PUBLIC HEALTH

'Tis the season: meningococcal disease

Background and epidemiology: Invasive meningococcal disease (IMD) is endemic in Canada, with 2 cases per 100 000 population per year. IMD is more common among young children (≥ 1 year old); incidence declines with age, except for a peak among adolescents (15–19 years). The majority of cases occur during the winter months.[1]

IMD is caused by *Neisseria meningitidis*, a gram-negative coccus. There are 5 main serogroups: A, B, C, W135 and Y. Serogroups B and C are responsible for most endemic disease in Canada: group C accounts for almost half of meningococcal disease during years having outbreaks, and about 30% at other times.[2] Serogroups A, W135 and Y cause disease primarily among international travellers. About 10% of cases of meningococcal disease are fatal,[2] with a higher rate for meningococcal C infections.[1]

Clinical management: IMD usually presents as meningitis or septicemia, and on occasion as orbital cellulitis and septic arthritis. It can progress rapidly to shock and death. Symptoms of meningitis include high fever, headache, stiff neck, vomiting and drowsiness. People may also display photophobia, confusion and nonblanching purpura. Long-term effects such as deafness, seizures and requirements for amputation occur in about 10% of infected patients.[2]

Patients with probable or confirmed meningococcal meningitis need treatment with empiric antibiotics immediately; third-generation cephalosporins are a common choice as the first-line agent. As treatment begins, patients should be kept in respiratory isolation for 24 hours. If the antibiotic used is inadequate to correct nasopharyngeal colonization with *N. meningitidis*, then that should also be treated.[1]

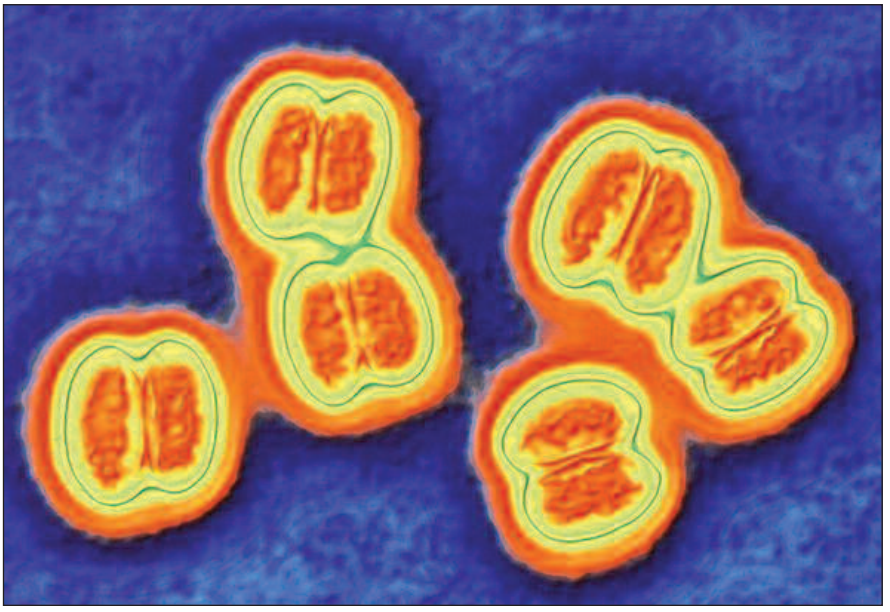
Probable or confirmed cases must be reported to public health authorities. Box 1 outlines updated case definitions of IMD, effective from Jan. 1, 2006.

Diagnosis: A culture of *N. meningitidis* from blood, cerebrospinal fluid (CSF) or sterile site fluid (e.g., joint fluid) is diagnostic for IMD. Samples are best taken before antibiotic therapy, but treatment should not be delayed for testing or to wait for results. Polymerase chain reaction (PCR) testing of blood or CSF samples, which allows rapid diagnosis and serotyping, is also possible. PCR has greater sensitivity than culture, particularly if antibiotics have already been started.[1] Latex agglutination antigen testing is also used. Meningococcal isolates should be sent to the provincial or territorial laboratory for serogrouping and antibiotic susceptibility testing.

Contact management: About 10% of people carry *N. meningitidis* in their nasopharynx at any given time. Because others are at risk of colonization with the bacteria that caused the IMD being treated, everyone in close contact during the incubation period (7 days before symptom onset to 24 hours after the start of effective treatment), regardless of immunization status, should be offered clearance antibiotics to reduce nasopharyngeal carriage and prevent further spread in the community (Box 2). Table 1 lists appropriate agents for chemoprophylaxis.

Clearance antibiotics should be given within 24 hours of diagnosis, although they may be given up to 10 days after the last contact with the index case. Clearance antibiotics should likewise not be delayed for laboratory results.

People who have had close contact are also at increased risk of IMD, since clearance antibiotics do not prevent disease in a person in whom IMD is al-



PLoS

Neisseria meningitidis, cause of invasive meningococcal disease.

Box 1: Case definitions* of invasive meningococcal disease

Confirmed case — Invasive disease with laboratory confirmation of infection, by either of these means:

- Isolation of *Neisseria meningitidis* from a normally sterile sample site (e.g., blood, CSF or joint, pleural or pericardial fluid)
- Demonstration of *N. meningitidis* DNA by appropriately validated NAT from a normally sterile site

Probable case — Invasive disease with purpura fulminans or petechiae and no other apparent cause, in the absence of either factor bulleted above, with or without a finding in CSF of *N. meningitidis* antigen

Note: CSF = cerebrospinal fluid, NAT = nucleic-acid amplification technology.
*Adapted from *Can Commun Dis Rep* 2005; 31S1:1-20,[1] available at www.phac-aspc.gc.ca/publicat /ccdr-rmtc/05vol31/31s1/index.html (accessed 2005 Oct 6).

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Box 2: People considered* to have close contact† with someone infected with invasive meningococcal disease

- Members of the same household
- Anyone sharing a sleeping area
- Anyone with direct nose or mouth contamination with oral or nasal secretions of an infected person (e.g., kissing on the mouth or sharing cigarettes or drinking bottles)
- Health care workers with intensive unprotected contact (e.g., intubation or resuscitation) with an infected patient
- Other children and staff in child care and nursery school facilities
- Airline passengers who sat immediately beside an infected person (but not across the aisle) on trips taking 8 hours or longer

*Adapted from *Can Commun Dis Rep* 2005;31 S1:1-20,[1] available at www.phac-aspc.gc.ca /publicat/ccdr-rmtc/05vol31/31s1/index .html (accessed 2005 Oct 6).
†During the incubation period or early symptomatic phase of the infection.

Table 1: Chemoprophylaxis for close contacts of people with IMD*

Drug and dosage	Comment
Ciprofloxacin, 1 dose PO • Adults (≥ 18 yr): 500 mg	Contraindicated during pregnancy and lactation Approved for adults only; not recommended for prepubertal children
Rifampicin, 4 doses PO q 12 h • Adults: 600 mg • Children (≥ 1 mo): 10 mg/kg (to a maximum of 600 mg) • Infants (< 1 mo): 5 mg/kg	Contraindicated in pregnancy Urine and tears may be stained red, which may also stain contact lenses Can reduce effectiveness of oral contraceptives
Cetriaxone, 1 dose IM • Adults: 250 mg • Children: 125 mg	The recommended drug for pregnant women Alternative for people who cannot tolerate oral medication Dilute in 1% lidocaine to reduce pain of injection

Note: IMD = invasive meningococcal disease, PO = by mouth, q = every, IM = intramuscular.
*Adapted from *Can Commun Dis Rep* 2005;31S1:1-20,[1] available at www.phac-aspc.gc.ca/publicat/ccdr -rmtc/05vol31/31s1/index.html (accessed 2005 Oct 6).

ready developing. Such people should be advised to seek medical attention immediately if they develop a fever or an IMD-type illness. For those who are susceptible, vaccination is also recommended and may further reduce the risk of secondary cases.[1]

Vaccination: Vaccines against meningococcal disease either are directed against several serogroups (e.g., Men-ACYW-P for serogroups A, C, Y and W135) or are conjugate meningococcal vaccines with activity only against meningococcal C.

Meningococcal C conjugate vaccine is recommended for all children. They should receive three doses, at ages 2, 3 and 4 months. Older children (5 months to 18 years) were vaccinated as part of a catch-up vaccination program with these recommendations, introduced in 1999. Vaccine effectiveness has been estimated at 87%–98%, with no significant differences across age groups.[3] Because data for meningococcal C vaccination have been available for less than 5 years, the need for revaccination is currently unclear.

Polysaccharide vaccines against multiple serogroups have a shorter duration of protection and are not immunogenic for children younger than 2 years.[1] They are recommended for outbreak control, travellers to places where IMD is endemic or epidemic, and suspectible close contacts of patients with known relevant serogroup disease. They are not recommended for routine vaccination.

No vaccine is currently available in Canada for serogroup B disease.

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