NICE National Institute for Health and Care Excellence

# Prophylaxis against infective endocarditis

## Antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures

Issued: March 2008

**NICE clinical guideline 64**

guidance.nice.org.uk/cg64

NICE has accredited the process used by the Centre for Clinical Practice at NICE to produce guidelines. Accreditation is valid for 5 years from September 2009 and applies to guidelines produced since April 2007 using the processes described in NICE's 'The guidelines manual' (2007, updated 2009). More information on accreditation can be viewed at www.nice.org.uk/accreditation

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# Introduction

Infective endocarditis (IE) is a rare condition with significant morbidity and mortality. It may arise following bacteraemia in a patient with a predisposing cardiac lesion. In an attempt to prevent this disease, over the past 50 years, at-risk patients have been given antibiotic prophylaxis before dental and certain non-dental interventional procedures.

In the absence of a robust evidence base, antibiotic prophylaxis has been given empirically to patients with a wide range of cardiac conditions including a history of rheumatic fever. The efficacy of this regimen in humans has never been properly investigated and clinical practice has been dictated by clinical guidelines based on expert opinion.

Recent guidelines by the British Society for Antimicrobial Chemotherapy (Gould et al. 2006) and the American Heart Association (Wilson et al. 2007) have challenged existing dogma by highlighting the prevalence of bacteraemias that arise from everyday activities such as toothbrushing, the lack of association between episodes of IE and prior interventional procedures, and the lack of efficacy of antibiotic prophylaxis regimens.

Against this background, the Department of Health asked the National Institute for Health and Clinical Excellence (NICE) to produce a short clinical guideline which would give clear guidance on best clinical practice for prophylaxis against IE in patients undergoing dental and certain non-dental interventional procedures.

The Guideline Development Group (GDG) comprised NICE's short clinical guidelines technical team and experts from many branches of medicine and dentistry, including cardiologists and cardiac surgeons, microbiologists, pharmacists, dental practitioners, paediatric dentists and academic dentists. There were also two patient representatives. In addition, the GDG sought advice from co-opted experts in gastroenterology, obstetrics, urology, otolaryngology, respiratory medicine and anaesthetics.

The group considered the evidence available in the light of existing guidelines and attempted to generate recommendations that would be of improved benefit to the patients and would be acceptable to practising clinicians. The group were mindful that antibiotic administration is not without risk to the individual patient, notwithstanding the implications of unnecessary antibiotic use on antimicrobial resistance. A new piece of health economic analysis was also undertaken to

inform the GDG on the cost effectiveness of prophylaxis for patients undergoing dental procedures.

The GDG were unanimous in their conclusions about which patients with preexisting cardiac lesions are at risk of developing IE. They also agreed that the body of clinical and cost-effectiveness evidence reviewed in this guideline supported a recommendation that at-risk patients undergoing interventional procedures should no longer be given antibiotic prophylaxis against IE. In particular, the GDG were convinced by the evidence suggesting that current antibiotic prophylaxis regimens might result in a net loss of life. It should be emphasised that antibiotic therapy is still thought necessary to treat active or potential infections.

The GDG recognised that these recommendations, which are detailed and justified in this document, are a paradigm shift from current accepted practice. Dissemination of the new recommendations and the rationale underpinning them is a pre-requisite to their acceptance by patients and their healthcare professional carers. The GDG hope that the following sections provide sufficient clarity for this short clinical guideline to be accepted and implemented.

**Professor David Wray**
Guideline Development Group Chair

# Patient-centred care

This guideline offers best practice advice on antimicrobial prophylaxis against infective endocarditis (IE) before an interventional procedure for adults and children in primary dental care, primary medical care, secondary care and care in community settings.

Treatment and care should take into account patients' needs and preferences. People should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If patients do not have the capacity to make decisions, healthcare professionals should follow the Department of Health's advice on consent and the code of practice that accompanies the Mental Capacity Act. In Wales, healthcare professionals should follow advice on consent from the Welsh Government.

If the patient is under 16, healthcare professionals should follow the guidelines in the Department of Health's Seeking consent: working with children.

Good communication between healthcare professionals and patients is essential. It should be supported by evidence-based written information tailored to the patient's needs. Treatment and care, and the information patients are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

Families and carers should be given the information and support they need.

Care of young people in transition between paediatric and adult services should be planned and managed according to the best practice guidance described in Transition: getting it right for young people.

Adult and paediatric healthcare teams should work jointly to provide assessment and services to young people with IE. Diagnosis and management should be reviewed throughout the transition process, and there should be clarity about who is the lead clinician to ensure continuity of care.

# 1 Guidance

The following guidance is based on the best available evidence. The full guideline gives details of the methods and the evidence used to develop the guidance.

## *1.1 List of all recommendations*

### Adults and children with structural cardiac defects at risk of developing infective endocarditis

1.1.1 Healthcare professionals should regard people with the following cardiac conditions as being at risk of developing infective endocarditis:

- acquired valvular heart disease with stenosis or regurgitation
- valve replacement
- structural congenital heart disease, including surgically corrected or palliated structural conditions, but excluding isolated atrial septal defect, fully repaired ventricular septal defect or fully repaired patent ductus arteriosus, and closure devices that are judged to be endothelialised
- previous infective endocarditis
- hypertrophic cardiomyopathy.

### Patient advice

1.1.2 Healthcare professionals should offer people at risk of infective endocarditis clear and consistent information about prevention, including:

- the benefits and risks of antibiotic prophylaxis, and an explanation of why antibiotic prophylaxis is no longer routinely recommended
- the importance of maintaining good oral health
- symptoms that may indicate infective endocarditis and when to seek expert advice

- the risks of undergoing invasive procedures, including non-medical procedures such as body piercing or tattooing.

## Prophylaxis against infective endocarditis

1.1.3 Antibiotic prophylaxis against infective endocarditis is not recommended:

- for people undergoing dental procedures
- for people undergoing non-dental procedures at the following sites[1]:
  - upper and lower gastrointestinal tract
  - genitourinary tract; this includes urological, gynaecological and obstetric procedures, and childbirth
  - upper and lower respiratory tract; this includes ear, nose and throat procedures and bronchoscopy.

1.1.4 Chlorhexidine mouthwash should not be offered as prophylaxis against infective endocarditis to people at risk of infective endocarditis undergoing dental procedures.

## Infection

1.1.5 Any episodes of infection in people at risk of infective endocarditis should be investigated and treated promptly to reduce the risk of endocarditis developing.

1.1.6 If a person at risk of infective endocarditis is receiving antimicrobial therapy because they are undergoing a gastrointestinal or genitourinary procedure at a site where there is a suspected infection, the person should receive an antibiotic that covers organisms that cause infective endocarditis.

[1] The evidence reviews for this guideline covered only procedures at the sites listed in this recommendation. Procedures at other sites are outside the scope of the guideline (see appendix 1 in the full guidance for details).

# 2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available.

The aim of this guideline is to provide evidence-based recommendations to guide healthcare professionals in the appropriate care of people considered to be at risk of infective endocarditis (IE) who may require antimicrobial prophylaxis before an interventional procedure.

# 3 Implementation

NICE has developed tools to help organisations implement this guidance.

# 4 Research recommendations

It is noted that infective endocarditis (IE) is a rare condition and that research in this area in the UK would be facilitated by the availability of a national register of cases of IE that could offer data into the 'case' arm of proposed case–control studies.

## *Cardiac conditions and infective endocarditis*

- What is the risk of developing IE in those with acquired valvular disease and structural congenital heart disease? Such research should use a population-based cohort study design to allow direct comparison between groups and allow estimation of both relative and absolute risk.

## *Interventional procedures and infective endocarditis*

- What is the frequency and level of bacteraemia caused by non-oral daily activities (for example, urination or defaecation)? Such research should quantitatively determine the frequency and level of bacteraemia.

# 5 Other versions of this guideline

## *5.1 Full guideline*

The full guideline, Prophylaxis against infective endocarditis: antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures, contains details of the methods and evidence used to develop the guideline.

## *5.2 Information for the public*

NICE has produced information for the public explaining this guideline.

We encourage NHS and voluntary sector organisations to use text from this information in their own materials.

# 6 Updating the guideline

NICE clinical guidelines are updated so that recommendations take into account important new information. New evidence is checked 3 years after publication, and healthcare professionals and patients are asked for their views; we use this information to decide whether all or part of a guideline needs updating. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations. Please see our website for information about updating the guideline.

# Appendix A: The Guideline Development Group and the Short Clinical Guidelines Technical Team

## *Guideline Development Group*

The Guideline Development Group was composed of relevant healthcare professionals, patient representatives and NICE technical staff.

The members of the Guideline Development Group are listed below.

**Professor David Wray (Chair)**
Professor of Oral Medicine

**Mr Danny Keenan**
Consultant Cardiothoracic Surgeon

**Dr Deborah Franklin**
Consultant Paediatric Dentist

**Dr John Gibbs**
Consultant Cardiologist

**Dr Jonathan Sandoe**
Consultant Microbiologist

**Dr Kathy Orr**
Consultant Microbiologist

**Dr Martin Fulford**
General Dental Practitioner

**Dr Nicholas Brooks**
Consultant Cardiologist

**Mr Nick Cooley**
Antibiotic Pharmacist

**Dr Richard Oliver**
Senior Lecturer and Honorary Consultant in Oral Surgery

**Ms Suzannah Power**
Patient representative

**Ms Anne Keatley-Clarke**
Patient representative

The following individuals were not full members of the Guideline Development Group but were co-opted onto the group as expert advisers:

**Professor Graham Roberts**
Professor of Paediatric Dentistry

**Professor Kate Gould**
Professor of Microbiology

**Dr Bernard Prendergast**
Consultant Cardiologist

**Mr Ian Eardley**
Consultant Urologist

**Professor Mark Kilby**
Professor of Maternal and Foetal Medicine

**Dr Andrew Klein**
Consultant Anaesthetist

**Dr Pallav Shah**
Consultant Chest Physician

**Dr Miles Alison**
Consultant Gastroenterologist

**Mr Gerald McGarry**
Consultant Otorhinolaryngologist (ENT surgeon)

**Ms Alison Pottle**
Cardiac Nurse

## *Short Clinical Guidelines Technical Team*

The Short Clinical Guidelines Technical Team was responsible for this guideline throughout its development. It was responsible for preparing information for the Guideline Development Group, for drafting the guideline and for responding to consultation comments. The following people, who are employees of NICE, made up the technical team working on this guideline.

**Dr Tim Stokes**
Guideline Lead and Associate Director

**Francis Ruiz**
Technical Adviser in Health Economics

**Roberta Richey**
Technical Analyst

**Michael Heath**
Project Manager

**Toni Price**
Information Specialist

**Lynda Ayiku**
Information Specialist

**Nicole Elliott**
Commissioning Manager

**Emma Banks**
Coordinator

# Appendix B: Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

**Robert Walker**

**Ailsa Donnelly**

**John Harley**

**John Young**

# About this guideline

NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

The guideline was developed by the Short Clinical Guidelines Technical Team. The team worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

The methods and processes for developing NICE clinical guidelines are described in The guidelines manual. This guideline was developed using the short clinical guideline process.

We have produced information for the public explaining this guideline. Tools to help you put the guideline into practice and information about the evidence it is based on are also available.

**Changes after publication**

**July 2013:** minor maintenance

**December 2011:** Copied into NICE guideline template, links checked.

**Your responsibility**

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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