

The control of meningococcal disease

Rapid treatment of people believed to be infected, and chemoprophylaxis of all close contacts, are the essentials of both immediate and broader public health management of this disease

ALTHOUGH NOT COMMON, invasive infection with *Neisseria meningitidis* can be devastating to affected patients and families, and, despite modern treatment, has a case-fatality risk of about 9%.¹ In a small proportion of affected patients the disease runs a fulminant course, with death supervening in less than 12 hours. As a result, the disease is a cause of public alarm and receives intense media coverage.

In its initial stages the disease may not be recognised, yet an adequate response requires decisive and rapid action from both clinicians and communicable disease control services. To help practitioners meet these demands, in 1996 the National Health and Medical Research Council published guidelines for controlling meningococcal disease.² These guidelines have recently been superseded by guidelines produced by the Communicable Diseases Network.^{3,4}

While vaccines are available against some serogroups of meningococci (polysaccharide vaccines effective against serogroups A, C, W-135 and Y, and conjugate vaccine against serogroup C), they are not currently recommended for routine use in Australia. As a consequence, and as there is no vaccine against serogroup B, the mainstay of the public health control of invasive meningococcal disease rests on timely and effective treatment of cases and public health interventions to prevent secondary cases (those which follow and are associated with primary cases).

Meningococci may be associated with a wide range of clinical syndromes, from asymptomatic nasopharyngeal carriage, through pneumonia, septic arthritis and conjunctivitis to meningitis and septicaemia. Meningococcal septicaemia, with or without meningitis, can be particularly life-threatening and has considerably higher mortality than meningococcal meningitis. Invasive meningococcal disease and meningococcal conjunctivitis may be followed by secondary cases, and both require public health interventions.⁵ The most characteristic feature of meningococcal septicaemia is a haemorrhagic (ie, petechial or purpuric) rash that does not blanch under pressure.

Deaths from meningococcal septicaemia may be prevented by early antibiotic treatment. Patients with suspected meningococcal septicaemia who are given parenteral benzylpenicillin by general practitioners are 2.5 times less likely to die than those not given penicillin.⁶ The greatest benefit of parenteral penicillin is seen in those who are most ill — those with a haemorrhagic rash. For optimal benefit, benzylpenicillin should be given intravenously. However, if this is not possible, it is quite appropriate to administer benzylpenicillin intramuscularly.

All general practitioners should have benzylpenicillin in their surgeries and emergency bags, and should be ready to administer it immediately to a patient with an acute systemic febrile illness and either a petechial or purpuric rash. Box 1 shows dosage guidelines based on United Kingdom recom-

1: Doses of parenteral benzylpenicillin for treating suspected cases of meningococcal disease

Age group	Dose of parenteral penicillin
Children aged < 1 year	300 mg
Children aged 1–9 years	600 mg
Adults or children aged 10 years or over	1200 mg

mendations,⁷ presented in this form here for simplicity in emergency situations. There are other, equally valid guidelines available.⁸

The use of empirical benzylpenicillin does not necessarily obscure a microbiological diagnosis. While giving penicillin before blood and cerebrospinal fluid specimens are taken does reduce the proportion of positive cultures, it is still possible to isolate meningococci from nasopharyngeal swabs or detect meningococcal DNA by polymerase chain reaction.⁹ Characterisation of meningococci from these sources may be useful in the public health management of affected patients.

Patients presenting to a hospital emergency department with suspected invasive meningococcal disease need to be seen urgently. If a presumptive diagnosis of invasive meningococcal disease is made, they should receive their first dose of antibiotics as soon as possible and no later than 30 minutes after arrival. In some patients other bacterial meningitides may not have been excluded, and empirical therapy with cefotaxime or ceftriaxone plus penicillin or amoxicillin should be used.⁶ These drugs are intended to cover listeriosis, and pneumococcal and meningococcal meningitis. Antibiotic regimens should then be modified as diagnostic and sensitivity information becomes available.

If a general practitioner encounters a patient with a non-specific febrile illness which is not sufficiently distinctive or severe to require referral to hospital, the patient should be kept under frequent review. If a rash develops, or the patient's condition deteriorates in any way, the patient should contact his or her general practitioner urgently or go immediately to a hospital emergency department.

Once a presumptive diagnosis is made, the relevant public health unit should be notified immediately so that contacts can be identified and the public health response determined. A public health response is required after diagnosis of either a probable or confirmed case of invasive meningococcal disease, or of conjunctivitis caused by infection with groupable meningococci. Meningococci coincidentally isolated from oropharyngeal, genital or anal swabs are of no public health consequence, and do not require a public health response.

2: Public health responses in defined settings in which a case of invasive meningococcal disease has occurred

Setting	Information* and chemoprophylaxis	Information* only
Household [†] of an affected person	All	Not applicable
Child-care facilities	Children and staff in the same room for 4 or more hours at one time in the 7 days before the onset of illness	All other children and staff at the facility
Education facilities	Very close contacts (essentially those who have been "household-like" contacts)	All other students in the same classroom (schools) or tutorial groups (universities)
Those who have shared saliva with an affected person (eg, mouth kissing, sharing drink bottles and "bongs")	All	Even though they may not have shared saliva with a case, other members of any sporting team with an affected member should be given information
Those exposed to an affected person after the onset of symptoms	Very close household-like contacts; health carers who have either intubated the patient without a face mask or performed mouth-to-mouth resuscitation	All others concerned that they may have had contact with the affected person after the onset of symptoms

*The disease, including the common signs and symptoms, must be described and the mode of transmission explained. Appropriate action if symptoms suggesting meningococcal infection occur should be described.

[†]"Households" include people in the same dormitory, military barracks or hostel bunkroom in the seven days before the onset of symptoms. This also includes those in seats adjacent to the affected person during long distance travel (8 hours or more). Sexual contacts should be managed as household contacts.

Nasopharyngeal carriage of meningococci is common — about 10% of the population carry meningococci at any given time,¹⁰ not all of which are virulent strains. In North American and European populations the average duration of meningococcal carriage is about nine months; it is an immunising process, with protective antibodies developing soon after acquisition. Factors associated with an increased risk of carriage include smoking and living in crowded circumstances. Contrary to popular belief, a patient with meningococcal disease is not an efficient transmitter of the meningococcus that is causing the illness. Rather, it is the carrier who transmitted the organism to the patient in the first instance who is much more likely to transmit the meningococcus again, causing further cases.¹¹

The public health response targets people who have been in contact with a patient with meningococcal disease in the seven days before onset of disease. The response comprises providing information to contacts (taking into consideration their cultural and literacy needs), and chemoprophylaxis for each person in the network of close contacts. The rationale for chemoprophylaxis is to eliminate meningococci from any carrier within the network of contacts close to the index case and thereby reduce the risk to other susceptible individuals. This rationale must be explained, and the possible adverse reactions and interactions with other medications need to be discussed. Ideally, chemoprophylaxis should be given as soon as possible (within 24 hours) after the diagnosis of the index case.

Robert G Hall

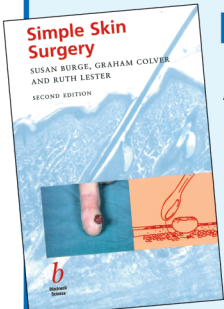
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