

## Meningococcal vaccine for children and adolescents



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The Canadian Paediatric Society issued an interim statement on meningococcal vaccine for children (1) that made recommendations for the use of meningococcal serogroup C conjugate vaccines. As of February 2005, 10 provinces and one territory have implemented publicly funded, universal immunization programs; some have also implemented catch-up programs (2).

### CLINICAL PRESENTATIONS AND EPIDEMIOLOGY

*Neisseria meningitidis* is a Gram-negative diplococcus that is usually associated with asymptomatic nasopharyngeal carriage; however, on occasion, it causes conjunctivitis, septicemia, meningitis, septic arthritis and pneumonia. The severity of cases ranges from occult bacteremia to a fulminant and fatal disease. Five serogroups (A, B, C, Y and W-135, based on the polysaccharide capsule) cause virtually all of the infections; in Canada, serogroups B and C predominate. The incidence of serogroup Y disease has increased dramatically over the past several years in the United States, primarily in adolescents and adults; it is not yet clear whether there is a similar shift in the serogroup epidemiology in Canada. The incidence of invasive disease varies widely throughout the world; in Canada, the rate of one per 100,000 population is in the intermediate range. Serogroup B disease occurs endemically, with peak incidence in children younger than five years of age. Serogroup C disease often occurs in outbreaks, with peaks of incidence in children younger than five years of age and in adolescents from 15 to 19 years of age. Mortality rates average 10% for invasive disease, with higher rates for septicemic disease (ie, meningococemia). Serogroup C disease has been associated with a higher rate of septicemic disease and a higher mortality rate, particularly among adolescents. Although the disease burden from invasive meningococcal disease in Canada is lower than for other invasive bacterial infections (eg, pneumococcal disease), cases of meningococcal infection generate great fear and anxiety in the general population. Media interest in this disease is unwavering; some would say that there is nearly 100% reporting of infections in the lay press.

### VACCINE DEVELOPMENT

Until recently, meningococcal vaccines available in Canada consisted of purified capsular polysaccharide against one or more serogroups; the most commonly used vaccine was the quadrivalent A, C, Y, W-135 vaccine (the serogroup B polysaccharide is poorly immunogenic and no vaccine has been available in Canada). Although immunogenic and effective in older children and adults, the vaccine is poorly immunogenic in young infants and does not provide long-term protection at any age because it fails to induce immunological memory. Using the conjugate technology that is so successful in the control of *Haemophilus influenzae* type b invasive disease, three manufacturers have developed and licensed meningococcal C conjugate vaccines that are safe and immunogenic in infants, older children and adults. These vaccines were introduced into the routine immunization schedule in the United Kingdom in 1999 (at a time when the incidence of invasive disease was nearly fourfold higher than that in Canada), which resulted in an immediate, remarkable decrease in invasive disease in the immunized cohorts. A quadrivalent meningococcal A, C, Y, W-135 conjugate vaccine was licensed in the United States in February 2005 for use in children 11 years of age and older; this vaccine is not yet available in Canada.

In its "Statement on recommended use of meningococcal vaccines" published in October 2001 (3), Health Canada's National Advisory Committee on Immunization (NACI) recommended the routine immunization of infants at two, four and six months of age with the meningococcal C conjugate vaccine. Infants four to 11 months of age not previously immunized were recommended to receive two doses of vaccine at least four weeks apart, and a single dose was recommended for children one to four years of age, adolescents and young adults. For children five years of age and older who have not reached adolescence, NACI suggested that a single dose of vaccine be considered.

### SUMMARY AND RECOMMENDATIONS

As of June 2005, all provinces and territories (except Nunavut) have implemented publicly funded, universal

meningococcal C conjugate vaccination programs. However, only Alberta has implemented an infant program according to the NACI recommendations (4,5). Most of the other provinces have implemented a program at one year of age based on a cost analysis that determined that infant programs would only prevent an additional 5% to 10% of cases when compared with programs implemented at one year of age, but would incur a threefold increase in vaccine cost (6). While this approach is reasonable from a population perspective, some vaccine-preventable cases may occur in infants between birth and 12 months of age. Therefore, in view of the safety, immunogenicity and effectiveness of the vaccine, the severity of the disease and the public concern about the risk of severe meningococcal disease, the

Canadian Paediatric Society continues to recommend the following:

- All Canadian children should be immunized with a meningococcal C conjugate vaccine beginning at two months of age according to the recommendations published by NACI (3,7,8).
- Health care providers who care for children should continue to recommend and offer meningococcal C conjugate vaccine to infants and children according to the NACI guidelines, understanding that some parents may choose not to purchase the vaccine but rather wait to receive the vaccine as part of the provincial or territorial publicly funded program.

## REFERENCES

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The recommendations in this statement do not indicate an exclusive course of treatment or procedure to be followed. Variations, taking into account individual circumstances, may be appropriate. Internet addresses are current at time of publication.