



Complete Summary

GUIDELINE TITLE

Antibiotic prophylaxis in surgery. A national clinical guideline.

BIBLIOGRAPHIC SOURCE(S)

Scottish Intercollegiate Guidelines Network (SIGN). Antibiotic prophylaxis in surgery. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2008 Jul. 71 p. (SIGN publication; no. 104). [218 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline will be considered for review in three years. Any amendments to the guideline in the interim period will be noted on the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

COMPLETE SUMMARY CONTENT

SCOPE
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SCOPE

DISEASE/CONDITION(S)

Surgical site infection

GUIDELINE CATEGORY

Prevention
Risk Assessment

CLINICAL SPECIALTY

Anesthesiology
Family Practice
Infectious Diseases
Internal Medicine
Nursing
Pharmacology
Radiology
Surgery

INTENDED USERS

Advanced Practice Nurses
Nurses
Pharmacists
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

- To provide evidence based recommendations to reduce inappropriate prophylactic antibiotic prescribing
- To expand and review the evidence base supporting the recommendations of the July 2000 guideline on antibiotic prophylaxis in surgery and to widen the range of surgical procedures covered

TARGET POPULATION

Adult and pediatric patients undergoing elective or emergency procedures

Note: Patients undergoing emergency operations with contaminated or dirty wounds require antibiotic therapy rather than prophylaxis and as such are beyond the scope of the guideline.

INTERVENTIONS AND PRACTICES CONSIDERED

Prophylactic antibiotics

MAJOR OUTCOMES CONSIDERED

- Long-term and short-term morbidity
- Cost and length of hospital stay
- Rates of antibiotic resistance

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Systematic Literature Review

The evidence base for this guideline was synthesised in accordance with Scottish Intercollegiate Guidelines Network (SIGN) methodology. A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Information Officer. Databases searched include Medline, Embase, Cinahl, and the Cochrane Library. For most searches the year range covered was 2001-2007. Internet searches were carried out on various websites including the United States (US) National Guidelines Clearinghouse. The Medline version of the main search strategies can be found on the SIGN website, in the section covering supplementary guideline material. The main searches were supplemented by material identified by individual members of the development group.

Literature Search for Economic Issues

A SIGN Information Officer conducted a literature search of the National Health Service (NHS) Economics Evaluations Database (NEED) for studies that highlighted economic issues related to antibiotic prophylaxis.

Literature Search for Patient Issues

At the start of the guideline development process, a SIGN Information Officer conducted a literature search for qualitative and quantitative studies that addressed patient issues of relevance to antibiotic prophylaxis in surgery. Databases searched include Medline, Embase, CINAHL and PsycINFO, and the results were summarised and presented to the guideline development group. A copy of the Medline version of the patient search strategy is available on the [SIGN Web site](#).

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

1++: High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+: Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias

1-: Meta-analyses, systematic reviews, or RCTs with a high risk of bias

2++: High quality systematic reviews of case control or cohort studies

High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+: Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2-: Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3: Non-analytic studies (e.g., case reports, case series)

4: Expert opinion

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Once papers have been selected as potential sources of evidence, the methodology used in each study is assessed to ensure its validity. Scottish Intercollegiate Guidelines Network (SIGN) has developed checklists to aid guideline developers to critically evaluate the methodology of different types of study design. The result of this assessment will affect the level of evidence allocated to the paper, which in turn will influence the grade of recommendation it supports.

The methodological assessment is based on a number of key questions that focus on those aspects of the study design that research has shown to have a significant influence on the validity of the results reported and conclusions drawn. These key questions differ between study types, and a range of checklists is used to bring a degree of consistency to the assessment process. SIGN has based its assessments on the MERGE (Method for Evaluating Research and Guideline Evidence) checklists developed by the New South Wales Department of Health, which have been subjected to wide consultation and evaluation. These checklists were subjected to detailed evaluation and adaptation to meet SIGN's requirements for a balance between methodological rigour and practicality of use.

The assessment process inevitably involves a degree of subjective judgment. The extent to which a study meets a particular criterion (e.g., an acceptable level of loss to follow up) and, more importantly, the likely impact of this on the reported results from the study will depend on the clinical context. To minimise any potential bias resulting from this, each study must be evaluated independently by at least two group members. Any differences in assessment should then be discussed by the full group. Where differences cannot be resolved, an independent reviewer or an experienced member of SIGN Executive staff will arbitrate to reach an agreed quality assessment.

Evidence Tables

Evidence tables are compiled by SIGN executive staff based on the quality assessments of individual studies provided by guideline development group members. The tables summarise all the validated studies identified from the systematic literature review relating to each key question. They are presented in a standard format to make it easier to compare results across studies, and will present separately the evidence for each outcome measure used in the published studies. These evidence tables form an essential part of the guideline development record and ensure that the basis of the guideline development group's recommendations is transparent.

Guideline Specific: Updating the Evidence

The guideline is based on a series of key questions that form the basis of the systematic literature search. Key questions were posed to update all sections of the SIGN guideline on antibiotic prophylaxis in surgery (SIGN 45) as well as new topics (*see Annex 1 of the original guideline document*). Where no new evidence was identified to support an update, the guideline text and recommendations are reproduced verbatim from SIGN 45. The original supporting evidence was not re-appraised by the current guideline development group.

The evidence in SIGN 45 was appraised using an earlier grading system. Details of how the grading system was translated to SIGN's current grading system are available on the SIGN Web site (<http://www.sign.ac.uk>).

Additional details can be found in the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50]), available from the [SIGN Web site](#).

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Synthesising the Evidence

Guideline recommendations are graded to differentiate between those based on strong evidence and those based on weak evidence. This judgment is made on the basis of an (objective) assessment of the design and quality of each study and a (perhaps more subjective) judgment on the consistency, clinical relevance and external validity of the whole body of evidence. The aim is to produce a recommendation that is evidence-based, but which is relevant to the way in which health care is delivered in Scotland and is therefore implementable.

It is important to emphasise that the grading does not relate to the importance of the recommendation, but to the strength of the supporting evidence and, in particular, to the predictive power of the study designs from which that data was

obtained. Thus, the grading assigned to a recommendation indicates to users the likelihood that, if that recommendation is implemented, the predicted outcome will be achieved.

Considered Judgment

It is rare for the evidence to show clearly and unambiguously what course of action should be recommended for any given question. Consequently, it is not always clear to those who were not involved in the decision making process how guideline developers were able to arrive at their recommendations, given the evidence they had to base them on. In order to address this problem, SIGN has introduced the concept of considered judgment.

Under the heading of considered judgment, guideline development groups summarise their view of the total body of evidence covered by each evidence table. This summary view is expected to cover the following aspects:

- Quantity, quality, and consistency of evidence
- External validity (generalisability) of studies
- Directness of application to the target population for the guideline
- Any evidence of potential harms associated with implementation of a recommendation
- Clinical impact (i.e., the extent of the impact on the target patient population, and the resources required by NHS in Scotland to treat them in accordance with the recommendation)
- Whether and to what extent, any equality groups may be particularly advantaged or disadvantaged by the recommendations made
- Implementability (i.e., how practical it would be for the NHS in Scotland to implement the recommendation)

Guideline development groups are provided with a pro forma in which to record the main points from their considered judgment. Once they have considered these issues, the group is asked to summarise their view of the evidence and assign a level of evidence to it, before going on to derive a graded recommendation.

Additional detail about SIGN's process for formulating guideline recommendations is provided in Section 6 of the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50], available from the [SIGN Web site](#). The process for synthesizing the evidence base to form graded guideline recommendations is illustrated in the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50], available from the SIGN website.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

A: At least one meta-analysis, systematic review of randomized controlled trials (RCTs), or RCT rated as 1++ and directly applicable to the target population; *or*

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; *or*

Extrapolated evidence from studies rated as 1++ or 1+

C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results *or*

Extrapolated evidence from studies rated as 2++

D: Evidence level 3 or 4 *or*

Extrapolated evidence from studies rated as 2+

Good Practice Points: Recommended best practice based on the clinical experience of the guideline development group

COST ANALYSIS

In section 8 of the original guideline document, the guideline developers review cost effectiveness of surgical antibiotic prophylaxis. They outline the cost considerations related to surgical antibiotic prophylaxis, and they provide some "rules of thumb" that a decision maker can use to estimate the likely cost effectiveness of embarking upon a particular preventative strategy for surgical site infection.

Cost Effectiveness of Antibiotic Prophylaxis

Very few prospective randomised trials of surgical prophylaxis have included economic evaluation within the trial design. There are some evaluations that combine evidence of effectiveness of prophylaxis with estimates of the additional costs of treating wound infection. As described in section 8 of the original guideline document, the effectiveness of prophylaxis can be estimated using an odds ratio for risk of wound infection. This, together with the rate of wound infection for that procedure in the hospital, is used to calculate the "numbers needed to treat" (NNT, the number of patients who must receive prophylaxis in order to prevent one wound infection). Refer to the original guideline document for details.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

A national open meeting is the main consultative phase of SIGN guideline development, at which the guideline development group presents its draft recommendations for the first time. The national open meeting for this guideline was held on 26 March 2007 and was attended by 56 representatives of all the key specialties relevant to the guideline. The draft guideline was also available on the SIGN website for a limited period at this stage to allow those unable to attend the meeting to contribute to the development of the guideline.

Peer Review

All SIGN guidelines are reviewed in draft form by independent expert referees, who are asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline. A number of general practitioners (GPs) and other primary care practitioners also provide comments on the guideline from the primary care perspective, concentrating particularly on the clarity of the recommendations and their assessment of the usefulness of the guideline as a working tool for the primary care team. The draft is also sent to two lay reviewers in order to obtain comments from the patient's perspective.

The comments received from peer reviewers and others are carefully tabulated and discussed with the Chair and with the guideline development group. Each point must be addressed and any changes to the guideline as a result noted or, if no change is made, the reasons for this recorded. As a final quality control check prior to publication, the guideline and the summary of peer reviewers' comments are reviewed by the SIGN Editorial Group for that guideline to ensure that each point has been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised. Each member of the guideline development group is then asked formally to approve the final guideline for publication.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the Scottish Intercollegiate Guidelines Network (SIGN) and National Guideline Clearinghouse (NGC): In addition to these evidence-based recommendations, the guideline development group also identifies points of best clinical practice in the original guideline document.

The grades of recommendations (A–D) and levels of evidence (1++, 1+, 1-, 2++, 2+, 2-, 3, 4) are defined at the end of the "Major Recommendations" field.

Benefits and Risks of Antibiotic Prophylaxis

Risks of Prophylaxis

C: Patients with a history of anaphylaxis, laryngeal oedema, bronchospasm, hypotension, local swelling, urticaria or pruritic rash, occurring immediately after a penicillin therapy are potentially at increased risk of immediate hypersensitivity to beta-lactams and should not receive prophylaxis with a beta-lactam antibiotic.

D: The duration of prophylactic antibiotic therapy should be single dose except in special circumstances (*for example, prolonged surgery, major blood loss or as indicated in sections 5.2, 5.3 and 6.4 in the original guideline document*).

Indications for Surgical Antibiotic Prophylaxis

See sections 5.2 and 5.3 in the original guideline document for recommended indications for surgical antibiotic prophylaxis to prevent surgical site infection (SSI) and recommended indications for surgical antibiotic prophylaxis to prevent SSI in children.

Antibiotic Prophylaxis to Prevent Chest or Urinary Tract Infection

A: Prophylactic antibiotic treatment during surgery solely for the prevention of urinary or respiratory tract infection is not recommended.

Administration of Prophylactic Antibiotics

Choice of Antibiotic

C: The antibiotics selected for prophylaxis must cover the expected pathogens for that operative site.

B: Intranasal mupirocin should be used prophylactically for adult patients undergoing surgery with a high risk of major morbidity who are identified with *Staphylococcus aureus* (*S. aureus*) or methicillin-resistant *S. aureus* (MRSA).

A: A glycopeptide should be considered for antibiotic prophylaxis in patients undergoing high risk surgery who are MRSA positive.

Timing of Administration

B: Intravenous prophylactic antibiotics should be given ≤ 30 minutes before the skin is incised.

Duration of Prophylaxis

B: A single dose of antibiotic with a long enough half-life to achieve activity throughout the operation is recommended.

B: Up to 24 hours of antibiotic prophylaxis should be considered for arthroplasty.

C: An additional intraoperative dosage of antibiotic is recommended for cardiac surgery longer than four hours when using an antibiotic with pharmacokinetics equivalent to cefazolin.

Route of Administration

Topical Administration

High-risk Surgery

B: Intranasal mupirocin should be used prophylactically for patients undergoing high risk surgery who are identified with *S. aureus* or methicillin-resistant *S. aureus*.

Grommet Insertion

B: A single dose of topical antibiotic is recommended for insertion of grommets.

Other Routes of Administration

Joint Replacement

B: In addition to intravenous antibiotics, impregnated cement is recommended for cemented joint replacements.

Cataract Surgery

A: Intracameral antibiotic prophylaxis is recommended for cataract surgery.

Penetrating Eye Injuries

B: Intracameral or intravitreal intraocular antibiotic prophylaxis is recommended at completion of surgery for penetrating eye injuries (*dependent on extent of injury and the presence or absence of an intraocular foreign body*).

Antibiotic Impregnated Devices in Neurosurgery

C: Routine use of impregnated devices in neurosurgery is not recommended.

Antimicrobial-Impregnated Central Venous Catheters

A: Routine use of antimicrobial-impregnated central venous catheters is not recommended.

Implementing the Guideline

Definitions:

Levels of Evidence

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4: Expert opinion

Grades of Recommendation

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C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results *or*

Extrapolated evidence from studies rated as 2++

D: Evidence level 3 or 4 *or*

Extrapolated evidence from studies rated as 2+

Good Practice Points: Recommended best practice based on the clinical experience of the guideline development group

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Benefits of Prophylaxis

- In many ways, the value of surgical antibiotic prophylaxis in terms of the incidence of surgical site infection (SSI) after elective surgery is related to the severity of the consequences of SSI. For example, in the presence of an anastomosis of the colon, prophylaxis reduces postoperative mortality. In total hip replacement surgery prophylaxis reduces long term postoperative morbidity. For most operations, however, prophylaxis only decreases short term morbidity.
- Surgical site infection increases the length of hospital stay. The additional length of stay is dependent on the type of surgery. Prophylaxis has the potential to shorten hospital stay. There is little direct evidence that it does so as few randomised trials have included hospital length of stay as an outcome measure. There is evidence to indicate that prevention of wound infection is associated with faster return to normal activity after discharge from hospital.

POTENTIAL HARMS

Risks of Prophylaxis

- Penicillin allergy
- Anaphylaxis
- Antibiotic-associated diarrhea
- *Clostridium difficile* associated diarrhea
- Antibiotic resistance
- Multiresistance carriage

The final decision regarding the benefits and risks of prophylaxis for an individual patient will depend on:

- The patient's risk of surgical site infection (SSI)
- The potential severity of the consequences of SSI
- The effectiveness of prophylaxis in that operation (see Section 5 of the original guideline document)
- The consequences of prophylaxis for that patient (e.g., increased risk of colitis)

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- It is important to emphasise that surgical antibiotic prophylaxis is an adjunct to, not a substitute for, good surgical technique. Antibiotic prophylaxis should be regarded as one component of an effective policy for the control of healthcare associated infection.
- Most of the recommendations in this guideline apply to elective surgery but some emergency operations are included (*see section 3.1.2 in the original guideline document*).
- The guideline is not intended to provide every surgical specialty with a comprehensive text on preventing surgical site infection (SSI), but rather to provide the evidence for current practice pertaining to antibiotic use, and to provide a framework for audit and economic evaluation.
- The prevention of SSI by antibiotics encompasses a range of procedures and routes of administration (oral, intramuscular, topical) but most evidence relates to the intravenous route.
- The risk factors for surgical site infection, the benefits and risks of antibiotic prophylaxis and the general principles of antibiotic administration described in this guideline are based on evidence in adults, but apply equally to children. If the evidence is not applicable it has been stated in the text.
- The guideline does **not** cover the following:
 - Prevention of endocarditis after surgery or instrumentation (this is already covered by a United Kingdom [UK] guideline which is regularly updated)
 - Use of antiseptics for the prevention of wound infection after elective surgery
 - Treatment of anticipated infection in patients undergoing emergency surgery for contaminated or dirty operations
 - Administration of oral antibiotics for bowel preparation or to achieve selective decontamination of the gut
 - Most topical antibiotic administration, for example, in wounds or for perineal lavage
 - Use of antibiotics for prophylaxis in patients with prosthetic implants undergoing dental surgery or other surgery that may cause bacteraemia
 - Transplant surgery
- This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it

should be fully documented in the patient's case notes at the time the relevant decision is taken.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Implementation of national clinical guidelines is the responsibility of each NHS Board and is an essential part of clinical governance. Mechanisms should be in place to review care provided against the guideline recommendations. The reasons for any differences should be assessed and addressed where appropriate. Local arrangements should then be made to implement the national guideline in individual hospitals, units and practices.

Implementation Tools for Preventing Inappropriate Prescribing

D: Inappropriate prolongation of surgical prophylaxis can be reduced by use of specific prescribing forms for surgical prophylaxis, or recording of prophylaxis in single dose sections of existing drug prescription charts.

Auditing Current Practice

D: Short period audits held at regular intervals, with stakeholder feedback, are recommended.

See section 8 of the original guideline document for further advice on the resource implications associated with implementing the key clinical recommendations, and advice on audit as a tool to aid implementation.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Jul (revised 2008 Jul)

GUIDELINE DEVELOPER(S)

Scottish Intercollegiate Guidelines Network - National Government Agency [Non-U.S.]

SOURCE(S) OF FUNDING

Scottish Executive Health Department

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the guideline development group made declarations of interest and further details of these are available on request from the Scottish Intercollegiate Guidelines Network (SIGN) Executive.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline will be considered for review in three years. Any amendments to the guideline in the interim period will be noted on the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

GUIDELINE AVAILABILITY

Electronic copies of the updated guideline: Available in Portable Document Format (PDF) from the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Quick reference guide: Antibiotic prophylaxis in surgery – principles. Scottish Intercollegiate Guidelines Network, 2008 Jul. 2 p. Available in Portable Document Format (PDF) from the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).
- Surgery specific quick reference guides are available from the [SIGN Web site](#) for the following:

Adults

- Breast surgery
- Cardiothoracic surgery
- ENT surgery
- Facial surgery
- Gastrointestinal surgery
- Gynaecological surgery
- Head and neck surgery
- Intracranial surgery
- Limb surgery
- Ophthalmic surgery
- Urogenital surgery

Children

- Gastrointestinal surgery
- Head and neck surgery
- Thoracic surgery
- Urogenital surgery
- Core audit indicators are available in Section 8 of the [original guideline document](#).
- SIGN 50: A guideline developer's handbook. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network. (SIGN publication; no. 50). Available from the [SIGN Web site](#).
- Appraising the quality of clinical guidelines. The SIGN guide to the AGREE (Appraisal of Guidelines Research & Evaluation) guideline appraisal instrument. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2001. Available from the [SIGN Web site](#).

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on October 17, 2001. The information was verified by the guideline developer as of December 17, 2001. This NGC summary was updated by ECRI Institute on January 14, 2009. The updated information was verified by the guideline developer on January 19, 2009.

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