and Health Service Delivery	172 (31.2%)	157 (91.3%)	Mental Health	20 (11.6%)
			Addictions and Risk Behaviours	19 (11.0%)
			Access to Care	19 (11.0%)
			Health Promotion	10 (5.8%)
			Maternal/Pre/post Natal Health	14 (8.1%)
			Sexual Activity and STIs	10 (5.8%)
			Chronic Health Conditions	41 (23.8%)
			Acute/Communicable	4 (2.3%)
			Functional Health	8 (4.7%)
			Accidents and Injuries	6 (3.5%)
			Physical Activity	5 (2.9%)
			Quality of Life/Self Measures	7 (4.1%)
			Environmental Health/Contamination	5 (2.9%)
			Well-being Indices	3 (1.7%)
			Cumulative Impacts	1 (0.6%)
Work Environment and Conditions	19 (3.4%)	14 (73.7%)	Emergency Management	1 (5.3%)
			Subsistence economies and on-reserve employment	5 (26.3%)
			Employment access and characteristics	13 (68.4%)
Economy and Politics	24 (4.3%)	10 (41.7%)	Revenue and Taxation	6 (25.0%)
			Indigenous Issues and Self Governance	6 (25.0%)

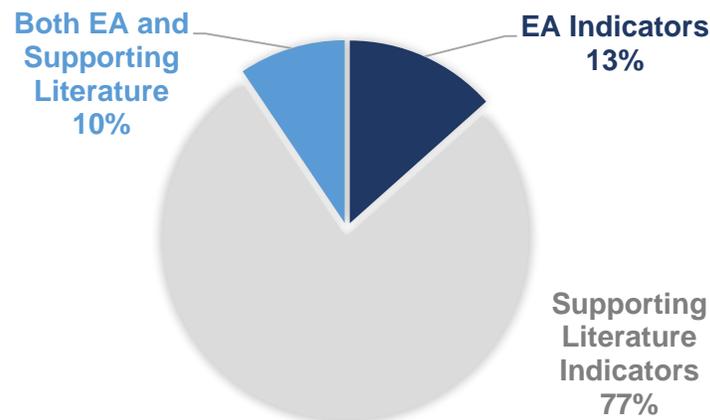
			Local Economy and Politics	12 (50.0%)
			Environment and Cultural Impacts	9 (20.9%)
Culture and Indigenous Identity	43 (7.8%)	9 (20.9%)	Land	3 (7.0%)
			Language	5 (11.6%)
			Community Cohesion	9 (20.9%)
			Culture and Identity	9 (20.9%)
			Governance, and Relations with Industry	8 (18.6%)
			Crime and Illicit Activities	30 (45.5%)
Community and Social Value	66 (12.0%)	51 (77.3%)	Public Safety/Attitude	3 (4.5%)
			Community Connectedness	8 (12.1%)
			Social Problems	3 (4.5%)
			Leisure and Recreation	11 (16.7%)
			Social Capital	4 (6.1%)
			Financial Stability	3 (4.5%)
			Natural Environment	4 (6.1%)
Ten Themes	552 (100%)	440 (79.7%)	56 Subthemes	552

We also looked for sources of publicly available data for each indicator identified. In total, we found that 440 (79.7%) of the indicators extracted had some form of publicly accessible data, and that 112 (20.3%) did not.

4.2 Indicator Origins

The origins of indicator provide insight into which types of indicators are being used in EAs, supporting literature, and across multiple sources. **Figure 2** displays information regarding indicator origin, where 13 percent were collected from the EA documents sampled, 77 percent were obtained from supporting literature sources, and 10 percent of indicators were co-located across both EAs and supporting literature. It is notable that of the 43 total indicators associated with the Indigenous culture and identity theme, 38 were derived from supporting literature, with only four utilized in EA documents, and one that is found in both EAs and the supporting literature.

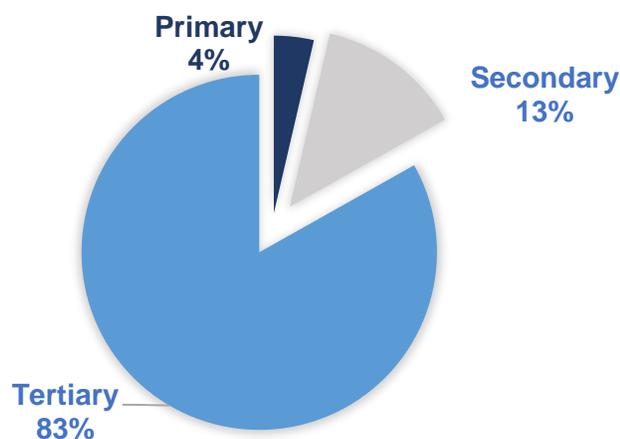
Figure 2. Origin of indicators in our sample by percentage of total indicators (N=552)



4.3 Coding Results for Indicator Characteristics: Causal Pathways, Level of Analysis, and Count vs. Proportion

Figure 3 provides the distribution of all indicators by causal pathway type. Primary causal pathway indicators (e.g. direct impacts) made up only 3.6 percent of the total indicators collected. Secondary causal pathway indicators identified to have both direct and indirect impacts on communities made up 13.2 percent, and tertiary indicators with indirect and diffuse causal pathways made up 83.2 percent.

Figure 3. Distribution of indicators according to classified causal pathway type



The population or individual level indicator coding results concluded that 71.4 percent of indicators were population level descriptors, while the remaining 28.6 described more individual level indicators. Count and proportion level coding analysis concluded that

56.0 percent of indicators were considered to be proportion level, while 44.0 percent were found to be counts.

Table 3 summarizes the distribution of indicators according to causal pathway by indicator source type. Of the 552 indicators identified, a total of 74 indicators were retrieved exclusively from the EA documents. Comparatively, 426 indicators were retrieved exclusively from the sample of supporting grey literature documents and 52 co-occurred across both sources.

Table 3. Distribution of identified indicators on causal pathways by indicator source

Indicator Source	Location on Causal Pathway			
	Total Indicators	# of Primary Indicators (%)	# of Secondary Indicators (%)	# of Tertiary Indicators (%)
EA Documents	74	9 (12.2%)	16 (21.6%)	49 (66.2%)
Supporting Literature	426	10 (2.3%)	40 (9.4%)	376 (88.2%)
Both	52	1 (1.9%)	13 (25.0%)	38 (73.0%)
Total	552	20	69	463

Table 3 suggests that EA documentation, while still identifying a number of more ‘distal’ indicators on the causal pathway, tends to select indicators that are more proximal (e.g. more ‘direct impacts’) to resource development activities. We suggest that this is likely a result of BC EAO coding criteria which tends to place a higher emphasis on direct impacts relative to the complex web of effects which may produce latent impacts to socioeconomic conditions within a community and associated health impacts.

4.4 Coding Results and Scoring for EAO Attributes

As described in the methods section, we coded each extracted indicator against the six criteria for indicators outlined by the BC EAO. The greater an indicator scored out of six the more it met the six criteria outlined by BC EAO; that is, the more likely a trait is to be relevant, practical, measurable, responsive, accurate and predictable as defined by the BC EAO. The results have been aggregated across valued components to give readers a sense of what kinds of indicators align more or less closely with BC EAO criteria.

Table 4 describes overall number of indicators distributed across themes and sub-themes, and displays the mean score for the BC EAO attributes of indicators coding. For example, using the theme ‘housing’ as an example, there are a total of 39 indicators, further categorized into five sub-themes: safe housing (N=4), housing maintenance (N=6), social housing/homelessness (N=7), home ownership (N=9), and access/affordability (N=13). Access/affordability has a total mean score of 4.84, which is one of the three highest scoring sub-themes across our entire sample of indicators,

indicating that collection of 13 indicators was most likely to be relevant, practical, measurable, responsive, accurate and predictable. It is particularly important to highlight that health, well-being and health service delivery represented the lowest overall mean score for an overarching theme, signaling that health indicators may not necessarily align well with BC EAO guidance on indicator selection criteria.

Table 4. BC EAO Attributes of Indicators Coding Results

Theme	Mean Score for all Indicators Grouped by Theme	Sub-theme	Mean Score for Indicators Grouped by Sub-theme
Demographics N=110	2.72	Social Assistance (N=12)	2.83
		Employment (N=7)	4.40
		Income (N=10)	4.00
		Family Dynamics (N=14)	2.64
		Population Demographics (N=30)	2.16
		Health Demographics (N=24)	2.79
Housing N=39	3.92	Youth (N=13)	2.30
		Safe Housing (N=4)	2.00
		Housing Maintenance (N=6)	3.83
		Social Housing/Homelessness (N=7)	3.00
		Home Ownership (N=9)	4.22
Education N=36	2.52	Access/affordability (N=13)	4.84
		Grade School (K-12) (N=23)	2.26
Infrastructure and Services N=20	4.15	Post-Secondary (N=13)	3.00
		Water (N=7)	5.28
		Utilities and Waste Removal (N=4)	2.25
		Transportation (N=7)	4.28
Agriculture and Food N=23	3.78	Infrastructure (N=2)	3.50
		Access/Availability (N=8)	4.00
		Land Use (N=4)	5.25
Health, Well-being, and Health Service Delivery	1.90	Traditional food systems (N=11)	3.09
		Mental Health (N=20)	1.55
		Addictions and Risk Behaviours (N=19)	2.94
		Access to Care (N=19)	2.63
		Health Promotion (N=10)	1.40

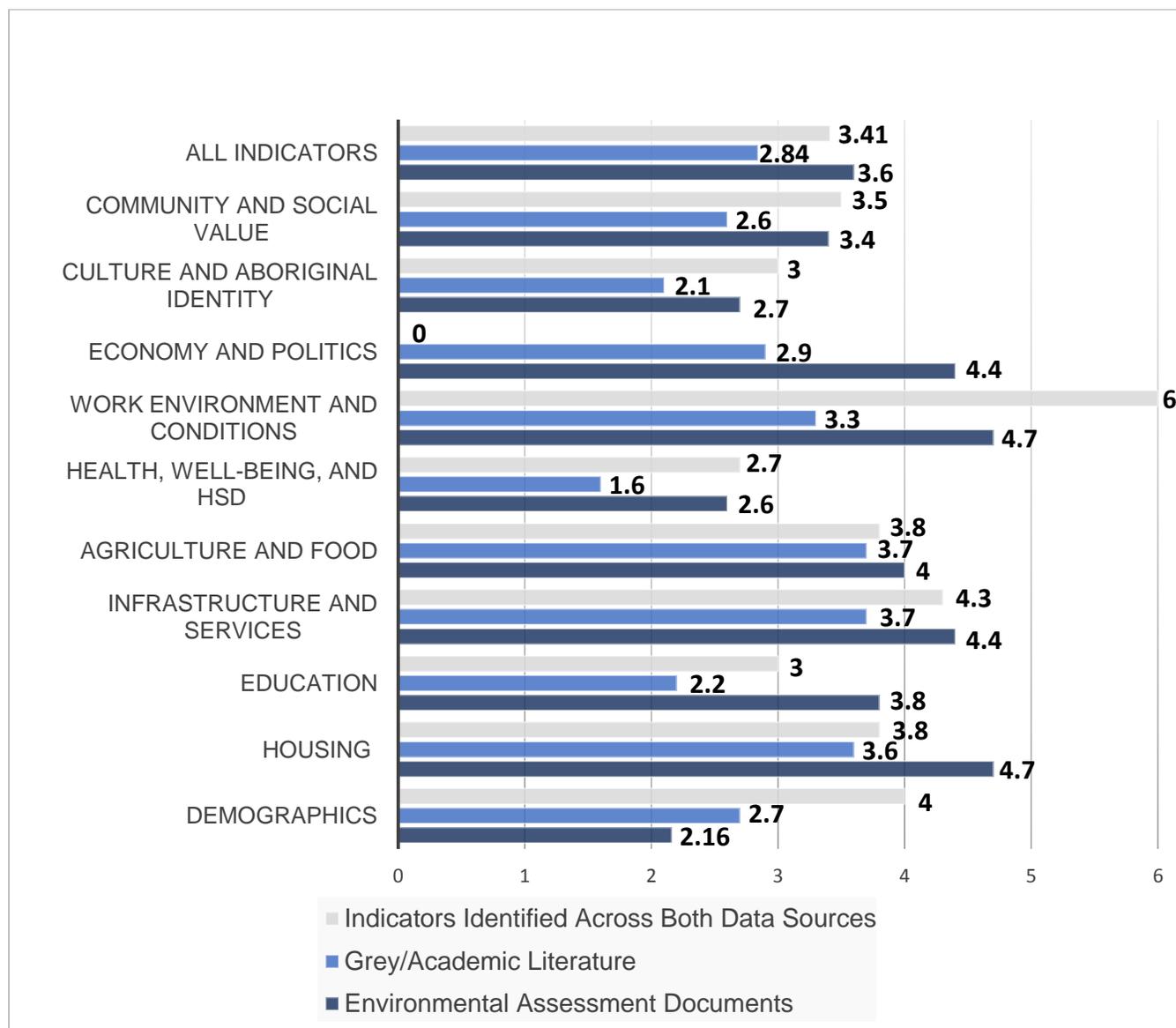
N=172		Maternal and Pre/post Natal Health (N=14)	1.14
		Sexual Activity and STIs (N=10)	3.00
		Chronic Health Conditions (N=41)	1.09
		Acute/Communicable (N=4)	1.25
		Functional Health (N=8)	1.00
		Accidents and Injuries (N=6)	3.00
		Physical Activity (N=5)	1.80
		Quality of Life/Self Measures (N=7)	1.71
		Environmental Health/Contamination (N=5)	3.40
		Well-being Indices (N=3)	4.00
		Cumulative Impacts (N=1)	4.00
Work Environment and Conditions N=19	4.05	Emergency Management (N=1)	3.00
		Subsistence economies and on-reserve employment (N=5)	3.00
		Employment access and characteristics (N=13)	4.46
Economy and Politics N=24	3.25	Revenue and Taxation (N=6)	3.66
		Indigenous Issues and Self Governance (N=6)	2.83
		Local Economy and Politics (N=12)	3.25
Culture and Indigenous Identity N=43	2.23	Environment and Cultural Impacts (N=9)	3.11
		Land (N=3)	2.00
		Language (N=5)	2.00
		Community Cohesion (N=9)	1.88
		Culture and Identity (N=9)	1.44
Community and Social Values n=66	2.86	Governance, and Relations with Industry (N=8)	2.25
		Crime and Illicit Activities (N=30)	2.56
		Public Safety/Attitude (N=3)	4.00
		Community Connectedness (N=8)	3.37
		Social Problems (N=3)	2.66
		Leisure and Recreation (N=11)	2.45
		Social Capital (N=4)	2.50
Financial Stability (N=3)	3.66		
	Natural Environment (N=4)	4.25	

Figure 4 displays the BC EAO attributes of indicators mean coding results of each theme stratified by indicator origin (i.e. from EAO documents or from supporting literature). When comparing the mean analysis coding results found in **Figure 4**, a number of conclusions can be drawn. First, indicators obtained from EAs scored the greatest overall, with a mean score of 3.6. This result is likely reflective of how the BC EAO attributes of indicators are specifically designed to inform the selection of indicators used in the EA process. Comparatively, indicators retrieved from the grey/supporting literature, had an overall total mean of only 2.8. When both data sources (EAs and supporting literature) were combined, the total overall mean score for indicators was 3.4.

Figure 4 also shows that indicators found in both EAs and supporting literature scored highest in the following seven themes: community and social value; Indigenous culture and identity; work environment and conditions; health, well-being, and health service delivery; and demographics. Indicators that originated from EAs alone scored highest in housing, education, infrastructure, agriculture and food, and economy and politics, compared to grey/academic literatures that scored highest in the areas of agriculture and food; infrastructure and services; housing; and work environment and conditions. The lowest rated themes across all indicator themes are health, well-being, and health service delivery, Indigenous culture and identity, and economy and politics.

Overall, indicators with higher scores were more likely to be derived from an EA. These indicators are also more likely to be identified as a primary or secondary causal pathway (as opposed to tertiary pathway). Moreover, indicators that rank highly using the BC EAO attributes of indicators coding tend to be regularly collected through large scale population surveys such as the Canadian Census or the Canadian Community Health Survey. These indicators therefore tend to have publicly available data that is either aggregated across large geographic regions (e.g. in the case of the Canadian Community Health Survey) down to specific communities or census divisions (e.g. in the case of the Canadian Census) and tend to be accessible online at little or no cost. While this simplifies the assessment process, it can also overlook or fail to detect and track important indirect impacts that can potentially outweigh direct impacts when determining health outcomes. Many publicly available datasets are also limited on their spatial and temporal scale and their ability to disaggregate between populations, which limits the ability to assess and understand impacts to specific communities and/or specific (and often the most impacted) sub populations within those communities, as well as important community values that help define community contexts which may not be captured in broader datasets.

Figure 4. A comparison of mean indicator scores according to the BC EAO attributes of indicators criteria by thematic area



4.4 Qualitative observations made during the document reviews

In addition to the quantitative results identified above, a number of qualitative observations were also made by the core investigative team when reviewing the documents. First, we found there is a lack of transparent and standardized processes and criteria for selecting indicators that measure and monitor SDoH impacts. Most of the documents reviewed did not identify how and why certain indicators were selected. It was not clear whether these originated from the proponent, a working group member, public consultation, a literature review or a combination thereof. It was often also not

clear whether certain indicators were included simply due to data availability or whether (and how) it would appropriately measure components of a certain valued component. Furthermore, all of the EA documents within our sample relied heavily on a desktop review in order to collect baseline data for the project site and surrounding communities. Qualitative indicators or indicators needing the collection of primary data were relied upon much less frequently, and if present, were usually based on interviews with select stakeholder informants.

5 Discussion

Our sample yielded a total of 552 indicators, which have the potential to provide a diverse array of information describing community health values. One of the benefits in conducting this review is the identification of possible supporting datasets that can be accessed by project proponents, government agencies, and community members. We now discuss the implications of the results above to provide guidance and suggestions for future research and assessment processes.

5.1 General Observations on SDoH and Health Monitoring Practices from a Sample Review of EA Documentation

Our targeted sample of EA documents highlighted both strengths and areas of limitation within Provincial EAs, specifically pertaining to the methods in which it monitors SDoH and selects relevant indicators. Our review found that there is considerable variability in indicators identified and monitored within EAs in BC, and across independent assessments driven by unique community concerns. Even where EA documents speak to similar values, the recommended measures and indicators are often not consistent. For example, most EA documents refer to—in one way or another—potential impacts to health, housing, education, employment, income, crime, infrastructure and social service delivery. However, these values were often reflected in different indicators that exist at multiple scales, leading to significant variability in terms of the direct measurement of valued components.

This variability in indicators and scales of measurement hinders comparison and generalization across communities and potential projects, limiting the availability to determine relative impacts of specific projects that may operate across similar geographic contexts, and across time. This is particularly relevant for cases where communities or populations exist adjacent to multiple projects and where comparability may be desirable, particularly in the measurement of cumulative impacts to the SDoH over time. However, comparability across projects is not always a desirable goal insofar as different communities and populations may have unique values, experiences and impacts which may require nuanced and attentive monitoring practices.

It is also often not clear how EA practitioners rationalize the sourcing of indicators (e.g. are they informed by a literature review, selected only due to data availability, identified by select stakeholders, surfaced through broad public engagement, or some combination therein). This makes it difficult to discern what drove indicator selection, the robustness of this process and whether or not the identified indicators represent the values of those that are most likely to be impacted by the project.

Eliciting community values and indicators for valued components requires transparent processes for involving community members (both Indigenous and non-Indigenous).(39,40) The lack of clarity around the sourcing of relevant values can lead to what we view as often conflicting interpretations of indicators across resource development projects and sectors. According to the BC EAO criteria, indicators should be measurable and clearly relate to an identified valued component. Instances of proponents identifying an over-arching theme (i.e. a valued component) instead of an actual measurable indicator appeared in almost all of the EA documents reviewed across our targeted sample. The relationship and differentiation between a value and an indicator that represents that value therefore requires consistency across project EAs. We believe it also necessitates a process for articulating the importance of the relationship between a valued component and an indicator, and the proximal or distal nature of that indicator in relation to development or extractive activities in order for measurement processes to take place. This should be taken into consideration in on-going data collection activities and future monitoring processes.

5.2 Moving Beyond Desktop Review Indicators of the SDoH

Our review identified numerous indicators with publicly available data. These data are typically collected via the Canadian Census, Vital Statistics, BC Stats, the Canadian Community Health Survey, the National Household Survey, and other Statistics Canada data products. EAs frequently use desktop review indicators in an effort to describe SDOH and health outcomes within communities that are anticipated to be impacted by the resource development activities of a potential project. Current EA regulations in BC mandate a degree of public and Indigenous engagement through participation on working groups (in the case of Indigenous groups), and public consultation periods (in the case of public members). However, given that most EA documentation conceptualized the SDoH through desktop reviews, some concern can be directed towards the fact that data availability appears to be a large decision factor when choosing SDoH indicators for inclusion in assessment protocols.

Moreover, there are strengths and limitations to many public data sources. While desktop data is free and easy to access, most of these data products have collection schedules of 2-4 years which may or may not align with project timelines. Any data that represents a sample of populations (e.g. the Canadian long-form census, the Canadian

Community Health survey) also raises challenges around data accuracy at the granular level of a census division or at the community level due to small population sizes and corresponding small sample sizes. Generalizability of some publicly available data sets can be challenging to apply to the Northern Health region because of its large geographic area and relatively small population. Additionally, large resource development and extraction projects usually have both negatively impacted and benefitted groups living within the affected geographic area. Large datasets are often not able to disaggregate between different populations or be representative of groups that may be especially vulnerable to socioeconomic and health impacts of resource extraction and development projects.

Further, since many of the indicators in EAs were sourced through a “desktop review” of publicly available data, indicators relying on qualitative, community derived and relevant data were limited or altogether absent from our analysis. We suspect that this information is usually included in EA documentation because it is freely available and relatively easy to access. As noted above, publicly available datasets are often limited in their spatial and temporal granularity and ability to disaggregate between different populations which limits their ability to identify and monitor important impacts that may be absent from larger publicly available datasets, or limited due to the granularity of available data. While these indicators may not have readily available public data, this does not diminish their significance within a local and regional context, nor does it mean there are no other processes for collecting this information. In fact, indicators that require innovative and collaborative processes or rely on community-level information for tracking and monitoring, may strengthen relationships, credibility and outcomes.(39–41) These impacts could potentially be better captured by qualitative, social science and/or project/community/population-specific monitoring protocols; yet, these methods appear to be underutilized in the current assessment processes.

Indeed, some communities may already collect data and track unique indicators at a municipal and regional level that could be useful to project proponents. Furthermore, local health care providers, clubs and organizations, and non-profit organizations may keep records that can provide data describing a variety of community conditions (e.g. through commissioned studies or reports). Such documents may include both quantitative *and* qualitative information (such as number of visits to health services and the quality of care received), both of which should be considered as potentially relevant for characterizing community baseline information. Indicators reviewed throughout this report demonstrate a clear bias in both regulatory and community-driven assessments for utilizing primarily quantitative metrics, although it should be noted that several independent assessment reports reviewed here also included narrative documentation of perceived and actual impacts.(34,41)

Given the strong reliance on public data sources, future assessments should consider whether additional data need to be collected and/or made available that more closely reflect the values identified in many of our supporting documents. Furthermore, moving the industry standard beyond desktop reviews might significantly enhance and support the collection and incorporation of community-driven indicators and assessment methods into a variety of future data collection activities. To that end, an identified data gap should not be a rationale for the exclusion of a particular value if that value has been identified as important or relevant to a particular project by affected communities.

For research that is the property of another organizations/stakeholders or Indigenous rights holders, these data can be requested in good faith, but should be utilized with appropriate protocols and agreements in place that: recognize original data collection efforts; clarify data ownership, management, maintenance and use; and which protect privacy and confidentiality. While these types of data may require investment from proponents in terms of developing trust, they may also fill important knowledge and information gaps that would be otherwise unfilled through a simple desktop review of data. Thus, a better assessment of SDOH indicators may occur through expanding the type of information that is assessed in EA documentation and developing methods to incorporate narrative concerns and experiences from community members into assessments and follow-up evaluations through systematic and well-defined social science methodologies.

Project proponents should also support and work collaboratively with communities and potentially impacted populations in selecting indicators and developing assessment methods for those values that may not be adequately assessed using readily available information. However, there is currently no defined mandate to work collaboratively with community members to choose, collect and monitor indicators that are reflective of locally relevant values through defensible, transparent and rigorous social science methodologies (e.g. longitudinal surveys/cohort studies, focus groups with affected population groups or service areas, in-depth interviews, etc.). We argue that broadening the scope of data collection efforts that are responsive to local values will likely improve the robustness of any assessment process.

Finally, our results raise challenging questions regarding the attributes of indicators. We sought to apply the BC EAO criteria of indicators to our sample and found that while the six criteria may be appropriate for establishing indicators for environmental impacts, they do not necessarily make sense when applied to SDOH and health impacts. This is likely a reflection of the focus of the EAO (which is ultimately located under the Minister of Environment) and the Environmental Assessment process which had as its origin the assessment of the environmental effects of a project, rather than the social, economic, heritage and health effects. An alternative framework or list of attributes could be considered to improve social indicator selection, for which we propose some preliminary

criteria in the recommendations section, below. This may also point to a larger question around whether the EA process is the appropriate venue to assess social and health impacts or whether a unique process, such as a Health Impact Assessment or Social Impact Assessment process would be of greater relevance. Indeed, numerous authors have pointed to the need to incorporate health more fulsomely into EA, or to mandate the use of other tools and processes to overcome the challenge that EA may require in adequately addressing health and socioeconomic health impacts of resource extraction and development.(19,44–47)

In this review, EA documents tended to place greater emphasis on physical natural environments rather than SDoH and human health. This has been documented globally in countries with similar histories of natural resource extraction and development.(19,48) Nonetheless, health is one of the five BC EAO pillars, and yet aspects of health that extend beyond direct biophysical exposures (e.g. through air and water contamination) such as quality of life, mental health, social wellbeing, and culture are not given even weight with valued ecosystem components in assessment procedures. We speculate that this can lead to indicator selection bias, as indicators that have convenient data availability and access are often more likely to be chosen over others that may require increased cost, time, and specific researcher experience and qualification.(21) Indeed, we found that nearly 80% of the indicators identified in our sample have sources of regularly collected data, but for reasons described above, those data are not always collected in intervals that are useful for tracking the short and medium-term impacts of development activities. Thus, indicators extracted through a desktop review may not accurately represent experiences of individuals within affected communities.

The results also raise important questions around the applicability of the EAO attributes to assess the strength of indicators related to the socio/cultural/health impacts of resource development and extraction. Whereas indicators that directly apply to biophysical changes to the environment score high using this tool, the more indirect impacts—that is indicators measuring the SDoH and health impacts of resource development—tend to score much lower. This points to whether the SDoH and health impacts indicators uncovered in our research are indeed poor indicators as their “score” might suggest, or whether an alternative classification tool is required to rank their applicability and efficacy in use. The social-cultural-health realm is extremely complex and nuanced, and thus can be extremely challenging to assess what makes a ‘strong’, locally-relevant SDoH indicator that can be used for future monitoring and evaluation processes.

Nonetheless, we are empathetic to the challenges posed under the current regulatory context that exists across BC for natural resource governance insofar as it can be incredibly difficult to overcome numerous limitations in practice. These include the fact that EAs are not designed to cover the speculative period of resource development (e.g.

assigning land tenures and pre-construction community engagement processes which may impact the SDoH through artificially impacting housing rates, for example), the lack a community of practice in BC that focuses on health impact assessment methods and training, and that the EA process only considers projects that meet certain criteria (e.g. smaller projects together can have huge impacts and these cumulative impacts of multiple projects may be missed entirely).(21,49) Several related and collective challenges remain, including, but not limited to: how best to incorporate Indigenous leadership and expertise in these processes and how to reconcile on-going court cases pertaining to the legal land rights of Indigenous communities in relation to on-going natural resource governance processes (i.e. participating as members of an EA working group); the growing need for professional standards and frameworks for legislation on the assessment of SDoH and health impacts related to resource extraction and development; and whether or not the EA process can be considerably enhanced and staffed to meet such legislative changes versus inventing entirely separate assessment processes altogether. Our hope is that the recommendations made below can begin to address some of these limitations, and that the list of indicators provided in this report's appendix will assist future waves of impact assessment.

6 Conclusion and Recommendations

The purpose of this project was to scope SDOH and general health indicators that relate to resource extraction and development in the EA process, and compare indicators being used in EAs with indicators identified by stakeholders, community driven processes, and Indigenous representatives in selected grey-literature documents. The findings from our targeted sample conclude that there are a variety of potential SDoH indicators available to industry, government, and community stakeholders and Indigenous rights holders. Our findings raise a number of considerations for processes oriented towards measuring and monitoring the SDoH impacts of resource extraction and development, although we anticipate this report may be most useful for those involved in EA certification processes and conducting independent assessments (e.g. Health Impact Assessments, Social Impact Assessments). They also highlight many areas for future research and data collection efforts to further strengthen assessment of the SDOH and health impacts of resource extraction and development. To redress the issues highlighted above, and in an attempt to enhance indicator selection and utilization, we provide several recommendations. Recognizing that this project was funded by a seed grant, many of the recommendations centre around where additional considerations and efforts may be directed to gain further clarity and/or advance our understanding on this issue.

6.1 Recommendation #1 – To further explore the applicability of current EA indicator selection criteria for monitoring social and health impacts to better inform existing and future regulatory and assessment processes.

Our analysis of EAO criteria for indicators found that the six criteria are not easily applied to SDOH or health indicators (e.g. they resulted in low average scores). This may be the result of these criteria having been devised with environmental measures in mind. The complexity inherent to social and health variables—in that changes are often cumulative, resulting from multiple stressors across time and space—leads to challenges in measuring the attribution of any single aspect of a resource development project to the indicator or valued component of interest. Currently, for an indicator to be robust under EA criteria, it must be: relevant, practical, measurable, responsive, accurate, and predictable. We appreciate the desire to have accurate and reliable data for assessing the positive and negative impacts of projects, however, the applicability of the criteria applied to social and health indicators can be improved.

To that end, the *relevance* criterion could be broadened (in policy and/or practice) to incorporate perspectives from potentially affected communities, as they are the primary stewards of local knowledge (see also Recommendation #2).(40) Moreover, we believe that *relevance* in relation to SDOH and health indicators presents a unique opportunity to consider the equity implications of resource extraction and development. That is, certain populations may be more or less vulnerable to a variety of impacts, and indicator selection should be attentive to equity issues whereby addressing disparities, inequalities and inequities is good for all members of a community. The current EA process is not particularly attentive to equity dynamics of resource development activities, which could be remedied by utilizing it as a guiding value in indicator selection related to the relevance of indicators.

We recommend that *practicality* be broadened and/or clarified to reflect that ‘achievable data’ can be collected by proponents, by communities or through collaborative efforts, and not only through a desktop review of existing data. Indeed, numerous environmental studies are commissioned to better understand baseline conditions for wildlife and other ecosystem values. Similar processes can be developed to better understand the socio-economic and health dynamics of a project using social science research methodologies and leading practices in community engagement and social impact assessment. New or revised criteria could be explored that would be more inclusive of alternative methodologies, and also more specific and sensitive to the complex relationships and diffuse effect pathways characteristic of many important impacts to SDOH and the health of communities.

Measurability should reflect the ability to count key variables of interest, as well as incorporate qualitative measurements of values and indicators over time. This is particularly salient for community members who may feel statistics do not capture their lived experience of a project or a place that may be changing around them in complex ways. This requires impact assessors to be attentive to the ways in which regularly collected public data sources may or may not be reflective of micro-dynamics of a community that manifest in terms of impacts to the SDoH or human health.

Responsiveness, accuracy and predictability are all important aspects of indicator robustness. However, it is important to note that given numerous influencing factors on health and well-being, it may be impossible to articulate the indirect pathways between various forms of resource extraction and development and impacts to the SDoH in a single indicator. For instance, some social impacts may not be entirely predictable requiring alternative and reflexive assessment processes that can both capture and attend to these impacts if and when they arise. Moreover, each of these criteria is also heavily dependent on availability of data and timing under which it is collected which may not capture the temporal or geographical scale of the project or impacted populations (e.g. many desktop reviews utilized data that is collected every four years from the Canadian census which may not accurately capture the experiences in the community). Thus, *responsiveness, accuracy and predictability* may not be entirely appropriate for any one indicator, and thought should be given to utilizing multiple indicators for a valued component in order to address these three criteria. Finally, *responsiveness, accuracy and predictability* are not necessarily reflective of *perceived* impacts to the SDoH from a given project which can be an impact in and of itself. This potential shortcoming additionally supports notions that indicators can not only be quantitative, but should also include qualitative research methods to capture robust information on the lived experiences of local populations.

Past research has attempted to develop alternative criteria for selection of impact indicators related to resource extraction and development. For example, the Arctic Social indicators project highlight the need for: data availability, data affordability, ease of measurement, robustness, scalability, and inclusiveness.(46) Thus, indicators should be suitable for longitudinal analysis; be sensitive to changes over time; and be available at least at the regional level, or ideally the level of specific affected communities. However, based on findings from this report, we challenge the notions that availability, ease of measurement and affordability are always suitable metrics for monitoring social and health impacts of resource extraction and development for the reasons described above.

Additional guidance from frameworks for indicator development and selection are outlined in the initial report. These include the following list of associated principles and practices for SDoH monitoring and assessment:

- Developing suitable and comprehensive baseline information that applies to the state of values not only immediately prior to the construction and operation of a resource extraction and development activity, but that is also considerate of the larger regional context over time (i.e. scoping a suitable historical baseline);
- Considering the needs of and impacts to future generations;
- Evaluating SDOH impacts across the life course wherever possible (e.g. during early childhood development, adolescence, adulthood and old-age);
- Utilizing principles of human rights and considering responsibilities defined under the *UN Guiding Principles on Business and Human Rights*, in addition to the notion of free, prior and informed consent as defined in the *UN Declaration on the Rights of Indigenous People*;(50,51)
- Considering existing inequitable health outcomes across SDOH categories and how development activities may exacerbate (or ameliorate) those conditions;(52) and
- Utilizing adaptive management principles to ensure assessments are continually conducted and evaluated over the lifecycle of a project, and that such assessments continue to be updated and reflect new and emerging impacts to communities.(53,54)

6.2 Recommendation #2 – Future work should seek to clarify expectations and provide guidance on appropriate social science methodologies to help improve meaningful and inclusive community engagement practices that may assist with identifying, selecting, measuring and monitoring SDOH and health indicators in natural resource management processes.

The indicators surfaced from EA documents and grey literature documents scored differently in our analysis of BC EAO indicator criteria. This indicates that these two sources of information may be qualitatively different and that the current EA process may not capture values that are important for communities or vulnerable populations. For the reasons described under Recommendation #1, we believe that a low score for an indicator using the current criteria for indicator robustness may not be reflective of whether an indicator is inherently 'good' or 'bad' for a given project, but that processes for building consensus around locally important values and selecting appropriate indicators are required. These should align with social and health impact assessment leading practices identified above and in the initial report.

Impact assessors may require further guidance and a “minimum bar” on how social and health indicators should be selected (differing from environmental indicators) and how

and to what extent the indicator selection process should be detailed in the reports to promote transparency. Further work is likely required to get more clarity and be able to provide guidance on the indicator selection and social science methodologies that should be used to inform the assessment of social and health indicators. This could include clarity on a range of suitable engagement processes for indicator selection (e.g. how they can or should be structured, who should be included, how consensus is achieved, the kinds of questions that can be posed to identify indicators of valued components, and how recommendations from the public should be incorporated).(55,56) These processes should be based on transparent protocols and some of the leading practices identified in the initial report so that communities can participate in the negotiation of acceptable levels of impact resulting from development activities.(1) At a minimum, it should articulate clear expectations around when and how primary and/or community derived qualitative or quantitative data should be incorporated into assessment processes to ensure that impact assessments are not only based on a desktop review.

6.3 Recommendation #3 –A “parallel streams” approach should be considered for assessing and monitoring health and SDoH impacts, relying on a combination of publicly accessible standardized data and community driven and derived, locally important data.

Recommendations 1 and 2 inform our final recommendation, which is to further evaluate existing approaches to how impacts to SDoH and health are assessed and monitored in the context of resource development and major projects in BC. Given the importance of resource development and extraction to northern economies and well-being, there is a need to improve the frequency and granularity of available data that can be used in both formal impact assessment processes and community driven assessments. How this data should be collected and by whom requires further consideration.

To that end, we confer with the conclusions made in the initial report: that a dual-stream monitoring system could be developed over time relying on a combination of publicly accessible standardized data and community driven and derived data that is reflective of and attentive to local values. At the provincial level, a variety of consensually agreed upon community-level indicators related to resource extraction and development would need to be developed across health, social and natural resource agencies. Developing a regularly collected, provincial health survey (see the Ontario Health Survey, for example) with targeted questions on SDoH impacts of resource extraction and development could ensure comparability across communities over time and provide a suite of publicly accessible data to inform EA and other assessment types. It could also

bolster population health surveillance and potentially lead to more reliable and representative data collection in northern communities.

However, given the importance of community engagement raised in the above recommendations, it is also relevant to provide indicators and a means of collecting data at the community-level which represent the nuances of resource-dependent communities. We believe that within the context of impact assessment processes, such information can be retrieved either through the engagement of community partners who are already collecting data, through direct collaboration with a variety of community organizations, civil society groups, and Indigenous communities or through the use of social science methodologies to collect primary social data. Mainstreaming this into regulated impact assessment processes as a potential requirement for project proponents would have a variety of benefits. This type of system could also provide opportunities for communities to be gatekeepers of their own data.

6.4 Additional research opportunities and knowledge gaps

The recommendations above indicate that future research and dialogue is required on the best mechanisms for bolstering both existing regulatory processes and community-driven modes of assessing SDoH and health impacts. However, the limitations of our report (articulated in **Section 3.5**) may shed light on additional research pathways to improve our understanding and the robustness of indicators related to the SDoH and health impacts of resource extraction and development. These may include:

- Reviewing a more fulsome sample of EA documents and analyzing the differential degree to which SDoH and health indicators are utilized to provide a more accurate assessment of the current state of industry best practices in monitoring such indicators;
- Reviewing EA documentation in a historical context to determine how the assessment of SDoH and health impacts has changed over time (NB-our review does not comment on historical development in this domain, but it is worth noting that preliminary analysis suggests more recent assessments are more attentive to SDoH and health impacts than older assessment protocols which is likely reflective of the growing consideration of health and economic impacts in the regulatory context of EA);
- Conducting a systematic review (or equivalent) of the peer-reviewed evidence on indicator development to extract further guidance on indicator development, social science assessment methods and frameworks for bolstering indicator robustness and transparency in the selection process;
- Exploring the possibility of developing hybridized assessment tools that simultaneously account for not only environmental, community and health

impacts of resource extraction and development, but also the relationships between those components; and

- Building a collaborative research agenda with First Nations and Indigenous communities to explore how best to consider the *United Nations Declaration on the Rights of Indigenous People* in relation to the need to be attentive to the unique histories of these communities to avoid possible ‘one-size-fits-all’ indicator selection protocols in ways that are also attentive to free, prior and informed consent.

We believe the information provided in Appendix A can be utilized to catalyze discussion amongst various stakeholders (e.g. industry proponents, government agencies, civil society groups), rights holders, and communities on opportunities for future data collection opportunities such as those described above. We do not suggest that this list is exhaustive, comprehensive or suitable for every community or region of northern BC. It is thus offered to populate in readers’ imaginations the multitude of ways in which impacts of resource extraction and development can be conceptualized and measured, and actively encourage Indigenous communities, non-Indigenous communities, industry proponents and government agencies alike to develop alternative measures that are reflective of both perceived and actual impacts of projects.

6.5 Conclusion

This work has raised important questions surrounding the leading and emerging practices on indicators both in practice and in the literature. However, by incorporating community concerns and feedback, indicators that are developed through processes of public engagement may be more likely to accurately respond to the individual nuances of northern and rural communities. We believe the recommendations above can support and enhance the conceptualization, monitoring and continued development of SDOH indicators with the aim of supporting sustainable development activities and healthy and just communities.

References

1. Aalhus M. *The social determinants of health impacts of resource dependent in rural and northern communities: A summary of impacts and promising practices for assessment and monitoring*. Prince George: Northern Health; 2017.
2. Marmot M. Social determinants of health inequalities. *Lancet*. 2005 Mar 19;365(9464):1099–104.
3. Marmot M, Friel S, Bell R, Houweling TAJ, Taylor S, Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. *Lancet*. 2008 Nov 8;372(9650):1661–

- 9.
4. Markey S, Halseth G, Manson D. Contradictions in hinterland development: challenging the local development ideal in Northern British Columbia. *Community Dev J*. 2009 Apr 1;44(2):209–29.
5. Bowles P, Wilson GN. *Resource Communities in a Globalizing Region: Development, Agency, and Contestation in Northern British Columbia*. UBC Press; 2015. 333 p.
6. Halseth G. Cumulative effects and impacts: Introducing a community perspective. In: Gillingham M, Halseth G, Johnson C, Parkes M, editors. *Integration Imperative: Cumulative environmental, community and health effects of multiple natural resource developments*. London: Springer; 2015. p. 83–113.
7. Halseth G, Ryser L, Markey S, Martin A. Emergence, transition, and continuity: Resource commodity production pathways in northeastern British Columbia, Canada. *J Rural Stud*. 2014 Oct;36:350–61.
8. Amnesty International. *Out of sight, out of mind: Gender, Indigenous rights, and energy development in northeast British Columbia, Canada*. London: Amnesty International; 2016. Available: https://www.amnesty.ca/sites/amnesty/files/Out%20of%20Sight%20Out%20of%20Mind%20EN%20FINAL_0.pdf
9. Lavoie JG, Wong S, Katz A, Sinclair S. Opportunities and Barriers to Rural, Remote and First Nation Health Services Research in Canada: Comparing Access to Administrative Claims Data in Manitoba and British Columbia. *Health Policy*. 2016 Aug;12(1):52–8.
10. Shandro JA, Veiga MM, Shoveller J, Scoble M, Koehoorn M. Perspectives on community health issues and the mining boom–bust cycle. *Resour Policy*. 2011 Jun 1;36(2):178–86.
11. Mactaggart F, McDermott L, Tynan A, Gericke C. Examining health and well-being outcomes associated with mining activity in rural communities of high-income countries: A systematic review. *Aust J Rural Health*. 2016 Aug;24(4):230–7.
12. Mikkonen J, Raphael D. *Social Determinants of Health: The Canadian Facts*. Toronto: York University School of Health Policy and Management; 2010. Available: <http://www.thecanadianfacts.org/>.
13. Marmot M. Achieving health equity: from root causes to fair outcomes. *Lancet*. 2007 Oct 5;370(9593):1153–63.

14. Parkes MW. Cumulative Determinants of Health Impacts in Rural, Remote, and Resource-Dependent Communities. In: Gillingham M, Halseth G, Johnson C, Parkes MW, editors. *The Integration Imperative: Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments*. New York, NY: Springer International Publishing; 2016. p. 117–49.
15. Atlin C, Gibson R. Lasting regional gains from non-renewable resource extraction: The role of sustainability-based cumulative effects assessment and regional planning for mining development in Canada. *Extr Ind Soc*. 2017 Jan 1;4(1):36–52.
16. Cloquell-Ballester V-A, Cloquell-Ballester V-A, Monterde-Díaz R, Santamarina-Siurana M-C. Indicators validation for the improvement of environmental and social impact quantitative assessment. *Environ Impact Assess Rev*. 2006 Jan;26(1):79–105.
17. Gregory R, Easterling D, Kaechele N, Trousdale W. Values-Based Measures of Impacts to Indigenous Health: Perspective. *Risk Anal*. 2016 Aug;36(8):1581–8.
18. BC Environmental Assessment Office. *Guidelines for the selection of valued components and assessment of potential effects*. Victoria: BC EAO; 2013 [cited 2017 Feb 1]. Available: http://www.eao.gov.bc.ca/pdf/EAO_Valued_Components_Guideline_2013_09_09.pdf
19. Harris P, Vilianni F, Spickett J. Assessing Health Impacts within Environmental Impact Assessments: An Opportunity for Public Health Globally Which Must Not Remain Missed. *Int J Environ Res Public Health*. 2015 Jan 20;12(1):1044–9.
20. Canadian Association of Physicians for the Environment. *The need for health impact assessments to be integrated into all federal environmental assessment processes: A submission from health organizations and health professionals to the expert panel established by the Minister of Environment and Climate Change to review federal environmental assessment processes*. CAPE; 2016 [cited 2017 Jan 3]. Available from: https://cape.ca/wp-content/uploads/2017/01/HIA-EA_final.pdf
21. Peterson E, Kosatsky T. Incorporating health into environmental assessments in Canada. *Environ Health Rev*. 2016 Mar;59(1):4–6.
22. Spickett J, Batmunkh T, Jones S. Health Impact Assessment in Mongolia: Current Situation, Directions, and Challenges. *Asia Pac J Public Health*. 2015 Mar;27(2):NP2732-NP2739.
23. Northern Health. *Quick Facts*. Prince George: Northern Health; 2016 [cited 2017 Jun 1]. Available from: <https://northernhealth.ca/AboutUs/QuickFacts.aspx>

24. Conuma Coal Resources Limited. Wolverine Coal environmental assessment. Victoria, BC: BC EAO; 2005 [cited 2016 May 2]. Available from: <https://projects.eao.gov.bc.ca/p/wolverine-coal-mine/detail>
25. HD Mining International Ltd. Murray River Coal Environmental Assessment. Victoria: BC EAO; 2015 [cited 2016 May 2]. Available from: <https://projects.eao.gov.bc.ca/p/murray-river-coal/detail>
26. Terrane Metal Corp. Mount Milligan Copper/Gold Environmental Assessment. Victoria: BC EAO; 2009 [cited 2016 May 2]. Available from: <https://projects.eao.gov.bc.ca/p/mount-milligan-copper-gold/detail>
27. New Gold Inc. Blackwater Gold Environmental Assessment. Victoria: BC EAO; 2012 [cited 2016 May 2]. Available from: <https://projects.eao.gov.bc.ca/p/blackwater-gold/detail>
28. BC Hydro and Power Authority. Site C Clean Energy Environmental Assessment. Victoria: BC EAO; 2014 [cited 2016 May 3]. Available from: <https://projects.eao.gov.bc.ca/p/site-c-clean-energy/detail>
29. Pacific Northwest LNG Limited Partnership. Pacific Northwest LNG Environmental Assessment. Victoria: BC EAO; 2014 [cited 2016 May 2]. Available from: Retrieved from <https://projects.eao.gov.bc.ca/p/pacific-northwest-lng/detail>
30. Coastal GasLink Pipeline Ltd. Coastal GasLink Pipeline Environmental Assessment. Victoria: BC EAO; 2014 [cited 2016 May 2]. Available from: <https://projects.eao.gov.bc.ca/p/coastal-gaslink-pipeline/detail>
31. Woodside Energy Holdings Party Ltd. Grassy Point LNG. Victoria: BC EAO; 2014 [cited 2016 May 3]. Available from: <https://projects.eao.gov.bc.ca/p/grassy-point-lng/detail>
32. LNG Canada. LNG Canada Community Level Infrastructure and Services Management Plan. Prince Rupert: LNG Canada; 2016.
33. Takla Lake First Nation. *Socioeconomic Study for Proposed Prince Rupert Gas Transmission Project*. Takla Lake: Takla Lake First Nation (58pp.); 2014.
34. Shandro JA, Winkler M, Jokinen L, Stockwell A. *Health impact assessment of the 2014 Mount polley Mine tailings dam breach: Screening and scoping phase port*. West Vancouver: First Nations Health Authority (80pp.); 2016 [cited 2016 Jul 5]. Available from: <http://www.fnha.ca/Documents/FNHA-Mount-Polley-Mine-HIA-SSP-Report.pdf>
35. Northern Health. *Standard working group comments and recommendations for*

- provincial environmental assessments in northern British Columbia*. Prince George: Northern Health (15pp.); 2015. Available from: https://www.northernhealth.ca/Portals/0/Your_Health/Programs/Public%20Health/OfficeHealthResourceDevelopment/2015-04-29-NH-EAStandardComments.pdf
36. Northern Health. *Northern caucus overview of sub-regional engagement sessions: Health and Resouce Development*. Prince George: Northern Health; 2017.
 37. Northern Health. *Interim support for developing health baselines for projects in the Prince Rupert area*. Northern Health; 2016.
 38. Rasali D, Zhang R, Guram K, Gustin S, Hay D. *Priority health equity indicators for British Columbia: Selected indicators report*. Vancouver, BC: PHSA (110pp.); 2016 [cited 2016 Nov 2]. Available from: http://www.phsa.ca/population-public-health-site/Documents/Priority%20health%20equity%20indicators%20for%20BC_selected%20indicators%20report_2016.pdf
 39. Cox D, Frere M, West S, Wiseman J. Developing and using local community wellbeing indicators: Learning from the experience of Community Indicators Victoria. *Aust J Soc Issues*. 2010 Sep 1;45(1):71–88.
 40. Fraser EDG, Dougill AJ, Mabee WE, Reed M, McAlpine P. Bottom up and top down: Analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management. *J Environ Manage*. 2006 Jan 1;78(2):114–27.
 41. Shandro JA, Jokinen L, Kerr K, Sam AM, Scoble M, Ostry A. *Ten Steps Ahead: Community Health and Safety in the Nak’al Bun/Stuart Lake Region During the Construction Phase of the Mount Milligan Mine*. University of Victoria, Norman B. Keevil Institute of Mining Engineering, Monkey Forest Social Performance Consulting, Fort St James District, Nak’azdli Band Council.; 2014. Available from: Available online at: <http://wildborderwatersheds.org/resources/category/mining/> (Accessed 15 January 2014)
 42. McMichael AJ. Globalization, Climate Change, and Human Health. *N Engl J Med*. 2013 Apr 4;368(14):1335–43.
 43. UN General Assembly. United Nations Declaration on the Rights of Indigenous People [Internet]. 2007 [cited 2018 Jan 22]. Report No.: A/RES/61/295. Available from: <http://www.refworld.org/docid/471355a82.html>
 44. Noble BF, Bronson JE. Integrating Human Health into Environmental Impact Assessment: Case Studies of Canada’s Northern Mining Resource Sector. *Arctic*. 2005;58(4):395–405.

45. Esteves AM, Franks D, Vanclay F. Social impact assessment: the state of the art. *Impact Assess Proj Apprais*. 2012 Mar 1;30(1):34–42.
46. Arctic Social Indicators. Nordic Council of Ministers; 2015 Feb [cited 2017 Nov 17]. Available from: <http://urn.kb.se/resolve?urn=urn:nbn:se:norden:org:diva-3810>
47. Molnar A, Renahy E, O'Campo P, Muntaner C, Freiler A, Shankardass K. Using Win-Win Strategies to Implement Health in All Policies: A Cross-Case Analysis. *PLoS ONE*. 2016 Feb 4;11(2).
48. Association BM. Health and Environmental Impact Assessment: An Integrated Approach. Routledge; 2013. 274 p.
49. Benusic MA. Mandatory health impact assessments are long overdue. *BC Med J*. 2014;56(5):238–9.
50. Scott-Samuel A, O'Keefe E. Health impact assessment, human rights and global public policy: a critical appraisal. *Bull World Health Organ*. 2007 Mar;85(3):212–7.
51. MacLachlan M, Amin M, Mannan H, El Tayeb S, Bedri N, Swartz L, et al. Inclusion and Human Rights in Health Policies: Comparative and Benchmarking Analysis of 51 Policies from Malawi, Sudan, South Africa and Namibia. *PLoS ONE*. 2012 May 23;7(5). Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3359320/>
52. Storm I, Uiters E, Busch MCM, den Broeder L, Schuit AJ. The relevance of work-related learning for vulnerable groups. Dutch case study of a Health Impact Assessment with equity focus. *Health Policy Amst Neth*. 2015 Jul;119(7):915–24.
53. Folke C, Carpenter S, Elmqvist T, Gunderson L, Holling CS, Walker B. Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations. *AMBIO J Hum Environ*. 2002 Aug 1;31(5):437–40.
54. Stankey GH, Clark RN, Bormann BT. Adaptive management of natural resources: theory, concepts, and management institutions. Gen Tech Rep PNW-GTR-654 Portland US Dep Agric For Serv Pac Northwest Res Stn 73 P. 2005 [cited 2018 Feb 16];654. Available from: <https://www.fs.usda.gov/treesearch/pubs/20657>
55. Booth A, Halseth G. Why the public thinks natural resources public participation processes fail: A case study of British Columbia communities. *Land Use Policy*. 2011 Oct;28(4):898–906.
56. Booth AL, Skelton NW. “There’s a Conflict Right There”: Integrating Indigenous Community Values into Commercial Forestry in the Tl’azt’en First Nation. *Soc Amp Nat Resour*. 2011;24(4):368–83.

Appendix A. List of extracted indicators, definitions and data sources

Theme – Demographics

Sub theme	Indicator	Description	Available Data Sources
Social Assistance	Proportion of the income assistance caseload that consists of single parent families	Proportion of entire population receiving income assistance that consists of single parent families	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Children <15 receiving income assistance: 1 year or more	Income assistance includes children less than 15 years of age receiving income support under the BC Employment and Assistance program. Includes only those on temporary assistance, including cases with recipient types of expected to work, expected to work-medical condition, temporarily excused, and persistence multiple barriers. Persons with disabilities, children in the home of a relative and Indigenous people living on reserve are not included. Data are for the month of September.	Ministry of Social Development and Social Innovation, 2006 Census of Canada, Statistics Canada, BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile, Community health atlas
	Children <15 receiving income assistance: in single parent family	Income assistance includes children less 15 years of age living in single parent families receiving income support under the BC Employment and Assistance program. Includes only those on temporary assistance, including cases with recipient types of expected to work, expected to work-medical condition, temporarily excused, and persistence multiple barriers. Persons with disabilities, children in the home of a relative and Indigenous people living on reserve are not included. Data are for the month of September.	Ministry of Social Development and Social Innovation, 2006 Census of Canada, Statistics Canada, BC Stats, Community Health Atlas

	Income assistance age 15<	Income assistance includes those aged 15 and older receiving income support under the BC Employment & Assistance program. This only includes temporary assistance, including cases with recipient types of expected to work, expected to work-medical condition, temporarily excused, and persistence multiple barriers. Persons with disabilities, children in the home of a relative and Indigenous people living on reserve are not included. Data are for the month of September.	Ministry of Social Development and Social Innovation, 2006 Census of Canada, Statistics Canada, BC Stats, Community Health Atlas
	Youth 15 to 24 receiving income assistance: 1 year or more	Income assistance includes youth aged 15 to 24 receiving income support under the BC Employment & Assistance program. This only includes temporary assistance, including cases with recipient types of expected to work, expected to work-medical condition, temporarily excused, and persistence multiple barriers. Persons with disabilities, children in the home of a relative and Indigenous people living on reserve are not included. Data are for the month of September.	Ministry of Social Development and Social Innovation, 2006 Census of Canada, Statistics Canada, BC Stats, Community Health Atlas
	Youth 15 to 24 receiving income assistance: who are employable	Income assistance includes youth aged 15 to 24 receiving income support under the BC Employment & Assistance program. This only includes temporary assistance, including cases with recipient types of expected to work, expected to work-medical condition, temporarily excused, and persistence multiple barriers. Persons with disabilities, children in the home of a relative and Indigenous people living on reserve are not included. Data are for the month of September.	Ministry of Social Development and Social Innovation, 2006 Census of Canada, Statistics Canada, BC Stats, Community Health Atlas

	<p>Youth 15 to 24 receiving income assistance: who are single parents</p>	<p>Income assistance includes youth aged 15 to 24 receiving income support under the BC Employment & Assistance program. This only includes temporary assistance, including cases with recipient types of expected to work, expected to work-medical condition, temporarily excused, and persistence multiple barriers. Persons with disabilities, children in the home of a relative and Indigenous people living on reserve are not included. Data are for the month of September.</p>	<p>Ministry of Social Development and Social Innovation, 2006 Census of Canada, Statistics Canada, BC Stats, Community Health Atlas</p>
	<p>Total number of individuals on social assistance</p>	<p>The total number of individuals within a community who are receiving some type of social assistance</p>	<p>Statistics Canada, BC Stats, Census Data 2006</p>
	<p>Employment insurance beneficiaries</p>	<p>Employment Insurance (EI) Beneficiaries are unemployed persons receiving regular benefits from the EI program. Not all unemployed people receive benefits. Some are not covered by the system, are ineligible for benefits, do not make a claim, or have exhausted their benefit entitlement. Rates are calculated as a percent of the same age population. Data are available using three month moving averages for the month of September.</p>	<p>Employment Insurance Statistics, Statistics Canada and BC Stats, Community Health Atlas</p>
	<p>Youth 15 to 24 receiving employment insurance</p>	<p>Employment Insurance (EI) Beneficiaries are unemployed persons receiving regular benefits from the EI program. Not all unemployed people receive benefits. Some are not covered by the system, are ineligible for benefits, do not make a claim, or have exhausted their benefit entitlement. Rates are calculated as a percent of the same age population. Data are available using three month moving averages for the month of September.</p>	<p>Employment Insurance Statistics, Statistics Canada and BC Stats, Community Health Atlas</p>

	Percent of local labour force receiving income assistance	Proportion of local workers receiving some form of income assistance	Ministry of social development and social innovation (employment and assistance by municipality)
	Equity (distribution of benefits)	The absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically	No Available Data
Employment	Unemployment rate	The number of unemployed persons seeking work divided by the number of employed persons aged 15 and over.	Statistics Canada, Socio-economic Profiles
	Employment rate	The percentage of the population that is employed	BC Statistics (labour market statistics)
	Gender parity in waged employment	A socioeconomic index that measures the relative difference in access to education between males and females	Statistics Canada (Women in Canada: A Gender-based Statistical Report, 2015)
	Employment by industry	Employment broken down by economic sectors	Census Data
	Long-term unemployment	When workers are jobless for 27 weeks or more	BC Stats, Statistics Canada, Vital Statistics
	Skilled employment	any worker who has special skill, training, knowledge, and (usually acquired) ability in their work. A skilled worker may have attended a college, university or technical school. Or, a skilled worker may have learned their skills on the job	Statistics Canada (Labour force survey, 2008)
	Professional employment	work predominantly intellectual and varied in character as opposed to routine mental, manual, mechanical, or physical work; involving the consistent exercise of discretion and judgment in its performance	Statistics Canada (Employment by industry, 2017)

Income	Per capita household income	An estimate of the combined incomes of all individuals living within the same household in any given year. Typically expressed as a dollar figure.	Statistics Canada (Average income after tax by economic family types, 2007-2011)
	Female lone parent families average income	Average annual income for female lone parent families	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Average family income	The family is defined as a husband/wife or same-sex couples with or without children at home or a lone-parent with children at home; otherwise known as an economic family.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Family income <\$20,000	Percent of economic families who earned <\$20,000. The family is defined as a husband/wife or same-sex couples with or without children at home or a lone-parent with children at home; otherwise known as an economic family.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Family income >\$80,000	Percent of economic families who earned >\$80,000. The family is defined as a husband/wife or same-sex couples with or without children at home or a lone-parent with children at home; otherwise known as an economic family.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Median Income	Median income is the amount that divides the income distribution into two equal groups, half having income above that amount, and half having income below that amount	BC Stats, Statistics Canada, Vital Statistics, Stats Canada 2006, BC Stats, BC Census profiles
	Poverty	General scarcity, dearth, or the state of one who lacks a certain amount of material possessions or money	Statistics Canada, persons of low income before tax, 2016
	Consumer price index	an index of the variation in prices paid by typical consumers for retail goods and other items	Statistics Canada (Consumer Price Index, monthly, by province, 2017

	Prevalence of low income of persons (after tax)	Prevalence of low income after tax is the percentage of people below the low income after tax cut-offs. These prevalence rates are calculated from estimates of economic families and persons 15 years of age and over not in economic families. (As defined by Statistics Canada). (Percentage of economic families or persons not in economic families who spend 20% more of their after-tax income than average on food, shelter and clothing.)	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Percent of population living below the poverty line	The number of individuals including children who are considered to live off less than what is considered to be the minimum standard of living	Statistics Canada (Low income persons)
Family Dynamics	Female lone parent families	Refers to percent of female lone parent families over all lone-parent families	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas
	Female population	Refers to the gender of the respondent	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas
	Lone parent families	Refers to lone parent families over the total number of census families in private households. Census family refers to a married or common-law couple or lone parent with at least one never-married son or daughter living in the same household.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Male lone parent families	Refers to percent of male lone parent families over all lone parent families	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Male population	Refers to the gender of the respondent	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas

	Dependency ratio	The ratio of the combined population aged between 0 to 19 years old and the population aged of 65 years and over to the population aged between 20 to 64 years old	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas
	Marital status common law	A person who is living with another person as a couple but who is not legally married to that person. Persons who are married or living common law may be of opposite sex or of the same sex. (Total population 15 years and over.)	2011 Census of Canada, Statistics Canada, Community Health Atlas
	Marital status divorced	A person who has obtained a legal divorce and who has not remarried. (Total population 15 years and over.)	2011 Census of Canada, Statistics Canada, Stats Canada data, Health Data (BC vital stats), Community Health Atlas
	Marital status married	A person who is married and has not separated or obtained a divorce, and whose spouse is living. Persons who are married or living common law may be of opposite sex or of the same sex. (Total population 15 years and over.)	2011 Census of Canada, Statistics Canada, Community Health Atlas
	Marital status separated	A person who is married but who no longer lives with his/her spouse (for any reason other than illness, work or school) and who has not obtained a divorce. (Total population 15 years and over.)	2011 Census of Canada, Statistics Canada, Community Health Atlas
	Marital status single	A person who has never married or a person whose marriage has been annulled and who has not remarried. (Total population 15 years and over.)	2011 Census of Canada, Statistics Canada, Community Health Atlas
	Marital status widowed	A person who has lost his/her spouse through death and who has not remarried. (Total population 15 years and over.)	2011 Census of Canada, Statistics Canada, Community Health Atlas

	Married couples	Refers to Married couples over the total number of census families in private households. Census family refers to a married or common-law couple or lone parent with at least one never-married son or daughter living in the same household.	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas
	% parents working away from home	The percent of homes within a community with at least 1 parent working away from home (ex. shift work, camp job)	Statistics Canada (Employment patterns of families with children, 2015)
Population Demographics	Gender Ratio	The ratio of males to females in a population	Statistics Canada (Female Population, 2015)
	Indigenous population	Indigenous population refers to persons who identify themselves as an Indigenous person, or are a member of an Indian Band or are a "registered Indian". One Indian Reserve in BC was incompletely enumerated.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Immigrant population	Refers to people who are, or have been, landed immigrants in Canada. A landed immigrant is a person who has been granted the right to live in Canada permanently by immigration authorities. Some immigrants have resided in Canada for a number of years, while others have arrived recently. Most immigrants are born outside Canada, but a small number were born in Canada	2006 Census of Canada, Statistics Canada, Community Health Atlas, Public Health Agency of Canada, BC CDCBC Stats, Statistics Canada,
	Visible minorities	Refers to the visible minority group to which the respondent belongs. The Employment Equity Act defines visible minorities as 'persons, other than Indigenous peoples, who are non-Caucasian in race or non-white in colour'.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Transient workforce	transient workers work in a particular place or organization for only short periods of time (ex. Long haul trucking)	Provincial Services Health Authority, BC Stats, Statistics Canada, Canada Mortgage and Housing Corporation, Northern Health - Health and Resource Development Website.

	Seniors (65 years and over)	Seniors; 65 years and over; as a proportion of total population	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas
	Total population	The total number of people living in a geographic area.	2006 Census of Canada, 2011 Census of Canada, 2016 Census. Community Health Atlas
	Total population 15+	Total population 15 years and over	2016 Census of Canada, Statistics Canada, Community Health Atlas
	Youth (under 20)	Youth; under 20 years; as a proportion of total population	2006 Census of Canada, 2011 Census of Canada, Statistics Canada, Community Health Atlas
	Population growth rate	The increase in a countries population within one years time. Typically expressed as a percentage.	Statistics Canada (Population growth)
	Birth Rate (per 1000)	The number of live births per thousand of population per year	Canadian Institute for Health Information (CIHI), Provincial Services Health Authority, BC Stats, Statistics Canada, Health Canada, Perinatal Services BC, Vital Statistics.
	Proportion of population that is Indigenous	The percentage of the population that is considered to be Indigenous (Indigenous, metis, inuit)	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Reserve Population	The number of individuals living on Reserve lands in a given year	(Indigenous Affairs and Northern Development Canada (g-n), 2011-2015)
	On and off Reserve Population	The total number of registered individuals that make up a nation	(Indigenous Affairs and Northern Development Canada (g-n), 2011-2015)
	Registered males on own reserve	The number of Indigenous males who are registered on their reserve of origin	Indigenous Affairs and Northern Development Canada, 2012a, 2013.

	Registered females on own reserve	The number of Indigenous females who are registered on their reserve of origin	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered males on other reserves	The number of Indigenous males who are registered living on reserves that are not traditionally their own	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered females on other reserves	The number of Indigenous females who are registered living on reserves that are not traditionally their own	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered males on own crown land	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered females on own crown land	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered males on other band crown land	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered females on other band crown land	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered males on no band crown land	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered females on no band crown land	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.

	Registered males off reserve	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Registered females off reserve	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Total registered population	In number of individuals	Indigenous Affairs and Northern Development Canada, 2012a, 2013.
	Population mobility	A statistic that measures migration within a population	National Household Survey, 2011
	Net Migration	The difference between in-migration and out-migration.	Canada Mortgage and Housing Corporation 2010, BC Stats, Northern Health data, BC Ministry of Public Safety 2007
	Net rates of return to indigenous lands	The rates of return to indigenous lands	Annual Net Migration Rates can be found on the Indigenous and Northern Affairs Canada: https://www.aadnc-aandc.gc.ca/eng/1375456585272/1375456664811
Health Demographics	Infant mortality count	Deaths of children under one year of age	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	Infant mortality rate	The number of deaths of children under one year of age per 1,000 births. Data are 5-year averages, based on July 1st to June 30th each year.	Vital Statistics Agency, Ministry of Health and BC Stats, Community Health Atlas, BC Stats, 2011, Local Health Area 56: Nechako Statistical Profile
	Life Expectancy at Birth	Number of years a person would be expected to live, starting from birth, on the basis of the mortality statistics for a given observation period	BC Vital Statistics Registry, BC Stats

	Average life expectancy	the average period that a person may expect to live given their geographical region (expressed in years)	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Health-adjusted Life Expectancy	Average number of years a person would be expected to live in healthy state	BC Vital Statistics Registry, BC Stats, Canadian Community Health Survey
	Life Expectancy at 65	Number of years a person would be expected to live, at age 65, on the basis of the mortality statistics for a given observation period	BC Vital Statistics Registry, BC Stats
	Morbidity rates	The frequency with which a disease appears in a population	BC Vital Statistics Registry
	Mortality Rates	A measure of the number of deaths that occur within the population in question during any given period in time	BC Vital Statistics Registry
	Disease specific morbidity and mortality rate	Rates of illness and death from a specific disease	Canadian Cancer Society, Statistics (Canada Age-standardized mortality rates by selected causes, by sex)
	Mortality rate from suicide	Age-standardized rate of deaths from suicide	BC Vital Statistics Registry, Statistics Canada
	Accidental poisoning age standardized mortality rates	International Classification of Disease (ICD-10) codes: X40-X49 (includes accidental drug overdoses)	Ministry of Health Vital Information Statistics (VISTA), Community Health Atlas
	Preventable premature mortality rate	Age-standardized premature mortality rate due to preventable causes	BC Vital Statistics Registry
	Mortality rate from unintentional injuries	Age-standardized mortality rate for unintentional injuries	BC Vital Statistics Registry

	All causes of mortality age standardized mortality rates	International Classification of Disease (ICD-10) codes: A00-Y89	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	External causes of death age standardized mortality rates	International Classification of Disease (ICD-10) codes: V01-Y98	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	Unintentional injuries age standardized mortality rates	International Classification of Disease (ICD-10) codes: V01-X59, Y40-Y86, Y880-Y883	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	Smoking-attributable potential years of life lost index	Deaths are the total number of deaths aged 35+ years or as specified in the diagnostic category. SAM - Smoking-Attributable Mortality, derived by multiplying the SAM percentage by the number of deaths in each category	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	Accidental poisoning potential years of life lost standardized rate	International Classification of Disease (ICD-10) codes: X40-X49 (includes accidental drug overdoses)	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	All causes of mortality potential years of life lost standardized rate	International Classification of Disease (ICD-10) codes: A00-Y89	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas

	External causes of death potential years of life lost standardized rate	International Classification of Disease (ICD-10) codes: V01-Y98	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	Unintentional injuries potential years of life lost standardized rate	International Classification of Disease (ICD-10) codes: V01-X59, Y40-Y86, Y880-Y883	Ministry of Health Vital Information STATistics (VISTA), Community Health Atlas
	Potential years of life lost due to natural causes	Number of potential years of life lost due to natural causes	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Potential Years of Life Lost due to accidental death	Number of years of life lost due to premature accidental death	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Disability adjusted life years	A measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death	Statistics Canada - Disability-adjusted life expectancy (DALE)
Youth	Proportion of children and youth aged 0-17	The percentage of people aged 0-17 in a given population	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Percent of 7-year olds with up-to-date immunizations	The percentage of seven-year olds with up-to-date immunization for D/T/aP/ IPV, measles, mumps, rubella, varicella, meningococcal C and hepatitis B.	Provincial health services authority report, 2012-2015 (iPHIS, PARIS, MoE)

	Child in care rate	Per 1000 population age 0-18 years of age. Children age 0 to 18 that are taken into care by the provincial child care authorities. Includes all children in care, including Ministry cases, delegated Indigenous Agencies cases, and Community Living BC cases.	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile, Ministry of Children and Family Development and BC Stats, Community Health Atlas
	Child abuse rate	Per 1000 population age 0-18 years of age. Children who have been subject to some type of abuse	BC Statistics 2006
	Children in need of protection	Based on numbers from the Ministry of Children and Family Development showing the number of children in need of protection.	Ministry of Children and Family Development and BC Stats, Community Health Atlas
	Children/youth at risk	An at-risk youth is a child who is less likely to transition successfully into adulthood. Success can include academic success and job readiness, as well as the ability to be financially independent	Statistics Canada (youth at risk)
	Child poverty rates	The number of children living under conditions of poverty below low income cut offs etc. that damage physical, mental, emotional, and spiritual health. Typically expressed as a ratio (1/5, 2016)	Statistics Canada Low Income Measure (LIM) after taxes
	Teen pregnancy rate for girls aged 15 to 19	Rate of teen pregnancies for girls aged 15-19	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Percentage of children with an adult in their family they could turn to if faced with a serious problem	The percentage of children who have access to an adult in their family who they feel would support them if they experienced a serious problem	BC Adolescent Health Survey

	Percentage of youth who felt that members of their family paid attention to them, had fun together, and understood them	The percentage of youth who felt that members of their family paid attention to them, understood them, and enjoyed spending time with them	BC Adolescent Health Survey
	Percentage of youth who had an adult to turn to for help/who felt there was an adult in the neighbourhood who cares	The percentage of youth who feel they have an adult in their neighbourhood they could turn to for help	BC Adolescent Health Survey
	Hospitalized Motor Vehicle Accidents Rates Aged 15-24	Rate of hospitalization for motor vehicle accidents for those aged 15-24	BC Statistics 2006
	Adolescent health	The health of young people aged 10 - 19 years old	BC Adolescent Health Survey

Theme – Housing

Sub-themes	Indicator	Description	Available Data Sources
Safe Housing	Access to safe housing	The right to accessible, secure, affordable, culturally appropriate, and habitable housing	Statistics Canada - Shelters for abused women, 2014. Transitional homes in Canada
	Homes are safe and secure	Whether an individual would consider where they live to be a safe and secure place of residence	Statistics Canada - Shelters for abused women, 2014. Transitional homes in Canada. Housing and shelter costs
	Number of smoke free homes	The number of homes that are non-smoking. Residents of the home do not smoke indoors.	Statistics Canada - Second hand smoke
	Percentage of homes with smoke alarms	The percentage of homes that are equipped with an adequate number of functioning smoke detectors	BC Stats - BC Annual Statistical Fire Report, 2012, Statistics Canada - Survey of emergency preparedness and resilience
Housing Maintenance	Houses without running water/kitchen facilities	The number of homes within a given area that are without necessary services such as running potable water and access to kitchen and cooking facilities	Canadian Mortgage and Housing Corporation http://cmhc.beyond2020.com/HiCOMain_EN.html
	Percent of homes served by centralized water treatment plants and sewage disposal systems	The number of homes in a community that are receiving essential services of water treatment and adequate sewage disposal	Environment and Climate Change Canada - residential water use 1991-2011. BC Stats - environmental reporting BC

	Number of homes needing repairs (minor, major, regular maintenance)	The number of homes in a given community that require any degree of maintenance	National household survey, 2011. Census 2006, 2011, Statistics Canada - housing conditions
	Percent of homes served by centralized minor or regular maintenance	A percentage of the number of homes being responsibly and adequately maintained within a community	National household survey, 2011. Census 2006, 2011, Statistics Canada - housing conditions
	Number of properties under construction	The number of properties that are currently under construction within a given period of time	Canada Mortgage and Housing Corporation, local contractors and sub-contractors
	Number and value of building permits issued		BC Stats (Municipal permit records)
Social Housing & Homelessness	Social Housing usage rates	The vacancy rates for social housing units within a community	BC Stats
	Number of social housing properties	The number of social housing homes within a community	Canada Mortgage and Housing Corporation
	Waitlists for affordable/assisted housing	Whether or not there is a waitlist in order to be placed in an assisted housing unit	Canada Mortgage and Housing Corporation
	Number of members on housing waitlist	At least 30 members have been on the housing waiting list since 1990	Assembly of First Nations, 2013. Indigenous and Northern Affairs Canada
	Homelessness rate	the condition of people without a permanent dwelling, such as a house or apartment, often with	See Homeless Count. Rates cannot be determined due to monitoring efforts at this time.

		the inability to maintain safe and secure housing	
	Homeless count	The number of individuals residing within a community that are without a home (including couch surfing, and those living on the street)	United Way Northern BC - Prince George final Homeless Count 2016. http://www.unitedwaynbc.ca/index.php/2016/07/14/prince-george-homeless-count/ Counting Homelessness – Guide for a Standardized Method for BC Communities - List of communities that have performed homeless counts. http://www.housing.gov.bc.ca/pub/Counting_Homelessness
	Overcrowding	the situation in which more people are living within a single dwelling than there is space for, so that movement is restricted, privacy secluded, hygiene impossible, rest and sleep difficult	Statistics Canada - Persons per room of private households
Home Ownership	Equity in home	The value of ownership that is earned in a home or property that represents the current market value of one's home, less the remaining mortgage payments	BC Statistics - Household estimates and projections, Canada mortgage and housing corporation
	Owner-occupancy/Homeownership	A form of housing tenure where a person, called the owner-occupier, owner-occupant, or home owner, owns the home in which he/she lives	Census 2006, National Household Survey, 2011.

	Cost of new residential land	The average price of a new residentially zoned lot	Canada Mortgage and Housing Corporation
	Number of homes owned by residents	The number of homes that are owned by residents of the community	Canada Mortgage and Housing Corporation 2010, BC Stats Northern Health data, BC Ministry of Public Safety 2007
	Property Values	Value of any property owned by an individual.	BC Stats, Statistics Canada, Canada Mortgage and Housing Corporation
	Number of residential homes	The total housing count is approximately 80 units, however some of these houses are not fit for occupancy due to mold issues or have been condemned or destroyed	BC Statistics - building permits, Statistics Canada - Private households by structural type of dwelling
	Number of homes owned	The number of homes owned in a community	Statistics Canada - Private households by structural type of dwelling
	Place of residence	The physical location and type of housing in which one lives	Census 2011 (Population and housing demographics)
	Housing major monthly payment (owners)	Gross monthly payments for owners include expenses of occupants for water, heat & other utilities, mortgage payments, property taxes and condominium fees (if applicable). Households on reserves are excluded.	2006 Census of Canada, Statistics Canada, Community H Atlas
Housing Access & Affordability	Percent of rent collected per room	A measure of the value of housing within a given community	Canadian Mortgage and Housing Corporation
	Occupancy Rate	the ratio of rented or used space compared to the	Canada Mortgage and Housing Corporation

		total amount of available space	
	Vacancy rate	the percentage of all available units in a rental property, such as a hotel or apartment complex, that are vacant or unoccupied at a particular time	Canada Mortgage and Housing Corporation
	Average mortgage cost	The average dollar value of a mortgage within a given community	National Household Survey, 2011. Canadian Mortgage and Housing Corporation
	Average rental cost	The average dollar value of the average rental cost within a given community (excluding utilities)	BC Stats, Statistics Canada, Canada Mortgage and Housing Corporation, National Household Survey
	Average gross rental costs (including utilities)	Gross rent for renters includes expenses of occupants for water, heat & other utilities. Households on reserves are excluded.	2006 Census of Canada, Statistics Canada, Community H Atlas
	Paying more than 30% of income on rent	Gross rent for renters includes expenses of occupants for water, heat & other utilities. Percent paying 30% or greater on shelter costs compares annualized monthly payments to income reported for the previous year. Households on reserves are excluded.	2006 Census of Canada, Statistics Canada, Community H Atlas

	Percent of income spent on housing	The percentage of a households monthly income that is being spent on rent, utilities, and mortgage payments	BC Stats, Statistics Canada, Canada Mortgage and Housing Corporation
	Housing affordability	Units that are affordable by that section of society whose income is below the median household income	BC Stats, Statistics Canada, Canada Mortgage and Housing Corporation
	Average house prices	The average cost to purchase a home within a given community	Canadian Real Estate Association
	Cost of living measures	A theoretical price index that measures relative cost of living over time or regions	Statistics Canada - Consumer Price Index (shelter)
	Local housing index	An analytical tool for estimating changes in the rates of mortgage defaults, prepayments and housing affordability	Canada Mortgage and Housing Corporation
	Hotel, Motel, and campground vacancy rates	Vacancy rates at local housing establishments	Ministry of Community, Sport and Cultural Development, local accommodation providers, Canada Mortgage and Housing Corporation

Theme – Education

Sub-themes	Indicator	Description	Available Data Sources
Grade School (k-12)	Early development instrument	A 104 item questionnaire designed to measure five core areas of early childhood development. Scores indicate future learning, health, and social outcomes later in life	Human early learning partnership (UBC)
	Early learning opportunities for children	The number of opportunities that children receive to help them grow in core areas of development	List of available programs for young children: http://www2.gov.bc.ca/gov/content/education-training/early-learning/learn/programs
	Indications of positive childhood development	The presence of indicators of healthy childhood development	Human early learning partnership (UBC)
	Number of local teachers in formal schools	The number of local teachers in a formal school setting	Statistics Canada - Student teacher ratios in public sector
	Number of trained counselors	The number of formally trained counselors within a community or education centre	Statistics Canada - Student educator ratios in public sector
	Percent of children achieving learning expectations	The percentage of children that are achieving age standardized learning expectations	Statistics Canada - Academic outcomes
	Children vulnerable in one or more Early Development Instrument (EDI) domain	Percentage of B.C. kindergarten children (ages 5-6) who are vulnerable in one or more of the EDI domains.	Human early learning partnership (UBC)

	Physical health and well-being vulnerability among kindergarten children	Percentage of B.C. kindergarten children (ages 5-6) who are vulnerable in the physical health and well-being development domain	Human early learning partnership (UBC)
	School enrollment trends (primary, middle, and secondary)	Enrolment trends in local primary, middle, and secondary schools	Coast Mountains School District #82; Ministry of Education, Ministry of Community, Sport, and Cultural Development
	Student/teacher ratios	The ratio of the number of students compared to the number of teachers (ex. 15/1 results in more one-on-one learning time with teachers than 30/1)	Coast Mountains School District #82; Ministry of Education, Ministry of Community, Sport, and Cultural Development. Statistics Canada - student teacher ratio (public sector)
	School connectedness	The percentage of students who exhibit school connectedness, based on McCreary Centre School Connectedness scale	BC Adolescent Health Survey
	Grade 4 below standard in reading	Assessment results from the Foundation Skills Assessment (FSA) program provide a snapshot of how well BC students are learning foundation skills. Tests in reading, writing and math skills are taken by students in Grades 4 in both public and private schools. Results are presented as the % of students taking the exams who scored below standard. Data are 3 school year averages.	Ministry of Education, Community Health Atlas

	Grade 4 below standard in writing	Assessment results from the Foundation Skills Assessment (FSA) program provide a snapshot of how well BC students are learning foundation skills. Tests in reading, writing and math skills are taken by students in Grade 4 in both public and private schools. Results are presented as the % of students taking the exams who scored below standard. Data are 3 school year averages.	Ministry of Education, Community Health Atlas
	Grade 7 below standard in reading	Assessment results from the Foundation Skills Assessment (FSA) program provide a snapshot of how well BC students are learning foundation skills. Tests in reading, writing and math skills are taken by students in Grade 7 in both public and private schools. Results are presented as the % of students taking the exams who scored below standard. Data are 3 school year averages.	Ministry of Education, Community Health Atlas
	Grade 7 below standard in writing	Assessment results from the Foundation Skills Assessment (FSA) program provide a snapshot of how well BC students are learning foundation skills. Tests in reading, writing and math skills are taken by students in Grade 7 in both public and private schools. Results are presented as the % of students taking the exams who scored below standard. Data are 3 school year averages.	Ministry of Education, Community Health Atlas
	Community efforts to encourage	The avenues through which the community encourages and promotes formal education (scholarships, etc.)	Ways to Learn - formal schooling and alternative options

	learning and formal education		http://www2.gov.bc.ca/gov/content/education-training/ways-to-learn
	Attends and participates fully in school and extra-curricular activities	Students that are enrolled and fully participate in formal schooling and extra-curricular activities	Adolescent Health Survey. Promoting equality of educational opportunity http://www.cmec.ca/Publications/Lists/Publications/Attachments/289/2012.11_Promoting_Equality_of_Educational_Opportunity_EN.pdf
	Grade 10 provincial exam non-completion rate: English	The percent of students enrolled in Grade 10 who did not take or did not pass the provincial examination. Data are 3 school year averages.	Ministry of Education, Community Health Atlas
	Grade 12 provincial exam non-completion rate: English	The percent of students enrolled in Grade 12 who did not take or did not pass the provincial examination. Data are 3 school year averages.	Ministry of Education, Community Health Atlas
	School completion rates	The percent of the population aged 25 to 29 who have a secondary school diploma or equivalent	Statistics Canada - High school graduates and drop out rate
	High school graduates	The number of people who completed high school	Statistics Canada - High school Graduates
	Adults (25 to 54) without high school certificate	Without completed high school means without high school graduation.	2006 Census of Canada, Statistics Canada, BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile, Community Health Atlas
	18-year-olds who did not graduate high school	The percent of 18-year-olds who did not graduate is calculated as the population of 18-year-olds minus the number of high school graduates as a % of 18-year-olds. It is used as an indicator of the high school dropout rate. Data are 3 school year averages.	Ministry of Education and BC Stats, Community Health Atlas

Post Secondary	Post secondary education centres	The number of education centres that offer post secondary skills training and education within a community	Statistics Canada, BC Stats
	Post-secondary education opportunities	The accessibility of post secondary education programs (location, funding, scholarships, transit, etc.)	Post-secondary Education Options: http://www2.gov.bc.ca/gov/content/education-training/post-secondary-education
	Post-secondary completion rate	Post-secondary completion rate: The proportion of students successfully completing post-secondary education within a given number of years from entry	Statistics Canada - Canadian post secondary enrolments and graduates
	Post secondary graduates	confirmed graduates in #'s	Statistics Canada - Canadian post secondary enrolments and graduates, 2012
	Adults (25 to 54) without post-secondary	Without completed post-secondary includes those who have not received a certificate, diploma or degree from a trade school, college or university.	2006 Census of Canada, Statistics Canada, Community Health Atlas
	Holds current certification	The number of members within a community that hold a current and valid certification	Statistics Canada - certification, completion, and wages of Canadian registered apprentices
	Supply of local and regional training programs	The availability and access to local training/education centers	BC Stats
	Education, training, and skill development		Statistics Canada - Education, training, and learning

	Success of cultural education programs	The success of cultural programs within a community. (Indigenous education)	EVALUATION OF THE BC INDIGENOUS POST-SECONDARY EDUCATION STRATEGY report: http://www2.gov.bc.ca/assets/gov/education/post-secondary-education/Indigenous-education-training/apes_evaluation_report.pdf Indigenous Education and Training page: http://www2.gov.bc.ca/gov/content/education-training/post-secondary-education/Indigenous-education-training
	Indigenous Training for Employment Program (ATEP)	To connect Indigenous individuals with growing industries in BC (Funding in \$)	BC Stats - Indigenous community data initiative (Census 2006)
	Highest level of schooling for population age 25+	The highest level of schooling that an individual has achieved by the age of 25+	Census Data
	ESL Students	The number of English language learners or English as a Second Language students who are in the process of acquiring English and have a first language or dialect other than English	Ministry of Education and BC Stats, Community Health Atlas, Socio-Economic Profiles
	Educational attainment	The highest level of schooling that an individual over the age of 15 has reached	Census 2006, 2011, National Household Survey, 2011.

Theme – Infrastructure and Services

Sub-themes	Indicator	Description	Data Sources
Water	% of homes with potable water	The percentage of homes within a given community that have consistent and safe access to potable water	Households and the Environment survey, 2006
	Drinking water quality	The safety and quality of water for drinking, household, and recreational use	Community profiles, BC Ministry of Transportation and Infrastructure (BC MOTI)
	Safe community drinking water	A community's access to safe, clean, and secure drinking water	Statistics Canada - Survey of drinking water plants
	Local water supply	The provision of water supplied by a municipality or community as public utilities	Statistics Canada - Survey of drinking water plants
	Groundwater usage	Groundwater is found underground in the cracks and spaces in soil, sand and rock	GeoBC data, Information from various government, commercial and private websites, guidance documents, acts, regulations and reports
	Surface water usage	Surface water is water that is collected on the surface of the earth	GeoBC data, Information from various government, commercial and private websites, guidance documents, acts, regulations and reports
	Number of boil water advisory days	The number of boil water advisory days that occur annually within a community	Households and the Environment survey, 2007. Northern Health Authority Data.
Utilities & Waste Removal	Community sewage disposal systems	Whether or not a community has an adequate sewage disposal system in place	Official community plans. Statistics Canada - waste disposal by source, province and territory
	Local sewage system capacity	The maximum amount of sewage a community's sewage/treatment system can take while still operating effectively	Statistics Canada - age of public infrastructure
	Landfill volume	The total volume of solid landfill waste expressed in cubic meters	Community profiles, BC Ministry of Transportation and Infrastructure (BC

			MOTI), Insurance Corporation of British Columbia, BC Transit
	Electricity and Energy usage	The availability and affordability of electricity and other energy sources	Community profiles, BC Ministry of Transportation and Infrastructure (BC MOTI), Insurance Corporation of British Columbia, BC Transit
Transportation	Daily traffic volumes	The number vehicle passing through a specific measurement point per day	BC Ministry of Transportation and Infrastructure
	Number of Traffic Incidents	The number of traffic incidents occurring annually	RCMP records, ICBC regional data
	ICBC/RCMP records of automotive collisions	Annual records from ICBC and the RCMP pertaining to the number and details of automotive collisions occurring annually	ICBC Statistics, Police Traffic Incidence System data
	Traffic violations incidences	The number of traffic violations occurring per year (tickets and penalties)	ICBC Statistics, Police Traffic Incidence System data
	Fatal collisions incidences	The number of automotive collisions occurring annually that involve a fatality	ICBC Statistics, Police Traffic Incidence System data
	Public transportation utilization	Whether a community has public transportation or not, and the degree to which the service is utilized	Statistics Canada - Public Transit in Canada, 2007.
	Navigability of waterways	The degree to which water ways are navigable and passable	The Canadian Hydrographic Service is responsible for surveying Canadian navigable waterways: http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/index-eng.html Nautical charts, navigational products and survey results from the Canadian Hydrographic Service: http://www.chs-shc.gc.ca/index-eng.asp

Infrastructure	Funding to improve infrastructure	Expressed in dollars (\$)	Ministry of Transport and Infrastructure, Statistics Canada - Age of Public Infrastructure
	Number of community infrastructure facilities requiring repair	Roads, buildings, water, sewer, and power amenities, landfills, band office, and education centers	Statistics Canada - Age of public infrastructure 2007 (roads, bridges, water supply, waste water treatment, and sewer systems only)

Theme – Agriculture and Food

Sub-themes	Indicator	Description	Data Sources
Access & Availability	Food security/insecurity (moderate to severe)	A situation in which all community residents can obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes self-reliance and social justice	Canadian community Health Survey, 2011-2012
	Prevalence of household food insecurity	The proportion of households that were moderately or severely food insecure in the past 12 months	Canadian Community Health Survey
	Cost of food	The cost of purchasing nutritionally adequate foods to meet an individual's dietary needs	Canadian Institute for Health Information (CIHI), Provincial Health Services Authority, BC Stats, Statistics Canada, Health Canada, Community Health Information Portal
	Percentage of households that had members who did not have enough to eat at times last year/ who could not access healthy foods	The percentage of households that had members in the home who did not receive enough to eat at times during the last year or did not have adequate access to nutritious foods	Canadian Community Health Survey 2011-2012 - Food insecurity by household type
	Use of homeless shelters and food banks	The number of individuals and households that rely on food banks and local shelters for support	Statistics Canada - number of people living in shelter during the census, residential facilities (shelters) for female victims of domestic violence. (PROXY MEASURES). Food banks Canada - Hungercount 2016
	Nutritional status of individuals	Fishing restrictions and de-facto reductions in fishing have led to significant changes in diet	Canadian Community Health Survey

	Fruit and vegetable consumption	The percentage of population aged 12 and older who reported consuming fruits and vegetables at least five times a day	Canadian Community Health Survey
	Number of people using food programs	The number of individuals utilizing food assistance programs (ex. Food banks and social assistance programs)	Canadian Institute for Health Information (CIHI), Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, BC Cancer Registry, BC Stats, Statistics Canada, Health Canada, BC Government, Community Health information Portal, Vital Statistics, Government of Canada
Land Use	Agricultural land usage		Census of Agriculture, 2006 - Total farm area, land tenure and land in crops, by province (Census of Agriculture, 1986 to 2006)
	Commercial fishing operations	Impacts to commercial fishing activities	Department of Fisheries and Oceans Canada
	Number of active fisheries	The number of active fisheries within an area (coastal regions)	Department of Fisheries and Oceans Canada
	Arable land	Land that is capable of being developed and used to grow crops	Census of Agriculture, 2006 - Total farm area, land tenure and land in crops, by province (Census of Agriculture, 1986 to 2006)
Traditional Food Systems	Consumption of traditional foods	Consumption of traditional foods: A per capita intake of traditional foods (in kg)	Statistics Canada's 2006 Indigenous Children's Survey (ACS), First Nations Food, Nutrition, and Environment Study, UNBC 2008-2009.
	Extent of traditional land use/harvest activities	The extent to which the surrounding land is utilized for traditional harvest and food procurement practices	Statistics Canada's 2006 Indigenous Children's Survey (ACS), First Nations Food, Nutrition, and Environment Study, UNBC 2008-2009.

	Harvest of traditional foods	Harvest of traditional foods: The total weight of traditional foods harvested within a given period (in kg)	Statistics Canada's 2006 Indigenous Children's Survey (ACS), First Nations Food, Nutrition, and Environment Study, UNBC 2008-2009.
	Number of individuals hunting, fishing, gathering, and preservation of traditional foods	The types of hunting, fishing, gathering, and preservation practices in which a community participates	Statistics Canada's 2006 Indigenous Children's Survey (ACS), First Nations Food, Nutrition, and Environment Study, UNBC 2008-2009.
	Catch rate of ungulates	The number of ungulates taken by a community in a given period of time	Statistics Canada's 2006 Indigenous Children's Survey (ACS), First Nations Food, Nutrition, and Environment Study, UNBC 2008-2009.
	Number of hunters in community	The number of individuals within a community who hunt for food	Indigenous Food Security in Northern Canada: http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/food%20security/foodsecurity_fullreporten.pdf
	Percent of household diet that is comprised of subsistence foods	The percentage of diet that is comprised of traditional foods per household	First Nations Food, Nutrition, and Environment Study, 2008-2009, Revised Northern Food Basket, 2014-2015
	Percentage of adults consuming traditional foods and medicines (game, fish, berries, other)	The percentage of adults in a community who consume traditional foods and medicines	First Nations Food, Nutrition, and Environment Study, 2008-2009, Revised Northern Food Basket, 2014-2015

	vegetables, bannock, etc.)		
	Quantitative changes in preferred harvested species	Changes in the numbers and types of species being taken for subsistence foods (ex. Moose instead of caribou)	No Available Data
	Access to and knowledge of nutritious foods	Community and nation specific use and traditional knowledge of country foods	Revised Northern Food Basket 2014-2015. First Nations Traditional Foods Fact Sheets: http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/food%20security/foodsecurity_fullreporten.pdf
	Competition	Competition for fewer salmon and greater consumption of substitute species.	No Available Data

Theme – Health, Well-being, and Health Service Delivery

Sub-themes	Indicator	Description	Available Data Sources
Mental Health	Mental health status	A state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community	Canadian Community Health Survey, 2012
	Incidence of mental health conditions	The number of individuals being diagnosed with mental health conditions within a given period of time	Canadian Community Health Survey, 2012
	Prevalence of mood/anxiety disorder	The percentage of population aged 12 and older with self-reported mood/anxiety disorder	Canadian Community Health Survey, 2012
	Prevalence of depression	The percentage of population that have depression	BC Ministry of Health, Canadian Community health survey
	Perceived mental health	The percentage of population aged 12 and older with self-reported perceived mental health status as very good or excellent	Canadian Community Health Survey
	Emotional Stress	Increased emotional distress and burden due to the potential environmental impacts and the perceived risk of such impacts. Emotional stress also stems from distrust between FN and industry.	Canadian community health survey, 2003, 2005, 2007-2014
	Stress Levels	The degree to which an individual is experiencing the physical and emotional impacts of elevated stress levels (can be chronic or acute)	Determinants of health model, Public health agency of Canada, BC Mines Act, BC workers compensation Act, Health Canada, Northern Health

	Self confidence and self-esteem	confidence in ones self and confidence in ones own abilities and worth	Adolescent health survey,
	Self sufficiency	The degree to which an individual or community is self sufficient and reliant	Self sufficiency project, 1994. (Aged, and only examines single parents EI, social insurance, and income)
	Fate control	The ability to guide ones own destiny, which can be experienced at the individual, household, community, and regional level	
	Access to mental health, youth, and addiction services	1 child and youth mental health clinician at 0.2 FTE, 1 addiction workers at 1.0 FTE (band member), 1 mental health therapist at 0.8FTE (provided by Carrier Sekani Family services/contract position)	Child and youth mental health and substance use support services in BC interactive portal: http://apps.gov.bc.ca/pub/dmf-viewer/?siteid=5973380584092976532
	Access to counselling services when needed	Whether or not an individual in need has access to formal counseling services	Canadian Community Health Survey
	Presence of helpline	The presence of a local helpline or support line	BC Crisis Centre, Canadian Association of Suicide Prevention
	Hospitalization rate for mental illness	Age-standardized acute care hospitalization rate for mental illness	Discharge Abstract Database, BC Ministry of Health
	Suicide rates	The number of suicides that occur annually	BC Vital Statistics Registry - deaths
	Suicide age standardized mortality rates	is a weighted average of the age-specific mortality rates per 100,000 persons, where the weights are the proportions of persons in the	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas

		corresponding age groups of the population	
	Suicide potential years of life lost index	The number of years of potential life not lived when a person dies "prematurely" (typically to age 75)	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Suicide potential years of life lost standardized rate	Age-standardized rate of potential years of life lost (age-standardized rate per 100,000 population)	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas, Socio-economic Profiles
	Indigenous youth suicide rate	The number of indigenous youth suicides that occur within a community during a given period	BC Vital Statistics Registry - deaths
	Incidence of complex health conditions	Complex behavioural and physical conditions including: FASD, ADHD, Conduct disorder, Oppositional defiant disorder, and complicated mental health issues among children and families (generational impacts of complex health conditions)	Canadian Community Health Survey, Canadian Health Measures Survey
Addictions & Risk Behaviour	Addictions	Providers report that addiction issues have become normalized amongst the Indigenous population	Canadian Community Health Survey
	Gambling rates	Proportion of population that identifies as having gambled in the past year	Local health services and infrastructure, Stats Canada data, Health Data (BC vital stats)
	Drug and alcohol abuse	A patterned use of a drug in which the user consumes the substance in amounts or with methods which are harmful to	Canadian Alcohol and Drug Use Monitoring Survey, 2012. Statistics Canada. Local social agencies.

		themselves or others, and is a form of substance-related disorder	
	Prevalence of hazardous drinking	The percentage of population aged 15 and older who reported being current drinkers and who reported drinking five or more drinks on at least one occasion per months in the past 12 months	Canadian Community Health Survey, Public Health Agency of Canada, BC CDC, UVIC Centre for Addictions Research, McCaery Centre Society, Provincial Services Health Authority, Community Health information Portal, BC Centre for Excellence in HIV/AIDS
	Substance abuse and unhealthy behaviours	Changes in human behaviours may occur. Increased rates of substance abuse and dependance, sleeping problems (alcohol, smoking, over-eating)	Canadian Community Health Survey
	Alcohol-related potential years of life lost index	Alcohol-related deaths include deaths where alcohol was a contributing factor (indirectly related) as well as those due to alcohol (directly related).	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Drug-induced potential years of life lost index	Deaths due to drug-induced causes. This category of deaths excludes unintentional injuries, homicides, and other causes that could be indirectly related to drug use.	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Illicit drug deaths rate	Illicit Drug Deaths are unintentional (accidental) deaths due to illicit drugs based on the permanent residence of the victim. Data are 3-year averages. Data on unintentional illicit/illegal drug deaths are retrieved from the Coroners Medical Certificate of	Vital Statistics Agency, Ministry of Health and BC Stats, Community Health Atlas

	Death which are submitted to the BC Vital Statistics Agency. These data only include deaths where an unintentional overdose occurred and was determined to be the underlying cause of death (UCOD).	
Risky behaviour and binge partying behaviours	Behaviours that potentially expose people to harm, or significant risk of harm which will prevent them reaching their potential	Statistics Canada - Health behaviours information. Canadian community health survey
Substance use before age 15	Among students who use alcohol or cannabis, the percentage whom first use before the age of 15	BC Adolescent Health Survey
Percentage who felt that a household member had been hurt by the effects of drugs/alcohol within the last year	The percentage of homes with an individual suffering from the effects of drug and/or alcohol abuse within the last year	Canadian Alcohol and Drug use Monitoring Survey - https://www.canada.ca/en/health-canada/services/health-concerns/drug-prevention-treatment/drug-alcohol-use-statistics/canadian-alcohol-drug-use-monitoring-survey-summary-results-2012.html
Substance abuse support programs	The presence of substance abuse cessation programs (AA, NA, SMART, etc.)	Alcoholics Anonymous, Al Anon Family groups
Perception of changes in drinking and violence within the community	The community's perception of the changes in drinking behaviours and violence within their own community	General social survey
Smoking Rate	The prevalence of smoking within a community or population. (Smoking	Canadian Community Health Survey

		rate excludes smokless cigarettes and chewing tobacco)	
	Rates of tobacco use	Any habitual use of the tobacco plant leaf and its products (including smoking cigarettes, e-cigarettes, and chewing tobacco)	Canadian Community Health Survey
	Adult current smoking rate	The percentage of population aged 20 and older who reported being a current smoker (daily or occasional)	Canadian Community Health Survey
	Teen current smoking rate	The proportion of students in Grades 7 through 12 who smoked cigarettes within the past 30 days	BC Adolescent Health Survey
	Rate of smoking during pregnancy	The percentage of new mothers who report smoking during pregnancy	Canadian Community Health Survey
	Problem Gambling	an urge to gamble continuously despite harmful negative consequences or a desire to stop	Local health services and infrastructure, Stats Canada data, Health Data (BC vital stats), key informant interviews
Access to Care	Number of trips outside of the Territory to receive healthcare services per year	The number of trips per year that require one to leave their community in order to receive medical treatment or care	Leaving Canada for Medical Care, 2017 - https://www.fraserinstitute.org/studies/leaving-canada-for-medical-care-2017
	Access to primary health care	2 full time RN's (may not have rural certification, no relief work with high turnover), 2.5 physician days per month with access to telehealth, access 3-4 days per month to nurse practitioner with telehealth, 1	Canadian community health survey, Health services access survey, 2002.

		medical driver (part-time with no qualified driver currently), janitor/clerical both currently provided by 1 band member.	
	First Responder Services	A Certified first responder is one who has received certification to provide pre-hospital care (via medivac, ambulatory care, or fire services)	Government departments and agencies, statistical data, published reports, academic literature, and other qualitative data sources
	Practicing certified health care professionals	The number of practicing certified health care professionals within a community	Canadian Institute for Health Information
	Access to a General Practitioner (GP)	The percentage of population aged 12 and older with self-reported regular medical doctor	Canadian Community Health Survey
	Number of doctors within a community	The number of doctors that service a given community	Canadian Institute for Health Information
	Capacity of health services to meet local needs	The ways in which the local health services meet or do not meet the needs of the community	No Available Data
	Hospital admissions	the number of cases of a specified disease or condition admitted to hospitals, related to the population of a given geographical area	Canadian Institute for Health Information
	Availability and use of traditional	Whether or not an individual has access to a traditional healer and medicines	Indigenous Peoples Survey, 2006, Canadian Community Health Survey

	healers and medicines		
	Community control of health services	The degree to which a community has control over the allocation of health care resources	No Available Data
	Local palliative care for elders	The presence of a palliative care facility for elders within the community	Community health profiles. Provincial health services authority. General Social Survey
	Total number of medevacs	The number of medical emergencies that require the use of medivac to a neighbouring larger community centre	No Available Data
	Total patient visits to health care centres	The total number of patients visiting and utilizing the services available at a health centre within a given period	Canadian Institute for Health Information
	Number of emergency room visits	The number of emergency room visits that occur annually.	Canadian Institute for Health Information
	Capacity to meet the needs of a temporary workforce	The capacity of a community to meet the additional needs of the new temporary workforce, as well as maintain their current resident caseload	No Available Data
	Utilization of specific health and social services	Utilization rates for specific health and services (counselling, nurse practitioner, dental visits, etc.)	Provincial Health Services Authority - community health profiles. Statistics Canada
	Demand on health care system	The demand and stress placed on a local health care system as a result of temporary workers	Canadian Community Health Survey

	Demand on community services	The demand and stress placed on local community services as a result of temporary workers	No Available Data
	Access to family counselling services	Access to psychological counseling (psychotherapy) that helps family members improve communication and resolve conflicts	Canadian Community Health Survey
Health Promotion	Health promotion program participation rates	The presence of health promotion programs within a given community, and the rate at which these programs are being utilized	No Available Data
	Rates of seatbelt and child car seat use	The number of individuals who correctly and consistently use seatbelts when in a motorized vehicle	Canadian National Survey on Child Restraint Use, 2010. ICBC Data
	Receives immunizations	Whether an individual has received and remained updated on the standardized vaccinations	Childhood National Immunization Coverage Survey, 2013 (CNICS) (statistics canada)
	Vaccination Rates	Vaccines can prevent or ameliorate morbidity from infection. When a sufficiently large percentage of a population has been vaccinated, this results in herd immunity	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, Statistics Canada, Health Canada, BC Government, Community Health information Portal, Vital Statistics
	Presence and source of dental insurance	The percentage of population aged 12 and older who reported that they have insurance of different sources that covers all or part of their dental expenses. Sources of dental insurance to be examined when possible	Canadian Community Health Survey

	Cervical cancer screening rate	The proportion of women aged 30-69, excluding those having had a hysterectomy, who have been screened for cervical cancer in the past three years	BC Cancer Registry
	Colorectal cancer screening rate	Proportion of people aged 50-74 who had a colorectal cancer screening test in the previous two years	BC Cancer Registry
	Screening mammography rate	The proportion of women aged 50-69 who had a screening mammogram in the past two years	BC Cancer Registry
	Percent receiving prenatal screenings	The percentage of expecting mothers that receive adequate prenatal screening and care	Maternity Experiences Survey, 2006.
	Existing community health plans	The deliberate effort to involve the members of a geographically defined community in an open public process designed to improve the availability, accessibility, and quality of healthcare services in their community as a means toward improving its health status	No Available Data
Maternal & Pre/Post Natal Health	Pregnancy rates	the total number of resident pregnancies including live births, induced abortions, and fetal deaths per 1,000 women aged 15-44 years for a specified geographical area during a specified period	Vital Statistics, Statistics Canada, Birth and death databases

	Teenage pregnancy rate	Rate of births (live an still) and therapeutic abortion among females aged 15-19	BC Vital Statistics Registry
	Miscarriages	The number or recorded miscarriages that occur annually	Vital Statistics, Statistics Canada, Birth and death databases, Hospital Morbidity Database and Therapeutic Abortion Database
	Small for gestational age rate	Total number of singleton live births with weights below the 10th percentile of birth weights for their gestational age and sex, expressed as a percentage of all live singleton births with gestational ages from 22 to 43 weeks with known birth weight	BC Perinatal Health Registry
	Large for gestational age rate	Total number of singleton live births with weights more than 90th percentile of birth weights for their gestational age and sex, expressed as a percentage of all live singleton births with gestational ages from 22 to 43 weeks with known birth weight	BC Perinatal Health Registry
	Cesarean sections count	A delivery by cesarean, involving the surgical incision of the abdomen and uterine walls.	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Cesarean sections rate	A delivery by cesarean, involving the surgical incision of the abdomen and uterine walls.	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas

	Live birth count	The BC Vital Statistics Act defines a live birth as "The complete expulsion or extraction from its mother, irrespective of the duration of the pregnancy, of a product of conception in which, after the expulsion or extraction, there is: (a) breathing; (b) beating of the heart; (c) pulsation of the umbilical cord; or (d) unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta attached."	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Live birth rate	The BC Vital Statistics Act defines a live birth as "The complete expulsion or extraction from its mother, irrespective of the duration of the pregnancy, of a product of conception in which, after the expulsion or extraction, there is: (a) breathing; (b) beating of the heart; (c) pulsation of the umbilical cord; or (d) unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta attached."	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Low birth weight count	A birth weight of less than 2,500 grams. Low birth weight babies have increased risks of morbidity and premature death.	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Low birth weight rate	A birth weight of less than 2,500 grams. Live births less than 2,500g,	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas, BC Perinatal Health Registry

		expressed as a percentage of all live births with known birth weight	
	Pre-term birth count	A gestational age less than 37 weeks.	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Pre-term birth rate	A gestational age less than 37 weeks.	Ministry of Health Vital Information STAtistics (VISTA), Community Health Atlas
	Exclusive breastfeeding duration of 6 months or more	The percentage of women aged 15 to 49 who gave birth in the previous five years who reported exclusive breastfeeding duration of six months or more to their last child	Canadian Community Health Survey
Sexual Activity & STI's	Sexual activity	Activities associated with sexual intercourse	Determinants of health model, Public health agency of Canada, BC Mines Act, BC workers compensation Act, Health Canada, Northern Health, Adolescent Health Survey
	Sexual exploitation	Sexual abuse through the exchange of sex or sexual acts for drugs, food, shelter, protection, other basics of life, and/or money	General Social Survey of Victimization (Statistics Canada)
	Prostitution	the practice or occupation of engaging in sexual activity with someone for payment	Uniform Crime Reporting Survey (UCR) (Statistics Canada)
	Human trafficking	The illegal movement of people, typically for the purposes of forced labor or commercial sexual exploitation	Integrated Criminal Court Survey (ICCS) (Statistics Canada)
	Incidence of STI's	The number of new cases of STI's diagnosed per year within a given geographic area	Canadian Community Health Survey

	HIV/AIDS rate	the percentage of people tested in a population who were found to be infected with HIV	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, Health Canada, Community Health information Portal, BC Centre for Excellence in HIV/AIDS
	Hepatitis C rate	The percentage of people tested in a population who were found to be infected with Hep C	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, Health Canada, Community Health information Portal, BC Centre for Excellence in HIV/AIDS
	Gonorrhea rate	The percentage of people tested in a population who were found to be infected with gonorrhea	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, Health Canada, Community Health information Portal, BC Centre for Excellence in HIV/AIDS
	Chlamydia rate	The percentage of people tested in a population who were found to be infected with chlamydia	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, Health Canada, Community Health information Portal, BC Centre for Excellence in HIV/AIDS
	Syphilis rate	The percentage of people tested in a population who were found to be infected with syphilis	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, Health Canada, Community Health

			information Portal, BC Centre for Excellence in HIV/AIDS
Chronic Health Conditions	Chronic Disease Rates	A chronic disease is one lasting 3 months or more, and it cannot be prevented by vaccines or cured by medication	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, UVIC Centre for Addictions Research, McCreary Centre Society, Provincial Services Health Authority, BC Cancer Registry, BC Stats, BC Injury Research and Prevention Unit, Statistics Canada, Health Canada, BC Government, Office of the Provincial Health Officer, Community Health information Portal, Vital Statistics, BC Centre for Excellence in HIV/AIDS
	Diabetes rates	The number of cases of both type 1 and type 2 diabetes within a community	Canadian Institute for Health Information (CIHI), Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, BC Stats, Statistics Canada, Health Canada, Community Health information Portal
	Diabetes diagnostic rates	The number of individuals being diagnosed with diabetes (type 2) within a given period of time	Canadian Community Health Survey
	Incidence of diabetes	Age standardized incidence rate of diabetes mellitus	BC Ministry of Health
	Diabetes mellitus (DM) age standardized incidence rate	Diabetes mellitus (DM) is a chronic condition that results from the body's inability to sufficiently produce or use insulin (a hormone produced by the cells in the	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas

		pancreas that regulates the storage and use of glucose in the body)	
	Diabetes mellitus (DM) age standardized prevalence rate	Diabetes mellitus (DM) is a chronic condition that results from the body's inability to sufficiently produce or use insulin (a hormone produced by the cells in the pancreas that regulates the storage and use of glucose in the body)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Diabetes mellitus (DM) incident cases	Diabetes mellitus (DM) is a chronic condition that results from the body's inability to sufficiently produce or use insulin (a hormone produced by the cells in the pancreas that regulates the storage and use of glucose in the body).	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Diabetes mellitus (DM) prevalent cases	Diabetes mellitus (DM) is a chronic condition that results from the body's inability to sufficiently produce or use insulin (a hormone produced by the cells in the pancreas that regulates the storage and use of glucose in the body)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Chronic kidney disease (CKD) age standardized incidence rate	Chronic kidney disease (CKD) is the slow loss of kidney function which is removing wastes and excess water from the body. CKD starts slowly and gets worse over time. The loss of kidney function usually takes months or years to occur. The final stage of chronic kidney disease is called end-stage	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas

		renal disease where the kidneys are no longer able to remove enough wastes and excess fluids from the body. In this case, the patient needs dialysis or a kidney transplant. (Pubmedhealth, 2011)	
	Chronic kidney disease (CKD) age standardized prevalence rate	Chronic kidney disease (CKD) is the slow loss of kidney function which is removing wastes and excess water from the body. CKD starts slowly and gets worse over time. The loss of kidney function usually takes months or years to occur. The final stage of chronic kidney disease is called end-stage renal disease where the kidneys are no longer able to remove enough wastes and excess fluids from the body. In this case, the patient needs dialysis or a kidney transplant. (Pubmedhealth, 2011)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Chronic kidney disease (CKD) incident cases	Chronic kidney disease (CKD) is the slow loss of kidney function which is removing wastes and excess water from the body. CKD starts slowly and gets worse over time. The loss of kidney function usually takes months or years to occur. The final stage of chronic kidney disease is called end-stage renal disease where the kidneys are no longer able to remove enough wastes and excess fluids	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas

		<p>from the body. In this case, the patient needs dialysis or a kidney transplant. (Pubmedhealth, 2011)</p>	
	<p>Chronic kidney disease (CKD) prevalent cases</p>	<p>Chronic kidney disease (CKD) is the slow loss of kidney function which is removing wastes and excess water from the body. CKD starts slowly and gets worse over time. The loss of kidney function usually takes months or years to occur. The final stage of chronic kidney disease is called end-stage renal disease where the kidneys are no longer able to remove enough wastes and excess fluids from the body. In this case, the patient needs dialysis or a kidney transplant. (Pubmedhealth, 2011)</p>	<p>Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas</p>
	<p>Chronic obstructive pulmonary disease (COPD) age standardized incidence rate</p>	<p>Chronic obstructive pulmonary disease (COPD) includes a number of diseases such as chronic bronchitis and emphysema. These diseases are non-reversible and entail the narrowing of the airways that limits air flow to and from the lungs. Many cases are caused by smoking, or exposure to smoke, and some may be associated with occupational exposure.</p>	<p>Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas</p>

	Chronic obstructive pulmonary disease (COPD) age standardized prevalence rate	Chronic obstructive pulmonary disease (COPD) includes a number of diseases such as chronic bronchitis and emphysema. These diseases are non-reversible and entail the narrowing of the airways that limits air flow to and from the lungs. Many cases are caused by smoking, or exposure to smoke, and some may be associated with occupational exposure	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
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	Cardiovascular Disease diagnostic rates	The number of individuals being diagnosed with CVD in a given period of time	Canadian Health Measures Survey
	Mortality rate from cardiovascular disease	Age-standardized rate of death from cardiovascular diseases, including ischemic heart diseases, cerebrovascular diseases, and all other circulatory diseases	BC Vital Statistics Registry
	Heart failure age standardized incidence rate	Heart failure (HF) usually results when heart disease causes a structural or functional problem that hinders the heart's ability to fill with blood and pump it to the other parts of the body. This can result in fluid pooling in the lungs, abdomen, and the lower extremities, causing swelling in the feet and legs. (Provincial Health Officer's Annual Report, 2009) ICD-9 (428), ICD-10 (I50)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Heart failure age standardized prevalence rate	Heart failure (HF) usually results when heart disease causes a structural or functional problem that hinders the heart's ability to fill with blood and pump it to the other parts of the body. This can result in fluid pooling in the lungs, abdomen, and the lower extremities, causing swelling in the feet and legs. (Provincial Health Officer's Annual Report, 2009) ICD-9 (428), ICD-10 (I50)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas

	Heart failure incident cases	Heart failure (HF) usually results when heart disease causes a structural or functional problem that hinders the heart's ability to fill with blood and pump it to the other parts of the body. This can result in fluid pooling in the lungs, abdomen, and the lower extremities, causing swelling in the feet and legs. (Provincial Health Officer's Annual Report, 2009) ICD-9 (428), ICD-10 (I50)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Heart failure prevalent cases	Heart failure (HF) usually results when heart disease causes a structural or functional problem that hinders the heart's ability to fill with blood and pump it to the other parts of the body. This can result in fluid pooling in the lungs, abdomen, and the lower extremities, causing swelling in the feet and legs. (Provincial Health Officer's Annual Report, 2009) ICD-9 (428), ICD-10 (I50)	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	30-day acute myocardial infarction in-hospital mortality	The risk-adjusted rate of all-cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of acute myocardial infarction	Discharge Abstract Database, BC Ministry of Health
	Prevalence of heart disease	The percentage of population aged 12 and older with self-reported heart disease	Canadian Community Health Survey

	Hypertension (high blood pressure) age standardized incidence rate	Hypertension (high blood pressure) is an important risk factor for heart disease and stroke and also a co-morbidity of diabetes. The combination of poorly controlled blood pressure and blood sugar is particularly dangerous	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Hypertension (high blood pressure) age standardized prevalence rate	Hypertension (high blood pressure) is an important risk factor for heart disease and stroke and also a co-morbidity of diabetes. The combination of poorly controlled blood pressure and blood sugar is particularly dangerous	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Hypertension (high blood pressure) incident cases	Hypertension (high blood pressure) is an important risk factor for heart disease and stroke and also a co-morbidity of diabetes. The combination of poorly controlled blood pressure and blood sugar is particularly dangerous	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Hypertension (high blood pressure) prevalent cases	Hypertension (high blood pressure) is an important risk factor for heart disease and stroke and also a co-morbidity of diabetes. The combination of poorly controlled blood pressure and blood sugar is particularly dangerous.	Workforce Analysis Branch, Health Sector Workforce Division, Ministry of Health, Community Health Atlas
	Systolic blood pressure	The highest arterial pressure. As opposed to diastolic pressure	Canadian Health Measures Survey
	Incremental Lifetime Cancer Risk	To estimate the risk of cancer associated with exposure to a carcinogenic or	BC Ministry of Environment, Ministry of Health, Health Canada Hazard Quotients for

	potentially carcinogenic substance, also called cancer slope factors (cancer risks from long-term exposure via inhalation or oral/dermal exposure)	humans and marine resources for consumption
Cancer diagnostic rates	The number of individuals being diagnosed with cancer within a given period of time	BC Cancer Registry
Incidence of Lung Cancer	Age-standardized incidence rate of lung cancer	BC Cancer Registry
Incidence of Breast Cancer	Age-standardized incidence rate of breast cancer	BC Cancer Registry
Incidence of Colorectal Cancer	Age-standardized incidence rate of colorectal cancer	BC Cancer Registry
All-cause cancer incident cases (all ages-females)	Cancer cases included all invasive/malignant disease as well as in-situ disease for bladder diagnosed among BC residents. Cancer cases exclude in-situ disease (except bladder), benign neoplasms, and non-melanoma skin cancers.	BC Cancer Registry, Community Health Atlas
All-cause cancer incident cases (all ages-males)	Cancer cases included all invasive/malignant disease as well as in-situ disease for bladder diagnosed among BC residents. Cancer cases exclude in-situ disease (except bladder), benign neoplasms, and non-melanoma skin cancers.	BC Cancer Registry, Community Health Atlas

	All-cause cancer incident cases (all ages-total)	Cancer cases included all invasive/malignant disease as well as in-situ disease for bladder diagnosed among BC residents. Cancer cases exclude in-situ disease (except bladder), benign neoplasms, and non-melanoma skin cancers.	BC Cancer Registry, Community Health Atlas
	Arthritis Rate	The percentage of people tested in a population who were found to be living with some type of degenerative joint disease	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, BC CDC, Provincial Services Health Authority, BC Stats, Statistics Canada, Community Health information Portal
	Asthma Rate	The percentage of people tested in a population who were found to be asthmatic (a common long term inflammatory disease of the airways of the lungs)	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, Provincial Services Health Authority, BC Stats, Health Canada, Office of the Provincial Health Officer
	Neurological disorders diagnostic rates	The number of individuals being diagnosed with neurological disorders within a given period of time	Survey on Living with Neurological Conditions in Canada 2011-2012, Canadian Community Health Survey
	Hospitalization rate of ambulatory care sensitive conditions	Age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care may prevent or reduce the need for admission to hospital	Discharge Abstract Database, BC Ministry of Health

Acute/Communicable	Communicable disease rates	Rates of disease caused by pathogenic microorganisms, such as bacteria, viruses, parasites or fungi; the diseases can be spread, directly or indirectly, from one person to another (ex. Tuberculosis, Hep B, influenza virus, MRSA, etc.)	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, Provincial Services Health Authority, BC Stats, Health Canada, Office of the Provincial Health Officer, Tobin et al., 2011
	Pneumonia readmission rate	Hospital re-admission rate for pneumonia i.e. risk adjusted rate of unplanned re-admission following admission for pneumonia	Discharge Abstract Database, BC Ministry of Health
	Pressure ulcer rate among elderly patients	The rate of in-hospital pressure ulcers per 1,000 discharges among elderly patients	Discharge Abstract Database, BC Ministry of Health
	Medically treatable diseases potential years of life lost index	The disease categories are ones for which mortality could potentially have been avoided through appropriate medical intervention. It should be noted that the causes are considered to have been medically treatable only if the death occurred to persons within a specified age range	Ministry of Health Vital Information STAtistics (VISTA)
Functional Health	Functional Health	The integrative, science based healthcare which treats illness and promotes wellness by focusing on the unique aspects of each patient and then employs individual tailored interventions to restore physiological, psychological and structural balance	Canadian Institute for Health Information (CIHI), Canadian Communicable Disease Report, Public Health Agency of Canada, Provincial Services Health Authority, BC Stats, Health Canada, Office of the Provincial Health Officer

	Nutrition	The process of consuming healthful foods that allow the body to be healthy and grow	Canadian Community Health Survey
	Nutritional disorders diagnostic rates	The rates of diagnoses of nutritional disorders in Canada annually	No Available Data
	Prevalence of adolescent overweight and obesity	The percentage of adolescents, aged 12-17, that are overweight or obese according to the age-and-sex-specific BMI cut-off points as defined by Cole et al., using self-reported height and weight	Canadian Community Health Survey
	Obesity rates	The percentage of the population that is considered to be overweight, obese, or morbidly obese	Canadian Community Health Survey
	Childhood obesity	A medical condition that affects children and adolescents, the condition occurs when a child's weight exceeds the expected weight for their age/height	Adolescent health survey, Canadian community health survey
	Prevalence of adult obesity	The percentage of adults aged 18 and older that are obese (BMI ≥ 30.0) according to self-reported height and weight	Canadian Community Health Survey
	Body Mass Index	Body mass index: a person's weight in kilograms (kg) divided by his or her height in meters squared	Canadian Community Health Survey
Accidents & Injuries	Accident and Injury Rates	an undesirable or unfortunate happening that occurs unintentionally and usually results in harm, injury, damage, or loss of life	Canadian Community Health Survey

	Injury hospitalization rate	the number of inpatient hospital discharges due to all causes for every 1,000 people within the geographic area	BC Stats, BC Injury Research and Prevention Unit, Statistics Canada, Health Canada, Vital Statistics, Discharge Abstract Database, BC Ministry of Health
	Hospitalization Rate for respiratory disease	Rate of hospitalization from respiratory disease for a defined geographic area.	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Hospitalization (per 1,000 aged 0 to 14) for respiratory diseases	Hospitalization rates are based on data for acute, rehabilitation and surgical day care levels and does not include newborns. Rates are standardized per 1,000 population age 0 to 14. Data are for the most recent fiscal year.	Ministry of Health, Community Health Atlas
	Average hospitalization rate for injury and poisoning (per 1000)	Rate of hospitalizations due to injury or poisoning for a defined geographic area.	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Hospitalization (per 1,000 aged 0 to 14) for injuries and poisoning	Hospitalization rates are based on data for acute, rehabilitation and surgical day care levels and does not include newborns. Rates are standardized per 1,000 population age 0 to 14. Data are for the most recent fiscal year.	Ministry of Health, Community Health Atlas
	Physical Activity	Physical inactivity	No or irregular physical activity
Percentage of children participating in		The percentage of children that receive enough physical exercise every day	Adolescent health survey

	physical activity every day		
	Leisure time and physical activity	The percentage of population aged 12 and older with self-reported leisure time physical activity classified as active or moderately active	Canadian Community Health Survey
	Physical activity levels	A way to express a person's daily physical activity as a number, and is used to estimate a person's total energy expenditure	Canadian Community Health Survey, Canadian Health Measures Survey
	Self-reported physical fitness	Self-reported data on levels of physical activity	Canadian Health Measures Survey, 2007-2009
Self Measures/Quality of Life	Self-assessed quality of life	A subjective measure of individual quality of life. Typically collected in the form of a survey, questionnaire, or interview	Better Life Index, Canadian Community Health Survey, General social survey
	Self-reported health status	Self-reported health data collected via survey	Canadian Community Health Survey
	Perceived Health	The percentage of population aged 12 and older with self-reported perceived health status as very good or excellent	Canadian Community Health Survey
	Youth self rated over all health	A subjective measure of individual over all health (physical, emotional, mental, and spiritual). Typically collected via survey, questionnaire, or interview	Adolescent health survey
	Life satisfaction	The degree to which an individual is satisfied and fulfilled	Canadian Community Health Survey, General Social Survey
	Chronic pain and discomfort	The number of Canadians living in chronic pain or discomfort.	Canadian Community Health Survey, 2012

		Expressed as a ratio, 1/10 aged 12-44.	
	Quality adjusted life years	a generic measure of disease burden, including both the quality and the quantity of life lived	Vital Statistics, Statistics Canada, Birth and death databases
Environmental Contaminants	Concentration ratio	non-cancer health risks from inhalation or drinking water exposure	BC Ministry of Environment, Ministry of Health, Health Canada Hazard Quotients for humans and marine resources for consumption
	Hazard Quotient	non-cancer health risks from food/dermal exposure, the ratio of the potential exposure to a substance and the level at which no adverse effects are expected	BC Ministry of Environment, Ministry of Health, Health Canada Hazard Quotients for humans and marine resources for consumption
	Risk Quotient	health risks to populations from long-term exposure via oral/dermal pathways; or health risks to community based on concentration in exposure medium	Bc Ministry of Environment, Ministry of Health, Health Canada Hazard Quotients for humans and marine resources for consumption
	Methylmercury contamination	Individuals with above average levels of exposure to methylmercury	Canadian Health Measures Survey, 2014-2015
	Hair Sampling analysis	Hair sampling analysis to identify heavy metal contamination	Canadian Health Measures Survey, 2014-2015
Wellbeing Indices	Canadian index of wellbeing	The Canadian Index of Wellbeing is a composite index, composed of eight interconnected domains that measures stability and change in the wellbeing of Canadians over time	Canadian index of wellbeing survey, Uwaterloo

	Community well being index	A means of examining the well-being of individual Canadian communities. Various indicators of socio-economic well-being, including education, labour force activity, income and housing are combined to give each community a well-being "score"	Indigenous and Northern Affairs Canada - Canadian Wellbeing Index 1981-2011.
	Wellness indicators as determined by the community*	Indicators that are identified by each unique community to reflect their needs	No Available Data
Cumulative	Cumulative impacts	Effects on the environment which are caused by the combined results of past, current and future activities. Over time, direct and indirect human activities combine to collectively impact the environment, society, and human health	No Available Data

Theme – Work Environment and Conditions

Sub-themes	Indicator	Description	Available Data Sources
Emergency Management	Kinds of emergency to be anticipated and worst case scenarios	To prevent and manage the impacts of disasters on communities and the environment	No Available Data
Subsistence Economies & On-reserve Employment	Percentage participate in modern/non-traditional economic activities	The percentage of individuals that participate in trading and bartering for goods and services with other members of their community	Revised Northern Food Basket, National Household Survey, 2011
	Percentage participate or employed in traditional and subsistence activities	The percentage of individuals who participate in or are employed in the industry of subsistence harvesting	National Household Survey, 2011
	On-reserve labour market	The number of available workers located on reserve to meet the communities needs	Labour Market Statistics http://www2.gov.bc.ca/gov/content/data/statistics/employment-labour/labour-market-statistics/cansim-data-tables
	On-reserve positions filled by non-members	The number of non-members working in positions on reserve	Labour Market Statistics http://www2.gov.bc.ca/gov/content/data/statistics/employment-labour/labour-market-statistics/cansim-data-tables
	Number of individuals employed in band services	The number of individuals that the local band employs	Labour Market Statistics http://www2.gov.bc.ca/gov/content/data/statistics/employment-labour/labour-market-statistics/cansim-data-tables

Employment Access & Characteristics	Labour availability (in persons)	Labour force = employed + unemployed persons. The number of employable individuals available for a specific project or in a given region or municipality	BC Stats, Statistics Canada - Employment Statistics
	Labour Wages	The variation in the wage being paid (\$/hr) across the same position/industry	BC Taxation statistics, BC Stats, GDP Revenues for current, previous, and predictive years
	Barriers to employment	Barriers to employment describe a variety of circumstances that are outside of a workers control that influences their ability to obtain or maintain part-time or full-time employment (ex. Disabilities, physical health conditions, mental health conditions, transportation, access to child minding services, etc.)	Labour Force Survey, Canadian Survey on Disability
	Number of licensed businesses	The number of licensed operating businesses within a community	BC Stats - small business licenses
	Number of local contractors	The number of licensed operating contractors within a community	BC Taxation statistics, BC Stats, GDP Revenues for current, previous, and predictive years

	Number possessing special employment skills	Specialized or technical employment skills are typically earned through post secondary education that provides the student with learned industry valued skills that will increase their potential of finding employment within their chosen field	National Household Survey, 2011, Labour force survey
	Percentage of workforce that has worked the full year	The percentage of the workforce that has remained employed for 1 full calendar year	Stats Canada 2006, BC Stats, BC Census profiles
	Percent employed in resource development activities	A percentage of the number of individuals employed within the resource development industry	BC statistics -employment by industry. Statistics Canada - Employment by Industry
	Quality and sustainability of employment	The types of work available to an individual, and the degree to which they provide a stable income, opportunities to improve one's skills, and allow the individual to plan for the future	Labour Force Survey
	Reported employment conditions	The conditions under which workers report working under in a given work environment or industry	Local health services and infrastructure, Stats Canada data, Health Data (BC vital stats), key informant interviews

	Decision latitude at work	the level of control a worker has in determining her or his work	Statistics Canada 2004.
	Number of job advertisements	The number of ads placed by businesses seeking employees	Job Vacancy and Wage Survey, 2017
	Local workforce vs. temporary workforce	The number of positions available at any one time fluctuates according to proportions of operational and project-based funding - from AANDC, provincial government and private sector sources	No Available Data

Theme – Economy and Politics

Sub-themes	Indicator	Description	Available Data Sources
Revenue Sources & Taxation	Municipal Revenue	Municipal revenues are collected locally through taxation and through provincial and federal grants	Census Canada, BC Stats, Service Canada, local government, and local chamber of commerce
	Federal Revenue	Government of Canada federal revenues (expressed in \$/year)	Stats Canada
	Provincial Revenue	The provincial revenue of British Columbia (expressed in \$/year)	Stats Canada
	Gross domestic product	The monetary value of all goods and services produced within a nation's geographic borders over a specified period of time	BC Taxation statistics, BC Stats, GDP Revenues for current, previous, and predictive years
	Economic diversification	The act or practice of manufacturing a variety of products, investing in a variety of securities, selling a variety of merchandise, etc., so that a failure in one sector or an economic slump will not be disastrous	Labour Force Survey,
	Traditional economies	Traditions, customs, and beliefs shape the goods and the services the economy produces, as well as the rules and manner of their distribution	Revised Northern Food Basket
Indigenous Issues & Self Governance	Number of women in decision making roles (chiefs, councilors, board members, directors, etc.)	The number of women in roles of power within a community (chiefs, board members, council members, etc.)	No Available Data
	Financial losses	The loss of salmon means families have to turn to other alternatives for food. Family	No Available Data

		run commercial fishing operations are also impacted, thus reducing employment	
	Accuracy of promises from government and industry	The degree to which governing bodies (provincial, federal, industry) respects and adheres to promises made concerning future plans and developments	No Available Data
	Relationship between industry and nations	Undefined	No Available Data
	Number of existing major projects on territory	Number of existing projects operating on Indigenous territories (whether traditional or otherwise)	Province of BC, 2014b, BC Major Projects Inventory
	Number of proposed major projects on territory	Number of proposed projects located on Indigenous territories (whether traditional or otherwise)	Province of BC, 2014b, BC Major Projects Inventory
Local Economy & Politics	Locus of control	The extent of co-management, accuracy of promises from government and industry, percent of local ownership of infrastructure, and land tenure.	No Available Data
	Costs to regional government	The costs associated with an increased population due to an influx of temporary workers	BC Stats
	Presence of comprehensive community plan	Whether or not a community has an existing comprehensive community plan in place	No Available Data
	Presence of an official community plan	Whether or not a community has an official community plan	Regional District of Bulkley-Nechako planning, 2004.

	Political control	Political control: The percentage of Indigenous and local members in governing bodies.	No Available Data
	Percent of local ownership of infrastructure and land tenure	A percentage of the number of individuals that own local infrastructure projects and land	No Available Data
	Control over land/resources	Control over land/resources: The percentage of surface lands legally controlled by Indigenous and local inhabitants	No Available Data
	Economic control	Economic control: The percentage of public expenses generated within the region raised locally	No Available Data
	Capital spending on infrastructure projects	The amount of money being spent on local infrastructure	Ministry of Transport and Infrastructure, Statistics Canada - Age of Public Infrastructure
	Stable leadership	The degree to which a community has stable leaders in positions of power who make logical necessary decisions on behalf of their community	No Available Data
	Financial mismanagement	Management that, deliberately or not, is handled in a way that can be characterized as "wrong, bad, careless, inefficient or incompetent" and that will reflect negatively upon the financial standing of a business or individual	No Available Data
	Rags to riches/boom bust economies	A period of great prosperity or rapid economic growth is abruptly followed by one of economic decline	No Available Data

Theme – Indigenous Culture and Identity

Sub-themes	Indicator	Description	Available Data Sources
Environmental & Cultural Impacts	Health of Salmon	The degree of fish contamination (heavy metals, plankton)	Department of Fisheries and Oceans
	Altered Dietary Patterns	Changes in diet composition. Less Salmon, and more grocery bought and alternative species substitutions	Study: Mutoni, 2012. https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/8488/Mutoni_Sandrine_2012_memoire.pdf?sequence=2
	Number of families seeking alternative solutions	Alternative sources of fish include trout in lakes and rivers that were unaffected by the spill, as a result of the closure of the fisheries and fear of contaminated fish	No Available Data
	Fear of contamination	The psychological and behavioural changes that occur with a fear of contamination from resource extraction and other industrial activities	No Available Data
	Industrial contamination	The contamination of the environment by businesses, particularly plants, factories, and resource development projects that results in waste and by-products being released into the earth, water, and air	Canadian Health Measures Survey (Human physical health only)
	Number of cultural sites/CMT's destroyed	The number of cultural sites and culturally modified trees destroyed (intentionally and/or unintentionally)	Archaeological Impact Assessment (AIA), field work, BC Association of Professional Archaeologists (APA), Heritage Conservation Act, Canadian environmental assessment act 1996.
	Number of Canadian heritage sites	The number of documented Canadian heritage sites within a given area	Archaeological Impact Assessment (AIA), field work, BC Association of Professional Archaeologists (APA), Heritage Conservation Act, Canadian environmental assessment act 1996. BC Parks

	Fossil Sites	An area of interest known to contain fossilized remains of prehistoric lifeforms	Archaeological impact assessment guidelines, Heritage conservation act, Canadian environmental assessment act 1996.
	Number of archaeological sites	The number of documented archaeological sites within a given area	Archaeological Impact Assessment (AIA), field work, BC Association of Professional Archaeologists (APA), Heritage Conservation Act, Canadian environmental assessment act 1996.
Land	Land claims	The legal declaration of desired control over an area of property including bodies of water	Indigenous Affairs and Northern Development Canada
	Traditional land usage	Changes in the access, safety, and quality of sacred lands, traditional medicines, and gathering activities	No Available Data
	Displacement from traditional lands	When a group that is indigenous to a geographic area is forced to relocate for political, economic, or social purposes	Traditional land use studies: http://www.lifewaysofcanada.com/html/traditional-land-use-studies-TLU.php
Language	% that speak and or understand Native language	The percentage of individuals within a community who have the ability to speak and/or understand the native language of said community	National Household Survey, 2011
	Language retention rate	Language retention rate: The percentage of the population that speaks its ancestral language.	National Household Survey, 2011
	Opportunities to learn in one's Native language	Whether there are opportunities available for one to learn in their own native language	No Available Data
	Number of community members with a traditional name	The number of community members that have a traditional name	No Available Data

	Use of Native languages in the home	The number of homes that speak native languages in the home	National Household Survey, 2011
Community Cohesion	Attends annual general assembly	The annual attendance rate of a band's general assembly	No Available Data
	Number of community group celebrations	The number of community group celebrations that occur per year	No Available Data
	Participation in cultural/traditional events (dance, sweat, gatherings)	The rates of participation for cultural and traditional ceremonies and gatherings (sweat, dances, potlatch, etc.	No Available Data
	Types of games, gatherings, and ceremonies organized	The types of games, gatherings, and ceremonies that are organized within a community	No Available Data
	Cultural practices and traditions	Changes in salmon fishing, preparation storage, and ceremonial behaviours	No Available Data
	Strong relationships between elders and youth	Strong relationships between a communities youth and elders	No Available Data
	Participates in subsistence and other traditional activities	Whether or not individuals participate in subsistence and other traditional activities	Revised Northern Food Basket, 2014-2015
	Intra-community tension	Disagreements within communities	No Available Data
	Inter-community tension	Disagreements between communities	No Available Data
Culture & Identity	Number of drumming	The number of drumming occasions per calendar year	No Available Data

	occasions per year		
	Number of drums in the community	The number of drums within a community	No Available Data
	Cultural identity	Part of a person's self-conception and self-perception and is related to nationality, ethnicity, religion, social class, generation, locality or any kind of social group that has its own distinct culture	Indigenous Affairs and Northern Development Canada, National Household Survey, 2011.
	Appropriate care for, use and profile of elders	The degree to which the special care needs of senior citizens are being met, and how the community values elders unique skills	No Available Data
	Reported visits to elders, spiritual leaders, and community healers	The number of visits to elders, spiritual leaders, and community healers that occur per year	No Available Data
	Respect for Elders within the community	The degree to which elders are respected and valued within a community	No Available Data
	Investment in community culture and traditions	Investing both economic and social capital into community cultures and traditions	No Available Data
	Traditional knowledge	know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity	No Available Data
	Impacts of historical non-industrial activities	Colonization, the Reserve system, residential schools, the imposition of trap-line licensing, etc.	No Available Data

Governance & Relations with Industry	Misinformation, lack of trust, and poor communication	Mental health impacts include: emotional/psychological trauma, anxiety, depression	No Available Data
	Violation of Rights	Undefined	No Available Data
	Solid local administration (Degree to which community meets standards of the First Nations Financial Management Board)	The degree to which community meets standards of the First Nations Financial Management Board	No Available Data
	Self-governance in FN communities	The presence of a self-governance and autonomy within a community, and the degree of control that is possessed by local governments	No Available Data
	Indigenous title and rights	Whether a nation has legally asserted rights and title over a particular region	No Available Data
	Hereditary vs. elected leadership	The difference between hereditary and elected leadership	No Available Data
	Discreditation of traditional knowledge	The human health risk assessment (HHRA) included in the Project's EA Application does not acknowledge traditional knowledge and the methodology does not account for potential pathways that will affect, for example, country food and water quality	No Available Data
	First Nations influence and involvement	Undefined	No Available Data

Theme – Community and Social Value

Sub-themes	Indicator	Description	Available Data Sources
Crime & Illicit Activities	Caseload	The number of criminal code offences per officer within a given community	Province of British Columbia, 2011, 2012. B.C., Statistics Canada, Policing Jurisdiction Crime Trends, 2005 - 2014
	Crime rate	Crime rates are calculated on the basis of 1,000 population; population estimates are provided by BC Stats	Province of British Columbia, 2011, 2012. B.C., Statistics Canada, Policing Jurisdiction Crime Trends, 2005 - 2014
	Increase in violent crimes	Expressed as an average for the period of question	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Total serious crime rate	Per time period of interest	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Violence against women	Any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life (United Nations)	Statistics Canada, Canadian Centre for Justice Statistics, Incident-based Uniform Crime Reporting Survey
	Incidence rates of physical abuse, neglect, sexual abuse, and exposure to domestic violence of women	The incidence rate is the number of new cases that occur in a given time period.	Statistics Canada, Canadian Centre for Justice Statistics, Incident-based Uniform Crime Reporting Survey
	Incidence rates of physical abuse, neglect, sexual abuse, and exposure to	The incidence rate is the number of new cases that occur in a given time period.	Statistics Canada, Canadian Centre for Justice Statistics, Incident-based Uniform Crime Reporting Survey, Canadian Incidence Study of Reported Child Abuse and Neglect-2008

	domestic violence of children		
	Violence in the home and community	Violence perpetrated against children during residential schools, and the lack of healing options subsequently has resulted in the normalization of continued violence and trauma (men, women, and children)	Statistics Canada, Canadian Centre for Justice Statistics, Incident-based Uniform Crime Reporting Survey, Canadian Incidence Study of Reported Child Abuse and Neglect-2008
	Adult charged rate	Adults aged 18+ accused of a criminal offence and formally charged, recommended to the Crown for charging by police or cleared by means other than the laying of a charge.	Ministry of Justice, BC Stats, Statistics Canada, Canadian Centre for Justice Statistics, Integrated Criminal Court Survey
	Youth charged rate	Youth aged 12 to 17, accused of a criminal offence and formally charged, recommended to the Crown for charging by police or cleared by means other than the laying of a charge. Rates are calculated on the basis of 100,000 youth aged 12 to 17 in the population	Ministry of Justice, BC Stats, Uniform crime reporting survey, Integrated Criminal Courts Survey (ICCS)
	Violent crime rate	The crime rate of violent crimes (involving the use or threatened use of violence against a person, including homicide, attempted murder, assault, sexual assault and robbery)	Ministry of Justice, BC Stats, Homicide Survey
	Homicide	Homicide occurs when a person directly or indirectly, by any means, causes the death of another human being (Homicide includes first and second degree murder, manslaughter and infanticide)	Ministry of Justice, BC Stats, Homicide Survey

	Intimate partner violence rate	Violence occurring between romantic or intimate partners (domestic violence)	Statistics Canada, Canadian Centre for Justice Statistics, Incident-based Uniform Crime Reporting Survey, General social survey on victimization
	Drinking and driving incidences	The number of drinking and driving incidences recorded by RCMP annually	Ministry of Justice, BC Stats, Uniform crime reporting survey, Integrated Criminal Courts Survey (ICCS), Canadian Community Health Survey
	Drug crime incidences	The incidences of crimes including offences under the Controlled Drugs and Substances Act such as importation, exportation, trafficking, production and possession of drugs or narcotics	Ministry of Justice, BC Stats, Uniform crime reporting survey, integrated criminal courts survey, Canadian community health survey, Socio-economic Profiles
	Property crime incidences	The number of incidences of crime involve unlawful acts to gain property, but do not involve the use or threat of violence against the person	Ministry of Justice, BC Stats, uniform crime reporting survey
	Assault incidence	The rate of occurrence of level 1 or common assault, the least serious form including behaviours such as pushing, slapping, punching and face-to-face threats	Ministry of Justice, BC Stats, Uniform Crime reporting survey
	Assault with a weapon	The rate of occurrence of level 2 assault, defined as assault with a weapon or causing bodily harm	Ministry of Justice, BC Stats, Uniform Crime reporting survey
	Aggravated assault	The rate of occurrence of level 3 aggravated assault, defined as assault that wounds, maims, disfigures or endangers the life of the victim	Ministry of Justice, BC Stats, Uniform Crime reporting survey
	Sexual assault incidences	The rate of occurrence of sexual assaults (violent offence classified into one of three levels according to the seriousness of the incident)	Ministry of Justice, BC Stats, Uniform Crime reporting survey

	Prevalence of physical and/or sexual abuse or mistreatment	The percentage of B.C. students who had been physically and/or sexually abused	BC Adolescent Health Survey, General Social Survey on Victimization
	Harassment incidence	Any unwanted persistent physical or verbal behaviour that offends or humiliates the victim	Ministry of Justice, BC Stats, Uniform Crime Reporting Survey
	Missing persons' incidences	The number of individuals reported as missing to RCMP annually	Ministry of Justice, BC Stats, Uniform Crime Reporting Survey
	Non-Cannabis Drug Charges	Average charges per 100,000	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Prostitution and human trafficking	The practice or occupation of engaging in sexual activity with someone for payment, and the illegal movement of people, typically for the purposes of forced labor or commercial sexual exploitation	Uniform Crime Reporting Survey, Integrated Criminal Court Survey
	Juvenile Serious Crime Rate	Average charges per 1000	BC Stats, 2011. Local Health Area 56: Nechako Statistical Profile
	Juvenile (12 to 17) crime rate: non-cannabis drug charges	Drug offence rates include possession and trafficking/importing/cultivation of illegal drugs excluding cannabis. Variations in the rates between regions may reflect differing police enforcement of drug possession between jurisdictions as well as differing levels on non-cannabis drug use. Total rates are based on number of offences (charges for juveniles) and are reported per 100,000 population. Data are 3-year averages.	Canadian Centre for Justice Statistics, Statistics Canada, BC Stats, Community Health Atlas
	Juvenile (12 to 17) crime rate: serious crime: property	Breaking & entering is the only property crime included in the serious property crime rate. Serious property crimes exclude motor vehicle theft (shown	Canadian Centre for Justice Statistics, Statistics Canada, BC Stats, Community Health Atlas

		separately) and minor crimes such as bicycle theft and pick pocketing. Data are 3-year averages.	
	Juvenile (12 to 17) crime rate: serious crime: total	The total of the serious violent crime rate and the serious property crime rate. Data are 3-year averages.	Canadian Centre for Justice Statistics, Statistics Canada, BC Stats, Community Health Atlas
	Juvenile (12 to 17) crime rate: serious crime: violent	Serious violent crime rate is based on reporting within the crime categories of homicide, attempted murder, sexual and non-sexual assault (level 2 and 3: resulting in bodily harm, wounding, disfiguring, maiming or endangering the life of someone) as well as robbery and abduction. Data are 3-year averages.	Canadian Centre for Justice Statistics, Statistics Canada, BC Stats, Community Health Atlas
Public Safety & Attitude	Perception of public safety	Public perceptions of community safety and cohesion	Crime Severity Index
	Presence of public safety and services	3 RCMP officers at 1.0FTE, no paramedic or fire services	RCMP services, Crime Severity index
	Changes in community values and attitudes	Changes to community values and attitudes	Statistics Canada, BC Stats, interviews with key informants
Community Connectedness	Conflict between community members (intra-community tension)	Conflict between community members residing within the same community	General Social Survey
	Existing partnerships between communities	Partnerships and collaborations between communities (recreation, social values, economic, etc.)	General Social survey

	Community cohesion	A common or shared vision and sense of belonging by all members	General Social Survey
	Levels of volunteerism	The annual breakdown of volunteerism and giving occurring within a given community	General Social Survey
	Investment in baseline data and social capital	Undefined	No Available Data
	Participation in community information sessions	Participation rates in local community information sessions	No Available Data
	Community website available and updated regularly	Whether or not a community has a website, and the degree to which said website is maintained	No Available Data
	Response to community surveys and inquiries	The rates of response and participate in community surveys and inquiries	No Available Data
Social Problems	Alcohol sales (per capita)	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. Represents sales per resident population 19 years and older; therefore, high tourist areas will be overstated. Data are based on the calendar year.	Liquor Distribution Branch and BC Stats, Community Health Atlas, Socio-economic Profiles
	Racism	Violence, hatred and discrimination on the basis of racial identity	Incident-based Uniform Crime Reporting Survey, General Social Survey, Hate Crime Supplemental Survey

	Prevalence of discrimination among youth	The percentage of B.C. students who experienced discrimination based on race/ skin color, physical appearance, sexual orientation, gender/sex, a disability, (family) income, age, or being seen as different	BC Adolescent Health Survey
Leisure & Recreation	Access to communications and information technology (phone, internet, computers)	The degree of access to communication technology within a community	Canadian Internet Use Survey, 2005, Adolescent Health Survey
	Participation in community/group activities at least once per month	Participation in community or group activities at least once per month	No Available Data
	Receives and reads community newspaper and memos	The existence and availability of a community newspaper	No Available Data
	Attendance at bingo	The number of individuals attending bingo events	No Available Data
	Participates in arts, sports, and clubs	Participation rates in local arts, sports, and club activities	No Available Data
	Number of programs for children	The number of programs that are designed for children	No Available Data
	Number of programs for elderly	The number of available programs that are designed for the elderly	No Available Data

	Number of recreation and leisure facilities	The number of existing facilities that cater to family oriented leisure activities (recreation centres, community centres, parks, etc.)	No Available Data
	Number of religious spaces (churches, sweat lodges, etc.)	The number of religious spaces existing within a community	No Available Data
	Number of youth programs	The number of programs that are available for youth	No Available Data
	Recreation facilities for youth activities	The number of facilities within a given community that offer programs and activities for youth	No Available Data
Social Capital	Social resources	the breadth and quality of one's social ties, and the ability to rely on friends and family in times of need	Adolescent Health Survey
	Income and social status	Money received or earned through work or through investments and the position or rank of a person or group, within the society	Labour Force Survey, Consumer Price Index, General Social Survey
	Number of child care facilities	The number of licensed local facilities that offer safe, affordable, and reliable child minding services	BC Stats, Statistics Canada, Early Development Instrument (EDI), Ministry of Education, Representative for Children and Youth, Community Health information Portal
	Assist in caring for elders and disabled family and community members	The degree to which all members participate in the care of elders and disabled family and community members	General Social Survey, Canadian Community Health Survey
Income	Financial stability	a state in which a financial system is resistant to economic shocks and is fit to	Canadian Survey of Financial Capability,

		smoothly fulfil its basic functions (individual, family, community)	
	Increased standard of living	Increased wealth and material comfort available to a person or community	Consumer Price Index
	Revenue sharing	The sharing of profits and revenues earned through a financial relationship	No Available Data
Natural Environment	Outdoor recreation (Fishing, registered hunting, trapping and guiding)	activity is leisure pursuits engaged in the outdoors, often in natural or semi-natural settings out of town	Interviews for traditional First Nation land use, Statistics Canada, BC Stats
	Parks Attendance	The number of park attendees per season	GeoBC data, Information from various government, commercial and private websites, guidance documents, acts, regulations and reports
	Number of visitor days (tourism)	The number of visitor days per year	Interviews with key informants from First Nations and local tourism offices, GeoBC data
	Number of park users	The number of park attendees per season	Indigenous Groups, Kitimat Community Advisory Committee, District of Kitimat and Leisure Services Department City of Terrace, Kitimat Visitor Centre, Ministry of Jobs Tourism and Skills Training, Regional District of Kitimat Stikine, City of Terrace and Leisure Services Department, and Kermodie Tourism Society

Appendix B. Instructions for how to utilize Appendix A

The Indicator Table found in Appendix A is a tool that was created from the work described throughout this report. We anticipate that the SDoH and health indicators collected through our work are able to support a variety of resource extraction and development impact monitoring processes. The purpose of this appendix is to provide the reader with an understanding of how to utilize the indicators collected within our sample and maximize the usability of available information.

Appendix A displays the simplified results of our indicator scoping phase from our exploratory sample. The table contains a total of 552 indicators that may be of use to describe the social, economic, and health conditions impacted by natural resource extraction activities. While our list of indicators is substantial, it is by no means exhaustive. The following 552 indicators are organized into 10 tables representing greater themes. The greater themes include: Demographics, Housing, Education, Infrastructure and services, Agriculture and food, Health, well-being, and health service delivery, Work environment and conditions, Economy and politics, Indigenous culture and identity, and Community and social value. Within each greater theme there are sub-themes that explore valued components. The list is made up of a variety of indicators with varying types of data sources available. Some of the indicators in this list are provincially or federally monitored with data that is collected at regular intervals, while others may have data that is only available at a municipal level or not collected at all currently.

Description and Example

The “Demographics theme” shows that there is a total of 110 indicators identified to describe and report on the demographic impacts of resource extraction and development activities. Within each greater theme, indicators have been organized into ‘sub-themes’ which are displayed in the left-most column. These sub-themes can be measured proximally through the use of specific indicators. The second column houses the ‘indicators’ contained in our sample. The indicators are categorized as measures of the sub-theme and ultimately of the greater theme. The central ‘description’ column contains information that describes the type of data, the collection schedule, or defines the indicator. The right-most column contains ‘available data sources’. These are short descriptions of where data is located, and which governing body collects and distributes the respective data. The available data sources column is intended to provide readers with a sense of what data are available to populate the indicator. The granularity and monitoring schedule of the data varies considerably across indicators. Our available data source column is intended to point users towards suitable datasets.

For example, within the sub-theme of ‘employment’ the indicator ‘employment by industry’ can be found below the ‘indicators’ column. The ‘description’ column describes

the data collection schedule, stating that this data is collected annually. The 'available data sources' column provides the reader with information on where to locate data online for the indicator in question. In the example of 'employment by industry', a description of the indicator is given. The right most column of the table is titled 'available data sources'. Using the 'employment by industry' example, if we perform an internet search including the indicator name and the source type, in this example "employment by industry census data" we are able to find results from 2012 – 2016 easily on the Statistics Canada website. It should be noted that some of the indicators collected in our sample do not have data available online, as the indicator is not currently measured through a standardized process.

Indicators without available data

In specific contexts, indicators without sources provided can often be obtained directly from communities through periods of engagement. For example, within the community and social value theme the indicator 'number of programs for children' can be found. While this data is not tracked publicly through standardized processes, working-group engagements with community stakeholders can provide answers that are both current and unique to the community in question. The former example provides quantitative data that is available. Qualitative indicators are also included in the total sample; these indicators can provide a richer and more accurate depiction of the socio-economic and health conditions existing within the community. An example of a qualitative indicator from the Indigenous and cultural identity theme is 'fear of contamination'. This indicator does not have publicly tracked data, and is unique to each community. Working-group engagement can serve to gauge an individual community's concerns.

Common Data Source Websites

Statistics Canada:

Census Program: <http://www12.statcan.gc.ca/census-recensement/index-eng.cfm>

BC Vital Statistics: <http://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/vital-statistics>

BC Community Health Atlas: <http://maps.gov.bc.ca/ess/hm/cha/>

Canadian Community Health Survey:

<http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226>

National Household Survey: <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E>

Canada Mortgage and Housing Corporation: <https://www.cmhc-schl.gc.ca/en/hoficlincl/homain/stda/>

Indigenous and Northern Affairs Canada: <https://www.aadnc-aandc.gc.ca/eng/1100100010002/1100100010021>