

Executive Summary

Chief Medical Officer of Health's Recommendations Concerning Shale Gas Development in New Brunswick

Office of the Chief Medical Officer of Health (OCMOH)
New Brunswick Department of Health

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Cover photo:

"Tight Gas" wells in the McCully Field near Penobsquis, NB

Photo from NB DNR – http://www.gnb.ca/0078/minerals/Images/Carbon_Photo-60.jpg

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Whoever wishes to investigate medicine properly, should proceed thus: in the first place to consider the seasons of the year, and what effects each of them produces for they are not at all alike, but differ much from themselves in regard to their changes. Then the winds, the hot and the cold, especially such as are common to all countries, and then such as are peculiar to each locality. We must also consider the qualities of the waters, for as they differ from one another in taste and weight, so also do they differ much in their qualities. In the same manner, when one comes into a city to which he is a stranger, he ought to consider its situation, how it lies as to the winds and the rising of the sun; for its influence is not the same whether it lies to the north or the south, to the rising or to the setting sun.

These things one ought to consider most attentively, and concerning the waters which the inhabitants use, whether they be marshy and soft, or hard, and running from elevated and rocky situations, and then if saltish and unfit for cooking; and the ground, whether it be naked and deficient in water, or wooded and well watered, and whether it lies in a hollow, confined situation, or is elevated and cold; and the mode in which the inhabitants live, and what are their pursuits, whether they are fond of drinking and eating to excess, and given to indolence, or are fond of exercise and labour, and not given to excess in eating and drinking.

“On Airs, Waters and Places”, Hippocrates, c. 400 BCE

Message from the Chief Medical Officer of Health

Doctors have known for thousands of years that the environment greatly impacts upon human health. Hippocrates, the Greek physician often referred to as the “father of Western medicine”, first wrote about it twenty-five centuries ago. Fortunately today in New Brunswick both residents and visitors still find here a healthy and pleasing environment. Indeed our vast networks of river systems are renowned for their fishing and other recreational pursuits. The key initiative of creating and maintaining healthy environments however requires ongoing attention: we must continue to invest in what truly makes people healthy. This requires the effort of an entire community led and supported by a whole-of-government approach.

Section 41 of the Canadian Medical Association Code of Ethics reads that a physician should ‘recognize that community, society and the environment are important factors in the health of individual patients’. Increasingly, doctors are expressing their concerns when any of these factors impact negatively upon their patients. Because of our training and experience in environmental health, we as Public Health doctors have a particular and important role to play. Furthermore, it is part of our mandate to advocate, and provide meaningful information so that people, communities, organizations and governments have the knowledge necessary to make the appropriate decisions when faced with balancing the potential benefits and harms of a given situation. Like any other doctor, we must consider all our patients – in this case the entire population present and future – and give thoughtful advice for actions that will promote fair opportunities for individuals, families and communities to enjoy good health.

Virtually every industry has potential health implications associated with it. The type, the frequency and the severity varies considerably with the nature and complexity of the industry – so too with shale gas production.

The gas and oil industry is not new to New Brunswick. However, it is only in the last 10 years or so that the combination of technologies has been developed that makes it feasible to extract gas from the layers of shale deep in the earth in an economically viable way. The methodologies used are complex and still evolving. With shale gas production, we not only have to consider what the health impacts are from the known conventional part of the industry but also factor in those considerations that relate to the new.

With industry, there may of course be economic benefits which should have a positive impact on health status. However, we cannot simply assume that more money equates to a healthier population – the money needs to be utilised strategically. Economic factors aside, the ultimate decision to allow industry expansion to proceed will need to take into account what appears to have become a polarized public debate, possibly a result of both the values based nature of the discussion and varying degrees of the public’s understanding of the facts. When people don’t understand an issue, or feel their values are being compromised, this has an adverse bearing on their health and wellbeing.

As Chief Medical Officer of Health, I am therefore providing these recommendations to our government to offer advice on measures that should be put in place to maximize the health benefits and minimize the health risks related to shale gas development if the decision is taken to go ahead with it. In addition, this document is intended to provide information to the many others who have a role to play in protecting the health of the public. This work is based on experience from other jurisdictions, a review of the available literature, and expert opinion from a variety of public health and environmental health professionals. As this process develops, new knowledge emerges and our understanding evolves, some of these recommendations may need to be adapted or adjusted.

Currently, the people of New Brunswick are among some of the most privileged in the world, enjoying one of its most beautiful social and physical environments; therefore, at this point in time, we must ensure that we all do our best to preserve that for ourselves and the generations to come.



Dr. Eilish Cleary
Chief Medical Officer of Health
New Brunswick Department of Health

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While large-scale development of a shale gas industry in New Brunswick may offer an economic growth opportunity for the province, it will be important to ensure that the overall health gains are greater than the losses. Economic status of individuals and communities can be an important determinant of their health, however there are many other factors resulting from industry development that can have strong negative impacts. Unless proper controls are put in place there is a risk of spoiling any benefits from economic gains through adverse health outcomes.

If an expansion of the unconventional gas industry takes place in New Brunswick, Government needs to take targeted and strategic actions aimed at prevention and mitigation of negative health impacts, which includes building capacity in local and provincial services and infrastructure. These will need to be put in place prior to further development as current infrastructure, capacity, processes and legislation are not adequate to meet these needs. In addition, as this industry is new and evolving, monitoring of the health of the population will be important on an ongoing basis to detect adverse impacts. This will allow for modifications, including if warranted, a slow down or halting of further development. Accordingly, the Chief Medical Officer of Health (CMOH) has developed the recommendations in this document which she believes are necessary in order to protect the health of the public.

While there has been considerable discussion amongst the public about potential impacts on water, it is important to remember that clean water and healthy air are not the only important requirements and determinants of health. The proposed areas for action address potential health impacts resulting from changes in either the social or physical environment. Protection of the health of future generations is also considered in order to ensure long-term sustainability of these actions. As the practice of public health results from an assessment of a complex balance of factors, and often has to contend with uncertainties, it is important that it be informed by a strong theoretical foundation. Therefore, all of the recommendations are grounded in the guiding principles for protection of public health, including scientific knowledge and reasonable judgement of the determinants of health, ethical considerations, public health values and principles, and the resulting health objectives.

This report identifies the known issues that should be addressed and the unknowns which require further investigation. The recommendations propose actions that should be taken in areas such as health equity, assessment of health impacts, monitoring of health and environmental impacts, strengthening of the planning process, ensuring transparency and community participation, filling knowledge gaps, requiring appropriate environmental controls, and enabling more effective government oversight. Attention is needed in order to protect vulnerable populations such as children, and those for whom the environment plays a particularly strong foundation to their health such as First Nations peoples.

This document was developed through a critical review of the experience of shale gas development in other jurisdictions through the lens of anticipated impacts (both positive and negative) to public health. Other sources of information include reviews of case studies reported in the scientific literature and other reports, current emerging issues in conference proceedings, discussions with public health and environmental experts, media reports, and listening to the current public debate on shale gas. This was done with a view to providing recommendations to Government for use prior to and during any expansion of the industry in New Brunswick.

Many of these recommendations are complementary to those proposed in the document entitled "Responsible Environmental Management of Oil and Gas Activities in New Brunswick -Recommendations for Public Discussion" (May 2012) which was developed to outline measures required to protect the environment. This document builds upon and enhances the proposed environmental measures as deemed necessary in order to provide added protection for human health. The recommendations that resulted are intended to help inform the Government's risk management and regulatory framework in such a way that it will be able to provide appropriate, and comprehensive public health promotion and protection along with its other goals. This document is also intended to provide information to the many others who have a role to play in protecting the health of the public.

With respect to the scope of this document, the primary focus is on health risks. However, some measures have been included in order to maximize possible health benefits. Not included are other potential impacts which could be both positive (e.g. economic gains in terms of income, employment, energy) and negative (e.g. green house gases, tourism, fishing, hunting, ecosystem damage and earthquake activity). There are others within government and amongst partners who are better positioned in terms of expertise to speak to these matters.

It is important to note that the CMOH's recommendations are not a full assessment of all health risks as they apply in the New Brunswick context. However, it is intended to help start a conversation on potential health impacts from shale gas development and what can be done about them.

The work of building a healthy population belongs to all of society and so many of the recommended actions will require considerable work from individuals and organizations in the community as well as from Government and industry. Because of their training and expertise, Public Health professionals will have a particularly important role to play in leadership and content knowledge. Ideally New Brunswick should be building efficiencies and expanding knowledge through a pan- Canadian approach when possible.

The cost of funding these recommendations has not yet been determined. It is recognized they may not be insignificant and there could be opportunity to have much of the costs absorbed by industry. This advice is based on what should be routine public health practice for all environmental health programs. The knowledge used is current, but as there are many data and information gaps it will need to evolve. In particular, it will be key to hear public thoughts and perceptions to better inform future actions. An implementation group should be established and an oversight mechanism put in place.

Document Overview

Part 1 of this document outlines the guiding principles for protection of public health, including aspects of the determinants of health, ethical considerations, public health values and principles, and the derived health objectives. This information provides a background for the reasoning behind public health promotion, prevention and protection decisions, and for the recommendations herein.

The main determinants of population health are factors that impact the social and physical environments. In addition to protecting the physical environment, investment in improving the social determinants of health today will translate into better health equity, improved population health and less money spent on treatment and rehabilitation tomorrow.

Ethical considerations, values and principles guide all actions intended to improve, promote and protect health because the practice of public health is always a balancing act between knowns and unknowns and decisions often need to be made in the face of uncertainty.

The health objectives, values and principles describe the different pieces of work that need to be undertaken to make a difference through improved health of the population. However, action on these issues needs to come from outside the health sector as well as from within it. The Public Health sector should play a leadership role, but achieving these outcomes needs to involve collaborative, multi-sectoral partnerships across the whole community.

Part 2 of this document examines the New Brunswick context, summarizes the key findings from a review of experience in other jurisdictions and outlines many knowledge gaps with respect to shale gas and public health in general. It also contains an overview of some of the work being undertaken elsewhere which will assist in contributing to the knowledge base related to this industry.

1. Shale gas – the New Brunswick context

While the oil and gas industry is not in itself new to New Brunswick, the combination of technologies and methodologies that enable recovery of gas from the shale layers is recent. This has led to considerable interest as it is believed that there is a rich reserve in the province although it is not uniformly distributed throughout. This would mean that not all communities would be equally impacted by any potential development. There is currently no estimate available of the rate, size, density, location or production capacity of the potential development which has made it difficult to do a full assessment on potential health impacts.

2. Experience from other jurisdictions

The principal lessons noted were that there are social and community health risks from this industry which can be compounded by inequities caused amongst the local populace. One could expect that as a result of economic gains due to increased income, energy and employment, there would be an indirect positive benefit in health status as a result of this industry, however clear evidence to support this was not found in the course of this review.

There are significant data gaps that limit assessment of health risks and to date there has been limited involvement in shale gas issues by public health officials and experts. The public discussion on shale gas has been dominated by chemical toxicity concerns but many other factors of potential concern to public health also need attention. Few studies have been undertaken that consider the overall potential impacts on health and the physical and social environments over the entire lifetime of the industry.

One particular possible social and community health risk that the Province will need to guard against is the “Boomtown Effect” that can arise during economic development. This effect occurs when a rapid change in population, industrialization and economic prosperity also leads to a host of social ills that impact community health. These can include increased rates of crime, drug and alcohol abuse, sexually-transmitted infections (STIs), and domestic violence; inadequate supply and quality of housing; increased cost of living; increased community dissatisfaction; increased mental health and social services case loads; increased hospital admissions; insufficient infrastructure; and insufficient capacity in public services, including policing, local government, social services, and health care.

The Boomtown Effect is thought to be more intense for small communities with a traditional way of life that did not previously involve the industrial sector responsible for the boom, so there may be a risk to New Brunswick communities unless this effect is anticipated and mitigated through strategic investments.

Potential impacts to the physical environment include more than just the risk of releases of the chemicals present in hydraulic fracturing fluids that are the main focus of the current public debate about shale gas. A portion of these fluids flows back to the surface with the natural gas stream, and these wastes may contain natural contaminants (such as petroleum, heavy metals, radioactivity and high salt concentrations) from deep underground, so waste management is an environmental and health issue. There are further potential health risks due to air quality, noise, vibration, continuous illumination and physical hazards due to extensive heavy truck traffic. In addition to the potential for toxicity or physical injury, there are other possible hazards to mental health and community wellbeing that result from a feeling of lack of control over one’s destiny in local communities in the face of these issues.

3. What we don’t know now

Some of the key information gaps identified during this review include a lack of standard methods for preventing and mitigating social impacts, a lack of health status studies before and during gas development, and a lack of systematic health impact assessments. Information needed to assess toxicity risks may also be lacking, such as the toxicological characteristics of industry products and wastes,

and accurate exposure data is usually not available. There is also a lack of knowledge about the extent, locations and rate of development which makes it very difficult to forecast local effects of specific projects and to assess the potential for cumulative effects over time.

There are many important pieces of work that are currently underway in Canada and the US which will contribute important detail on aspects of the shale gas industry and its connection to health. More study is needed, and while New Brunswick will benefit from these findings they will not substitute for in-province health impact assessments.

Part 3 of this document describes 30 recommendations that the CMOH believes are necessary to address the key findings and to protect or enhance population health through appropriate management of the shale gas industry. These recommendations may be grouped into the following categories:

1. Protection of health and community wellbeing related to changes in the social environment

Includes recommendations for optimizing equitable distribution of risks and rewards; revenue sharing; identifying a role for local governments in planning the location of gas industry infrastructure; identifying a role for Public Health in community planning; and implementing a transparent consultative process with the public and other stakeholders on the implementation process for these recommendations.

2. Protection of health related to changes in both the social and physical environments

Includes recommendations for developing a requirement to submit a health impact assessment (HIA) as part of the standard Project Registration process; developing a protocol for monitoring of health status of persons living, working, attending school or playing in proximity to the industry; and for linking this information to environmental monitoring data and socioeconomic data.

3. Protection of health related to changes in the physical environment

Includes recommendations for monitoring networks for ambient air and water quality; provisions for wastewater handling, testing, transportation, treatment and disposal; full and timely disclosure of chemicals used; less toxic alternatives for hydraulic fracturing fluids; safe setback distances that consider human health factors; limiting health impacts from noise, vibration and continuous illumination; traffic management plans; emergency response training; and promotion and protection for the health of workers.

4. Protection of future generations

Includes recommendations for a plan to anticipate and mitigate the “Boomtown Effect”; a strategic health impact assessment; identifying areas to be excluded from development; a strategic land use plan that considers health equity; consideration of vulnerable and disadvantaged populations; consideration of First Nations; a strategic water management plan; and public reporting of environmental and health monitoring data.

5. Implementation and oversight

Includes recommendations for strengthening government oversight capacity and resources; striking an implementation group to oversee implementation of the CMOH’s recommendations; establishing an on-going dialogue among community, government, academics and industry; and creating a multi-disciplinary advisory committee to Cabinet.

Part 4 of this document outlines the conclusions upon which the recommendations are based. The mandate of the Office of the Chief Medical Officer of Health is to improve, promote and protect the health of the people in New Brunswick. Based on this work it is clear that if the decision is taken to expand the shale gas industry in New Brunswick, Government must take targeted and strategic actions aimed at prevention and mitigation, including building capacity in local and provincial services and infrastructure, in order to minimize the risks of negative impacts on health.

The learnings from other jurisdictions that have undergone recent development of this industry indicate that it will be necessary to look at health in broad terms, and so, in addition to physical factors, plans will need to address the social determinants of health. This will be particularly important if there is an expectation of benefitting the health of the population through economic gains. The review also found that there are major information gaps that will need to be filled through research and ongoing monitoring of health surveillance as well as requiring Health Impact Assessments.

Process issues have been identified which highlight the need for openness, transparency and availability of reliable information. Participation of local communities and governments will be key to ensuring that the most informed decisions about planning and mitigation can be put in place. To date there is not enough information available about the specific way (in terms of scope, size, well pad density, rate, etc.) that the development of the shale gas industry would unfold, but this information will be important to enable strategic project plans, land and water use planning and to inform assessments of potential cumulative impacts.

In summary, the CMOH has provided the recommendations in this document to inform Government decision-making. This advice is the best possible at this time given the assessment of limited current knowledge and so may have to evolve over time. Absent from the inputs to date has been consultation with the public and this is considered a key next step. In addition, this document is intended to provide a solid information base for that discussion. It is recognized that these recommendations would require a formal implementation and oversight structure and require participation from across the community.

While the recommendations in this document may seem onerous, rather they should be seen as routine public health practice. It is important to consider the impact that industry can have on human health. In so doing, New Brunswick could be a leader in establishing a path to balance the contentious and sometimes polarized views within society regarding the increasing number of vital issues of environmental health - locally and globally.

Summary of Recommendations

1. Protection of Health and Community Wellbeing Related to Changes in the Social Environment

Recommendation 1.1: The Province should establish mechanisms to measure, monitor, and optimize equitable distribution of risks and rewards that maximize benefits to the socioeconomic determinants of health for all New Brunswickers

Recommendation 1.2: The Province should develop a method based on a clear set of principles with input from Public Health that will enhance the proposed revenue sharing approach so that an appropriate portion of monies from royalties and other sources will help to offset negative impacts on the social determinants of health

Recommendation 1.3: The Province should implement structures and processes to ensure a role for local governments in planning the location of gas industry infrastructure such as roads, well pads, pipelines, compressor stations and water storage and treatment facilities

Recommendation 1.4: The Province should implement structures and processes to ensure a role for Public Health in community planning in order to ensure that the built environment is optimized for the determinants of health

Recommendation 1.5: The Province should undertake a transparent consultative process with representative members and sectors of the public and other stakeholders on the implementation process for these recommendations in order to achieve better health outcomes

2. Protection of Health Related to Changes in Both the Social and Physical Environments

Recommendation 2.1: The Province should implement a requirement for submitting a Health Impact Assessment (HIA), prepared according to the specifications of Department of Health (DH), as part of the standard Project Registration process managed by Department of Environment and Local Government (DELG).

Recommendation 2.2: The Province should develop and implement a protocol for monitoring the health status of persons living, working, attending school or playing in proximity to the industry.

Recommendation 2.3: The Province should develop and implement methods to link health status information to environmental monitoring data and socioeconomic status data.

3. Protection of Health Related to Changes in the Physical Environment

Recommendation 3.1: The Province should put in place monitoring networks for ambient air and water quality, as well as drinking water quality in the local areas expected to have an industry presence, in advance of industry development and continuing throughout the lifetime of development, production and post-production.

Recommendation 3.2: The Province should put in place special provisions for wastewater handling, testing, transportation, treatment and disposal.

Recommendation 3.3: The Province should require full and timely disclosure of all chemical compounds (rather than products or compound classes) which must include their identities, concentrations and quantities.

Recommendation 3.4: The Province should require that all hydraulic fracturing fluids contain additives that are the least toxic of any available alternatives.

Recommendation 3.5: The Province should develop and implement reasonable, safe setback distances approved by Public Health that consider human health and which are based on exposure risk assessments in addition to established precedents.

Recommendation 3.6: The Province should develop and implement standards approved by Public Health to limit health impacts from noise, vibration and continuous illumination.

Recommendation 3.7: The Province should require site-specific traffic management plans for all projects, including route plans and designated times of day for heavy truck movements.

Recommendation 3.8: The Province should enhance local and provincial emergency response training, capacity and preparedness to respond to the most likely and most serious emergencies that might pose a threat to human health.

Recommendation 3.9: The Province should enhance the mechanisms that are in place to promote and protect the health of workers in the industry and others who may be at the work sites (government inspectors, support industry workers, emergency responders, etc.).

4. Protection of Future Generations

Recommendation 4.1: The Province should develop a plan for anticipating and mitigating the “Boomtown Effect”.

Recommendation 4.2: The Province should undertake a Strategic Health Impact Assessment (Strategic HIA) to estimate the long-term cumulative health and social benefits and costs.

Recommendation 4.3: The Province should designate areas that are to be excluded from development, including drinking watersheds and wellfields, sensitive natural areas, specified agricultural lands, and other areas of special significance (scope to be defined).

Recommendation 4.4: The Province should prepare a strategic land use plan with considerations of health equity and with input from Public Health and other experts and stakeholders.

Recommendation 4.5: The Province should implement a process that will allow planning and regulatory decisions to consider vulnerable and disadvantaged populations that are at greater risk to environmental contaminants.

Recommendation 4.6: The Province should require that planning and regulatory decisions consider First Nations even if reserve lands are not directly affected.

Recommendation 4.7: The Province should prepare a strategic water management plan to protect the quality and availability of water for public water supplies, private well water supplies and fresh water in general.

Recommendation 4.8: The Province should encourage, promote and financially support research in New Brunswick, such as long-term longitudinal health studies and research on potential health effects, social impacts, and other aspects.

Recommendation 4.9: The Province should commit to periodically reviewing and reporting to the public on environmental and health monitoring data.

5. Implementation and Oversight

Recommendation 5.1: The Province should establish sufficient capacity and resources to enable relevant Government departments to oversee the development of this industry including conducting

project reviews and approvals, inspections, monitoring, enforcement and management of environmental, health or social consequences.

Recommendation 5.2: The Province should establish an implementation group for the recommendations in this report that is led by Public Health and includes representatives from other relevant government departments and other stakeholders.

Recommendation 5.3: The Province should sponsor a series of summits led by Public Health to better understand and communicate public health information and issues and to foster an effective ongoing dialogue among community, government, academics and industry.

Recommendation 5.4: The Province should create a multi-disciplinary Advisory Committee to Cabinet charged with reviewing government oversight throughout the lifetime of the industry in NB.