

New Brunswick Disease Watch Bulletin

Office of the Chief Medical Officer of Health

New Brunswick Public Health Nutrition Framework for Action

Non-communicable chronic diseases such as type II diabetes mellitus, cardiovascular disease and certain types of cancer are rising in New Brunswick and across Canada [1]. Some of the increase is related to changing demographical and epidemiological patterns, but a large part is attributable to poor nutrition and other risk factors. New Brunswickers rank high in the country in terms of prevalence of diet-related risk factors among adults: according to the most recent issue of *New Brunswick Health Indicators*, in 2009-10 nearly two-thirds (63 per cent) of the province's population aged 18 and older were overweight or obese, with 28 per cent being obese, based on data from the 2009-2010 Canadian Community Health Survey [2]. These rates were significantly higher than the national average. The rate of childhood overweight and obesity was also high (24 per cent of the population aged 12-17), a disconcerting fact given that obese children tend to remain obese as adults. Research indicates that nutrition plays a strong role in the prevention of many diseases and health conditions; for example, children and youth

Introduction

Welcome to the 13th edition of the *New Brunswick Disease Watch Bulletin*.

In this volume, we focus on the outbreak of pertussis in the province and we provide a review of the 2011-2012 influenza season. We look at the current epidemiology and available vaccines and vaccines in development for Invasive Meningococcal Disease and have an article regarding extreme heat events and heat-related illnesses and death.

Moreover, we provide information regarding the newly released *New Brunswick Public Health Nutrition Framework for Action 2012-2016* which identifies strategic directions and priority areas for action related to nutrition across the Public Health system.

We welcome feedback and suggestions for topics. Please forward them to alex.doroshenko@gnb.ca

who consume vegetables and fruit more frequently are less likely to be overweight or obese [3]. In New Brunswick, fewer than half (46 per cent) of children and youth aged 12-19 eat vegetables and fruit at least five times per day [2].

Obesity and many non-communicable chronic diseases are largely preventable through action on nutrition and other risk factors. Physicians and other health-care professionals can play a strong role in supporting and promoting good nutrition among their patients and within their communities.

The development of the *New Brunswick Public Health Nutrition Framework for Action 2012-2016* identifies strategic directions and priority areas for action related to nutrition across the Public

Health system. It also provides the opportunity to address these areas in a comprehensive and co-ordinated way. This is well aligned with concepts in the Canadian Medical Association's recommendations from the Standing Committee on Health, where it is emphasized that there is a need to support a culture of health and wellness. Finding solutions will require a collaborative, system-wide approach involving all levels of government, the health, education, industry, finance and transportation departments, and the private sector [4].

The framework highlights how good nutrition plays an important role in growth, development and overall health throughout the lifecycle and recognizes the many challenges related to making healthy food choices. It is

the intention of this framework to have an influence on health behaviours before the point where an individual has a health event or diagnosis of disease.

There are six strategic directions and five priority areas for action outlined in this framework, all of which are strongly based within the population health approach. The strategic directions and priority areas will guide Public Health's nutrition-related initiatives during the next four years. The strategic directions are: capacity-building; partnerships and collaboration; knowledge management and communication; comprehensive approach; policy; and surveillance, monitoring, evaluation. The Public Health nutrition priority areas are: food security; healthy environments; prenatal and early childhood; breastfeeding; and school-aged children and youth.

Although this framework is specific to the work of the Public Health system, success will rely on building strong relationships across many sectors at all levels within the Public Health system and broader health system, including primary health-care providers.

Many of the strategic directions and priority areas are related to the goals within the broader health system and can be tackled from multiple angles. For example, a great deal of emphasis has been placed on educating individuals to make healthier choices; health professionals now realize, however, the significance that the physical environment has on influencing health behaviours [5]. Making healthy food choices is much easier in an environment that makes healthy, affordable and appealing food options easily available which is the focus of the *Healthy Environments* priority. Physicians and health professionals within a community are well respected and can influence change. Physicians are encouraged to be supportive of healthy food environments by ensuring only healthy foods are offered at their workplace and advocating for the same at meetings, daycares, recreation facilities and schools, for example. This could make a significant impact on the health of the population.

Another priority area is *Food Security*, which refers to the ability of all people, at all times, to have access to nutritious, safe, personally acceptable and culturally appropriate foods, produced in ways that are environmentally sound and socially just. Efforts to reduce food insecurity have often been focused on encouraging individuals to make better choices without considering the broader factors that determine a person's ability to access food. Physicians and other health-care providers should consider all the social, economic and environmental factors that impact food choice to allow for more appropriate and individualized care.

These are just a few examples of how this framework can be useful for health-care practitioners in achieving the goal of a healthier population and healthier communities. Physicians and other health-care providers interested in working with Public Health colleagues on these priority areas are encouraged to review the framework available on the Department of Health website (<http://www.gnb.ca/publichealth>) and contact Public Health.

Practice points for physicians in the area of nutrition promotion:

- Help patients identify healthy food choices.
- Support the development of nutrition policies in health care settings (e.g., hospitals, community health centres).
- Use the World Health Organization's Child Growth Standard charts [6] and track data on children's growth patterns in New Brunswick against this standard.
- Consult families to determine their information and support needs related to early childhood nutrition.
- Review best practices for supporting breastfeeding families.
- Advocate for the removal of marketing and advertisement of food or beverages high in fat, sugar and salt that are aimed at children.
- Create opportunities for community dialogue on local food security issues.
- Reflect on personal learning needs and gaps regarding food security.
- Connect with Public Health colleagues across the province to share evidence and best-practices.

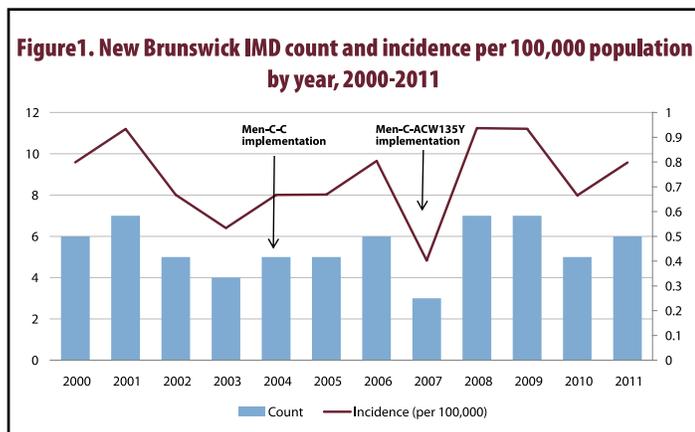
Source: New Brunswick Public Health Nutrition Framework for Action 2012-2016 (<http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/Publications/PublicHealthNutritionFrameworkforAction.pdf>).

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Invasive Meningococcal Disease: Update on Epidemiology and Vaccines

Invasive Meningococcal Disease (IMD) is caused by *Neisseria meningitidis*, a gram-negative diplococcus. This organism is usually associated with asymptomatic nasopharyngeal carriage, but sometimes can cause septicemia, meningitis, septic arthritis, pneumonia and conjunctivitis. The severity of cases ranges from occult bacteremia to a fulminant and fatal disease. In Canada, the overall incidence rate of IMD is of one per 100,000 population [1]; this is consistent with the average incidence rate in New Brunswick, which is approximately 0.8 per 100,000 population [2]. The annual count of IMD cases and incidence rate in New Brunswick by year is shown in **figure 1**.



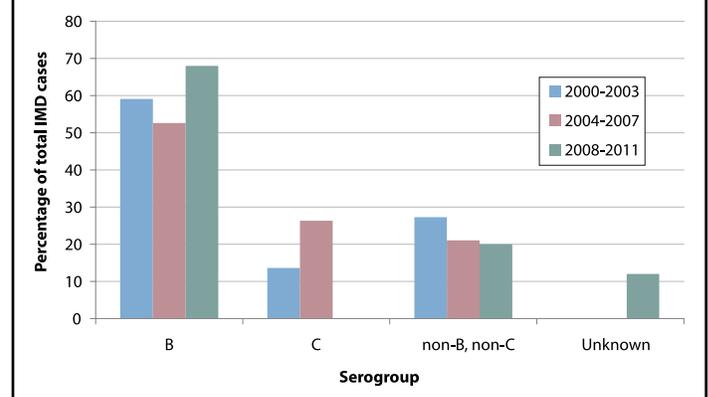
Epidemiology by serogroups

Although there are 13 different serogroups of *N. meningitidis*, based on polysaccharide capsule, five serogroups (A, B, C, Y, and W-135) cause virtually all meningococcal infections in Canada, with serogroups B and C predominating. IMD due to serogroup B occurs endemically in Canada, with a peak incidence in children younger than five years of age. Over the period from 1995 to 2006, serogroup B disease accounted for 45% of all average annual IMD cases reported in Canada [3]. In children under 5 years old, over 70% of IMD cases are currently due to serogroup B [1]. In New Brunswick, serogroup B represented about 80% of reported cases in children younger than five years of age and 60% of the overall reported IMD cases in the period between 2000 and 2011 [2].

Serogroup C disease often occurs in outbreaks, with a peak in adolescents from 15 to 19 years of age. It is associated with a higher rate of septicemic disease and higher mortality than with other serogroups, particularly among adolescents. There has been a substantial decrease in meningococcal serogroup C incidence since the introduction of publicly-funded

meningitis C immunization programs for infants in Canada. In New Brunswick, there were no reported cases of serogroup C disease since 2008 [2] (**figure 2**). Incidence of serogroup Y disease remains stable and serogroups A and W135 are rare in Canada.

Figure 2. Percentage of IMD cases by serogroup and time period, all ages, New Brunswick 2000-2011



In Canada, IMD case fatality rates (CFR) for the 1995-2006 period associated with serogroup B and C were 6% and 13% respectively [2]. In New Brunswick, over the period 2000-2011, CFR due to serogroup B and C were 15% and 12% respectively, however the total number of cases and deaths is relatively small. In New Brunswick, there have been 3 fatalities since 2008 to date; all were caused by serogroup B, serotype 4, serosubtype P1.4 [2].

IMD Immunization in New Brunswick

In New Brunswick, meningococcal conjugate C (MCV-C) vaccine was introduced into routine immunization schedule in September 2004 for infants aged 12 months who were born in 2003 and later, and in 2004/2005 school year - as a catch-up for grade 9 students. In 2007, MCV-C was replaced with quadrivalent conjugate Men-C-ACW135Y (MCV-4) vaccine for grade 9 students.

Currently, three meningococcal vaccines are used in the publicly funded program. *Meningococcal conjugate C vaccine (Menjugate® or Neis Vac®)* is provided routinely to infants at 12 months of age while students in Grade 9 will receive *quadrivalent meningococcal conjugate ACYW-135 (Menveo®)* vaccine through school-based programs [4].

IMD vaccines

Before 2001 purified capsular polysaccharide vaccines against one or more IMD serogroup were in use in Canada. These vaccines were poorly immunogenic in young infants and lacked long-term protection. Conjugated vaccines (MCV-C and MCV-4) were developed and became available in Canada between 2002 and 2007. Conjugated vaccines induced strong

antibody response and demonstrated vaccine effectiveness between 87% and 98%, however vaccine effectiveness may decline over time [5] and provinces and territories in Canada have booster programs for school-age children, either with MCV-C or MCV-4.

The use of a conjugated polysaccharide vaccine strategy for the control of disease due to serogroups C, A, Y, and W135 has been successful, however remained problematic for the serogroup B IMD because of homology between serogroup B polysaccharide and human tissue leading to immunological tolerance and potential to develop autoimmune diseases [6].

To date, vaccination against serogroup B has been limited to countries with ongoing outbreaks where the majority of disease is caused by a single strain. These vaccines were prepared from an outer membrane vesicle (OMV) from the epidemic strain and contain outer membrane proteins PorA and PorB, as well as polysaccharides and envelope proteins. PorA and PorB are both highly variable among circulating strains, except in epidemic settings [6]. New Zealand had used OMV-based vaccine in the vaccination program between 2004 and 2008 to control a clonal outbreak of IMD due to one strain of serogroup B [7].

Several other vaccines against serogroup B disease based on subcapsular antigens have been in development. A new multicomponent vaccine (4CMenB) (**table 1**) vaccine against Meningococcal B disease has been developed by Novartis using “reverse vaccinology” approach, which decodes *N. meningitidis* genome sequence and selects proteins likely to be the most immunogenic vaccine candidates [8]. Its licensure in Canada is expected in the near future.

Table 1. Antigens included in 4CMen B vaccine

| |
|--|
| Factor H-binding protein (fHbp) |
| Neisserial adhesin A (NadA) |
| Neisseria heparin binding antigen (NHBA) |
| Serogroup B PorA-containing OMV |

This vaccine has undergone Phase II and Phase III randomized control trials to determine its immunogenicity and reactogenicity among different age group populations. In adolescents, seroresponse at 6 months following immunization ranged from 73% to 100% depending on the number of doses received with two or three doses inducing greater immune response. No significant safety signals were identified [9]. Immunogenicity in infants ranged from 76%-86% depending on whether the vaccine was administered concurrently with other routine vaccines [10].

Public health practice points

Cases of suspected IMD should be treated urgently and transferred to acute care facilities immediately.

According to New Brunswick Public Health Act, **IMD should be reported to a Regional Medical Officer of Health verbally within 24 hours of clinical suspicion**, followed by a written report within one week after initial report [11]. Early case recognition and rapid reporting of IMD is important to ensure optimal treatment of the index case and prevention of secondary cases through timely initiation of chemoprophylaxis of close contacts.

Antimicrobial chemoprophylaxis of contacts of an index case is determined and coordinated by the regional Public Health; **clinicians may be asked to assist in prescribing and administering appropriate chemoprophylaxis regime to patients in their care.**

Clinicians are encouraged to check immunization status of their patients to **ensure that their immunization is in accordance with New Brunswick schedule** and provide vaccine to eligible unvaccinated individuals.

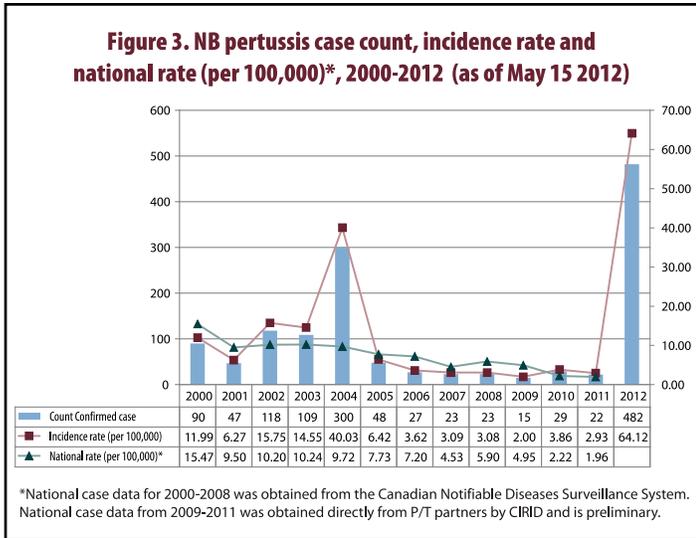
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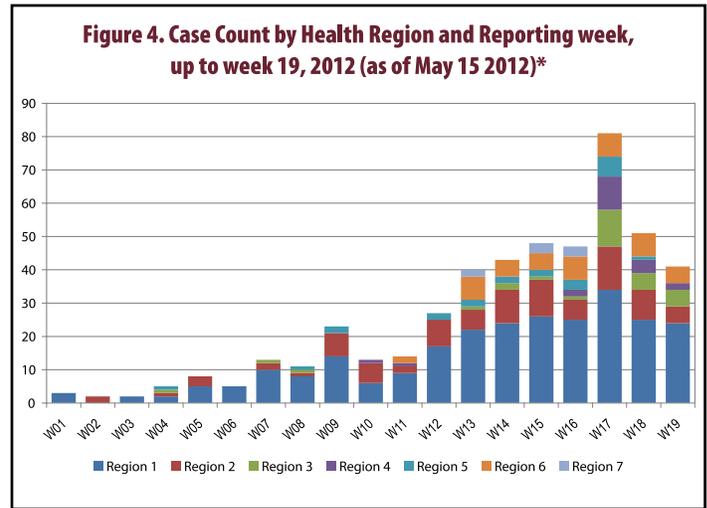
Disease in Focus: Pertussis

Epidemiology

Since January 2012 there has been a significant increase in cases of pertussis seen in New Brunswick. As of May 15, 2012, 482 confirmed (either by laboratory testing or epidemiological link) cases of pertussis have been reported to Public Health in New Brunswick [1]. This is the highest number of annual cases and population rate of pertussis in New Brunswick for more than 10 years (**figure 3**).



The outbreak is predominantly present in regions 1 (Moncton area) and 2 (Saint John area) in New Brunswick, however recently cases are increasingly reported from Fredericton and Northern New Brunswick. The proportion of pertussis reported from region 1 is 55% (266 cases) and from region 2 - 19% (92 cases) (**figure 4**). The highest proportion of cases are in 10-14 age group (48%), followed by 20+ age group (18%), 5-9 age group (17%), 15-19 age group (8%), 1-4 age group (6%) and infants under 1 year (3%). However three age group with the highest population rates of disease are: 10-14 age group (570.5 per 100,000), infants under 1 year (226.9 per 100,000) and 5-9 age group (217.1 per 100,000).



Microbiology, laboratory diagnosis and clinical presentation

Bordetella pertussis was named after its discoverer, Jules Bordet, who isolated the bacterium in 1906. It is a strictly aerobic, Gram negative, non-motile, fastidious coccobacillus. The organism is intolerant of fatty acids and anaerobic conditions. A number of virulence factors have been identified including adhesins [filamentous hemagglutinin (FHA), pertactin (PRN), fimbriae (FIM)] and toxins [pertussis toxin (PT), adenylate cyclase toxin, tracheal cytotoxin, dermonecrotic toxin, heat-labile toxin]. PT, FHA, PRN and FIMs are used as antigens in acellular pertussis vaccines.

Bacterial culture requires special medium (e.g. Regan-Lowe Agar or charcoal-cephalexin blood agar) and takes approximately 3-7 days to complete. Most laboratories in New Brunswick use PCR as a sole test for diagnosis of pertussis. PCR is more sensitive compared to culture and it is superior to culture for diagnosis in previously treated and in previously immunized individuals [2]. False positive PCR results have been reported from some laboratories and may lead to pseudo-outbreaks [2, 3].

Pertussis is a highly infectious disease. The reproductive rate (R_0) of pertussis is 17-18 [4]. It means that a single case of pertussis may result in 17-18 secondary cases among *fully susceptible* individuals *in a setting of efficient infection transmission*. Clinically typical pertussis progresses through catarrhal, paroxysmal and convalescent stages [5] (**figure 5**).

- Catarrhal stage – non-specific coryza, sneezing and other cold-like symptoms. Symptoms in patients presenting at this stage resemble symptoms of other respiratory illnesses therefore it is important to ask patients about exposure to anyone with paroxysmal stage symptoms and consider pertussis if appropriate. Mild cough may

start in catarrhal stage and gradually progresses to paroxysmal cough. This stage typically lasts up to 1 to 2 weeks.

- Paroxysmal stage – history of paroxysmal cough (succession of dry coughs without inspiration, often causing distress to patient and caregivers) of any duration, cough ending in vomiting or associated with apnea and cough with inspiratory “whoop”. It is important to note that patients may go for hours between paroxysms and thus may not present these symptoms while in your office. Older children and adults can have atypical manifestations of pertussis with prolonged cough with or without paroxysms and no whoop. This stage typically lasts 1 to 10 weeks.
- Convalescent stage – gradual recovery with cough becoming less paroxysmal and disappearing in 2 or 3 weeks.

Unimmunized or incompletely immunized young infants are particularly vulnerable to the infection and its complications. Secondary bacterial pneumonia is the most common complication and the cause of most pertussis-related deaths. Other, less common, complications are seizures and encephalopathy. Case fatality in infants under 2 months of age is approximately 1% [2]. Complications of pertussis are less frequent in adolescents and adults, but they experience prolonged illness.

Transmission

Transmission occurs by direct contact with respiratory droplets of infected persons. Individuals are *most contagious* during the early catarrhal stage and in the first 2 weeks after onset of cough. Individuals most at risk of contracting pertussis are close contacts of cases of pertussis and are generally those who had direct face-to-face exposure for five or more minutes with a symptomatic case during the infectious period; shared a confined space for one hour or longer with a symptomatic case during the infectious period or had a direct contact with respiratory, oral or nasal secretions from a symptomatic case during the infectious period (such as kissing, being directly sneezed or coughed upon or sharing food or eating utensils during a meal).

Reporting and epidemiological case definitions

Pertussis is a reportable disease under the *Public Health Act* in New Brunswick [6] and any clinically suspected case of pertussis needs to be reported to Public Health *verbally within 24 hours and in writing within 7 days*. It is not necessary to wait for laboratory confirmation to report the case to the Regional Medical Officer of Health (RMOH). Cases reported to Public Health are classified by RMOHs as confirmed or probable according to the case definitions shown in **table 1**.

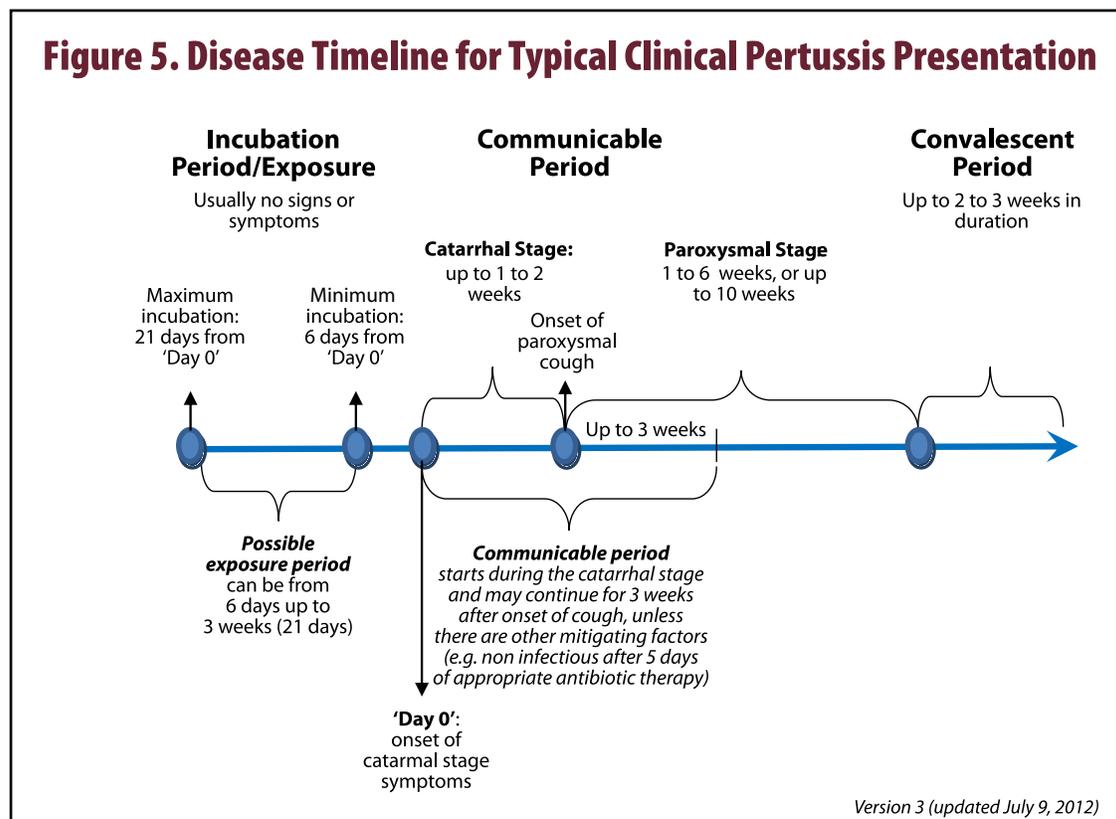


Table 1. Epidemiological case definitions and terminology related to pertussis [7]

Confirmed case: Laboratory confirmation of infection:

→ Isolation of *B. pertussis* from an appropriate clinical specimen

OR

→ Detection of *B. pertussis* DNA from an appropriate clinical specimen **AND** one or more of the following:

- cough lasting 2 weeks or longer
- paroxysmal cough of any duration
- cough with inspiration “whoop”
- cough ending in vomiting or gagging, or associated with apnea

OR

→ Epidemiologic link to a laboratory-confirmed case **AND** one or more of the following for which there is

- no other known cause:
- paroxysmal cough of any duration
- cough with inspiratory “whoop”
- cough ending in vomiting or gagging, or associated with apnea

Probable case: Cough lasting 2 weeks or longer in the absence of appropriate laboratory tests and not epidemiologically linked to a laboratory-confirmed case **AND** one or more of the following, with no other known cause:

→ paroxysmal cough of any duration

→ cough with inspiration “whoop”

→ cough ending in vomiting or gagging, or associated with apnea

Public health measures and management of cases

Public health measures to control pertussis are presented in **table 2**.

Table 2. Public Health Measures

Immunization
 Treatment of cases
 Chemoprophylaxis of contacts
 Hygienic measures
 Self-isolation and exclusion from high-risk settings

Antimicrobial agents administered during the catarrhal stage may ameliorate the disease. Antibiotics should be administered as soon as possible after onset of illness in patients with suspected pertussis to eradicate the organism and limit ongoing transmission. Azithromycin, erythromycin and clarithromycin are appropriate first line agents for

treatment of pertussis [8,9]. Treatment with antibiotics is usually recommended within 3 weeks of the onset of cough for patients older than 1 year old and within 6 weeks of cough onset for infants younger than 1 year old. Patients are considered to be non-infectious after completing the fifth day of appropriate anti-microbial treatment, but should complete a full regimen to avoid bacterial relapse. If antimicrobial therapy is not given, patients are considered infectious for 3 weeks after onset of cough [2]. Patients started on treatment may be advised to self-isolate themselves, if feasible, and are urged to avoid close contact with vulnerable persons such as infants under 1 year of age and pregnant women in 3rd trimester of pregnancy, until they have taken the appropriate regimen for 5 days. Health care workers with symptoms of pertussis are excluded from work for 5 days of antibiotic treatment or for 21 days after onset of cough if no antibiotic given. Regional Medical Officers of Health may exclude individuals with pertussis from high-risk settings in communities (i.e. schools).

Basic hygiene measures such as regular hand-washing, disposing of tissues properly and containing coughs and sneezes help control the spread of whooping cough.

Early use of prophylaxis may limit secondary transmission. In New Brunswick, antibiotic chemoprophylaxis is generally recommended for all close contacts *where there is a vulnerable person present among those close contacts*. A vulnerable person is usually an infant less than 1 year of age regardless of vaccination or a pregnant woman in the third trimester of pregnancy. Discussions with Regional Medical Officers of Health are advised when prophylaxis of close contacts of a case is considered in clinical practice.

Immunization

Immunization with a pertussis containing vaccine is *the best available protection against the disease*.

The whole-cell pertussis vaccine was introduced in Canada in the 1940s. It was replaced by the adsorbed whole-cell vaccine in the 1980s and by the acellular vaccine in 1997-98. Only acellular vaccines made from purified antigens of *B. pertussis* are now available in Canada [10]. There are 5-valent and 3-valent acellular pertussis vaccines available with comparable immunogenicity. The antigens contained in acellular pertussis vaccines are listed in **table 3**. Only 5-valent pertussis containing vaccines are available in New Brunswick

| <i>5-valent acellular pertussis vaccine</i> | <i>3-valent acellular pertussis vaccine</i> |
|---|---|
| Pertussis toxin (PT) | Pertussis toxin (PT) |
| Filamentous Hemagglutinin (FHA) | Filamentous Hemagglutinin (FHA) |
| Pertactin (PRN) | Pertactin (PRN) |
| Fimbriae (FIM2 and FIM3) | |

An acellular pertussis vaccine is given as a part of a combination vaccine in one of two formulations- the infant/pediatric formulation (aP) and the adolescent/adult formulation (ap). The current routine immunization schedule for pertussis containing vaccines in New Brunswick is shown in **table 4**. Tdap-IPV (Adacel-Polio) has recently been recommended for the 4-6 years booster dose in New Brunswick.

Table 4. Immunization schedule for pertussis containing vaccines in New Brunswick [11]

| Age | Vaccine |
|--|--------------------------|
| Primary series at 2, 4 and 6 months | DTaP-IPV-Hib (Pediaceal) |
| 18 months | DTaP-IPV-Hib (Pediaceal) |
| 4 to 6 years | Tdap-IPV (Adacel-Polio) |
| Adolescence (usually given in the middle school) | Tdap (Adacel) |
| Adulthood | Tdap (Adacel) |

In New Brunswick, 48.3% (233 of 482) of all cases had proof of being immunized with 5 doses of pertussis containing vaccine (those under 4 years of age who are not due to have 5 doses of the vaccine are included in the total number of cases). Among age groups who should have received 5 doses of pertussis containing vaccine according to NB schedule, 67.4% of cases aged 10-14 (157 cases out of 233) and 55% of cases aged 4-9 (50 cases out of 91) were immunized with 5 doses of pertussis containing vaccine [1]. Potential reasons for seeing a high proportion of immunized individuals contracting pertussis include waning immunity and exposure pressures in close settings where conditions for transmission are more favorable [12, 13]. Also, in a setting of very high vaccination coverage and vaccine not providing 100% protection, it is expected to see more vaccinated individuals contracting disease, because there are very few individuals who are unvaccinated. However, the total number of cases in this scenario is expected to decrease with the increasing vaccination coverage.

As a part of outbreak control measures, the Office of the Chief Medical Officer of Health in New Brunswick recommended the following immunization interventions:

- a. Check vaccination status to ensure that everyone is up-to-date with their immunization according to the New Brunswick Routine Immunization Schedule;
- b. School age children and adolescents who did not receive a pertussis-containing vaccine in the last 5 years and who have close contact with infants under 1 year of age are offered pertussis vaccination (for individuals 7 years and older Tdap (Adacel) vaccine is recommended). Adults who did not receive a pertussis-containing vaccine in adulthood (after 18 years of age) and who have close contacts with infants less than 1 year of age should also be vaccinated.
- c. Vaccination during pregnancy (preferably during the third or late second trimester) or administering Tdap immediately postpartum is recommended for pregnant women, who previously have not received

Tdap [14];

- d. School-based campaigns in the most affected regions, 1 and 2, offering immunization to students in grades 6, 7 and 8 started this spring. School-based immunization is planned for the less affected regions in the fall.

Practice points for physicians

In light of this outbreak physicians are encouraged to use a lower threshold for diagnosis of pertussis, test patients presenting with symptoms of pertussis and start appropriate treatment.

Physicians should report any suspected case of pertussis to their local Public Health Unit within 24 hours and discuss the need of post-exposure prophylaxis with the Regional Medical Officers of Health. Physicians are advised to examine the vaccination status of all presenting patients to ensure that they have received all doses of pertussis containing vaccine according to the New Brunswick Routine Immunization Schedule [10]. School age children and adolescents who did not receive a pertussis-containing vaccine in the last five years and who have close contact with infants less than 1 year of age should be immunized. Adults who did not receive a pertussis-containing vaccine in adulthood (after 18 years of age) and who have close contacts with infants less than 1 year of age should also be vaccinated. Furthermore, physicians are advised to counsel pregnant women about protection against pertussis. Available options include offering pregnant women, who previously have not received Tdap, vaccination during pregnancy (preferably during the third or late second trimester) or administering Tdap immediately postpartum [13].

For more information please refer to the OCMOH website: (http://www2.gnb.ca/content/gnb/en/departments/ocmoh/for_healthprofessionals/cdc.html) [15]

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Review of 2011-2012 Influenza Season in New Brunswick

Influenza activity in New Brunswick

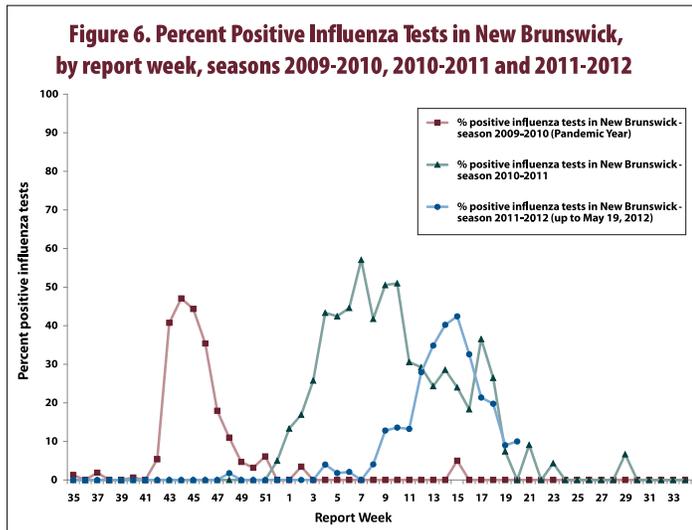
In New Brunswick, the first positive influenza laboratory confirmed case was detected during the last week of November 2011, however no other positive influenza detections were seen until the last week of January 2012.

ILI (influenza-like illness) consultation rates varied throughout the season but have remained low since the beginning of the season. Fewer ILI and influenza outbreaks have been reported compared to the same period in the previous season. Sporadic activity was reported by most regions in New Brunswick starting in week 9 (last week of February) [1].

In New Brunswick, the peak of influenza activity was reached in early April 2012. In New Brunswick, as in Canada, influenza activity started later than in previous non-pandemic seasons. Generally influenza activity starts in late fall or early winter then peaks and tapers off to low activity. Last season in New Brunswick, influenza activity started in late December and peaked in mid-February (**figure 6**) [1].

As of May 19 2012, 322 positive detections of influenza were reported, 80% were influenza type B viruses and 20% were influenza type A viruses. Of the

influenza type A viruses, 45% were influenza A (H3) and 55% were influenza A (H1N1)pdm 09. During the previous influenza season, influenza A was the predominant virus type in New Brunswick. Of the positive influenza laboratory detections reported for the season 2011-2012 up to May 19, 2012, 53% were observed in individuals 0-19 years of age, 36% were in individuals 20-59 years old and 11% were in individuals over 60 years. The majority of laboratory confirmed cases of influenza (77%) were reported from Health Region 1 (Moncton area) [1].



Source: Georges-Dumont Microbiology Laboratory Influenza Database, 2009-2012.

Influenza activity in Canada

In Canada, influenza activity started around the second week of December and the peak of transmission was reached in the third week of March. In the previous influenza season, activity started around the first week of November and peaked at week 52 (last week of December), which shows a later start for the current influenza season [2].

In Canada, there were increases in the number and proportion of influenza B as compared to influenza A detections as the season progressed, as is typically seen in influenza seasons. As of May 19 2012 in Canada, 46% of positive influenza viruses detected were influenza type A and 54% were influenza type B. Of the influenza type A viruses, 44% were A (H3), 16% were A (H1N1)pdm 09 and 40% were A unsubtype [2].

Since the beginning of September 2011, the National Microbiology Laboratory has antigenically characterized 18% of the 1251 influenza viruses that were received from Canadian laboratories as A/H3N2, 16% - as A(H1N1)pdm09 and 66% - as influenza B viruses. Of the influenza A/H3N2 viruses, 91% were antigenically related to A/Perth/16/2009 which matched the A/H3N2 component in this season's influenza vaccine. Of the A(H1N1)pdm 09 viruses characterized, 98% were antigenically related to A/

California/7/2009, the match to the H1N1 component in the seasonal vaccine. Of the influenza B viruses characterized, 48% were antigenically related to B/Brisbane/60/2008, which matched the B component of this season's vaccine; however, 52% of the influenza B viruses were related to B/Wisconsin/01/2010, which does not match the influenza B component in the seasonal vaccine [2].

Influenza A H3N2 variant viruses in USA

When an influenza virus that normally circulates in swine (but not people) is detected in a person, it is called a "variant influenza virus" [3].

In the United States, between July 2011 and April 2012, 13 human infections with an influenza A (H3N2) variant virus were reported from 6 states (Indiana, Pennsylvania, Maine, Iowa, West Virginia, Utah). This H3N2 variant virus contains genes from the human, swine and avian influenza viruses and the M gene from the 2009 H1N1 virus. Twelve of the 13 cases have occurred in children younger than 18 years of age. About half of the 13 infections with the H3N2 variant virus involved patients who had been exposed to swine prior to becoming ill [4]. So far, the severity of illnesses associated with this virus in people has been similar to the severity of illnesses associated with seasonal flu virus infections. At present there is no evidence that sustained human-to-human transmission of influenza A H3N2 variant viruses is occurring [5].

There have been no influenza A H3N2 variant viruses detected in Canada to date.

For more information on influenza activity, please see weekly influenza report which is available here: (http://www2.gnb.ca/content/gnb/en/departments/ocmoh/cdc/content/influenza/influenza_surveillance_activities.html)

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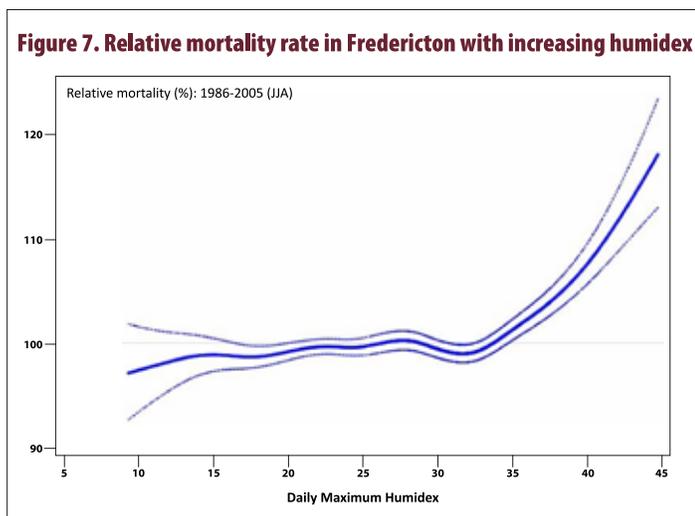
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Extreme Heat Events and heat-related illnesses and death

Climate change poses significant risks to the health of Canadians and people around the world. [1-2] As global warming increases, health risks from extreme heat events (EHEs) have become of emerging public health concern. EHEs resulted in the death of more than 70,000 people in Europe in 2003 and 55,000 people in Russia in August 2010 [3].

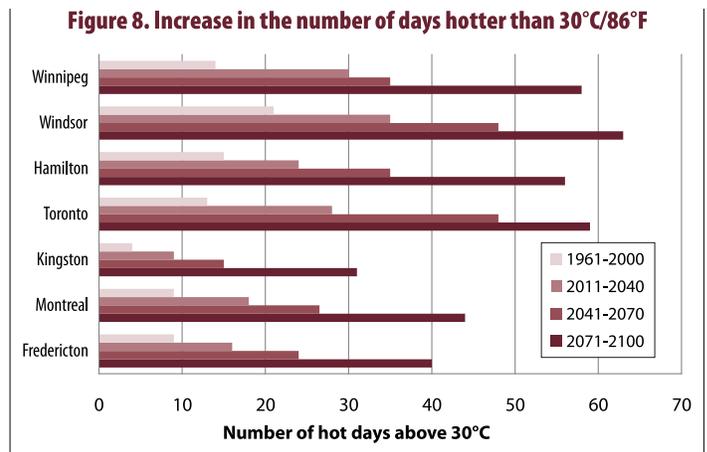
Such events demonstrate that EHEs can have a significant effect on the health of a community. EHEs are also a concern in Canada. Research has shown that in Toronto alone an average 120 people died from extreme heat annually between 1954 and 2000 [4]. In British Columbia, an extreme heat event in 2009 resulted in 156 excess deaths as temperatures reached 34.4 C [5] and a heat wave in Montreal in 2010 caused 150 excess deaths in a short period [1].

New Brunswick is also affected by high heat as increasing temperatures have been shown in Fredericton to increase the relative daily mortality rate between 1986 and 2005. (See graphic below Source: Health Canada).



Weather experts believe that climate change will impact the frequency, duration and intensity of EHEs, resulting in an increased incidence of heat-related fatalities in Canada. The number of days with a maximum temperature exceeding 30°C is projected to double by 2021-40 and more than triple by 2081-2100 for most cities in Canada. Fredericton is expected to experience the greatest increase in EHEs in Atlantic Canada.

Historical and projected number of hot days for selected cities in Canada



¹Temperature projections were obtained from the Canadian Regional Climate Model (CRCM) developed by the Ouranos Consortium on Regional Climatology and Adaptation to Climate Change, which used the Special Report Emission Scenario (SRES) A2. The number of hot days and warm nights for each city is based on the observed temperature data between 1961 and 2000, and projected for 2011-40, 2041-70, 2071-2100.

Past experience has shown that young children, older adults and those who are chronically ill and socially disadvantaged or isolated are most vulnerable to health effects related to extreme heat. There are a number of well-known risk factors associated with mortality during EHEs, summarized below [1].

| | |
|--|---------------------------|
| Physiological factors: | |
| • Cardiovascular conditions | • Age |
| • Pulmonary conditions | • Hypertension |
| • Renal illness or failure | • Diabetes |
| • Neurological disease | |
| Social isolation | |
| Lower socio-economic status | |
| Taking some types of medications such as: | |
| • Antidepressants | • Lithium |
| • Selective serotonin reuptake inhibitors | • Anti-Alzheimer's agents |
| | • Anti-Parkinson's agents |

Heat-related deaths and morbidity are preventable. The effects of climate change on the health of Canadians will depend upon actions taken by Public Health and emergency management officials – from local to national levels – community health and social service providers and by individual Canadians to prepare for and respond to the impacts. Research suggests that the effects of extreme heat on

individuals within a community is a function of the duration and severity of the heat event, when it occurs in the season, the sensitivity of the population, the preparedness of the community to respond during extreme heat events, actions taken by Public Health officials to manage the risks and the protective measures taken by individuals, particularly those who are vulnerable.

In 2010 and 2011, Fredericton was selected as one of four pilot cities across Canada to develop and implement a Heat Alert and Response System (HARS). The purpose of HARS is to reduce risks of heat-related morbidity and mortality and directing the community response to these dangerous events, by alerting the public, and by providing individuals with information and other resources that help them take protective actions before and during an EHE. The effort was supported by Health Canada and was carried out by the Office of the Chief Medical Officer of Health (OCMOH).

The pilot was run successfully for two years and has become a permanent program in the New Brunswick capital. Drawing from the experience and the success of the Fredericton pilot, the OCMOH now plans to expand HARS to other cities and areas of the province.

Advice for practitioners

Practitioners can help by identifying their patients who are vulnerable to extreme heat because of factors such as age, social status and medical conditions or because of the medications they take. They can inform their patients on how to protect their health in case of an extreme heat. Family members might be included into the discussion as they would be key in helping their patients in case of extreme heat. To assist practitioners, a list of medications that increase the health risk to heat as well as a list of simple actions to take to minimize the effect of heat can be found at the following website (www.gnb.ca/publichealth) under the Healthy Environment tab.

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