

# New Brunswick Disease Watch Bulletin

Office of the Chief Medical Officer of Health

## Introduction

Welcome to the 15th edition of the *New Brunswick Disease Watch Bulletin*.

In this issue, we discuss the New Brunswick (NB) Framework for the Prevention of Unintentional Injuries now available on our GNB Health website. Moreover, we provide updated information about radon and include recommendations from the Canadian guideline for radon in indoor air and from the Office of the Chief Medical Officer of Health (OCMOH) in NB.

We also provide an overview of Norovirus, one of the main causes of gastroenteritis in New Brunswick and worldwide. Lastly, we provide background information and some of the work that has been done at the OCMOH concerning shale gas and potential health issues that may arise if this industry were to develop in New Brunswick.

As usual, we welcome feedback and suggestions for topics to [alex.doroshenko@gnb.ca](mailto:alex.doroshenko@gnb.ca).

## Framework for the Prevention of Unintentional Injuries in New Brunswick

Unintentional injuries are one of the leading causes of disability, hospitalization and avoidable death in Canada and New Brunswick. A recent issue of the *New Brunswick Health Indicators* bulletin focusing on mortality cites unintentional injury as the fourth leading cause of death among males and the seventh leading cause of death among females of all ages in the province, representing some 270 deaths annually [1]. Major categories include transport-related injuries and falls. Unintentional injury is a significant public health issue, with impacts on families, workplaces, communities, the health-care system and society as a whole. Despite a prevailing attitude that such injuries are “accidental” (e.g. a result of chance, human error or random mechanical failure), they mostly result from events that are both predictable and preventable. While injuries can occur at any time across the life span, some groups are more at risk than others.

Reducing the burden of unintentional injury, and in particular mitigating the risk of an injury occurring, is a key component to improving overall health outcomes among New Brunswickers and reducing health inequalities. As reported in the September 2011 issue of *Disease Watch*, the Office of the Chief Medical Officer of Health (OCMOH) is developing strategies for enhanced surveillance and prevention of unintentional injuries in New Brunswick, with a focus on understanding and addressing the leading causes of injury and the impacts on the most vulnerable groups [2].

The OCMOH and the New Brunswick Trauma Program have collaborated and developed a *Framework for the Prevention of Unintentional Injury* [3]. The purpose of the framework is to guide a coordinated approach to the planning, implementation and evaluation of injury prevention policies, programs and services across New Brunswick.

## Goals of the Framework for the Prevention of Unintentional Injury in New Brunswick

- To promote a common vision whereby all New Brunswickers contribute to the reduction of unintentional injuries;
- To build the evidence base on unintentional injury, its root causes and impacts through enhanced surveillance, research and knowledge exchange;
- To promote the development of evidence-informed legislation, policies, programs and standards, with attention to population groups who may be at increased risk of unintentional injury including children, youth, seniors and First Nations;
- To strengthen partnerships among stakeholders from different sectors, thus better leveraging resources and efforts for optimal injury prevention results.

## Public health approaches to injury prevention

Public health policies and strategies to prevent unintentional injuries aim to address the home environment, the community environment (including school, childcare, recreational, workplace and health-care settings), the built environment (design of communities, facilities and roads for physical safety), the natural environment (e.g. quality of air, water, food and soil) and the socioeconomic environment (linking health inequalities to the degree of relative social inequality).

## Data in brief: selected facts on unintentional injury over the life course

1. Unintentional injury is one of the leading causes of disability, hospitalization and death among children. The Public Health Agency of Canada reports that Aboriginal children are at higher risk of unintentional injury and early death than other groups.
2. Unintentional injury is the leading cause of death among youth in New Brunswick, accounting for 42 per cent of deaths among those aged 15-24 in 2009-2010. Alcohol is an important contributing factor to that burden.
3. Among adults of working age (20-64 years), 29 per cent of activity-limiting injuries occur during sport and recreational activities, and 18 per cent while at a paid job or business, according to data from the Canadian Community Health Survey. More men than women are likely to report an injury.
4. Falls are the most common cause of injury-related hospitalizations among seniors in New Brunswick. In Canada and around the world, an estimated one in three persons aged 65 and over is likely to fall at least once each year.

Source: Office of the Chief Medical Officer of Health, drawing on data from multiple sources.

Priorities for injury prevention include focusing on early childhood, when risks of injury begin. For one, the Public Health system addresses primary prevention (prevention of the occurrence of injury) and primordial prevention (risk factor reduction) through both targeted and universal approaches under the Early Childhood Initiatives (ECI) program. One component of the program offers targeted home visiting for eligible first-time mothers during their pregnancy and following birth until the child reaches two years of age. Education and counseling for enhancing parenting abilities on injury prevention are provided and tailored according to the developmental stage of the child (e.g. car seat safety, safe sleep environments, water safety for both indoor and outdoor locations).

Another component of the ECI program under development is a universal screening program for 18-month-olds which will be implemented in 2013. Every child in New Brunswick will have the opportunity to be assessed for healthy growth and development by a public health professional in a clinic setting. Injury prevention is among the topics to be prioritized: the screening process offers a point of departure for discussion and raising awareness among parents and caregivers on safety practices and common hazards.

Most unintentional injuries are not the result of a single factor, but rather the result of the interaction of multiple factors, many of which can be changed. A commonly used paradigm in the injury prevention field was developed by Dr. William Haddon, who approached the need to design appropriate interventions by considering in a systematic manner different factors at the levels of the injured person, the cause of the injury and the environment in which the injury occurred; i.e. the "Haddon matrix" [4]. The new Framework for the Prevention of Unintentional Injury builds on such foundations and the latest evidence to identify opportunities for enhanced injury prevention by addressing a broad set of physical, behavioural, environmental, social and economic factors.

## Practice points for health care practitioners

Primary care practitioners are encouraged to increase their understanding of the risks and consequences of unintentional injuries and the benefits of prevention strategies. This may include reviewing the latest evidence and best practice research in order to support patients with different risks of injury, such as:

- Providing information and education to families and caregivers on child safety;
- Providing anticipatory guidance and counselling to adolescent patients in reducing risk-taking behaviours and injuries, including risk perception and risk management;

- Engaging older patients in healthy active ageing and activities to prevent falls;
- Advocating and getting involved in cross-sectoral partnerships for improving living conditions among disadvantaged groups who are at greater risk for injury caused by hazards in the home and the community.

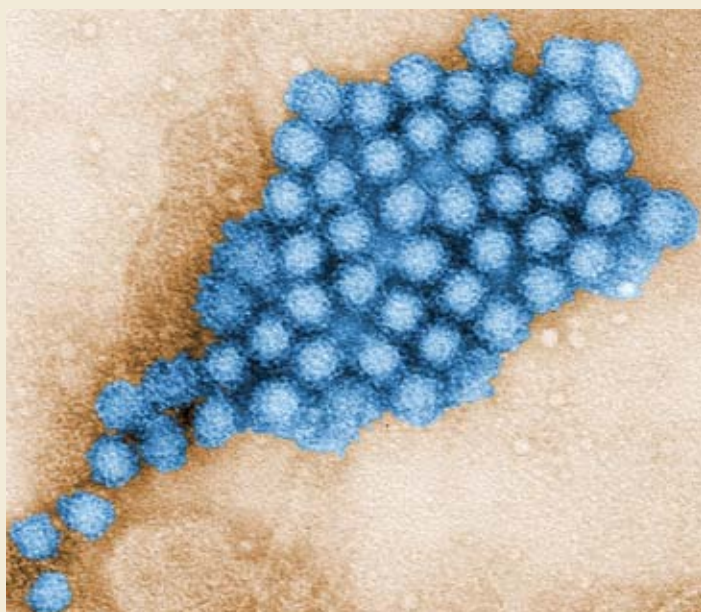
Physicians and other health-care providers interested in working with Public Health colleagues towards provincial injury prevention goals in New Brunswick are encouraged to review the framework available on the Department of Health website at: [http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyPeople/FrameworkPreventionUnintentionalInjury\\_Oct2012.pdf](http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyPeople/FrameworkPreventionUnintentionalInjury_Oct2012.pdf)

More information on the ECI Healthy Toddlers Assessment program will be forthcoming in a future issue of *Disease Watch*.

#### References:

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## Norovirus gastroenteritis: an overview



Source: CDC Public Health Image Library

Noroviruses are one of the main causes of gastroenteritis in New Brunswick and worldwide. While the illness is usually mild and of short duration, it can cause complications in some vulnerable populations and can lead to hospitalizations in children and the elderly.

### Classification

Formerly called Norwalk-like viruses, noroviruses are a group of RNA single-stranded viruses from the family *Caliciviridae*. They are classified into five genogroups, three of which contains viruses that infect humans (GI, GII and GIV), and into 25 genotypes [1]. Despite the great genetic diversity of noroviruses, most infections globally are caused by noroviruses of the genogroup

II genotype 4 (GII.4). Most noroviruses are species specific, although human noroviruses have been found in beef and swine. There are no reported human norovirus infections from an animal strain [2].

### Signs and symptoms

Norovirus infection produces gastroenteritis-like symptoms. The four most common symptoms are watery non-bloody diarrhea, abdominal cramps, nausea and vomiting. Some cases may also experience fever, headaches and myalgia. Acute symptoms last usually between one to three days and recovery follows without any long-term effects. Infection may last longer in young children, elderly patients or immunocompromised people. Complications can occur and include dehydration, electrolyte disturbances and renal insufficiency. Although the disease is usually mild, there have been deaths reported in immunocompromised patients and in the elderly [1].

### Epidemiology and transmission

Noroviruses are extremely infectious and are associated with multiple gastroenteritis outbreaks. The infectious dose is low -- as few as 18 viral particles are sufficient to infect a new host. The incubation period varies between 10 - 51 hours. The main mode of transmission is the fecal-oral route either directly from person to person via contaminated hands or indirectly via contaminated food, water, fomites or a contaminated environment. Infectious vomitus can produce aerosols which can also spread the disease [1]. The most commonly contaminated food is shellfish that has concentrated virus from sewage-contaminated waters. The virus can withstand



temperatures from freezing point to 60°C, and can survive on food items and environmental surfaces for many days. Norovirus outbreaks may occur all year round but tend to reach their peak during the cold months of winter. They often occur in semi-closed living environments that facilitate person to person spread, like hospitals, schools, nursing homes or cruise ships. In a third of the cases, viral shedding happens before the onset of symptoms. It typically peaks one to three days after the onset of symptoms, although it may go on for weeks in some cases. Shedding is often prolonged in infections with a longer symptomatic period, or in asymptomatic infections [2].

## Immunity

Immunity against noroviruses is strain specific; a previous infection will not protect against a strain with a different genetic make-up. The duration of immunity is unknown. Some patients will develop symptomatic illness caused by an infection with a similar norovirus strain two to three years after the first infection [2].

## Laboratory diagnosis

The main diagnostic test for norovirus is a real-time RT-PCR (reverse transcriptase PCR) assay. This test will confirm the norovirus diagnosis and can identify the two most common genogroups (GI and GII). The test is done on a stool sample; at least 0.5 mL or 0.5 g of stool is necessary [3]. RT-PCR can be performed on a frozen specimen. There are some quick test kits (e.g. EIA) available for rapid testing when the real-time RT-PCR equipment is not available. The sensitivity of the rapid test is much lower than the real-time RT-PCR and the negative results normally have to be confirmed later. The National Microbiology Laboratory in Winnipeg can perform genotyping on a stool specimen if needed for epidemiological reasons. But that information is not required for diagnostic purposes [4].

## Treatment and prevention

Typical norovirus cases are mild and the patient recovers after a few days. Usually, treatment is not required, although supportive care (oral rehydration, antiemetics, analgesics) may be warranted. For patients with severe dehydration, intravenous fluid replacement may be necessary [1-2]. Currently, there is no vaccine available; although, there are several vaccine candidates under development [5].

## Public Health management

Standard precautionary measures for enteric pathogens apply for norovirus. These include frequent and proper hand hygiene, environmental

decontamination and avoidance of potentially contaminated food and water. Disinfectants used for environmental cleaning should be appropriate to neutralize norovirus (e.g. high concentration domestic bleach). Good standards of food hygiene is recommended such as thorough cooking of meats and seafood including shellfish before consumption, washing/peeling of fruits before eating raw, ill food handlers or others at risk for further transmission of norovirus infection (e.g. children under five years of age, health care workers with direct contact with high risk patients, and those who may not be able to maintain good standards of personal hygiene) can be excluded from working for 48 hours after the end of the symptoms.

## Public Health Practice Points

- Individual cases of norovirus are not formally notifiable in New Brunswick; however, under *Public Health Act* in New Brunswick, suspected foodborne or waterborne outbreaks should be reported to Regional Medical Officers of Health verbally within one hour of becoming aware; and in writing by the end of the next working day;
- Counsel patients about enteric precautions for cases and contacts with attention to environmental contamination related to vomitus;
- Emphasize good food handling and cooking practices as well as avoidance of contaminated water;
- Promote good standards of infection control in your practice, in hospitals and long-term care homes, including sufficient and efficient cleaning and disinfection arrangements;
- Advise your Regional Medical Officer of Health if norovirus infection is diagnosed in a patient who is a food handler, child under five years of age, health care worker with direct contacts with high risk patients or others who cannot maintain personal hygiene and thereby may contaminate their surroundings.

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# Update on Radon

Health Canada recently completed the analysis of the data from the first year of the Cross-Canada Survey of Radon Concentrations in Homes. This is a two-year project to gather long-term (three-month or longer) indoor radon measurement results from across Canada. Approximately 9,000 homes were tested in all provinces and territories [1].

The results demonstrate that radon levels vary widely across the country. However, New Brunswick was found to be the second highest province for the number of houses above the national standard of 200 Bq/m<sup>3</sup> which should be considered hazardous. Nearly 22 per cent of the tested homes in New Brunswick were above the Health Canada standard that was adopted in 2007 [2]. These results are a reminder of the importance for New Brunswick home owners to test for radon.

Radon is a colorless, odorless, radioactive gas that occurs in the environment. It results from the natural breakdown of uranium in soils and rocks. When radon is released from the ground into the outdoor air, it is diluted and is not a concern. However, radon can accumulate in enclosed spaces such as homes to levels that are considered to be a health hazard. Exposure to elevated levels of radon has been mostly associated with an increased risk of lung cancer, depending on the concentration of radon, the duration of exposure, and a person's smoking habits. According to Health Canada statistics, radon exposure is the second leading cause of lung cancer after smoking [3]. Exposure to radon and tobacco use together can significantly increase the risk of lung cancer. For example, a lifelong smoker has a risk of contracting lung cancer of one in eight. If you add exposure to a high level of radon, the risk becomes one in three. The risk of lung cancer for a non-smoker exposed to the same high radon level is one in twenty.

There are no conclusive data on whether children are at greater risk than adults from radon [2].

Radon enters a building because the air pressure inside a building is generally lower than in the soil surrounding the foundation. It finds its way in through dirt floors, cracks in foundation walls and floors, sump pumps, gaps around pipes and basement drains. The only way to detect radon is through testing. Radon testing is relatively simple and inexpensive. Radon test devices can be purchased through the New Brunswick Lung Association ([www.nb.lung.ca](http://www.nb.lung.ca)) or a variety of laboratories and some home improvement retailers. They are also available over the internet.

Health Canada recommends testing your home during the heating months between October and April.

The Canadian guideline for radon in indoor air and the Office of the Chief Medical Officer of Health in NB recommends that:

- Remedial measures should be undertaken in a dwelling whenever the average annual radon concentration exceeds 200 Bq/m<sup>3</sup>.
- The higher the radon level, the faster should corrective actions be undertaken.
- When action is taken, the radon level should be reduced as much as possible using cost-effective methods.

A homeowner can reduce his/her risk from radon exposure by taking the following steps:

- Quit smoking.
- Take corrective measures to reduce radon if levels are above 200 Bq/m<sup>3</sup>.

Indoor radon levels can effectively be reduced by various methods (from the least to the most effective method):

- Increasing the mechanical ventilation, via a heat recovery ventilator, to allow an exchange of air;
- Sealing all cracks and openings in foundation walls and floors, and around pipes and drains;
- Ventilating the basement sub-flooring by installing a small pump to draw the radon from *below the concrete slab to the outside*. Known as *Active Soil Depressurisation*, it has been shown to be the most effective method. This method is typically performed by a contractor. Professional contractors recognized by Health Canada can be hired for both testing and mitigation.

## Health Care Practitioners' points

- Counsel patients about the risk of radon.
- Counsel patients about smoking cessation and refer them to appropriate services, if needed.
- Encourage patients to test their residence for radon and refer them for information about testing and remedial actions if needed.

For more information, visit the GNB website [www.gnb.ca/health](http://www.gnb.ca/health) or the Health Canada Web site [www.healthcanada.gc.ca](http://www.healthcanada.gc.ca).

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# Shale Gas and the Health of New Brunswickers

Media reports in the last couple of years have been filled with stories about possible development of a shale gas industry in New Brunswick, and many in the public are worried about this issue. Some people may wish to discuss their concerns with their physician, so this article will provide some background information about shale gas itself and some of the work that the Office of the Chief Medical Officer of Health (OCMOH) has been doing recently concerning shale gas and potential health issues that may arise if this industry were to develop in New Brunswick.

Shale gas, or “unconventional gas”, is really the same product as ordinary natural gas: both are mostly methane mixed with smaller amounts of a few other hydrocarbons such as ethane and propane that are also gases at ordinary temperatures. However, shale gas is obtained in a very different way than conventional natural gas.

All natural gas is formed deep underground over millions of years through the action of heat and pressure on ancient organic materials trapped in rocks such as shale. Once formed, the gas can move very slowly out of the rock layer where it was formed (called “source rock”) and accumulate in other rock types (called “reservoir rock”) such as sandstone under certain conditions. This gas can be extracted by drilling into these pockets of gas within the rock: this is how conventional natural gas is produced.

However, such conventional reservoirs of natural gas are relatively few in number and large finds of gas are rare. In contrast, shale gas technology can be used to obtain natural gas from almost anywhere that shale exists, as it does not depend on finding pre-existing reservoirs of gas. This is because the gas is obtained directly from the shale rock layer where it was formed (the source rock). However, the gas is tightly bound inside the shale, so the shale rock layers deep underground must be broken up, or fractured, in order for the gas to flow out.

The most common way to accomplish this is by drilling vertically to just above the target rock layer (usually a couple of kilometres below ground) and gradually turning the drill bit sideways to drill horizontally along and through a shale rock layer for a distance of a kilometre or more. Release of the trapped gas is then stimulated all along this horizontal wellbore by hydraulic fracturing (also known as “hydraulic stimulation”, “hydrofracking” or simply “fracking”). In this process, water mixed with chemicals and a finely divided solid material such as sand is pumped down

into the gas well under high pressure in order to create tiny fractures in the rock. These fractures are kept open by the sand particles to allow the gas trapped in the rock to flow out and up the well bore to the surface.

Some of the chemicals that can be present in hydraulic fracturing fluids and waste water from gas well operations can pose risks to the environment or to health if there are releases or exposures to them. This has been the main focus of the high level of public concern about shale gas, but there are many other potential health impacts that could possibly arise if the industry were to develop to a large extent in New Brunswick.

OCMOH has been investigating these possible impacts to health and has prepared a document which overviews the risks along with recommendations to Government about steps that would need to be taken to prevent or mitigate impacts. Some of the issues that are addressed by the Chief Medical Officer of Health’s (CMOH’s) recommendations include impacts to the physical environment, impacts to the social environment, and planning for protection of future generations.

Potential impacts to the physical environment include more than just the risk of releases of the chemicals present in hydraulic fracturing fluids. 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 a significant environmental and health issue. There are also potential risks to health due to air quality, noise, vibration, continuous illumination and physical hazards due to extensive heavy truck traffic. However, the state of the science regarding possible health effects due to exposure to chemical or physical hazards from shale gas production processes is not very far advanced, and this knowledge gap contributes to the controversy. There are several published references to air quality or water quality impacts, so proper risk management is required, but to date the literature on any directly observable health effects is sparse, which makes health status monitoring difficult.

In addition to the potential hazards to health via the physical environment, OCMOH has identified a number of issues related to possible changes in the social environment. Some of these can potentially have positive impacts to health in this province, such as increased economic activity leading to improved socioeconomic status of individuals and communities, which in principle can lead to better health status. However, there are many other risks for potential negative impacts to the social determinants of health including the “Boomtown Effect”, in which a rapid

change in population, industrialization and economic prosperity may also lead to a host of social ills that negatively 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. In addition, there can be other impacts specific to vulnerable and disadvantaged populations.

In order to minimize the risks of negative impacts on health and so increase the possibility that the potential benefits may outweigh them, the CMOH is recommending Government take targeted and strategic actions aimed at prevention and mitigation, as well as building capacity in local and provincial services and infrastructure. Accordingly, the CMOH's recommendations are intended to help guide Government decision-making on these issues.

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, as the document is not intended to be a complete Health Impact Assessment. However, it will help to start a conversation on potential health impacts from shale gas development and what can be done about them.

The document has been released and is available at the GNB Health website: [http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyEnvironments/Recommendations\\_ShaleGasDevelopment.pdf](http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyEnvironments/Recommendations_ShaleGasDevelopment.pdf)

