

Research Article

Natural Resource Development and Well-Being in Inuit Nunangat: A Scoping Review

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Abstract: Natural resource developments have significant positive and negative impacts on the health and well-being of communities in Inuit Nunangat (Inuit Homelands) in Canada. Mining, hydroelectric, and oil and gas developments significantly alter the landscapes of communities and often an entire region. As climate change and global demand for natural resources increase, the four regions in Inuit Nunangat—Nunatsiavut, Nunavik, Nunavut, and the Inuvialuit Settlement Region—may experience an increase in development activity. The goal of this scoping review was to map trends in the extent, range, and nature of published research examining the relationship between natural resource development and health and well-being of communities in Inuit Nunangat. A total of 2,861 articles were screened for relevance, and 58 articles met the inclusion criteria and were analyzed in full. The results indicate that: 1) Nunavut was the most discussed region; 2) mining and/or mineral exploration was the most commonly discussed resource development; 3) communication between researchers and industry officials or health authorities was not frequently reported; 4) there were numerous government policies discussed, suggesting policy is a significant factor in the relationship between resource development and well-being; 5) holistic health was the most common area of health discussed; 6) Inuit inclusion in research varied, with nearly half of articles reporting Inuit involvement in the data collection and/or analysis; 7) few articles discussed mine closures and the impacts on Inuit well-being; and, 8) no articles were published in 2020, therefore no articles discussed the impact of COVID-19.

Introduction

Despite being the natural stewards of the lands and waters for thousands of years, Indigenous Peoples around the world continue to fight to protect their lands as they advocate for their desire and right to be included, on their terms, in natural resource developments (United Nations Department of Economic and Social Affairs, 2018). Across the Circumpolar North, climate change is causing reductions in sea ice and thawing of permafrost, leading to the rapid opening of previously inaccessible lands and waters for potential developments (Herrmann, 2015; Meredith et al., 2019). The region has been described as a “natural resource reservoir that could quench the world’s energy and mineral appetite” (Larsen, 2015). These reported development opportunities have highlighted long-standing questions about the health and well-being impacts on Indigenous Peoples, as some have argued the development activity amounts to exploitation (Arctic Circle Panel, 2014). Inuit Tapiriit Kanatami (ITK), the national organization representing all Inuit in Canada, “takes a holistic view of Inuit health and strongly believes that significant improvements can be made by addressing current socio-economic conditions in Inuit communities” (Inuit Tapiriit Kanatami, 2014). The social determinants of health are the foundation of ITK’s strategy to improve the physical and mental health outcomes of Inuit: access to a clean environment (air, water, and land), vibrant culture and language, safe housing, equalized income distribution, and higher educational attainment levels are just some of the areas ITK focuses on improving, as improving in these areas leads to a healthier and improved quality of life for Inuit (Inuit Tapiriit Kanatami, 2014).

Inuit Nunangat (Inuit Homelands) encompasses the land, water, and ice of the four Inuit regions in Canada: Nunavut, Nunavik, Nunatsiavut, and the Inuvialuit Settlement Region (Inuit Tapiriit Kanatami, 2018a). Many Inuit communities in this region are located near, or are affected by, natural resource developments, particularly in the mining, hydroelectricity, and oil and gas sectors. The Inuvialuit Settlement Region, with a population of 5,335 (Statistics Canada, 2018a), located in the Western Arctic region of Canada, has notable offshore and onshore oil and gas reserves (CBC, 2018). The territory of Nunavut, with a population of 39,353 (Statistics Canada, 2022), has four existing operating mines (NWT & Nunavut Chamber of Mines, n.d.-a) and exploration is ongoing for potentially more (NWT & Nunavut Chamber of Mines, n.d.-b). Nunavik, with a population of 13,115 (Statistics Canada, 2018), comprising a substantial portion of Quebec (approximately one-quarter of total land mass), has significant mineral resources and is home to the James Bay hydroelectric development (Makivik Corporation, n.d.). Finally, Nunatsiavut, with a population of 2,560 (Statistics Canada, 2018c), located on the north coast of Labrador, is home to one of the richest nickel

reserves in the world at Voisey's Bay (CBC News, 2018b) and is downstream from the Muskrat Falls hydroelectric generating station (Brake, 2019; Whiffen, 2021).

For Inuit in Inuit Nunangat, advocating for the recognition of their inherent right to be the decision makers for natural resource developments has been a consistent priority for many years (George, 2013). Looking forward from an economic perspective, mining and oil and gas developments will likely make up most of the future natural resource developments in Inuit Nunangat, if Inuit provide their consent for such projects to proceed. Future hydroelectricity developments will likely be limited in Inuit Nunangat (Nunavut Climate Change Centre, n.d.; McDonald & Pearce, 2013) given high upfront capital costs—that most likely would be heavily funded by the provincial or territorial governments (CBC News, 2015)—and the increased risk in significant cost overruns, schedule delays, and operational concerns with available reservoirs. In terms of mining, however, Nunavut has been described as “a great place to do business” and “a region that has tremendous mineral potential” (Sevunts, 2017). Furthermore, after a 2016 decision by the Government of Canada to ban Arctic oil and gas drilling near the Inuvialuit Settlement Region (Van Dusen, 2016), a more cooperative approach was taken in 2018 where the Canadian government announced it would begin negotiations with the Inuvialuit Regional Corporation (IRC) on oil and gas developments in the Beaufort Sea (Williams, 2018). Two years later, the IRC announced they would be moving forward with the Inuvialuit Energy Security Project, a liquefied natural gas (LNG) project to meet the power and heating demands of Tuktoyaktuk, Inuvik, and other communities (Gleeson, 2020).

These developments are indications that Inuit Nunangat is continuing to focus on developing oil and gas projects and new mines, which will all have impacts on the health and well-being of Inuit communities, even if consent to develop is provided. Many of these developments are, or will be, bound by legally binding impact and benefit agreements (IBAs) between the developers and the Inuit organization or government representing the respective Inuit region (Inuit Tapiriit Kanatami, 2014). While many IBAs in Inuit Nunangat are confidential, they usually have chapters concerning preferential hiring and training for Inuit, Inuit business opportunities, environmental protection, workplace conditions, and Inuit community well-being initiatives (Gibson & O'Faircheallaigh, 2015). The requirement for IBAs often arises out of legislation or an environmental assessment (EA) process that every major natural resource development project is required to undergo in Canada (Cox & Mills, 2015). Whether IBAs and EAs have been effective tools for addressing the impacts of natural resource development on Indigenous health and well-being, has been the subject of several studies over the past decades (Cox & Mills, 2015; Jones & Bradshaw, 2015; Southcott et al., 2018) and, as a result, this study also includes what the literature says about Inuit IBAs and EAs.

With significant opportunity for future natural resource projects, and with current ongoing projects and a long history of developments (Cater & Keeling, 2013; Tester et al., 2013), along with a holistic view of health and well-being as described by ITK, the goal of this scoping review was to map the trends in the extent, range, and nature of available published articles examining the relationship between natural resource development and health and well-being in Inuit Nunangat. With the release of the National Inuit Strategy on Research (NISR) in 2018, which documented the historic exclusion of Inuit from research and the dominance of non-Inuit researchers in Inuit Nunangat (Inuit Tapiriit Kanatami, 2018b), this study also sought to document researcher backgrounds and Inuit inclusion and involvement in the literature. By understanding what and who is included in the available literature, we identify information gaps and future research opportunities to further explore this complex, but vitally important, relationship (Arksey & O'Malley, 2005).

Methods

Understanding the relationship between natural resource development and health and well-being in Inuit Nunangat is a complex, multidisciplinary area of study. To gain better insight into the trends in the available literature, a scoping review was conducted. This approach was guided by Arksey and O'Malley (Arksey & O'Malley, 2005) and reported following the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist (Tricco, 2018). A scoping review protocol was developed a priori and is available upon request from the primary author.

Search Strategy

A systematic approach was used to identify relevant English and French articles published prior to January 1, 2021. A search string was developed utilizing commonly used terms to describe Inuit regions, health, and specific resource developments (Table 1). The search string was created based on keywords in pertinent literature, and databases were selected in consultation with an academic librarian from the University of Guelph. Search results were uploaded to the reference management software Mendeley, and subsequently uploaded to DistillerSR, a systematic review software. Both Mendeley and DistillerSR were utilized to remove duplications, and DistillerSR was used to facilitate the screening of all search results for relevant articles, and to extract and organize data.

Table 1. Electronic database search-string terms utilized to search for relevant articles

Component	Search Terms
Geographic and population terms	("Northern Canada" OR Nunangat OR Inuvialuit OR Nunatsiavut OR Nunavik OR Nunavut OR "Northwest Territories" OR Labrador OR "Northern Quebec" OR Arctic OR ITK OR Eskimo ^a OR Inuit)
Health and agreement terms	AND ("well-being" OR health OR "impact benefits agreement" OR IBA)
Resource development terms	AND (hydroelectric* OR oil OR gas OR mining)

^a To develop a search string that would capture all research potentially relevant to Inuit, the authors had to acknowledge a long history of Inuit being exploited by researchers (Inuit Tapiriit Kanatami, 2018b), including the use of the term "eskimo," which is known to be a derogatory and racist term (Obed, 2015). The use of this term in no way reflects the authors' beliefs or relations with Inuit and all authors denounce its use today. Additionally, all articles generated from use of this search string were evaluated to ensure no racist research was included in this review.

Information Sources

The search was conducted using six electronic databases: CAB Direct, Medline via Ovid, Web of Science, Canadian Business and Current Affairs Database (ProQuest), PubMed, and JSTOR. A preliminary search was conducted on October 6, 2018, to get an initial sense of the available data, with a full updated search taking place on June 25, 2020. This search was again updated on February 22, 2021, to reflect literature up to and including December 31, 2020. These databases were selected to locate articles pertaining to applied life sciences, global health, multidisciplinary scientific research, current events, business research, and social sciences and humanities.

Eligibility Criteria and Screening Process

To be included, articles had to examine natural resource development and Inuit health and/or well-being in Inuit Nunangat (Table 2). For the purposes of this review, hydroelectric, oil and gas, and mining developments were the key natural resources considered, as they are some of the most common resources in Inuit Nunangat, and often considered some of the most impactful on the region. Health related topics reflected ITK's holistic view of health and included explicit mentions of "health" and "well-being," but also any mention of the social determinants of health. From a geographic point of view, Inuit Nunangat included the Inuvialuit Settlement Region, Nunavut, Nunavik, Nunatsiavut, and/or Inuit Nunangat as a whole (Inuit Tapiriit Kanatami, n.d.). This review included articles written in English or French.

Table 2. Inclusion and exclusion criteria for articles considered in this scoping review

Inclusion Criteria	Exclusion Criteria
Article discussed one or more of the Inuit regions in Canada: The Inuvialuit Settlement Region, Nunavut, Nunavik, Nunatsiavut, and/or Inuit Nunangat as a whole	Article did not discuss one or more of the Inuit regions in Canada
Article referenced one of the following natural resource developments: mining, hydroelectricity, and/or oil and gas	Article did not reference mining, hydro-electricity, and/or oil and gas
Article discussed an Inuit health related topic	Article did not discuss an Inuit health related topic
Article was published before January 1, 2021	Article was published after December 31, 2020
Article was published in English or French	Article was published in a language other than English or French

DstillerSR was utilized to facilitate all levels of screening and data extraction (Table 3). Level one of the screening processes focused on titles and abstracts. Based on the inclusion and exclusion criteria, titles and abstracts were screened for relevance using level one screening questions. A second independent reviewer confirmed exclusion of articles that did not meet the inclusion criteria. Potentially relevant articles proceeded to level two screening, where the full-text screening was completed, utilizing the level two screening questions. Two independent reviewers screened each article, and conflicts were resolved via discussion. All relevant articles from the second stage of screening proceeded to data extraction. The level of agreement between reviewers was calculated.

Table 3. Level One and Level Two screening questions for articles considered in this scoping review.

Level	Questions	Responses and Action
Level One: Title and abstract screening	<ol style="list-style-type: none"> 1. Is the article published in an academic journal? 2. Is the article about at least one of the four Inuit regions in Canada? 3. Is the article about mining, hydroelectricity, and/or oil and gas? 4. Does the article discuss Inuit health related topic(s)? 	<p>All questions: Yes = include No = exclude Unsure = include</p>
Level Two: Full-text screening	<ol style="list-style-type: none"> 1. Is the article a book review? 2. Is the article published in an academic and/or peer-reviewed journal? 3. Is the article about at least one of the four Inuit regions in Canada? 4. Is the article about mining, hydroelectricity, and/or oil and gas? 5. Does the article discuss Inuit health related topic(s)? 	<p>Question 1: Yes = exclude No = include</p> <p>All remaining questions: Yes = include No = exclude</p>

Data Extraction

Information from each relevant article was extracted. To map the trends in publications, the following information was extracted from each article: reported Inuit involvement and inclusion in the research; reported communication or attempt to communicate with industry and health officials at any level; government policies (both inductive and deductive); areas of health discussed; if recommendations on how to improve identified health concerns were noted; institutions involved in the research; and general study characteristics (i.e., year of publication, type of study, etc.). DistillerSR was used to facilitate data extraction and organization, and Excel was used to conduct descriptive analysis of the article attributes. Finally, thematic analysis was used to identify and describe reoccurring themes discussed in the literature.

Results

Study Characteristics

The online database search yielded 2,861 unique results in six databases with 58 articles meeting the inclusion criteria (2% of total articles) (Figure 1). The level of agreement amongst the reviewers was 99.7%. The 58 articles included for this scoping review were published between 1987 and 2019, with 2018 having the most articles for a single year with 11 (19% of total articles), followed closely by 2015 with 10 (17% of total) (Figure 2). Half of the articles (n=29) were published between 2015 and 2019. Many of the articles discussed more than one Inuit region in Canada (Figure 2), with Nunavut appearing in the articles more than any other Inuit region (n=23, 40% of total articles). Inuit Nunangat as a whole appeared in 18 articles (31% of total), and Nunavik and Nunatsiavut both appeared in 17 (29% of total). The Inuvialuit Settlement Region appeared the least number of times, with appearances in 13 articles (22%).

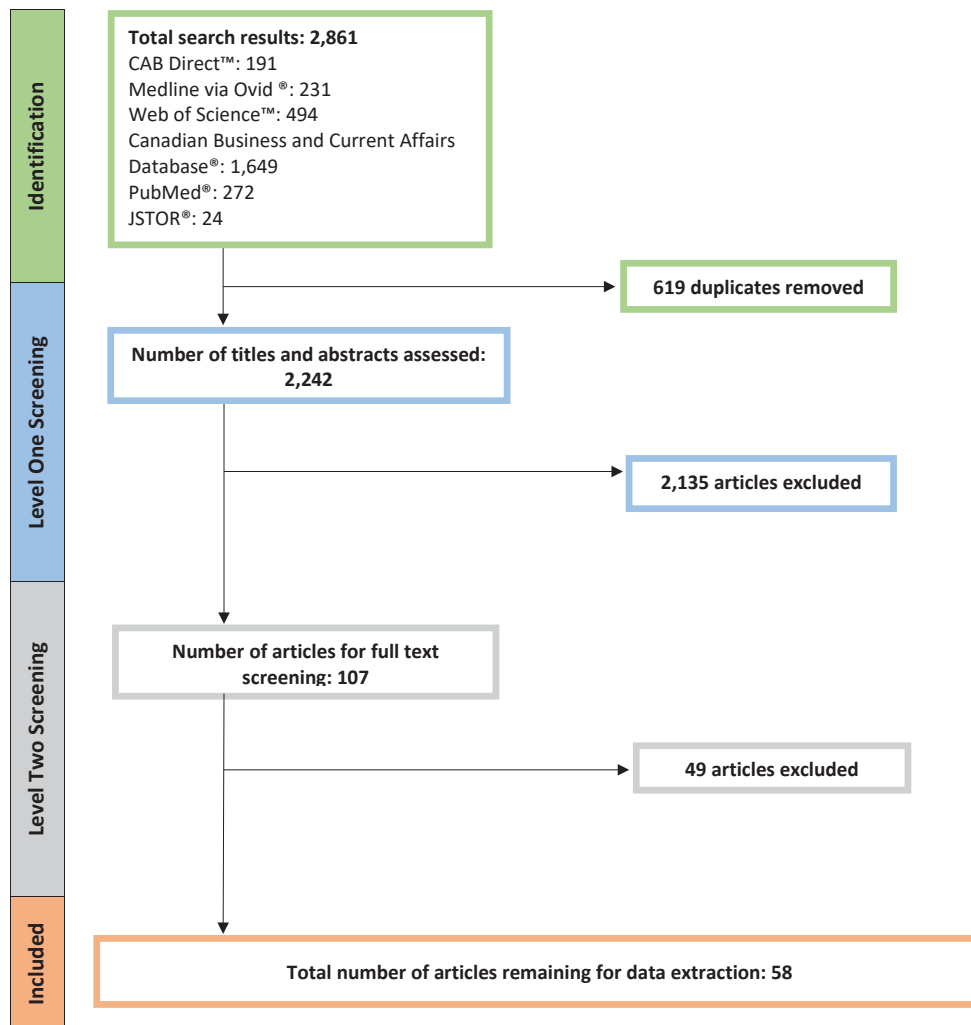


Figure 1. Number of articles identified in the database search and screened for relevance.

On a per capita basis, the region with the highest number of articles was Nunatsiavut (6.6 articles/1,000 residents), and the Inuvialuit Settlement Region had the second-highest articles per capita (2.4 articles/1,000 residents). Nunavik had the third-most numerous appearances on a per capita basis (1.3 articles/1,000 residents), and Nunavut had the fewest per capita appearances (0.6 articles/1,000 residents).

Thirty-one articles (53% of total) were classified as a primary research study and 27 articles (47%) were classified as a review study (Figure 3). Almost half, 47% (n=27) of articles, captured qualitative data, while 43% (n=25) captured a mix of qualitative and quantitative data. Only 10% (n=6 articles) focused solely on quantitative data.

Holistic Conceptualizations of Health were the Most Commonly Discussed Health Outcome

Articles were grouped into physical health, mental health, a holistic view of health, or a combination of two or three. About three-quarters of articles (74%, n=43) discussed more than one area of health. For example, one article noted that,

it has been argued that one of the strongest links between the health of Aboriginal peoples and their environment is traditional foods. Industrial development and other anthropogenic activities have resulted in the contamination of traditional foods and medicines, thereby causing the degradation of Indigenous peoples' physical and spiritual health. (Black & McBean, 2016)

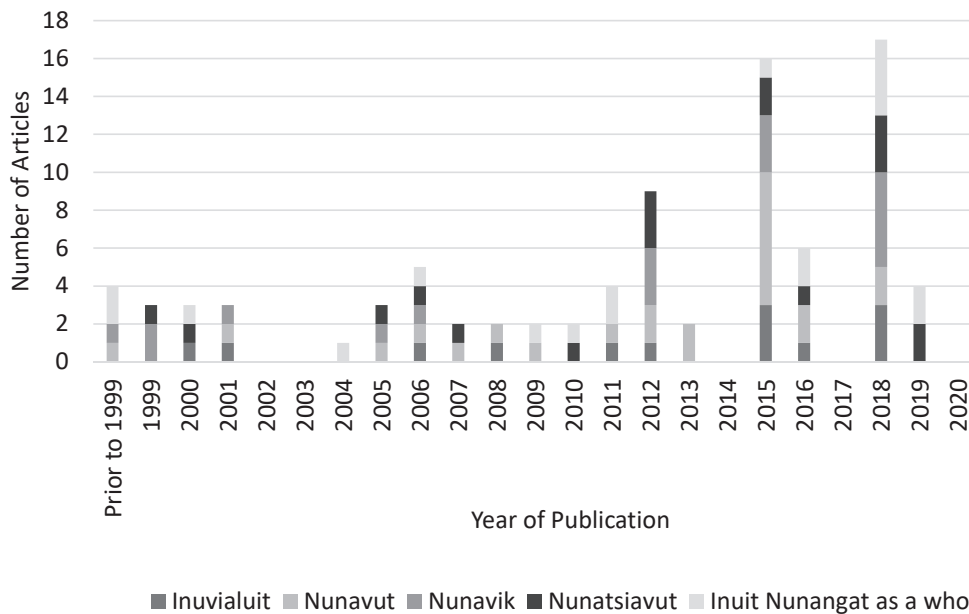


Figure 2. Year of publication by Inuit region for all included articles. Note: More than one Inuit region can appear in an article so location categories are not mutually exclusive.

Most articles (91%, n=53) discussed a holistic view of health, while 81% (n=47 articles) discussed physical health, and 43% (n=25) of articles discussed mental health.

The earliest published articles focused on physical health (Verdier et al., 1987; Wismer, 1996; Langlois & Langis, 1995). For example, one study from 1987 focused on the nutritional status (through blood and urine samples) of Inuit before and after a lead-zinc mine become operational in Nanisivik, Nunavut (Verdier et al., 1987). Another study from 1995 focused on contaminants in wildlife that Inuit consumed, for a baseline study preceding the potential impoundment of a hydroelectric facility reservoir in Nunavik (Langlois & Langis, 1995). This was followed by an increase in articles discussing holistic health in the late 1990s. From 2000 to 2013, the articles mostly focused on holistic health, followed by physical health and mental health, respectively.

From 2015 to 2020, the trends changed, whereby articles discussing mental health were still the least common, but the number of articles discussing physical and holistic health were nearly equal (n=26 and 27 articles, respectively). All four regions of Inuit Nunangat, and Inuit Nunangat as a whole, had similar trends with holistic and physical health being the most common health outcome discussed and mental health being the least discussed. In terms of primary research studies and review studies, there were no substantial differences in the number of studies discussing physical health (n=25 primary research articles and n=22 review articles) and holistic health (n=28 primary research articles and n=25 review articles). However, with mental health discussions, there were more primary research articles (n=16) than review articles (n=9).

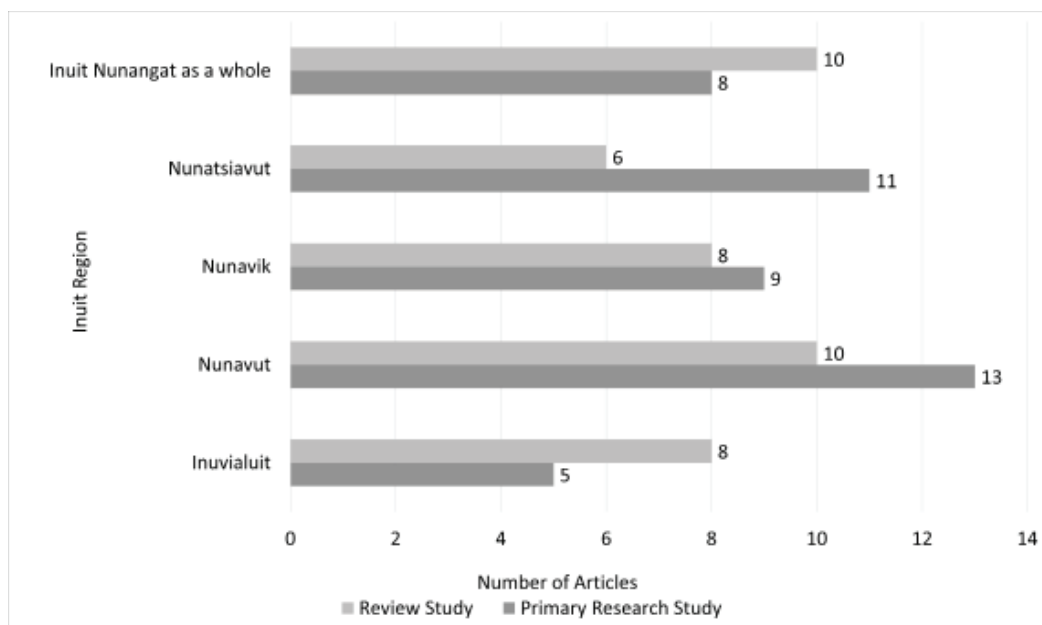


Figure 3. Type of study, by Inuit region, of all included articles. Note: more than one Inuit region can appear in an article; therefore, location categories are not mutually exclusive.

Regarding the relationship between health outcomes and methodology, all three shared a similar relationship for qualitative research articles, and articles that were a mix of qualitative and quantitative analysis. Quantitative research articles mostly focused on physical health (n=6 articles). Two quantitative articles focused on holistic health and one on mental health.

Throughout the data extraction, there were noticeable references to gender and women-specific impacts of natural resource development. While 24% (n=14 articles) mentioned gender as a factor, 45% (n=26) mentioned women specifically, 22% (n=13) mentioned both gender and women as important components of analysis, and 17% (n=10) had an in-depth (more than one paragraph) discussion on Inuit women-specific impacts of natural resource development. These discussions centred around the impacts of contaminants (PCBs and methylmercury) from natural resource developments, Inuit women's involvement in the environmental assessment process, increased domestic violence concerns, overall health of Inuit women, and gender considerations in employment and workplace experiences of Inuit women. For example, Cox and Mills (2015) reported "Inuit women in non-traditional occupations described barriers to advancement, difficulty gaining acceptance in the workforce, experiences of discrimination, and being treated as token hires" (Cox & Mills, 2015, p. 253). In 14% of articles (n=8), the authors reported communication with or attempts to communicate with health officials. In 86% of articles (n=50), the authors did not report communication with or attempts to communicate with health officials. While communication was not frequently reported, authors in 72% of articles (n=42) did include recommendations on how to improve identified health-related issues (Figure). For example, one article provided the following recommendation, after a small mineral exploration site was abandoned:

Developing a low-cost, community-based environmental health monitoring tool is an ideal strategy to generate baseline information and further follow-up ... the results empowered the indigenous community by generating their own evidence that can be utilized for future reference. (Sarkar et al., 2019, p. 939)

Also, for the Inuvialuit Settlement Region, Nunatsiavut, and Nunavut, one article spoke of the environmental assessment process and how Inuit women were not meaningfully included or considered (Dalseg et al., 2018). Inuit women were deeply concerned about the impacts of natural resource development on the health of their communities, and it was recommended for future EAs that,

it will be necessary to go further in exploring innovations required for fair accommodation of Indigenous women’s participation in EAs, and appropriate scoping of EAs to encompass gender issues. Simply including Indigenous governments or Indigenous peoples in EA processes does not automatically mean that Indigenous women are effectively included or gender analysis scoped in. (Dalseg et al., 2018, p. 159–160)

Just over one-quarter of articles (28%, n=16) did not include recommendations on how to improve identified health-related issues.

Mining was the Most Frequently Discussed Natural Resource Development

Not quite half of articles (42%, n=24) discussed two or more natural resource developments. Most articles (78%, n=45) discussed mining operations and/or exploration, and some discussed oil and gas operations and/or exploration (38%, n=22), and hydroelectricity construction and/or operations (29%, n=17). From 1987 to 2014, articles related to mining were the most numerous (n=20), followed by hydroelectricity (n=12) and oil and gas (n=11). From 2015 to 2020, articles related to mining were still the most numerous, but oil and gas related articles were more than double (n=11) those of hydroelectricity (n=5).

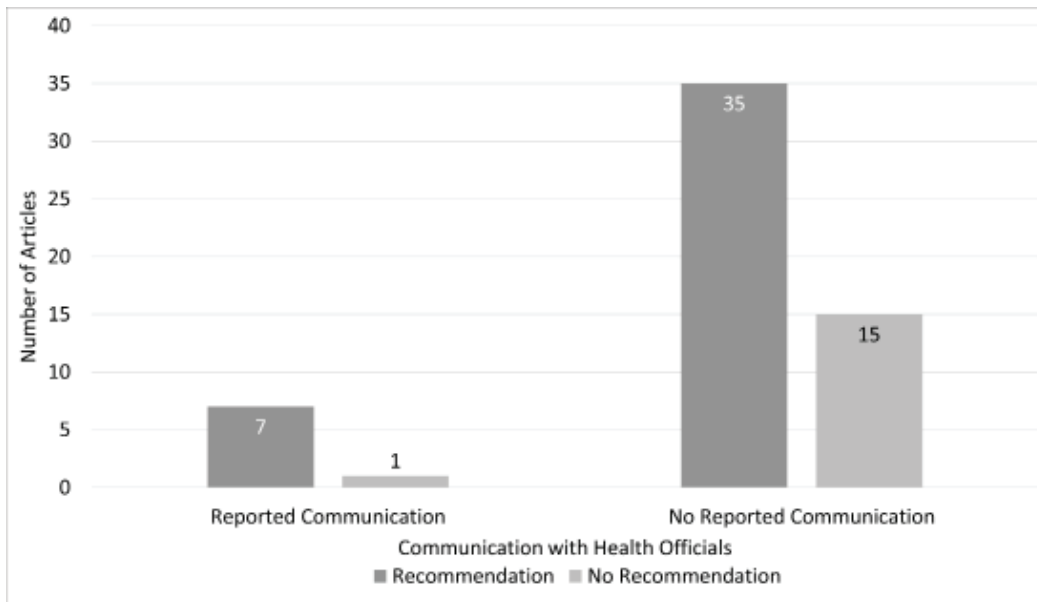


Figure 4. Reported communication with health officials by whether authors provided recommendations on how to improve identified health issues.

In all regions except the Inuvialuit Settlement Region, mining was the most discussed resource development. Oil and gas was discussed most frequently in relation to the Inuvialuit Settlement Region (n=9 articles). Hydroelectricity was the most discussed in Nunavik (n=10), but also was the second most discussed resource development in Nunatsiavut (n=6). Most of the articles focused on mining and hydroelectricity were primary studies (n=24 and n=11, respectively), while most of the studies focused on oil and gas were review studies (n=15).

Mining had an equal number of qualitative and mix of qualitative/quantitative articles (n=21), while quantitative articles discussing mining were less numerous (n=3). Articles related to oil and gas were mostly a mix of qualitative/quantitative methods (n=13), followed by eight qualitative articles and one quantitative article. Hydroelectricity mostly had qualitative articles (n=9) followed by a mix of qualitative/quantitative articles (n=5). Three quantitative articles discussed hydroelectricity.

In 83% of articles (n=48), the authors did not report communication with or attempts to communicate with industry officials for their study (Figure 5), and 17% (n=10 articles) of articles reported communication or attempts to communicate with industry officials. For example, one article communicated with industry officials, along with many other key knowledge holders:

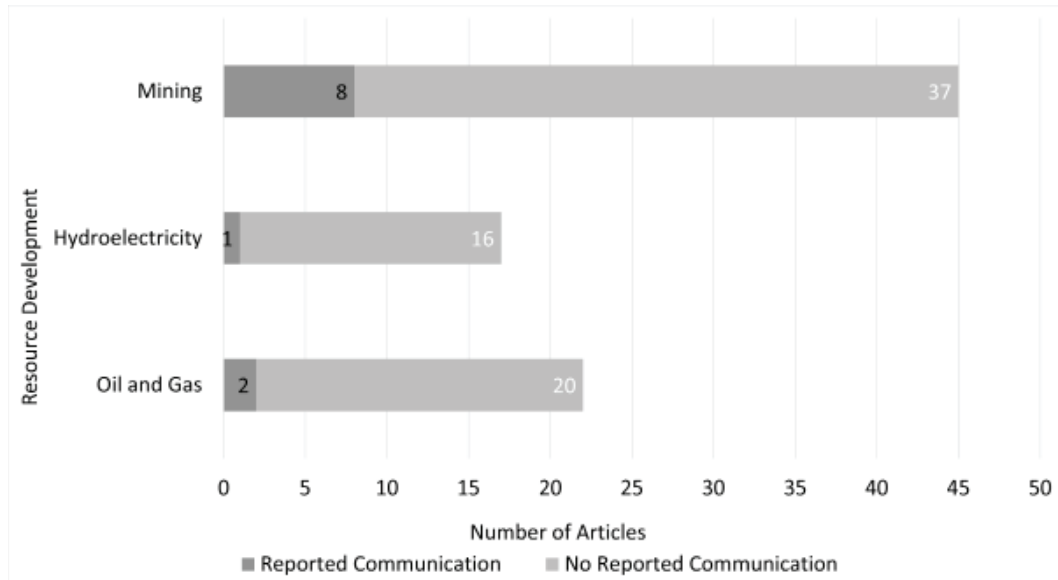


Figure 5. Reported communication, or attempts to communicate with, industry officials, by resource development, in included articles.

informants included Nunatsiavut Government representatives who had been involved with the EA process and with the IBA negotiations, some union representatives, one member of the Environmental Impact Assessment Panel, and personnel for Vale, the Brazilian multinational mining company that bought Inco in 2006 and became owners of Voisey’s Bay Nickel Company. (Cox & Mills, 2015, p. 249)

Health and Natural Resource Development-Related Policies were Most Frequently Discussed

Most of the articles (91%, n= 53) discussed and/or identified policies of government (municipal, provincial, federal, and/or Indigenous) (Table 4). The most discussed and/or identified deductive (pre-conceived) policy themes were those related to natural resource development (included in 90% of articles, n=52), followed by health policies (included in 60% of articles, n=35). The most common inductive (derived from data) policy theme discussed and/or identified was related to environmental assessments (included in 36% of articles, n=21), followed by policies related to land claims (included in 19% of articles, n=11).

Table 4. Deductive and inductive policy themes discussed and/or identified in included articles

Deductive (pre-conceived) Policy Themes	Appearance % of Total Articles (#) ^a
Natural resource development	90% (52)
Health	60% (35)
Impact and Benefit Agreements (IBA)	34% (20)
Employment	31% (18)
Royalty payments	24% (14)
Inductive (derived from data) Policy Themes	Appearance % of Total Articles (#) ^a
Environmental assessment	36% (21)
Land claims	19% (11)
Co-management of resources	12% (7)
Indigenous Knowledge (including Inuit Qaujimagatuqangit) in policy making	10% (6)
Sovereignty	10% (6)

^a If a policy theme appeared more than once in an article (i.e., two different discussions on health policies) it was counted as one appearance. Percentages calculated based on total number of included articles (58).

There were numerous references to the late Justice Thomas Berger, who led an inquiry into the Mackenzie Valley Gas Pipeline in the 1970s that challenged the traditional way Canadians had viewed natural resource development in the North (Berger, 1977). About one-quarter (26%; n=15) of the articles mentioned the Berger Inquiry, which was seen by many as a “watershed moment in the development of the North” (Southcott et al., 2018, p. 396). Berger himself visited all the northern communities that would be impacted by the pipeline and heard from hundreds of residents, many of whom were Indigenous (Southcott et al., 2018). While natural resource development was thought to automatically be a positive impact on a region, including the North, Berger challenged this basic assumption and recommended the pipeline not proceed for ten years so land claims could be settled (Southcott et al., 2018). Berger also recommended these land claim agreements give Indigenous Peoples better control over natural resource development in their region to ensure that the well-being of their communities would be seriously considered (Southcott et al., 2018). The Berger Inquiry was called “revolutionary” for how Canada views the North and the people who call it home (Myers, 2001). It is said to have changed how natural resource development is conducted in the North and is the foundation for much of the policy in place today that provides health and well-being safeguards to northern communities impacted by natural resource development (Myers, 2001).

Environmental assessments (EA) and Impact Benefit Agreements (IBA) appeared in articles an almost identical number of times (21 and 20 articles, respectively). It has been noted that the relationship between EAs and IBAs, however, is not well defined in the literature and is often case-specific (Cox & Mills, 2015, p. 247). While some included studies have applauded IBAs as a mechanism to address weaknesses in the EA processes, others have problematized the use of IBAs as a regulatory mechanism arguing that IBA negotiations can lessen the effectiveness of EA processes and that power differences constrain the ability of communities to ensure that companies follow through on their IBA commitments (Cox & Mills, 2015).

Most Articles were Authored by Academics, and Inuit Involvement Decreased Since 2015

Most of the articles (91%, n=53) were authored or co-authored by an academic. There were 86 scholars in eleven categories of academic disciplines represented, with political science and public policy (21%), environmental studies (17%), and geography (14%) most frequently represented. Government of Canada departments and/or agencies, and non-government organizations (NGOs) each authored or co-authored 10% of articles (n=6 each), while Indigenous governments/organizations authored or co-authored 7% (n=4).

Industry representatives and Inuit community members each authored or co-authored 3% of articles (n=2 each), while territorial government representatives, municipal government representatives, a legal expert, a private consultant, and a representative of a national government outside of Canada each authored or co-authored 2% (n=1 each). Since the first article published in 1987, academics have consistently been part of the authorship of the articles included in this review study. From 1987 to 2014, academic authors represented 66% of total authorship. However, from 2015 to 2020, academics made up a significant majority of authors (88%).

Academic authors were also the most numerous for articles concerning each of the Inuit regions. The different types of authors showed similar trends across all Inuit regions in terms of their involvement except for NGOs. Only when discussing Inuit Nunangat as a whole were NGOs represented in the authorship of articles (n=6 articles). Academic authors mostly authored qualitative studies (n=26 articles) or a mix of qualitative/quantitative studies (n=22 articles). Authors representing the Government of Canada (department or agency) mostly authored articles that were a mix of qualitative/quantitative methods (n=4 articles) rather than solely qualitative or quantitative (n=1 article each).

Beyond simply the involvement of Inuit in the collection and/or analysis of the data, Inuit were included as authors or co-authors in 14% of articles (n= 8), while 45% of articles (n=26) reported including Inuit in the collection and/or analysis of the data. For example, one article clearly noted the involvement of Inuit in the collection of data by including Inuit translators: “Our data collection relied primarily on participatory workshops (focus groups) ... workshops were facilitated by research assistant(s) ... with translations provided by Jonathan and Carolina Tugak” (Rixen & Blangy, 2016, p. 301). Another 38% of articles (n=22) did not report including Inuit in the collection and/or analysis of the data, while in 17% (n=10), it was not clear if Inuit were involved based on the text in the article. Reporting Inuit involvement improved over time from the earliest article published in 1987 up until 2015. From 1987 to 2004, 40% of articles (n=4) included Inuit, 40% (n=4) did not, and it was unclear if the remaining 20% (n=2) included Inuit in the collection and/or analysis of the data. From 2005 to 2015, involvement of Inuit improved to 55% of all articles (n=16) published during this time frame, with 24% (n=7) not reporting involvement of Inuit and the remaining 21% (n=6) being unclear if Inuit were involved in the collection and/or analysis of the data. However, from 2016 to 2020, there was a decrease in reporting of the overall involvement of Inuit. During this time frame, 32% (n=6) of articles described including Inuit in the collection and/or analysis of the data, while 58% (n=11) did not. It was unclear in the remaining 11% (n=2) if Inuit were included. In one article, former ITK President and now Governor General of Canada Mary

Simon provided her thoughts on not involving Inuit in matters of importance to them: “The old days of Inuit being passive observers to fundamental decisions being made about our homeland are dead and buried” (Simon, 2011, p. 890).

Articles reporting Inuit involvement in the collection and/or analysis of the data was the highest in Nunatsiavut (65%, n=11), Nunavik (59%, n=10), and Nunavut (48%, n=11), respectively. The Inuvialuit Settlement Region (54%, n=7) and Inuit Nunangat as a whole (50%, n=9) had the highest number of articles that did not report involvement of Inuit in the collection and/or analysis of the data.

In terms of Inuit involvement by type of study, there were equal numbers of articles that reported and did not report involving Inuit (50%, n=3 articles each) for quantitative studies (Figure 6). Articles reporting Inuit involvement was highest for research that used a mix of qualitative/quantitative methods (56%, n=14), while qualitative studies had the fewest number of articles that reported Inuit involvement (33%, n=9).

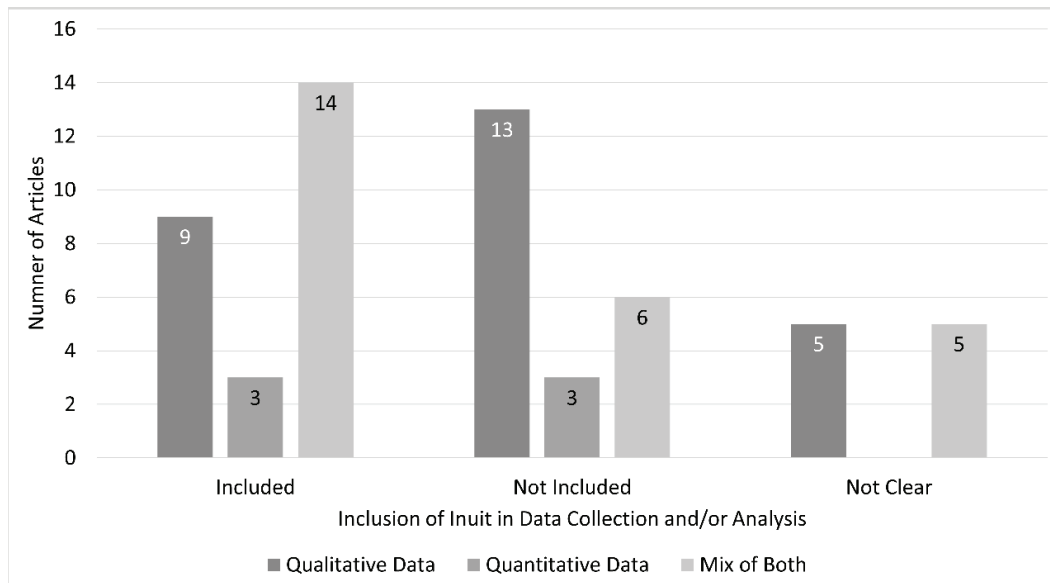


Figure 6. Inclusion of Inuit, by type of data collected, in the data collection and/or analysis in included articles.

Discussion

Fifty-eight articles discussing the relationship between natural resource development and well-being in Inuit Nunangat met the inclusion criteria for this study. In this scoping review, articles were wide-ranging, diverse, and mostly written by non-Inuit and non-Indigenous authors with academic affiliations. Most of the articles focused on mining and had a holistic view of health. Inuit have long held a holistic view of health (Inuit Tapiriit Kanatami, 2014), so the finding that almost all articles discussed this view of health aligns with Inuit world views. It is clear from the articles that natural resource development can both positively and negatively impact the social determinants of health (Rodon & Levesque, 2015).

The majority of articles were published between 2015 and 2020, and there were nearly equal numbers of articles discussing physical health and holistic health. The timing of this focus on health aligns with the November 2014 release of the comprehensive report entitled “Social Determinants of Health in Canada” by ITK (Inuit Tapiriit Kanatami, 2014). This report identified an increase in the literature focusing on chronic illnesses and infectious diseases that were linked to social determinants of health such as crowded and poor housing conditions. This trend was also observed in this scoping review, whereby the literature discussing physical and holistic health became more numerous. Other research on Inuit health and well-being also showed similar trends whereby matters potentially impacting mental health, such as climate change and food security, were studied more than mental health itself (White, 2021). This could be a practical reflection of the fact that Inuit are keenly aware of the mental health situation they are facing (Inuit Tapiriit Kanatami, 2014), and are now focusing on fixing the problem through improving the social determinants of health, including adapting to climate change, language revitalization, and increased connection to the land. It appears that research is not focusing on mental health but, rather, on the social determinants of health that cause decreased or poor mental health. This approach is in line with Inuit priorities as ITK called for this type of research approach in 2014 (Inuit Tapiriit Kanatami, 2014).

Most of the articles were published since 2015. This is an interesting finding as other research investigating Indigenous health research in Canada found similar trends (Caughey et al., 2021). This literature provides possible explanations tied to Government of Canada funding, which could explain the increase in articles since 2015. In Prime Minister Trudeau’s first post-election budget in 2016, the Government of Canada allocated an ongoing additional \$95 million per year to research granting councils in Canada—the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC)

(Department of Finance Canada, 2016). Also, ArcticNet, an organization funded by the Government of Canada to conduct climate change research, focuses on the Arctic region in Canada (ArcticNet, n.d.). Since 2015, ArcticNet's funding from the Government of Canada increased from \$9.6 million in 2015 (ArcticNet, 2017) to \$16.7 million in 2020 (ArcticNet, 2020), an increase of 74%.

More specifically, other studies suggest there are increases in published articles towards the end of the federal government's funding program (White, 2021). Initiatives such as ArcticNet and the Resources and Sustainable Development in the Arctic (ReSDA) network both received significant Government of Canada funding and were scheduled to conclude their programs in 2018. While ArcticNet has since had their funding renewed and increased, the previously planned conclusion of funding could be part of the reason we see more publication of articles post-2015. Similarly, with ReSDA, their funding ended in 2019 and, as a result, at least six articles in this review were connected to ReSDA with publication dates in 2015 and beyond. While it is outside the scope of the review, there is evidence to suggest a strong connection between federal government funding and the increase and/or decrease in articles.

While this scoping review included 2020 in the search range, no articles meeting the inclusion criteria were published in 2020. The COVID-19 pandemic initiated a long crisis that had to be managed by Inuit in Inuit Nunangat (Inuit Tapiriit Kanatami, 2020). It is likely that the vast majority of research, if not all, was postponed or cancelled for 2020 (Penney & Johnson-Castle, 2020), leading to delays in article publication. No articles discussed COVID-19 and the extraordinary impact it had on Inuit Nunangat and the natural resource industry, particularly the mining industry (Caughey, 2021; NWT & Nunavut Chamber of Mines, 2020). As such, there was no discussion on how mining companies operating in Inuit Nunangat with a significant fly-in, fly-out workforce from southern Canada responded to the pandemic. At the onset of the pandemic there were fears that companies would endanger Indigenous communities by exploiting the pandemic for economic purposes (Earthworks et al., 2020), but it is unclear how companies responded to the pandemic in Inuit Nunangat.

The Berger Inquiry in the 1970s was the catalyst for change in how resource development was conducted in the North, by ensuring that health and well-being safeguards for impacted communities were in place. The onset of a pandemic that threatened Inuit communities and how companies responded is an important area of study to evaluate whether the EAs, IBAs, and the legacy of the Berger Inquiry have actually instituted those envisioned safeguards. This is a research gap that should be filled since extraordinary global events, such as commodity price collapses, could lead to significant impacts to the natural resource industry in Inuit Nunangat, which could then lead to health and well-being impacts for Inuit. For

example, if gold prices collapse, the gold mines in Nunavut, which make up the vast majority of the operational mining industry in Nunavut, may need to reduce or cease operations as it may not be economically feasible to operate. Similarly, some mines in Inuit Nunangat ceased (Careen, 2020) or slowed down operations (George, 2020) at the onset of the COVID-19 pandemic for economic and/or public health concerns. The trickle-down effect on employment, procurement, and social investments could lead to significant health and well-being impacts for Inuit and this is an important area for further study.

In the articles reviewed for this study, authors rarely report communicating or attempting to communicate with either industry or health officials, despite the policy-related topics of natural resource development and well-being. However, regardless of the lack of communication with health officials reported in articles, the results indicate that over two-thirds of the articles provide recommendations on how to improve identified health related matters. This is important as Inuit have long argued that research must be useful for Inuit (Inuit Tapiriit Kanatami, 2018b), and simply identifying health issues without recommendations on how to improve them would not be considered useful. Future health research in or about Inuit Nunangat should include recommendations on how to improve identified health-related matters and it should include input from all relevant stakeholders (in this case industry and health officials) and, most importantly, Inuit themselves.

Most research included in this review focused on qualitative data or a mix of qualitative and quantitative data. Only a small number of articles focused solely on collecting quantitative data, which provides insight into the future type of health and natural resource development research that may occur in Inuit Nunangat. This differs significantly from other health-related research in Inuit Nunangat whereby quantitative methods made up a significant majority of the methods used in published articles (Caughey et al., 2021). Indeed, Inuit have said that much of the investment going into research in Inuit Nunangat is focused on the biological and physical sciences, which tend to be more quantitative, and this takes away attention from Inuit research priorities such as health and social sciences, which tend to be more qualitative (Inuit Tapiriit Kanatami, 2018b). While Indigenous ways of knowing tend to be more qualitative in nature, an important factor in evaluating research methodologies in Inuit Nunangat is to ensure they are Inuit-led methodologies, as described in ITK's National Inuit Strategy on Research (NISR).

In terms of Inuit involvement in the research, slightly less than half of all articles reported clear Inuit involvement in the data collection and/or analysis, while only 14% of articles included Inuit as authors or co-authors, and included beyond the data collection and/or analysis (i.e., included in study design, conclusion, or

findings). Research in other regions of Canada has shown similar low levels of Indigenous involvement (White, 2021). As ITK wrote in the NISR, this lack of Inuit involvement in research is unsurprising as Inuit have long experienced research exploitation and research racism, which has previously included many examples of exclusion and failure to acquire free, prior, and informed consent of Inuit (Inuit Tapiriit Kanatami, 2018b). Further, research in Inuit Nunangat has been governed and resourced in a manner that has traditionally limited Inuit participation, a practice that continues today in Canada despite promises of reconciliation (Inuit Tapiriit Kanatami, 2018b). Inuit self-determination, whether about research or other decisions impacting their communities, is vitally important for a higher quality of life (Ritsema et al., 2015). For any research completed in Inuit Nunangat, Inuit must be meaningfully included for the research to be of value, and for it to be considered ethical (Inuit Tapiriit Kanatami, 2018). Inuit have stated, most prominently through the NISR, that they want and must control access, ownership, and control over the research data (Inuit Tapiriit Kanatami, 2018b). Future research, especially in critical areas such as health, must address this inequity, and include and report the inclusion (not just involvement) of Inuit at all stages of research as many articles in this review failed to include/involve Inuit or report on inclusion/involvement. A failure to involve Inuit in all aspects of research would be symptomatic of a continuing inequity in Inuit leadership in research in their home territories, as indicated by ITK in the NISR (Inuit Tapiriit Kanatami, 2018b).

Natural resource developments in Canada are influenced and subject to multiple levels of government policies (Southcott et al., 2018; Koutouki et al., 2018; Hanrahan, 1999), and Inuit Nunangat is no exception. In all but five articles, there was discussion on government policies, with 90% of articles discussing natural resource development policy. Impact and Benefit Agreements (IBAs) are commonly utilized in natural resource developments when Indigenous Peoples are involved (Cox & Mills, 2015; Southcott et al., 2018; Rodoni & Levesque, 2015); however, only one-third of articles discussed IBAs. All Inuit regions require developers to negotiate IBAs with the respective Inuit government or organization (Inuit Tapiriit Kanatami, 2014), and, as such, it was expected that more articles would discuss IBAs given the significant importance placed on them by Inuit. For example, an entire chapter of the Nunavut Land Claims Agreement focuses on IBAs for major development projects (Tungavik Federation of Nunavut & Indian and Northern Affairs Canada, 1993). IBAs get mixed reviews on whether they are useful tools to address socio-economic impacts of a resource development and whether the economic benefits of the development would help offset the health and well-being impacts (Cox & Mills, 2015; Jones & Bradshaw, 2015):

it is far from clear that the securing of financial benefits through an IBA ... to identify and mitigate health impacts has produced net positive health outcomes for Indigenous populations located proximate to mine developments in the Circumpolar North. This concern has been increasingly expressed in scholarship focused on mining, community well-being, and the social determinants of health. (Jones & Bradshaw, 2015, p. 83)

Many IBAs in Inuit Nunangat, and across Canada, are confidential (Southcott et al., 2018) but usually have chapters concerning preferential hiring and training, business opportunities, environmental protection, workplace conditions, and community well-being initiatives (Cox & Mills, 2015; Rodon & Schott, 2014). Despite the presence of IBAs, in order to effectively address the social determinants of health Inuit must be part of all decision-making processes that impact them (Jones & Bradshaw, 2015). Only 10% of the articles in this scoping review explicitly discuss Indigenous Knowledge and/or Inuit Qaujimagatuqangit (IQ, Traditional Inuit Knowledge (Henderson, 2007) in policy making. This represents an important research gap that needs to be considered in future studies examining the impacts of natural resource development in Inuit Nunangat, as the lack of inclusion and/or erosion of Inuit Knowledge has the potential for producing policies that do not reflect Inuit needs and priorities and/or can cause long-term harm (Suluk & Blakney, 2008).

The literature also informed us that the groundwork for natural resource developments happens in the EA process, and also that most Indigenous-negotiating-leverage is lost after a project is approved and released from EA (Alcantara, 2007; Roburn, 2018). As such, the literature clearly indicates that the EA and IBA negotiation processes are key events that often dictate the long-term success of natural resource developments for Indigenous Peoples. There were also several articles (Cox & Mills, 2015; Dalseg et al., 2018) that spoke of the importance of the involvement of Indigenous women in the EA and IBA process, and pointed to Voisey's Bay as a case study of an EA that included a gender analysis (Cox & Mills, 2015). The authors also reported that few studies have adopted a gender-based analysis of Indigenous participation in EA processes (Cox & Mills, 2015), which could explain the low percentage (10%) of articles that focused on gendered impacts of natural resource development in Inuit Nunangat.

Based solely on the number of appearances in articles, Nunavut would be considered the most studied region. However, when viewed on a per capita basis, the least populous region of Nunatsiavut was researched the most and the most populous region, Nunavut, was researched the least. Depending on how one evaluates how much research is happening in a region, opinions will vary—but

regional gaps in research should be reviewed to ensure Inuit research priorities are being met regionally; however, ITK's National Inuit Strategy on Research suggests there are significant gaps in research across Inuit Nunangat that need to be filled (Inuit Tapiriit Kanatami, 2018b).

Resource-dependent regions are often referred to as “boom and bust” regions, and Nunavut and the Inuvialuit Settlement Region have experience with “boom and bust” scenarios (Duerden, 2004; Rixen & Blangy, 2016), as they are more involved in non-renewable resources such as mining and oil and gas, while hydroelectricity would likely see the “boom and bust” scenario during the construction phase and not the operational phase. However, none of the literature discussed what the “bust” scenario of a long-term, one-mine dependent region like Nunatsiavut looks like and how that will impact Inuit communities. For example, none of the articles discussed what employees and their families will do for residency and employment once the Voisey's Bay mine potentially closes in 2034 (CBC News, 2018b). Typically, employees in these types of situations relocate to wherever the next job is (Rixen & Blangy, 2016), but Indigenous people are strongly connected to their homelands (Chanteloup et al., 2018) and may not necessarily leave, or be able to leave, their home region. However, in other Inuit regions, Inuit employees and their families have historically felt the need to move after a mine closure (Cater & Keeling, 2013; Tester et al., 2013; Rodon & Levesque, 2015). It is important for the long-term sustainability and well-being of communities to understand what Inuit employees and their families will do for employment and residency in regions like Nunatsiavut after their main natural resource is fully exploited. As such, there is a significant gap in the literature whereby there is little documented focus on mine closures and the health and well-being impacts on an Inuit region.

Another key area for further research and examination is the connection between Inuit health and well-being at all stages of the mine life cycle, including exploration, operations, closure, and remediation. Inuit employees often face a dilemma that in order to continue their traditional lifestyle, they need access to snowmobiles, boats, all-terrain vehicles (ATVs), and other expensive items that can be secured with high-paying jobs at a mine that has negative environmental, social, and cultural impacts (Rixen & Blangy, 2016). Also, future research should focus in-depth on mine closures and the potential health and well-being impacts on Inuit and their communities, so that effective planning can occur and so mitigation strategies to lessen the impact of the “bust” can be implemented.

This scoping review focused on three areas of natural resource development and excluded others, such as fisheries, forestry, wind energy projects, or other energy developments. These other natural resource developments could be more meaningful to study for some communities, but were beyond the scope of this

review. Also, while beyond the scope of this study, the impacts of a mine in one Inuit region could look quite different than mines in other areas, depending on the proximity to communities, location of fly-in, fly-out employees, dependency on the mine for employment, or other factors that require further study. Finally, this study only reviewed published, peer-reviewed articles in selected databases, which could have omitted useful grey literature, book chapters, and volumes.

Conclusion

This scoping review offers insights into the research focusing on the relationship between natural resource developments and health and well-being in Inuit Nunangat. The unlimited time frame used in this review allowed us to view the trends and progress of the included published, peer-reviewed research. While the increase in the number of articles published over time is notable, the decline in reported Inuit involvement and meaningful inclusion in research is not. Marginal gains in reported Inuit involvement over time, with a decrease in most recent years, is discouraging and needs to be addressed within the research community. With the release of the National Inuit Strategy on Research, it is anticipated there will be an increase of reported Inuit involvement in future research in or about Inuit Nunangat. Anything short of full and meaningful inclusion at all stages of research would be counter to the intent of the NISR. Increased reporting of communication or attempts to communicate with health and industry officials would be helpful in order to identify information gaps or confirm reluctance of parties to communicate with researchers, as industry and health officials play an important direct and indirect role in the outcomes of health and well-being in Inuit Nunangat.

With the legacy of the Berger Inquiry and the implementation of environmental assessments and impact and benefit agreements, ensuring that natural resource development considers and values the health and well-being of Inuit and their communities has become the expectation on how to do business in Inuit Nunangat. Future research should explore how the natural resource development industry responded to the COVID-19 pandemic. This would provide valuable insights into whether the commitments made in EAs and IBAs were honoured. Future research should also focus on mine closure impacts, as only two articles discussed mine closures. Given the significance of reclamation, environmental protection, royalty payments, employment, and business opportunities, there is an opportunity and a need to begin researching Inuit well-being after mine closure in Inuit communities.

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Primary Author Positionality Statement

The primary author is an Inuk and a beneficiary of the Labrador Inuit Land Claims Agreement in Nunatsiavut. Raised in Happy Valley-Goose Bay, Newfoundland and Labrador, Matthew Pike has maintained strong connections to his Inuit heritage and culture, and connections to the land. Professionally, Matthew has been employed in multiple resource development projects impacting Inuit for over ten years, including the Muskrat Falls hydroelectric project (2010–2016), and most recently with the Voisey's Bay Mine in Northern Labrador (2018–2022).

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