NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

SCOPE

1 Guideline title

Management of meningitis and meningococcal disease in children and young people in primary and secondary care.

1.1 Short title

Meningitis and meningococcal disease in children.

2 Background

a) The National Institute for Health and Clinical Excellence ('NICE' or 'the Institute') has commissioned the National Collaborating Centre for Women's and Children's Health to develop a clinical guideline on meningitis and meningococcal disease in children and young people for use in the NHS in England and Wales. This follows referral of the topic by the Department of Health (see appendix). The guideline will provide recommendations for good practice that are based on the best available evidence of clinical and cost effectiveness.

b) The Institute's clinical guidelines will support the implementation of National Service Frameworks (NSFs) in those aspects of care where a Framework has been published. The statements in each NSF reflect the evidence that was used at the time the Framework was prepared. The clinical guidelines and technology appraisals published by the Institute after an NSF has been issued will have the effect of updating the Framework.

c) NICE clinical guidelines support the role of healthcare professionals in providing care in partnership with patients, taking account of their individual needs and preferences, and ensuring that patients (and

their carers and families, where appropriate) can make informed decisions about their care and treatment.

3 Clinical need for the guideline

a) Meningitis is a condition characterised by an inflammation of the pia and arachnoid mater, the two inner meninges (or coverings) of the brain and the spinal cord. The term is usually restricted to inflammation that results from infective agents. Bacterial septicaemia is spread of bacteria through the blood stream with associated cardiovascular compromise ('blood-poisoning'.). Both conditions can be caused by several different bacteria.

b) Meningitis is mostly caused by bacteria or viruses, and rarely by fungi. The principle organisms include *Neisseria meningitidis* (meningococcus), *Streptococcus pneumoniae* (pneumococcus), *Haemophilus influenzae* type b Group B *Streptococcus*, *Escherichia coli*, *Listeria monocytogenes*, *Mycobacterium tuberculosis* (TB), enterovirus and certain fungi. Apart from TB, the majority of the bacterial causes of meningitis are normal colonising organisms in healthy people. Infections are typically acquired by person-to-person transmission. Meningococcal infections account for the majority of cases of meningitis in the UK and Republic of Ireland.

c) Meningococcal disease is caused by *N. meningitidis,* and includes two predominant patterns of illness: meningitis and septicaemia (meningococcaemia), although a proportion of cases show features of both. Meningococcal infections can also affect other organs, including lungs (pneumonia), joints (bacterial arthropathy) and eyes (conjunctivitis). The main differentiating feature used for typing different strains is the sugar coating of the organism (polysaccharide capsule) which determines the serogroup to which the strain belongs; the most common groups are A, B, C, W135 or Y. Worldwide, the incidence of meningococcal disease and the

proportions of cases attributed to each of these groups vary substantially. The organism is carried in the nose by up to 40% of the population (incidence is highest in teenagers and there is almost no carriage in early childhood) and is usually asymptomatic. However, in a small minority of those who encounter the organism for the first time, meningitis, septicaemia or both can occur. The term “invasive disease” is applied to the condition when the organism can be isolated from a normally sterile site.

d) Between 1999 and 2005, the total reported cases of meningococcal disease, based on enhanced data surveillance, fell from 2967 to 1300 in England and Wales. Of these, the cases of meningococcal meningitis only, dropped from 1145 to 579. The total number of cases of all other infective meningitis over the same time period fell from 860 to 807 cases. The annual incidence rate of meningococcal disease in England and Wales was 4.0 and 3.9 per 100,000 people in 2004 based on enhanced surveillance data. Since the introduction of the meningococcal C conjugate (MenC) vaccine in 1999 most cases in the UK have been caused by group B strains, with the remaining mainly spread between C, W135 and Y.

e) Children younger than 5 years and young people aged 15 to 24 years are the most at risk of contracting bacterial meningitis and meningococcal septicaemia. The age based incidence of meningococcal disease and bacterial meningitis are 31.3 and 4.0 per 100,000 in the age groups of 0-4 years and 15-24 years respectively based on data collected in England and Wales in the year 2005. Meningococcal disease is the most common infectious cause of death in young people up to the age of 20 and the most common cause of death in children aged between 1 and 5 years.

f) Patients with meningitis present to primary care as well as to emergency departments. Nearly all patients with meningitis are managed in a hospital.

g) Typical presentations of meningitis vary depending on the age. Common features include fever, vomiting, headache, neck pain, photophobia, confusion, drowsiness, and fits in children and young people. Young babies may present only with irritability and refusal to feed. Children with septicaemia present with fever, vomiting, cold hands and feet, shivering, pale or mottled skin, fast breathing, rash, confusion and drowsiness. The rash associated with meningococcal disease ranges from a non-specific 'viral-looking' rash to the characteristic bluish purple rash (purpura). This purpuric rash is mostly seen with septicaemia but might not appear until quite late in the presentation and rarely, does not appear at all.

h) Babies and young people are the most vulnerable groups. The age-specific incidence of both meningococcal meningitis and meningococcaemia peaks between the ages of 6 months and 4 years. Meningococcal meningitis has a second peak between the ages of 15 and 24 years.

i) Meningitis and meningococcal disease carry a significant risk of mortality and serious long term morbidity. Up to 20% of the children who contract severe meningococcal septicaemia die, usually within 24 hours of the first symptoms appearing. Complications of *N. meningitidis* infection include neurological damage, deafness, acute renal failure and intravascular coagulopathy. Severe ischaemia of the limbs may result in loss of tissue requiring amputation. After effects caused by meningitis include residual headaches, memory disturbances, epilepsy, learning difficulties and other neurological sequelae including deafness, blindness and cerebral palsy.

j) Vaccination programmes using the MenC vaccine have reduced the number of group C meningococcal cases, but to date no effective vaccine has been developed for group B meningococcus. The MenC vaccine is given as a routine immunisation for all infants and may also be used for contacts of people with group C disease.

For contacts of cases with ACY or W135 disease, and people in at-risk groups who are older than 2 years, availabilities include the combined A-C-Y-W135 meningococcal polysaccharide vaccine or the A-C A,C polysaccharide vaccine. Apart from the serogroup A component, immunogenicity of these two polysaccharide vaccines has not been established for children younger than 2 years. A MenACYW conjugate vaccine is licensed in North America and others are in development.

k) Pneumococcal conjugate vaccine (covering seven types of *Streptococcus pneumoniae*) was introduced in 2006 for all children younger than 2 years and there has been a reduction in the number of cases of pneumococcal disease since then.

l) *Haemophilus influenzae* type b vaccine was introduced for all infants in 1992 and a booster dose was added in 2006. Meningitis caused by this organism is now unusual.

m) There has been a reduction in the incidence of meningitis over the years as a result of vaccines and improved awareness. This has affected some disease causing organisms more than others. However there continues to be variation in areas such as assessment and initiation of treatment, disease severity assessment and prevention of secondary cases. The absence of a consistent approach in the management of meningitis and meningococcal disease is reflected in considerable variation in the quality of care between settings.

4 The guideline

a) The guideline development process is described in detail in two publications that are available from the NICE website (see 'Further information'). 'The guideline development process: an overview for stakeholders, the public and the NHS' describes how organisations can become involved in the development of a guideline. 'The guidelines manual' provides advice on the technical aspects of guideline development.

b) This document is the scope. It defines exactly what this guideline will (and will not) examine, and what the guideline developers will consider. The scope is based on the remit from the Department of Health (see appendix).

c) The areas that will be addressed by the guideline are described in the following sections.

4.1 Population

4.1.1 Groups that will be covered

a) Infants, children and young people up to their 18th birthday who have or are suspected to have meningitis or meningococcal disease.

b) Neonates will be considered as a subgroup within this population, because of the different organisms affecting this group.

4.1.2 Groups that will not be covered

a) People with known immunodeficiency.

b) People with known central neurological diseases such as brain tumours, epilepsy, existing hydrocephalus or intracranial shunts.

4.2 Healthcare setting

a) The guideline will cover management primary and secondary care and in the community.

4.3 Clinical management

a) Epidemiology of meningitis and invasive meningococcal disease.

- Incidence and prevalence.
- Risk factors for disease (including smoking, age, crowding).
- Morbidity and mortality associated with the disease, including short and long term sequelae of the disease and resulting from its management.
- Impact of vaccination on the natural history of the disease and its sequelae.

b) When to suspect meningitis or invasive meningococcal disease in the primary and in secondary care.

- Symptoms and signs suggestive of meningitis and/or septicaemia across the age spectrum.
- Clinical risk stratification based on probabilities of combinations of symptoms and signs suggestive of meningitis.
- Cross refer to the NICE guideline on management of feverish illness in young children

c) Differentiating between meningitis and other causes of similar presentation.

- Fever and headache, fever and altered sensorium, fever with neck pain.

d) Differentiating between meningococcal disease and other causes of similar presentation.

- Child or young adult with fever and rash.
- How to recognise septicaemic shock.
- Cross refer to the fever guideline as in ©

e) Management of meningitis and invasive meningococcal disease in primary care and in the prehospital phase

- Prehospital administration of antibiotics.
- Referral and transfer to secondary and definitive care.
- Prophylaxis and management of contacts.

f) Management of suspected meningitis and meningococcal sepsis.

- Choice of antimicrobials and routes of administration.
- Fluid resuscitation, including type of fluid and volume.
- Route (intravenous, central, peripheral, intraosseous) of administration of resuscitation fluids, and timing and type of inotropes.
- Timing and role of intubation and ventilation, and the decision to initiate it.
- Type of endotracheal tube, and drugs used for induction before intubation.
- Therapies for correction of metabolic derangements, renal replacement therapy.
- Corticosteroids for treatment in meningitis and for replacement in septicaemia.
- Drugs, including vasopressors, inotropes and inodilators, recombinant BPI (bacterial permeability increasing protein)
- Use of scoring systems such as GMSPS (Glasgow Meningococcal Septicaemia Prognostic Score) in diagnosis and management
- Treatment of raised intracranial pressure.

g) Serious secondary complications: identifying patients at risk and prevention.

- Referral to paediatric intensive care facilities (retrieval and transfer).
- Neurosurgical involvement.
- Plastic surgery involvement – fasciotomy.
- Digit/limb debridement.

h) Choice and timing of investigations.

- Blood tests including culture and polymerase chain reaction (PCR).
- Use of inflammatory markers.
- Aspirates and swabs from other sites.
- Lumbar puncture for examination of cerebrospinal fluid.
- Antigen testing, culture and PCR of cerebrospinal fluid.
- Radiology including computed tomography and magnetic resonance imaging.
- Immunological testing.

i) Secondary prevention.

- Chemoprophylaxis of contacts – choice of antibiotics.
- Treatment of contacts – role of vaccines.
- Management of exposure in healthcare professionals.
- Follow up.

j) Major outcomes to be considered in patients with meningitis and invasive meningococcal disease.

- Mortality.
- Hospitalisation and nosocomial infections.
- Seizures.
- Neurological complications – immediate, short term and long term.

- Limb loss.
- Complications as a result of management.

k) Information that should be given to parents and carers.

- At the time of initial presentation.
- After diagnosis, and regarding long term effects including significant morbidities.

l) Note that guideline recommendations will normally fall within licensed indications; exceptionally, and only where clearly supported by evidence, use outside a licensed indication may be recommended. The guideline will assume that prescribers will use the summary of product characteristics to inform their decisions for individual patients.

m) The guideline development group will consider making recommendations on the principal complementary and alternative interventions or approaches to care relevant to the guideline topic.

n) The guideline development groups will take reasonable steps to identify ineffective interventions and approaches to care. If robust and credible recommendations for re-positioning the intervention for optimal use, or changing the approach to care to make more efficient use of resources, can be made, they will be clearly stated. If the resources released are substantial, consideration will be given to listing such recommendations in the ‘Key priorities for implementation’ section of the guideline.

4.4 Status

4.4.1 Scope

This is the consultation draft of the scope. The consultation period is 16 October – 12 November 2007.

The guideline will cross link to relevant sections of the NICE clinical guideline on feverish illness in children. This will be a clinical risk stratification model with relation to the presentation and differential diagnosis of meningitis and meningococcal disease in a child with a fever with or without a rash.

4.4.2 Guideline

The development of the guideline recommendations will begin in February 2008.

5 Further information

Information on the guideline development process is provided in:

- 'The guideline development process: an overview for stakeholders, the public and the NHS'
- 'The guidelines manual'.

These booklets are available as PDF files from the NICE website (www.nice.org.uk/guidelinesmanual). Information on the progress of the guideline will also be available from the website.

Appendix: Referral from the Department of Health

The Department of Health asked the Institute to develop a guideline:

‘To prepare a clinical guideline on the management of meningococcal disease and meningitis in children and adolescents in primary and secondary care.’