

## Advisory on a Québec Policy to Fight Environmental Noise: Towards Healthy Sound Environments

### KEY MESSAGES AND SUMMARY

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This scientific advisory provides an overview of the established effects of environmental noise on public health and quality of life, presents the exposure of the Québec population to environmental noise, outlines the social and legislative context and suggests interventions that might guide all levels of government to reduce and prevent the effects of noise. Its purpose is to document the relevance of introducing a public policy to fight environmental noise in Québec. This advisory is based on an extensive review of scientific and technical literature originating from several countries, with special attention directed towards approaches adopted in public policies. It is the result of work conducted by a team from the Institut national de santé publique du Québec supported by many other contributors.

### Highlights

Environmental noise, defined as noise emitted from all sources excluding those in the workplace, is pervasive and constitutes a risk to health and quality of life.

The review of the scientific literature shows that noise is a public health issue that can have multiple consequences, both physical and psychosocial. Environmental noise can be a source of sleep disturbance, interference with the ability to learn at school, cardiovascular disease, annoyance (discomfort, disturbance), hearing loss and tinnitus.

Environmental noise is a source of complaints and lawsuits, which are indicative of social acceptance issues. Public reactions attest to diverging interests in society, particularly with regard to the model and overall vision of land development and the need for tranquillity.

According to a conservative estimate, the societal costs associated with the effects of environmental noise amount to some \$680 million per year in Québec.

For the first time, an analysis of various data has led to the estimate that in 2014 at least 640,000 people aged 15 or older had been exposed to environmental noise levels likely to lead to major disturbances caused by any of the individual sources of environmental outdoor noise. Effective and promising preventive measures have been identified to tackle the problem at its source.

In Québec, at least 10 departments and 11 organizations share responsibilities in the matter. Prevention and a significant reduction of the effects of noise could be achieved through a public policy that would involve all sectors and levels of decision making.

These findings were made under the terms of an advisory requested by the Ministère de la Santé et des Services sociaux du Québec in order to better prevent the adverse effects associated with this health risk factor.

## Summary

This scientific advisory provides an overview of the proven effects of environmental noise on people's health and quality of life, presents the exposure of the Québec population to environmental noise, outlines the social and legislative context and suggests interventions that might guide all levels of government to reduce and prevent the effects of noise. Its purpose is to document the relevance of introducing a public policy to fight environmental noise in Québec. This advisory presents several approaches to fight environmental noise identified in the scientific and technical literature from various countries, with special attention directed towards approaches adopted in public policies. It is the result of work conducted by a team from the Institut national de santé publique du Québec, supported by many professionals working in public health, environmental protection, public policy, economics, as well as by academic researchers.

### Health effects and economic impacts

A broad review of scientific papers (systematic reviews, meta-analyses, knowledge syntheses, etc.) was used to identify the proven health effects of environmental noise, estimate the scope of the population's exposure to it and show that environmental noise is a public health concern. The consequences of environmental noise on health and quality of life can persist even after the exposure has ceased and go beyond its impact on hearing.

- Environmental noise has other impacts on physical health: sleep disturbance, cardiovascular diseases, specifically high blood pressure related to road and air traffic noise and myocardial infarction associated with road traffic noise.
- Noise also has psychosocial effects: annoyance (discomfort, disturbance), cognitive effects and learning impairment in school. Additionally, environmental noise is a source of complaints and lawsuits, which are indicative of social acceptance issues. Public reactions attest to diverging interests in society, notably in terms of the model and overall vision of land development and the need for tranquillity.

- Moreover, according to a conservative estimate, the economic impacts associated with noise in Québec were assessed at \$680 million per year for 2013. One of the documented effects is the decreased property value of homes affected by transportation noise.

### Environmental noise

Based on available data, it is possible to estimate the size of the Québec population exposed to hazardous noise levels in their environments outside the workplace:

- In 2014, it was estimated that at least 640,000 people aged 15 or older had been exposed to hazardous levels of environmental noise that could lead to serious annoyance (disturbances, discomfort), from one or another of the sources of environmental outdoor noise.
- Road traffic is the main source of noise, as elsewhere in the world. Other major sources of noise include air and rail traffic, and marshalling yards in particular. There is also noise caused by neighbourhood activities, industrial noise, motorized recreation vehicles, construction sites, young people listening to loud music, and places where amplified music is present (nightclubs, festivals). In many cases, there is a cumulative exposure to several sources of noise, particularly in urban settings.



Not every sound is noise. Loud or not, sounds can be pleasant and express joy or pleasure (such as when one is listening to music).

Noise is any sound or a set of unwanted sounds that annoys or is at a level (loudness) that may have adverse effects on health. Noise is not a new problem, but it is evolving continuously as the range of human activities and land uses expand.

Noise is measured in decibels using a sound level meter. Several indicators are used to interpret the levels to which people are exposed; annoyance is measured using an internationally standardized scale.

## Legislative context

The analysis of the social and legislative context led to the following findings:

- From a legal standpoint, noise reduction and prevention interventions fall under the responsibility of multiple sectors. They are grounded in fragmented bases broken down among different levels of government: municipal, provincial, federal and even international.
- In Québec, at least 10 departments and 11 public organizations share responsibility for environmental noise.
- In addition to involving various stakeholders, the preventive mechanisms available to the departments have unequal decision-making weight.
- Some legal provisions on noise are not covered by regulations at the present time, while other measures are neither monitored nor controlled.

## Effective and promising measures to fight environmental noise

**+** In recent decades, various organizations have sought to heighten government and decision-maker awareness of the magnitude of the effects of noise and possible solutions. They include the Organisation for Economic Co-operation and Development (OECD), the World Health Organization (WHO), with four reports on environmental noise between 1995 and 2011, and the European Union (EU).

The review and analysis of scientific and technical papers on effective and promising prevention and mitigation measures to apply to the effects of noise (documents on good practices, organizational documents, specialized conference proceedings, etc.) indicate that:

- Noise prevention measures exist for all noise environments and several directly pertain to the source of emission. Among these measures, land use and planning are essential tools in preventing the effects of a very large number of noise sources.
- Integrating preventive measures into a public policy would enhance current actions and increase their impact on preventing and mitigating the effects of

environmental noise on health and quality of life. A public policy to fight environmental noise would be the best measure for this problem, considering the breakdown of responsibilities between several departments and organizations. Bearing in mind federal jurisdiction, Québec has sufficient leverage to develop and implement such a policy.

- Implementing a local public policy is also a measure that could be applied by authorities closest to the citizens, namely the municipalities (MRC and metropolitan communities), provided the policy has the necessary technical and professional support and involves citizen participation.

## Recommendations

**Through these analyses, a set of recommendations were formulated that should contribute to mitigating or preventing the effects of environmental noise in Québec:**

1. That the Ministère de la Santé et des Services sociaux (MSSS) view environmental noise as a public health issue to integrate into its policies and action plans, given its major impact on health and quality of life.
2. That Québec recognize that the prevention, reduction and mitigation of the effects of environmental noise must be integrated into the actions of all departments and organizations concerned and at different levels of government (national and local).
3. That Québec establish a public policy to reduce the effects of noise. As a cohesive and mobilizing force, this policy would contribute to supporting the implementation of more effective and efficient concerted government action.
4. That the implementation of the policy foresee permanent coordination mechanisms to support and follow up on its implementation.
5. That Québec establish guidelines and consistent, coordinated regulatory standards that cover all sources of noise based on the knowledge and recommendations of recognized organizations in order to properly protect the population from the effects of noise on health and quality of life.

6. That the policy contain the necessary provisions to support municipal authorities (MRC, municipalities, metropolitan communities) in their enforcement of land-use planning and development conducive to maintaining and creating healthy sound environments.
7. That the intersectoral and integrating nature of the public policy direct departments, municipalities and organizations to adopt the best practices and measures to reduce the effects of environmental noise in their areas of responsibility, and promote this among stakeholders (manufacturers, distributors, developers and citizens).
8. That the policy prescribe means adapted to the context in Québec to intervene primarily on problematic situations (citizens highly exposed) that require corrective measures.
9. That Québec prescribe actions to the population, different departments, government organizations and municipalities regarding the effects of noise on health, related costs and effective measures to protect public health.
10. That the theme of noise and its effects on health and quality of life be integrated into children's education at school.
11. That colleges and universities train additional resources in the field of noise, particularly in engineering. That new programs also be developed with mandatory content on environmental noise in the curriculum offered to architects, urban planners, health professionals and other relevant professions.
12. That the theme of environmental noise and its effects benefit from the development of sustained grant programs from research funding organizations and provincial and federal research institutes to encourage specific and interdisciplinary research in the field.
13. That integrated monitoring be ensured based on all existing data and new information to be compiled, and more specifically noise exposure measurements, in order to document and follow the problem of environmental noise, beginning with transportation noise in particular.
14. That Québec lobby the federal government to limit noise emissions (road, air, rail, machines, etc.), to prompt the labelling of sound levels for various products and machines and to heighten awareness among decision makers and stakeholders at the federal level of the need to align their land-use planning and development policies with those already in force in Québec.

**These recommendations are consistent with a number of proposals advocated by the World Health Organization (WHO) and best practices established elsewhere in the world. They are essential leverage actions to limit the adverse effects of noise on human health and improve quality of life.**

## References

Refer to the complete advisory, in French, for the list of references used.

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The French version is entitled Avis sur une politique québécoise de lutte au bruit environnemental : pour des environnements sonores sains and is also available on the web site of the Institut national de santé publique du Québec at: <http://www.inspq.qc.ca>.

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