

Social and Psychological Dimensions of Mining Activities and Impacts on Quality of Life

KEY MESSAGES AND SUMMARY

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Funded by the ministère de la Santé et des Services sociaux, this review of the literature seeks to equip public health professionals in their activities surrounding the development and management of current and future mining projects.

Key messages

Industry and government interest in Québec mineral development, particularly in the region targeted by the Plan Nord, is leading public health actors to study development activities and their repercussions on health. To help the public health network better understand the health repercussions of mining activities, a review of the literature has been carried out. This review documents nuisance impacts on quality of life, as well as psychological and social effects on individuals and communities living near mineral exploration and development sites. It also summarizes the impacts of fly-in/fly-out (FIFO) on the psychological health of mine workers, as well as identifying the social and psychological effects of the mine closure/rehabilitation phase.

Main findings of the literature review

Nuisance impacts on quality of life

- Mineral exploration and development produce nuisance impacts, chief among them dust, noise, vibrations and increased traffic.
- Road and infrastructure construction, ore hauling, blasting and drilling are the activities most likely to have irritating and disruptive effects on neighbouring communities.
- Direct effects on well-being and lifestyle, and indirect effects on physical health, such as sleep disruption, stress and loss of tranquility, have been observed in a number of the case studies.

Social and psychological effects: generally negative despite some positive aspects

- Communities are generally hopeful and enthusiastic about the potential for prosperity, stable jobs and the return of young people when mining projects are announced.
- The arrival of the mining industry can spur employment and business activities. It can also lead to price hikes for goods and services.
- The demographic growth produced by a mining project (the boomtown effect) is likely to ramp up demand for services and infrastructure, particularly in the area of housing. It can create conflicts between newcomers and long-time residents.
- The presence of worker camps seems to also create a lot of pressure on certain services and infrastructure, even if this type of accommodation is a response to a housing shortage.
- Using the FIFO workforce management model leads to long working hours, difficulties balancing work and home life and other factors that can impact workers' psychological health. However, workers toiling in close quarters with one another for hours on end sometimes gives rise to a special sort of social support system that is beneficial to psychological health in the workplace.
- A poor attitude on the part of the industry (when it is uncommunicative, rarely consults the population or seems indifferent to the changes in people's lives), lifestyle changes, expropriation or relocation of buildings and increased nuisance can lead to negative psychological effects such as anxiety, distress and a sense of powerlessness.
- Proper preparation on the part of the various stakeholders, particularly in response to demographic growth, can mitigate certain social and psychological effects. In addition, the specific characteristics of each host community, industry activities and site configuration systematically require an initial assessment of the community in order to document the actual effects.

Summary

Context

Beyond their effects on physical health, mineral exploration and development activities are likely to have psychological and social effects, some good and some bad, on individuals (including the mine workers) and neighbouring communities. Furthermore, certain mining activities modify the living environment considerably (more than in the case of other types of industrial activities) and thus reshape the social and psychological dimensions of the physical space, in addition to affecting people's well-being. Public health actors must therefore be equipped with the latest knowledge to be able to understand and prevent the potential impacts of the mining industry on the health and quality of life of these communities.

Objectives of the literature review

This report documents the relationship between mining industry activities and aspects associated with the quality of life and social and psychological health of neighbouring communities. It seeks to equip public health professionals in their activities relating to the development and management of current and future mining projects. To that end, the authors have surveyed the literature in order to identify effects associated with this industry.

To meet the expectations of the ministère de la Santé et des Services sociaux (MSSS), the Institut national de santé publique du Québec (INSPQ) has also documented the links between the fly-in/fly-out (FIFO) workforce management model and the psychological health of mine workers.

Methodology

The body of literature considered in this review includes scientific publications as well as studies found in grey literature. The latter proved indispensable in this type of review (e.g. impact studies, public hearing reports).

The documentary research methodology comprised two main stages: 1) six databases were consulted using the multidisciplinary platform EBSCOhost and two search engines (Google and Google Scholar); and

2) complementary data sources were consulted (e.g. BAPE reports on mining projects).

The documentary research was carried out from October 5 to October 18, 2016, and includes documents published between 2005 and 2016. It was based on three concepts: mining activity; the types of impacts considered (social impacts, psychological impacts and nuisance impacts affecting quality of life); and the notion of community.

Several criteria of inclusion and exclusion were applied during the documentary research phase and during document selection in order to determine relevance based on the title and summary. A final stage involved assessing the quality of the documents through an in-depth reading. Another series of criteria were used for that purpose, including the independence of the funding and authors. The authors of the present review adopted a robust methodological approach that helped reduce bias and ensure the validity of the observations. In all, 46 studies were selected.

Key observations

Nuisance impacts on quality of life

Mineral exploration and development produce nuisance impacts, chief among them dust, noise, vibrations and increased traffic. The extent of the effects varies by activity phase and site characteristics, because, in some cases, these activities can be repetitive and stretch over several months.

According to the studies included in the present review of the literature, dust-related effects seem especially significant by virtue of the broad spectrum of sources and effects. It seems that people living near a mining site or haul road, as well as industry workers, are more affected than others.

The main dust-related effects in the context of exploration and development are as follows:

- Annoyances such as dust buildup and respiratory problems;
- Changes in lifestyle habits, such as curtailing food gathering and gardening activities, avoiding hanging laundry out to dry on a clothesline and opening windows;

- A perception of poor air quality, which can leave some people feeling stressed or worried.

Blast-related explosions, drilling near people's homes and hauling ore in heavy-duty trucks are reported to be the activities most likely to cause noise and vibrations. According to the studies consulted, noise causes nuisance and disruption, which in turn produces impacts on residents' health and quality of life, including:

- Disturbed sleep;
- Jumpiness, stress, anxiety, fear, and anger;
- Changes in lifestyle habits;
- Loss of tranquility.

Increased traffic associated with mining activities is likely to generate various effects, including a concern for pedestrian safety and for having to share the road with heavy trucks, as well as changes in animal migration habits, which in turn can affect the hunting activities of certain indigenous communities.

Social dimensions

The documents consulted outline the social dimensions associated with mining activities, be they related to exploration, development or closure.

Sociopolitical consequences, including conflict, disengagement and alienation, are observed right from the exploration stage. The literature identifies a number of causes of this conflict within the community, neighbourhood and family:

- Location of the project;
- Potential impacts on community members;
- Perception of inequality and injustice;
- Difficulty understanding the other stakeholders' positions;
- Exploration activities, such as construction of worker camps, relocation or destruction of buildings, or drilling, especially when the project has yet to receive official approval.

When development activities are taking place, the social dimensions identified centre mainly around rapid increases in the population and the arrival of workers from out of town (the "boomtown" effect). Case studies

identify a number of favourable and unfavourable impacts, such as:

- Increased employment opportunities and business activities;
- A hike in the prices of goods and services;
- Changes at the cultural and sociopolitical levels;
- Increased demand for services and infrastructure.

But owing to contradictory data, it is difficult to conclude whether mining activities have a generally positive or negative impact. From a socioeconomic standpoint, the impacts can vary by geographic location of the mining community, by the company's economic weight in the community and by the type of employee mobility management.

From a cultural and sociopolitical standpoint, the effects vary by the mining host community. These effects have to do with social cohesion, conflicts, changes in lifestyle and public order. Some of the studies present mixed results, which highlights the importance of examining the specific cultural and social context of each community instead of relying on generalizations.

In terms of services and infrastructure, demographic growth produced by the boomtown effect is likely to drive up the demand for housing, health care and municipal, social, educational, emergency and recreational services. Studies on small isolated communities seem to place a greater emphasis on the effects of this rapid population increase—particularly on housing, access to health services and road maintenance.

According to a number of articles consulted, the choice of setting up worker camps and of adopting a FIFO approach have greater negative impacts on social cohesion, regional socioeconomic development, services and infrastructure than on integration of workers and their families into the community.

Lastly, a few documents examine the social dimensions associated with closing a mine. When the mine has been the main employer for decades, its decommissioning seems to have a drastic impact on the community's lifestyle. According to the literature, closing a mine makes it necessary to develop a new economic

foundation in order to ensure the community's well-being.

Psychological dimensions

The literature consulted sheds light on the psychological dimensions associated with mining activities. As for the social dimensions, the psychological effects may occur when the project is announced, during mine operations, or during mine closure.

Some of the studies consulted indicate that residents exhibit stress, worry, sadness and anger during the project announcement and mining phases, as well as feelings of powerlessness and insecurity. These are attributed in particular to the absence of choice, anticipated lifestyle changes and a lack of information.

When it comes to mining activities, several scientific articles found instances of stress, distress and depression, as well as feelings of powerlessness and insecurity, in the communities situated near mining infrastructure in the face of lifestyle changes or loss of land caused by the operations of one or more mines. The following factors contribute to this:

- A poor attitude on the part of the industry (when it is uncommunicative, rarely consults the population or seems indifferent to the changes in people's lives);
- Changes in lifestyle;
- Expropriation or relocation of buildings;
- Increase in nuisance impacts.

Feelings of worry and fear have also been documented in a number of studies, attributable primarily to financial and environmental considerations.

Some of the documents consulted identify psychological repercussions associated with mine closures, pointing out a significant link between decommissioning a mine and a rise in psychological distress experienced by some of the individuals affected, especially in communities where the mine was the primary employer or in instances when the mine closed suddenly.

Avenues for intervention and research

With a view to improving current practices and avoiding certain negative repercussions on communities' socioeconomic development and social fabric, some of the authors whose works were consulted suggest the following actions:

- Increase information sharing and cooperation between the host community and the mining industry;
- Help outside workers and their families get settled into the host community by organizing a number of social and community activities;
- Document the exposure of FIFO mine workers to some of the factors identified, such as high workload and difficulties striking a balance between work and home life.

Conclusion

The literature consulted highlights more negative than positive effects on health and well-being, although positive effects have been observed. Planning for the arrival of the mining industry by the various stakeholders and an open, participatory management approach are recommended by several of the authors in order to avoid or mitigate negative impacts and increase positive ones.

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