

New Brunswick Disease Watch Bulletin

Enhancements to the NB Immunization Program

HPV School-based Vaccination Program to include boys and a 9-valent vaccine

- Beginning in September 2017, New Brunswick will offer the HPV vaccine to boys as well as girls. Currently, the HPV vaccine is offered free to girls in Grade 7. Under the expanded program, the province will offer the vaccine to all Grade 7 students.
- A 9-valent HPV vaccine (Gardasil®9), which provides protection against additional HPV types, will replace the 4-valent vaccine in the school-based immunization clinics. Public Health will administer two doses at least six months apart to Grade 7 students.
- Public Health will vaccinate the eligible cohorts of females born in 1995 or later and males born in 2005 or later. Males born before 2005 may present to their physician if a vaccination is desired as there will be no catch-up program.
- By expanding New Brunswick's routine, school-based HPV immunization program to include boys, the province will protect more youth from HPV-related cancers at an age when the vaccine can be most effective.

Office of the Chief Medical Officer of Health

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We welcome feedback and suggestions for topics. Please submit them to our editor Dr. Cristin Muecke, Medical Officer of Health - Provincial Programs at dr.cristin.muecke@gnb.ca.

Electronic copies of the bulletin can also be found on the Department of Health website under publications at: <http://www2/content/gnb/en/departments/ocmoh/publications.html>

Routine schedule to include Rotavirus vaccine for infants

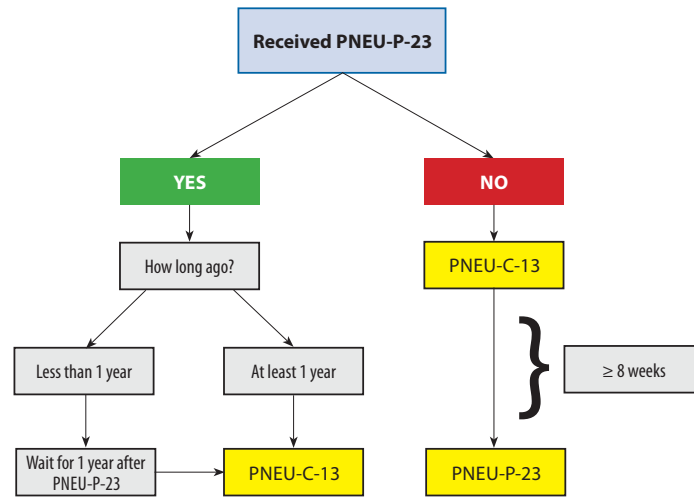
- The best protection against Rotavirus is immunization.
- Beginning in June 2017, New Brunswick will offer Rotarix® for infants born in 2017 and later. Eligible infants must receive the immunization within the recommended age requirements. The first dose must be administered before 15 weeks of age. The series must be completed by eight months of age.
- The recommended schedule is a two-dose series given at two and four months of age.
- The vaccine is administered orally.
- The Rotavirus vaccine can be given with other routine vaccines. Primary health-care clinicians will be able to order the vaccine for their patients through the routine vaccine order process.
- If a child deviates from the schedule, there are specific age limits and intervals for administration (refer to table below).

Rotavirus (RV)					
Series dose	Recommended age for this dose	Minimum age for this dose	Recommended interval to next dose	Minimum interval to next dose	Maximum age for this dose
RV-1	2 months	6 weeks (6 weeks and 0 days)	2 months	4 weeks	15 weeks (14 weeks and 6 days)
RV-2	4 months	10 weeks	-----	-----	8 months (8 months and 0 days)



Pneumococcal vaccination guide for health-care professionals

Administration of both 23-valent pneumococcal polysaccharide vaccine (Pneu-P-23) and 13-valent pneumococcal conjugate vaccine (Pneu-C-13)



Source: National Advisory Committee on Immunization - Update on the use of 13-valent pneumococcal conjugate vaccine (PNEU-C-13) in addition to 23-valent pneumococcal polysaccharide vaccine (PNEU-P-23). [2]

Adults (19 years and older) with medical conditions listed in Table 2 of the New Brunswick Immunization Guide and eligible for both Pneu-P-23 and Pneu-C-13[1]:

- Adults with eligible medical conditions who have never received a pneumococcal vaccine should receive one dose of Pneu-C-13 first, followed by one dose of Pneu-P-23 at least eight weeks later. Adults with eligible medical conditions and previously vaccinated with pneumococcal polysaccharide vaccine (Pneu-P-23) should be given a dose of Pneu-C-13 at least one year after the last dose of Pneu-P-23.
- Hematopoietic stem cell transplant recipients (HSCT) are eligible to receive 3 doses of Pneu-C-13 as per recommendations of specialist.

Infants and children with medical conditions listed in Table 2 of the New Brunswick Immunization Guide and eligible for both Pneu-P-23 and Pneu-C-13[1]:

- Infants with eligible medical conditions should receive a 4-dose schedule of Pneu-C-13, if age of presentation for immunization is between 2-6 months (children less than 24 months of age are not eligible for Pneu-P-23).
- Children (24 months of age and older) and adolescents with eligible medical conditions who have never received a pneumococcal vaccine should receive one dose of Pneu-C-13 first, followed by one dose of Pneu-P-23 eight weeks later. Children up to 18 years of age with asthma should receive Pneu-C-13. [1]

Note: Revaccination with PNEU-P-23 after five years is a one-time event for specific medical conditions listed in Table 2 (i.e., splenic disorders, chronic renal or hepatic disease, immune-compromising conditions). For those who require an additional dose of Pneu-P-23, it should be given at least eight weeks after Pneu-C-13 and at least five years after the most recent dose of Pneu-P-23.

References

1. Office of the Chief Medical Officer of Health. Standard 3.3 – Eligibility Criteria for Publicly Funded Vaccines/Biologics. New Brunswick Immunization Program Guide. Accessed on March 6, 2017 and available from: <http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/HealthProfessionals/NBIPG-standard3-3-e.pdf>.
2. Public Health Agency of Canada. An Advisory Committee Statement (ACS) National Advisory Committee on Immunization (NACI). Update on the use of 13-valent pneumococcal conjugate vaccine (PNEU-C-13) in addition to 23-valent pneumococcal polysaccharide vaccine (PNEU-P-23) in immunocompetent adults 65 years of age and older – Interim Recommendation, 2016 October. [27 pages]. Accessed on March 6, 2017 and available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/healthy-living/update-use-of-13-valent-pneumococcal-conjugate-vaccine-pneu-c-13-in-addition-to-23-valent-pneumococcal-polysaccharide-vaccine-pneu-p-23-immunocompetent-adults-65-years-and-older-interim-recommendation/update-pneu-c-13-and-pneu-p-23-mise-a-jour-2016-eng.pdf>



**Table 2 of the New Brunswick Immunization Guide:
Vaccine Eligibility Criteria for High Risk Individuals (In Addition to Routine Immunization Schedule)**

Condition	Vaccine											
	DTaP-IPV-Hib	Pneu-P-23		Pneu-C-13 ¹¹		Men-C-ACYW-135	Hib	HB	HA	Men B	MMR	Var
		Adult	Children ≥ 2 years	Adult	Children							
Immune-Suppressing Conditions												
Cancers		X ⁴	X ⁴	X ⁴	X ⁴		X ⁵					X ^{3,5}
Congenital Immunodeficiency		X ⁴	X ⁴	X ⁴	X ⁴	X ¹	X	X ¹²		X	X ³	X ³
Hematopoietic Stem Cell Transplant ⁸	X	X ⁴	X ⁴	X ⁴	X ⁴	X ¹	X	X ¹²		X	X ³	X ³
HIV		X ⁴	X ⁴	X ⁴	X ⁴	X ¹	X	X ¹²		X	X ³	X ³
Immunosuppressive Therapy		X ⁴	X ⁴	X ⁴	X ⁴	X ^{1,6}				X ⁶	X ^{3,9}	X ^{3,9}
Solid Organ Transplant		X ⁴	X ⁴	X ⁴	X ⁴	X ¹	X ²	X ¹²		X	X ^{3,9}	X ^{3,9}
Splenic disorders (including Sickle Cell Disease or other Hemoglobinopathies)		X ⁴	X ⁴	X ⁴	X ⁴	X ¹	X	X ⁷	X ⁷	X	X	X
Medical Conditions												
Chronic Cerebrospinal Fluid Leak		X	X ⁴		X ⁴							
Chronic Liver Disease (including hepatitis C, chronic hepatitis B, and other diseases)		X	X ⁴		X ⁴			X	X			
Chronic Lung Disease (including asthma for up to 18 years of age)		X	X ⁴		X ⁴							
Chronic Neurological Conditions ¹⁰		X	X ⁴		X ⁴							
Chronic Renal Disease and Dialysis		X	X ⁴		X ⁴			X ¹²				X
Cochlear Implant		X	X ⁴		X ⁴		X					
Diabetes and other Metabolic Diseases		X	X ⁴		X ⁴							
Heart Disease and Stroke		X	X ⁴		X ⁴							
Hemophilia, Bleeding Disorders (multiple blood or plasma/component transfusions)								X	X			
Cystic Fibrosis		X	X ⁴		X ⁴							X
Chronic salicylic acid therapy												X ³
Other												
Age 65 years or older			X									
Homelessness			X									
Illicit drug use			X					X	X			
Alcoholism			X									
MSM - men having sex with men								X	X			
Newly admitted to institutions for developmentally challenged								X				
Residents of long-term care facilities			X									

Footnotes:

1. Quadrivalent conjugate meningococcal vaccines can be used for individuals 24 months of age and older. Menveo is recommended for children age 2 months to 23 months in high risk groups.
2. Lung transplants only.
3. Varicella and MMR may be given only when client is immunocompetent and as determined by their health care provider (if pre-requisite conditions allow).
4. Where both Pneu-C-13 and Pneu-P-23 vaccines are indicated, give one dose of Pneu-C-13 first, followed by one dose of Pneu-P-23 at least eight weeks later. Pneu-C-13 vaccine should be administered at least 1 year after any previous dose of Pneu-P-23.
5. Malignant hematologic disorders only e.g. leukemia, lymphomas.
6. Only persons with acquired complement deficiency due to receipt of the terminal complement inhibitor eculizumab (Soliris).
7. Recommend for conditions requiring repeated transfusions (e.g. sickle cell disease).
8. Hematopoietic Stem Cell Transplant (HSCT) recipients should be viewed as “never immunized” and require complete re-immunization post transplantation. Pediacel is recommended for adults and children (expert opinion).
9. MMR and Varicella vaccine should be given at least 4 weeks before solid organ transplantation or initiation of immunosuppressive therapy.
10. Chronic neurological conditions that may impair clearance of oral secretions.
11. 4-dose schedule for Prevnar is recommended for children at high risk of Invasive Pneumococcal Disease (IPD).
12. Immunization with a higher dose of monovalent hepatitis B vaccine is recommended e.g. Recombivax Dialysis.

Reference:

Office of the Chief Medical Officer of Health. Standard 3.3 – Eligibility Criteria for Publicly Funded Vaccines/Biologics. New Brunswick Immunization Program Guide. Accessed on March 6, 2017 and available from: <http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/HealthProfessionals/NBIPG-standard3-3-e.pdf>.



Laboratory testing for viral gastroenteritis

The number of viral gastroenteritis outbreaks were elevated in New Brunswick at the beginning of the year, partly due to outbreaks in institutional settings, such as long-term care facilities and hospitals.

Although this is part of a seasonal pattern in which outbreaks are more common during winter, viral gastroenteritis can occur throughout the year and can affect all age groups.

These infections can be caused by many types of viruses. However, the symptoms and treatment recommendations are similar between viruses. People exposed to an enteric virus usually develop symptoms of illness within 24 to 48 hours; symptoms can occur as soon as 12 hours after exposure. People infected with a norovirus can spread the virus to others from the moment they start feeling ill to at least three days after they have recovered. Some people may be communicable for as long as two weeks after recovery.

Diagnosis of viral gastroenteritis can be confirmed by laboratory testing on a collected stool sample. However, in many situations, a laboratory test may not be clinically necessary for illness management. The result may not be available until after symptom resolution. **On the other hand in institutional outbreak settings or among vulnerable populations, Public Health encourages laboratory confirmation as an infection control measure.**

Since Jan. 9, 2017, the microbiology laboratory at the Dr. Georges-L-Dumont University Health Centre has implemented a real-time PCR test panel for multiple enteric viruses that cause gastroenteritis. This panel has been validated for detection and identification of the following viruses: norovirus G1, norovirus G2, rotavirus, adenovirus, astrovirus and sapovirus. In addition to replacing previous tests for noroviruses, rotaviruses and adenoviruses, it provides reliable identification for astroviruses and sapoviruses. Reliable diagnostic tests were not previously readily available for these viruses.

Although individual cases of viral gastroenteritis are not notifiable in New Brunswick, enteric laboratory test results are important to Public Health. The information can help Public Health reduce the spread of the disease and give data about circulating viruses. Laboratory confirmation provides evidence to help Public Health in the investigation and follow-up of institutional outbreaks.

Contact your regional laboratory if you have questions about the collection or shipment of stool samples for viral gastroenteritis tests.

New procedure for requesting publicly funded vaccines for high-risk individuals

The procedure for accessing publicly funded vaccines for high-risk individuals has been revised. Public Health approval for release of vaccines for these specific medical conditions or life circumstances is no longer required.

Central Serum Depot will release vaccines for individuals with high risk conditions according to physician recommendation and if the patient meets eligibility criteria for conditions listed in the New Brunswick Immunization Program Guide, *Table 2: Vaccine Eligibility for High Risk Individuals*. www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/HealthProfessionals/NBIPG-standard3-3-e.pdf

Procedure for health-care providers:

1. Complete the Publicly Funded Vaccines / Biologics Order Form for Physicians, Nurse Practitioners and Institutions. Specify the requested products and the indications for their use (medical condition): www2.gnb.ca/content/gnb/en/departments/ocmoh/for_healthprofessionals/cdc/NBImmunizationGuide/forms.html
2. Send the vaccine order form directly to Central Serum Depot by fax at 506-648-6477 or email Serum.depot@gnb.ca
3. Pick-up vaccines at the local sub-depot. Information about vaccine sub-depot locations can be found at: www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/HealthProfessionals/NBIPG-appendice4-5-e.pdf

Please ensure that vaccines are administered to the appropriate cohorts. Reserving vaccines for appropriate candidates helps maintain an adequate vaccine supply for at-risk populations. Regional Public Health remains a resource to clinicians for questions on publicly funded vaccines.



The Canadian Task Force on Preventative Health Care recently released recommendations on hepatitis C screening for adults

The Key Points:

- A systematic review found no evidence on the effectiveness of screening for HCV in the asymptomatic adult population.
- The task force recommends against screening for HCV in asymptomatic Canadian adults (including baby boomers) who are not at elevated risk of HCV infection.
- A strong recommendation against screening is warranted given its uncertain benefits but the certainty that it would lead to high levels of resource consumption. Referring individuals with screen-detected HCV for assessment would reduce access to assessment and treatment for people with clinically evident HCV.
- Other guidelines recommend testing individuals at elevated risk of HCV, including immigrants from HCV-endemic countries, individuals with current or past history of injection drug use, incarcerated individuals, and those who received blood or blood products prior to 1992, among others.

The full document can be found at: <http://www.cmaj.ca/content/189/16/E594>

The emergency physician and rabies prevention and control in New Brunswick

The prevention and control of rabies require collaboration between the Department of Health and other provincial government departments, including Energy and Resource Development as well as Agriculture, Aquaculture and Fisheries; regional health authorities; non-governmental organizations such as the New Brunswick Society for the Prevention of Cruelty to Animals; and partners such as the New Brunswick Veterinary Medical Association and the New Brunswick Medical Society.

The role of the emergency room physician is to conduct a medical rabies risk assessment on patients who present with an exposure to a suspect rabid animal. The physician also determines whether management of the exposure requires rabies post-exposure

prophylaxis (PEP). Situations where the rabies risk assessment leads to a recommendation for the administration of PEP must be reported to a regional Public Health office. Depending on the exposure circumstances, and the animal's condition and availability, administration of PEP can occur in one of two modes. PEP can be initiated immediately in the emergency room with rabies immunoglobulin and a first dose of vaccine; the regional Public Health office then completes administration of the vaccine series. Alternatively, PEP administration can be deferred pending a Public Health risk assessment and 10-day observation period for accessible domestic dogs or cats.



Emergency rooms must report a situation where a physician has recommended the administration or deferral of PEP. If PEP has been initiated or the physician has selected PEP deferred/pending, the emergency room must telephone the regional Public Health office and fax the completed *Hospital Report of Human Exposure to a Suspected Rabid Animal* form. Outside of regular business hours, emergency rooms must contact their regional Public Health office on-call staff and fax the completed exposure form. Submission of the completed form to the regional Public Health office is essential as it provides critical information for the regional Public Health office to begin its investigation and human health risk assessment.

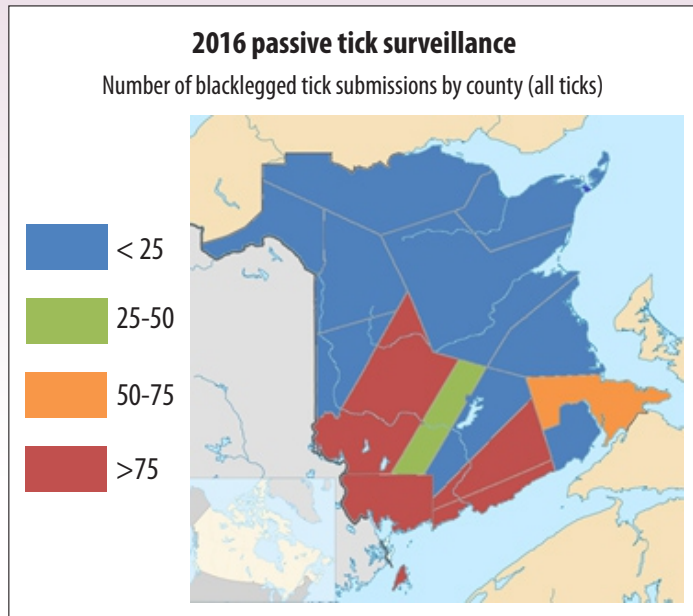
Treating physicians may also request consultation with the regional Public Health office and a Regional Medical Officer of Health. For more information, refer to the NB 2013 Physician Rabies *Risk Assessment Guidelines* at: <http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/HealthProfessionals/RabiesPEPFlowchartPhysicianJune2013E.pdf> and to current *Canadian Immunization Guidelines* at: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines.html?page=18>.



Lyme Disease Risk Areas

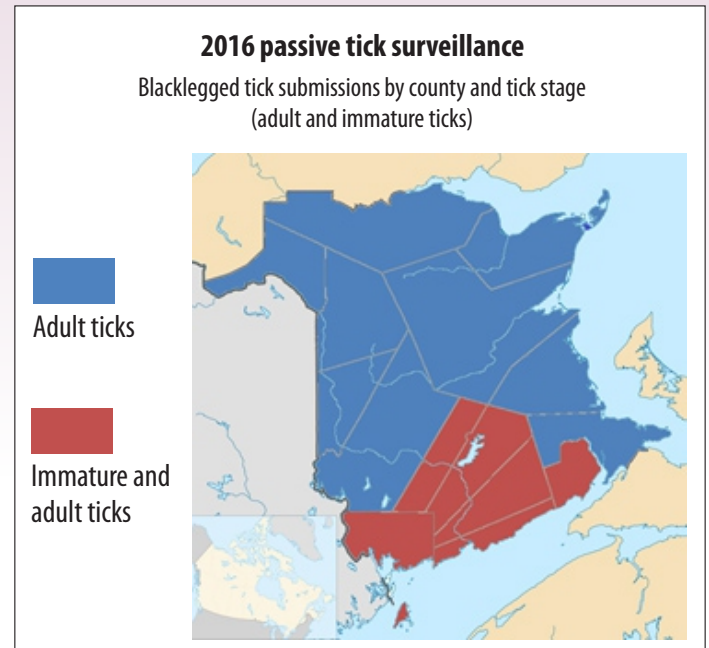
Although it is possible to be bitten by an infected tick anywhere in New Brunswick, the risk is highest in areas where tick populations are established or appear to be established.

Figure 1: Risk areas of established or emerging blacklegged tick populations in New Brunswick



Risk areas are locations where blacklegged tick populations are established or emerging. Based on provincial tick surveillance and reports of human disease, identified risk areas include:

- Grand Manan;
- Grand Bay/Westfield, Saint John, Rothesay and Quispamsis;
- St. Stephen, Saint Andrews and St. George.



For more information:

- Department of Health (Office of the Chief Medical Officer of Health – Public Health) – Lyme Disease: www2.gnb.ca/content/gnb/en/departments/ocmoh/cdc/content/vectorborne_andzoonotic/lyme.html

Pediatric Oral Health

More than one half of Canadian children and youth have at least one dental carie affecting their primary or permanent teeth. [1] Early childhood caries (ECC) is defined as one or more decayed, missing or filled tooth surfaces in any primary tooth in a preschool-age child (younger than 71 months of age). The United States Center for Disease Control reports that ECC is the most common chronic childhood disease. [2] Dental surgery for ECC is the most common day surgery procedure at most Canadian pediatric hospitals. [3] Potential consequences of ECC include acute and chronic pain; eating, sleeping and growth disturbances; tooth loss and misalignment; increased dental care costs throughout life; and compromised general health. Children and youth from lower-income households are disproportionately affected by ECC. [1]

Healthy Smiles, Clear Vision



Health professionals should encourage all parents to take their babies for their first dental check-up by their first birthday and to take their children to see a dental health professional regularly. For families unable to afford a dentist, health-care professionals should provide parents with information about the Healthy Smiles, Clear Vision program. **Healthy Smiles, Clear Vision is New Brunswick’s dental and vision plan for children of low-income families.** The dental component of the program covers basic services such as regular exams, X-rays and extractions, and preventative treatments such as sealants and fluoride treatments.



To apply, families can download the application form at www.gnb.ca/socialdevelopment. Families can get paper copies from Service New Brunswick centres and regional offices of the Department of Social Development.

References:

1. Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009. Ottawa: Health Canada; 2010.
2. U.S. Department of Health and Human Services. Oral Health in America: A report of the Surgeon General. Rockville (MD): National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000: <https://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/sgr/welcome.htm>
3. Canadian Dental Association Board of Directors. Position Statement: Early Childhood Caries. s.l.: Canadian Dental Association; 2010.

Extreme Heat Events: Recognizing the Signs and Symptoms of Heat-Related Illness

Climate change is contributing to the increased frequency and severity of heat waves. The number of days with a maximum temperature exceeding 30°C is projected to double by 2021–2040 and more than triple by 2081–2100 for most cities in Canada. [1] New Brunswick's Office of the Chief Medical Officer of Health has a Heat Alert and Response System (HARS) to reduce risks of heat-related morbidity and mortality and direct the community response to these events. [1]

Physicians and other caregivers should be familiar with heat vulnerabilities and early signs of harmful effects on health to assist patients.[2] Often, the symptoms of heat morbidity are non-specific. **When the province issues heat alerts, caregivers should have a high degree of clinical suspicion for heat related illness, especially in those with risk factors.**

Risk factors

Table 1 summarizes risk factors for heat-related health problems. A person with a chronic disease, who is socially isolated and/or takes several medications has a higher risk of developing a heat-related illness. Persons with two of these conditions are at further risk; those with all three are at highest risk. [3]

Some medications increase risks to health in extreme heat events (see <http://www2.gnb.ca/content/gnb/>

[en/departments/ocmoh/healthy_environments/content/heat_related_illnesses/medications_and_theheat.html](http://www2.gnb.ca/content/gnb/en/departments/ocmoh/healthy_environments/content/heat_related_illnesses/medications_and_theheat.html)). These medications can interfere with natural thermoregulatory mechanisms and/or alter perceptions of heat. [3]

Effects of heat on health

A heat wave can have direct and indirect health effects. Indirect effects are more frequent [3]:

- **Direct health effects:** edema, cramps, fainting, dehydration, exhaustion and heat stroke
- **Indirect health effects:** exacerbation of underlying illness

These can increase physician consultations, hospitalizations, and deaths. For example, the extreme heat event that occurred in Montreal in July 2010 caused 106 deaths. [2] Two thirds of these deaths involved persons with underlying medical conditions, such as cardiovascular disease. One third involved persons with mental health conditions (psychotic disorders, alcoholism). [2]

Signs and symptoms

In addition to signs of dehydration, symptoms that could indicate a heat-related pathology are listed in Table 2. Table 2 compares the main symptoms of heat-related health problems of greatest concern: heat cramps, heat exhaustion and heat stroke. **It is important to take the temperature of patients if their health deteriorates quickly;** a high temperature can indicate the onset of heat stroke.

Health worker's role

Healthcare professionals can identify people at risk among their clientele, by considering their medications, access to personal support and amenities (e.g. whether or not they have air conditioning), and their environment (e.g. proximity to a shopping centre or park).

Caregivers can disseminate prevention information. **The two key prevention messages are spend at least two hours per day in a place with air conditioning or cool air and drink lots of water before you feel thirsty.** [6] The quantity of fluids to ingest depends on a person's health status.

Recommend prevention measures that apply to patients taking a medication. There are detailed recommendations in Reference 5. Exertional heat stroke and classic heat stroke are medical emergencies that require hospitalization. [4] During



extreme heat events, heat strokes must be part of the differential diagnosis of all individuals who come to emergency rooms with a fever. The care must be adapted to the person's signs and symptoms, as shown in the algorithm in Figure 1.

For additional information, please consult the following websites and documents:

1. New Brunswick Disease Watch Bulletin 7/12. Extreme Heat Events and Heat-Related Illnesses and Death. http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/Publications/NB-Disease-Watch-Bulletin_Volume13-e.pdf
2. Canicule 2010 à Montréal. Rapport du directeur de santé publique. Lucie-Andrée Roy and collaborators, 2011, 48 pages https://publications.santemontreal.qc.ca/uploads/tx_assmpublications/978-2-89673-036-0.pdf
3. Extreme Heat Events Guidelines: Technical Guide for Health Care Workers. Health Canada, consulted on March 30, 2017 <http://www.hc-sc.gc.ca/ewh-semt/pubs/climat/workers-guide-travailleurs/index-eng.php>
4. Acute Care During Extreme Heat: Recommendations and Information for Health Care Workers. <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/climate-change-health/extreme-heat-events-guidelines-technical-guide-health-care-workers.html>
5. Médicaments du système nerveux central et canicule : Rapport et recommandations (Central nervous system medications and extreme heat events: report and recommendations) https://www.inspq.qc.ca/pdf/publications/1199_Med-SystemeNerveuxCanicules.pdf
6. Campagne «Il fait très chaud!» pour les personnes ayant des problèmes de santé mentale http://www.dsp.santemontreal.qc.ca/fileadmin/documents/dossiers_thematiques/Environnement/Chaleur_accablante/Fiche_accompagnatrice_de_l_outil_forme_generale_25_06_2014.pdf

Table 1: Key Risk Factors Associated with Heat-related Illnesses and Death [4]

Older adults (particularly >75 years)

Living conditions (bed-ridden, living alone, low income, malnutrition)

Persons with chronic illness, especially:

- **Cardiovascular disease** (hypertension, coronary artery disease, coronary circulation disorders)
- **Mental and behavioural conditions** (due to substance abuse, alcoholism)
- **Mental illness** (dementia, depression, schizophrenia, Alzheimer's disease)
- **Neurological disease** (Parkinson's disease)
- **Respiratory disease** (chronic obstructive pulmonary disease [COPD])
- **Kidney disease** (renal failure)
- **Metabolic conditions** (diabetes, obesity)



Figure 1: For Caregivers: Algorithm of Signs and Symptoms During Periods of Severe or Extreme Heat [6]

Note that this tool should be used as a complement to, but not as a substitute for, the caregiver's judgment. This is not a complete list and other symptoms may be present. In addition, the care may vary, depending on the degree of severity of the factors applicable to the person.

Fever $\geq 40^{\circ}\text{C}$ Confusion Delirium, hallucinations Difficulty breathing Arrhythmia Reddish dry skin	YES →	Medical emergency Hospitalization
↓ NO		
Fever $< 40^{\circ}\text{C}$ Dizziness Extreme fatigue Rapid breathing at rest Low blood pressure Increased heart rate Reddish skin, sweating Nausea, vomiting	YES →	Emergency requiring immediate preventive measures Take immediate cooling measures
↓ NO		
Heat-related discomfort Reddish skin, sweating	YES →	Take preventive measures
↓ NO		
Suggested measures to prevent heat health effects: <ul style="list-style-type: none"> • Go to a place with cool air or air conditioning • Drink water before you feel thirsty • Take several showers every day to cool off • Avoid physical effort • Keep friends and family informed 		



Table 2: Comparison of the main symptoms of heat cramps, heat exhaustion, and heat stroke (Adapted from Health Canada document)[4]

Terms in bold are key diagnostic factors

	Heat cramps	Heat exhaustion	Heat stroke
Skin	Sweaty	Greyish and sweaty	Red, hot, dry
Body temperature	No fever	Armpit: - 36.0 to <39.5°C - 96.8 to <103.1°F Oral: - 36.5 to <40.0°C - 97.7 to <104°F Rectal: - 35.5 to <37.0°C - 98.6 to <105°F	Armpit : - ≥39.5°C - ≥103.1°F Oral: - ≥40.0°C - ≥104°F Rectal: - ≥40.5°C - ≥105°F
Symptoms			
Neurological		<ul style="list-style-type: none"> • Anxiety and confusion • Dizziness and light-headedness • Headaches 	Mental status changes: <ul style="list-style-type: none"> • Delirium and hallucinations • Ataxia (lack of coordination indicating neurological dysfunction) • Confusion, irritability, emotional instability, aggressiveness, seizures • Loss of consciousness
Cardiac		Tachycardia	-Cardiac arrhythmias and tachycardia
Skin		Cutaneous flushing (hot, red skin) Sweating present	Classic heat stroke: hot, dry skin; typically affects sedentary vulnerable people Exertional heat stroke: profuse sweating typically associated with intense physical activity
Other	Strong spasms and muscle pain	Nausea, vomiting Hypotension	Shock Tachypnea
Outcome		Untreated and with ongoing heat exposure, heat exhaustion can worsen and become heat stroke.	In later stages, pulmonary edema, hepatic failure, renal failure, rhabdomyolysis (muscle fibre breakdown), death



New Brunswick ice storm

The ice storm that hit the east coast of New Brunswick was the worst crisis that NB Power has had to contend with in its history, and it was also a public health emergency. The storm during the night of Tuesday, January 24 to Wednesday, January 25, 2017 caused power outages for more than 133,000 NB Power customers. The Acadian Peninsula was the hardest-hit region, with some residents going without electricity for 12 days. At the start of the emergency, Health Protection Branch inspectors implemented their emergency response plan. They contacted municipalities to ensure that potable water systems were operating safely and not posing a health hazard.

The inspectors visited shelters and warming centres to ensure compliance with food safety regulations. They also distributed information to the public about food safety during power outages. No cases of food poisoning were reported during the crisis.

During the power outage, the main danger to public health was carbon monoxide poisoning. According to the Vitalité Health Network, from January 26 to February 3, 45 cases of carbon monoxide poisoning and two deaths were reported in the Acadian Peninsula. It is also suspected that many other cases were not reported. The inspectors implemented measures to prevent carbon monoxide poisoning in the various warming centres.

Notices from the acting Chief Medical Officer of Health were distributed to volunteers, and Canadian Armed Forces members were assigned to go door to door to prevent cases of carbon monoxide poisoning. Reminders, such as the following, were issued:

- Carbon monoxide is a colourless, tasteless, odourless gas. Unless you have a detector in your

house, you might never know it is present until it could be too late.

- Never operate a generator inside a house or garage, or near a window or near an air intake duct outside your home.
- Never use a barbecue, camp stove or propane heater inside your home or garage.
- There is no safe way to use a generator or to cook with a camp stove inside your home or garage. Carbon monoxide poisoning may occur, even if you open the windows or the garage door.

Physicians should be aware that:

- The symptoms of carbon monoxide poisoning vary depending on the level of exposure, and can mimic those of other illnesses, so having a high level of clinical suspicion is important for diagnosis. At low levels, symptoms include headache, malaise, nausea/vomiting and dizziness. At higher levels, confusion, loss of consciousness, and shortness of breath may occur and ultimately the patient may experience ischemic chest pain, arrhythmia, hypotension, seizures, coma, and death. [1]
- There are neither standard criteria nor laboratory tests that definitively diagnose acute CO poisoning, although carboxyhemoglobin levels, measured by CO-oximetry of a blood gas sample, are a useful adjunct. [1]
- Survivors of severe, acute CO poisoning can develop long term neurological complications, such as problems with memory, concentration, speech, depression, and parkinsonism, either immediately or within a few weeks of the event. [1]

References

1. Quinn DK, McGahee SM, Politte LC, Duncan GN, et al. 2009. Complications of Carbon Monoxide Poisoning: A Case Discussion and Review of the Literature. *Prim Care Companion J Clin Psychiatry* 11(2): 74-9.

