

Inadvertent perioperative  
hypothermia

## Implementation advice

2008

This implementation advice accompanies the clinical guideline: 'Inadvertent perioperative hypothermia: the management of inadvertent perioperative hypothermia in adults' (available online at: [www.nice.org.uk/CG65](http://www.nice.org.uk/CG65)).

Implementation of the guidance noted above is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement this 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 the guidance should be interpreted in a way which would be inconsistent with compliance with those duties.

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**This implementation advice is aimed at the person responsible for implementing NICE guidance in the organisation (NICE manager) and the clinical lead for the topic.**

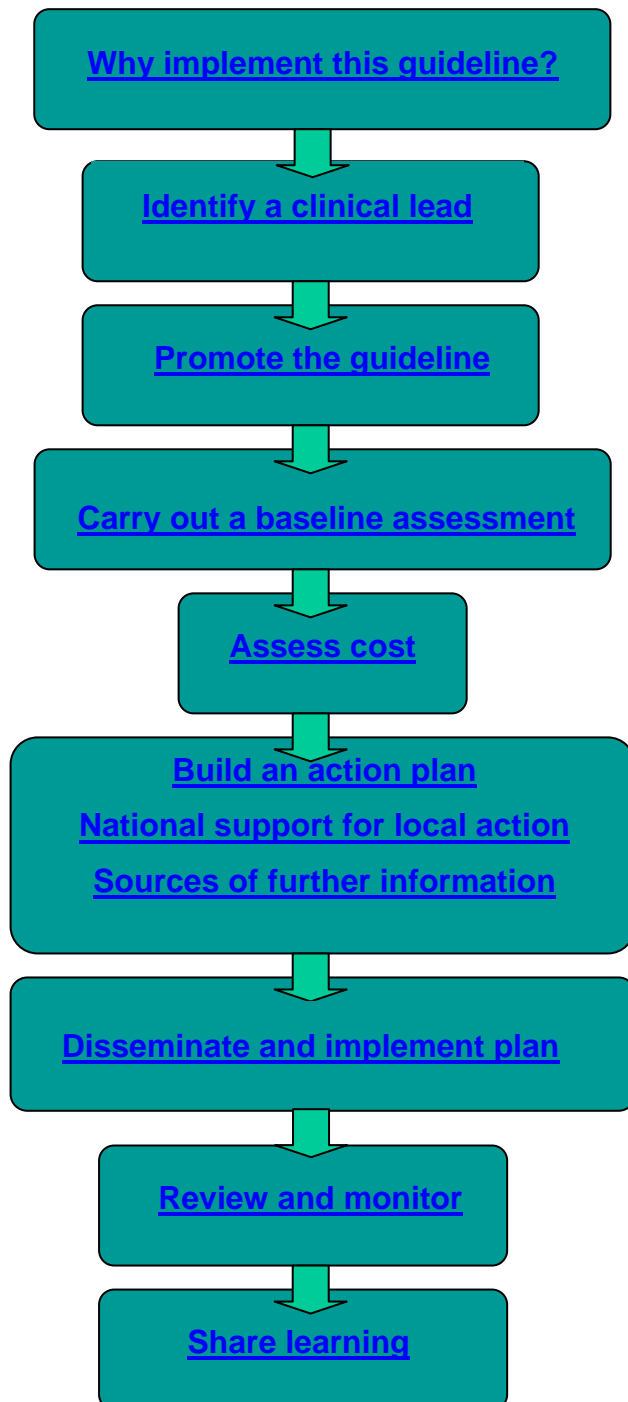
**This is a support tool containing suggested steps towards implementing our guidance informed by your local baseline assessment.**

**It is not NICE guidance.**

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## Steps to implementing NICE clinical guidelines

The algorithm below outlines the process for implementing NICE clinical guidelines. When using this advice online, hold down the 'Ctrl' button and click on the hyperlinks in the boxes to go directly to the advice you need. The advice has been developed in consultation with a range of experts from patient and professional groups. A list of these contributors is available [here](#).



## Why implement this guideline?

Inadvertent perioperative hypothermia is a common but preventable complication of perioperative procedures, which is associated with poor outcomes for patients. Prevention of inadvertent perioperative hypothermia requires the use of simple measures to keep patients comfortably warm, alongside more active interventions such as forced air warming and fluid warming in the intraoperative phase. Regular measurement and recording of patient temperature is key to the prompt identification and treatment of inadvertent perioperative hypothermia where preventative measures have failed.

It is estimated that implementing the NICE guideline will cost £23,000 per year per 100,000 population. In this estimate the costs of the increased use of forced air warming and fluid warming have been offset to some extent by savings associated with a reduction in surgical site infections. The net cost of implementation may be further reduced by an associated reduction in cardiac complications and hospital length of stay, but the cost savings associated with these benefits have not been quantified. In addition, compliance with NICE guidance is one of the criteria indicating good risk reduction strategies, and in combination with meeting other criteria could lead to a discount on contributions to the NHS Litigation Authority schemes, including the Clinical Negligence Scheme for Trusts (CNST).

The Healthcare Commission assesses the performance of NHS organisations in meeting core and developmental standards set by the Department of Health in 'Standards for better health'. The implementation of clinical guidelines forms part of the developmental standard D2. Core standard C5 says that nationally agreed guidance should be taken into account when NHS organisations are planning and delivering care.

If the guideline is not relevant to your organisation, remember to record it.

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## **Identify a clinical lead**

If you are responsible for implementing NICE guidance (NICE manager) you should identify a clinical lead to begin putting the guideline into practice.

The guideline has been written for healthcare professionals who care for adults undergoing elective and emergency surgery (including surgery for trauma), under general and/or regional anaesthesia in secondary and tertiary care settings.

Implementation issues exist in theatre and ward settings, including the emergency department where cases of emergency surgery can arise, so it may be helpful to appoint a clinical lead from each setting. The clinical lead(s) should link with the NICE manager to ensure effective implementation of the guideline within secondary and tertiary care settings. The clinical lead(s) should be selected from medically qualified clinicians or other healthcare professionals; for example, a theatre modern matron or an anaesthetist who has experience of caring for adults undergoing elective and emergency surgery.

An overarching lead should be identified. This may be the NICE manager, who can provide leadership and accountability for the overall implementation of the guideline across all of these settings.

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## **Promote the guideline**

The NICE manager should ensure that all relevant groups are aware of the guideline and have copies of the Quick Reference Guide.

The [slide set](#) provided by NICE should help you raise awareness of the guideline.

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## Carry out a baseline assessment

Using the published guideline, the clinical lead should work with the relevant specialist group to compare local activity with the recommendations. This information could be gathered through informal discussions or by using a more formal questionnaire. This baseline assessment will help identify exactly what your organisation and others are doing now and what needs to change in light of the guideline.

Consider, for example, how the recommendations will have an impact on:

- training and education
- equipment
- staff and service delivery
- communication.

The NICE [audit support](#) may help you with this process.

### ***Who should be involved?***

Once the baseline assessment has identified what needs to change, the next stage is to identify which groups will need to alter their current way of working and to consider the best way to engage them in the development and implementation of the action plan. In most cases there may be existing groups such as theatre audit groups that could fulfil this function. These groups are likely to include:

- theatre, ward and emergency department staff – including anaesthetists, surgeons, nurses, operating department practitioners, healthcare assistants and porters
- pre-operative assessment team
- admission unit team
- day surgery team
- medical device team
- purchasing and procurement services
- education and training leads

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## **Assess cost**

The NICE manager should work with the clinical lead to assess how much it will cost to implement the guideline using the [costing template](#) provided by NICE. It might be possible to make some of the required changes using existing resources, and there may be potential for savings to be achieved, or capacity freed up to be used for other things.

Click here to view NICE's [costing report](#).

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## **Build an action plan**

If your organisation is not meeting the recommendations, the NICE manager and clinical lead should work together to develop an action plan. The details of your action plan will depend on the results of your baseline assessment and your local circumstances.

In consultation with a range of [experts](#) we have identified four key areas to help implementation:

- ensure levels of training and competencies
- ensure adequate provision of equipment
- provide required services
- communicate effectively with patients, and their families and carers

### ***Suggested actions for service managers***

#### **Training and education**

Training and education are important to ensure that healthcare professionals are confident in identifying and managing inadvertent perioperative hypothermia.

- Commission training to ensure that all relevant healthcare professionals (staff carrying out pre-assessments, healthcare assistants, nurses and theatre staff):
  - understand the risk factors for inadvertent perioperative hypothermia and potential adverse consequences for patients
  - know how to use and maintain temperature recording and warming devices.

#### **Equipment**

- Ensure adequate provision of:
  - blankets or duvets for patients before and after surgery to lower the risk of inadvertent perioperative hypothermia
  - forced air warming equipment in theatres, in recovery rooms, on wards and in the emergency department.

- thermometers to allow for regular monitoring of patient temperature
- fluid warming devices and warming cabinets in theatres
- equipment to cool the surgical team in theatre, if needed.

### **Service provision**

- Ensure that the risk of inadvertent perioperative hypothermia is assessed as part of the preoperative assessment.
- Specify a patient core temperature of 36°C for:
  - transfer to theatre
  - induction of anaesthesia
  - transfer back to the ward.
- Ensure that patients who need forced air warming from the induction of anaesthesia are identified (that is, all patients at higher risk of inadvertent perioperative hypothermia and all patients having anaesthesia for longer than 30 minutes).

## ***Suggested actions for healthcare professionals***

### **Training and education**

To ensure patient safety, healthcare professionals will need training in the management of inadvertent perioperative hypothermia.

- Healthcare professionals who are trained in using temperature recording and warming devices, such as those for forced air warming, should cascade training to colleagues.

### **Service provision**

#### *Risk assessment*

- Nurses and healthcare assistants should assess each patient's risk of inadvertent perioperative hypothermia and potential adverse consequences as part of their everyday work.

### *Measures to keep the patient warm*

- Ensure that patients are kept comfortably warm while waiting for surgery, by providing at least one cotton sheet plus two blankets, or a duvet. Special care should be taken when patients are given premedication.
- Encourage patients to walk to theatre where appropriate.
- Ensure that the theatre suite has an ambient temperature of at least 21°C while the patient is exposed. Once forced air warming is established, the theatre temperature can be reduced to allow better working conditions.
- Ensure that the patient is adequately covered throughout the intraoperative phase to conserve heat, and exposed only during surgical preparation.
- Ensure that any patient clothing that has been taken into the theatre (for example, when patients walk to theatre) is taken straight through to the recovery room after removal, and is ready for use.
- Ensure that patients are kept comfortably warm when back on the ward: provide at least one cotton sheet plus two blankets, or a duvet.

### *Temperature monitoring*

- Nurses and operating department practitioners should monitor the patient's temperature regularly.
- Warm any patient found to have hypothermia (that is, a core temperature of below 36.0°C) at any time during perioperative pathway.
- Measure and document the patient's temperature in the hour before they leave the ward or emergency department.
- Measure and document the patient's temperature before induction of anaesthesia and every 30 minutes until the end of surgery.
- Anaesthetists should not start induction of anaesthesia until the patient's temperature is 36.0°C or above, unless surgery is urgent.
- Ensure that the patient's temperature is measured and documented on admission to the recovery room and then at 15-minute intervals.
- Measure and document patient temperature post-operatively on arrival at the ward and then as part of routine 4-hourly observations.

### *Forced air warming*

- Start forced air warming preoperatively on the ward or in the emergency department (unless there is a need to expedite surgery because of clinical

urgency, for example bleeding or critical limb ischaemia) if the patient's temperature is below 36.0°

- Start forced air warming from the induction of anaesthesia for all patients at higher risk of inadvertent perioperative hypothermia and all patients having anaesthesia for longer than 30 minutes.
- Use forced air warming throughout the intraoperative period if a patient's temperature is below 36.0°C before induction of anaesthesia (unless surgery is urgent; for example bleeding or critical limb ischaemia).
- Set the temperature setting on forced air warming devices at maximum and then adjust to maintain a patient temperature of at least 36.5°C.
- Actively warm patients post-operatively, using forced air warming, if their temperature is below 36.0°C, until they are discharged from the recovery room or until they are comfortably warm.
- Actively warm patients post-operatively, using forced air warming, if their temperature falls below 36.0°C while on the ward, until they are comfortably warm. Measure and document their temperature at least every 30 minutes during warming.

#### *Blood and fluid warming*

- Ensure that intravenous fluids (500 ml or more) and blood products are warmed to 37°C using a fluid warming device.
- Warm all irrigation fluids to be used intraoperatively in a thermostatically controlled cabinet to a temperature of 38–40°C.

#### *Discharge from recovery room back to the ward*

- Arrange ward transfer once the patient's temperature is 36.0°C or above. If the patient's temperature is below 36.0°C, they should be actively warmed to near 36.5°C using forced air warming before transfer.

### **Communication**

Effective communication between staff and patients is vital in preventing inadvertent perioperative hypothermia.

- Inform patients, and their families and carers, that staying warm before surgery will lower the risk of postoperative complications.

- Inform patients in writing, before admission, that it is important to keep warm before surgery and that the hospital environment may be colder than their home. The following text is provided as an example:
  - “Keeping warm before your surgery is important, as it may lower the risk of complications after your operation. The hospital may be colder than your home, so please bring additional warm clothing, such as a dressing gown, a vest and slippers. If you do feel cold at any time during your stay in hospital, you should tell the staff who are caring for you.”
- Encourage patients to tell staff if they are cold at any time during their hospital stay.
- Warn patients that they may wake up after surgery being warmed by a forced air warming device.

### ***Suggested actions for commissioners***

Service specifications for surgical services should include a statement on complying with the NICE guideline to prevent and manage inadvertent perioperative hypothermia.

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## National support for local action\* [[Back to build an action plan](#)]

There have been a number of developments over the last few years in policy concerning patient safety. These have focused on:

- providing guidance on good practice
- developing benchmarks to enable services to compare themselves with best-practice criteria
- defining standards for patient safety
- assessing progress in improving patient safety through the mechanisms of review and audit.

Document	Relevance
<a href="#">Safety first: a report for patients, clinicians and healthcare managers</a> Department of Health (2006)	<ul style="list-style-type: none"> <li>• Addressed issues raised by the National Audit Office 2005 report and looked at the NHS approach to patient safety more widely.</li> <li>• Made a number of recommendations to build on the progress already achieved in embedding patient safety in the NHS, including:                             <ul style="list-style-type: none"> <li>– establishing a national patient safety forum to oversee the design and implementation of a national patient safety initiative</li> <li>– simplifying the reporting of adverse effects to make it easier for clinical staff to report on a confidential basis without the fear of retribution.</li> </ul> </li> <li>• Establishing Patient Safety Action Teams to support frontline staff in delivering the national patient safety agenda.</li> </ul>
<a href="#">A safer place for patients: learning to improve patient safety</a> National Audit Office (2005)	<ul style="list-style-type: none"> <li>• Found that reporting of safety incidents had improved at a local level, but that progress at a national level on developing a national reporting and learning system has been slower than envisaged in 'Building a safer NHS for patients'.</li> <li>• Concluded that there remained a clear need to improve evaluation and sharing of lessons and solutions by the large number of organisations with a stake in patient safety. There was also a need for a clear system for monitoring that lessons had been learned.</li> </ul>
<a href="#">Standards for better health</a> Department of Health (2004; updated 2006)	<ul style="list-style-type: none"> <li>• The first domain of the national standards is about safety.</li> <li>• The domain outcome is: 'Patient safety is enhanced by the use of health care processes, working practices and systemic activities that prevent or reduce the risk of harm to patients.'</li> </ul>

<a href="#">Building a safer NHS for patients – implementing an organisation with a memory</a> Department of Health (2001)	<ul style="list-style-type: none"> <li>• Sets out the government’s plans for promoting patient safety following the publication of ‘An organisation with a memory’ and the commitment to implement it in The NHS Plan.</li> <li>• Announced the establishment of the National Patient Safety Agency (NPSA), and described an integrated approach to responding to risks to patients or adverse events when they occur, including the establishment of a new national reporting system for adverse events (the NPSA’s National Report and Learning System).</li> </ul>
<a href="#">An organisation with a memory</a> Department of Health (2000)	<ul style="list-style-type: none"> <li>• Review by an expert group of what was known about the scale and nature of adverse events and serious failures in NHS healthcare, and of the NHS’s capacity to learn from such failures.</li> <li>• Recommendations were:           <ul style="list-style-type: none"> <li>– a unified mechanism for reporting and analysis when things went wrong</li> <li>– a more open culture, in which errors or service failures could be reported and discussed</li> <li>– mechanisms for ensuring that, where lessons were identified, the necessary changes would be put into practice</li> </ul> </li> <li>• A much wider appreciation of the value of the system approach in preventing, analysing and learning from errors.</li> </ul>

**Sources of further information\* [\[Back to build an action plan\]](#)**

<b>Document</b>	<b>Relevance</b>
<a href="#">British Association of Day Surgery</a>	<ul style="list-style-type: none"> <li>• Provides information about day surgery and the British Association of Day Surgery for patients, relatives, carers and healthcare professionals.</li> <li>• Details courses provided by Perigon Healthcare Ltd, a specialist consultancy company, with a strong focus and reputation for the development of clinical assessment or preoperative assessment services. Courses for 2008/09 include <a href="#">‘Delivering the Patient Safety Agenda with High Performance Clinical/Pre-operative Assessment Services’</a>.</li> </ul>
<a href="#">ASA (American Society of Anesthesiologists) Physical Status Classification System</a>	<ul style="list-style-type: none"> <li>• The guideline states:            “Patients should be managed as being at higher risk of inadvertent perioperative hypothermia if any two of the following apply:           <ul style="list-style-type: none"> <li>– ASA grade II to V (the higher the grade, the greater the risk)</li> <li>– preoperative temperature below 36.0°C (and preoperative warming is not possible because of clinical urgency)</li> <li>– undergoing combined general and regional anaesthesia</li> <li>– undergoing major or intermediate surgery</li> <li>– at risk of cardiovascular complications.”</li> </ul> </li> <li>• The ASA website details the ASA Physical Status Classification System referred to above:           <ul style="list-style-type: none"> <li>– Class I: A normal healthy patient</li> </ul> </li> </ul>

- Class II: A patient with mild systemic disease
- Class III: A patient with severe systemic disease
- Class IV: A patient with severe systemic disease that is a constant threat to life
- Class V: A moribund patient who is not expected to survive without the operation
- Class VI: A declared brain-dead patient whose organs are being removed for donor purposes.

*\*Please note that the Institute is not responsible for the quality or accuracy of any information or advice provided by any other organisation.*

## Related NICE guidance [[Back to build an action plan](#)]

Document	Relevance
<a href="#">Preoperative tests: the use of routine preoperative tests for elective surgery</a> . NICE clinical guideline 3 (2003)	<ul style="list-style-type: none"> <li>• This guideline covers tests that are often carried out by doctors or nurses in hospitals and preoperative assessment clinics when a patient is due to have a planned (elective) surgical operation.</li> <li>• It gives further details about ASA grades, comorbidities and consent.</li> </ul>

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## **Disseminate and implement plan**

Once the action plan and assessment of cost have been approved by the NICE manager the work of implementing the action plan begins. To ensure effective implementation all relevant organisations should sign up to the action plan – for example, via a local area agreement.

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## Review and monitor

Implementation of the guideline should be reviewed and monitored, with results fed back to the relevant trust board.

One way to monitor implementation of the guideline is to audit current practice against the NICE guidance. The guideline is accompanied by [audit support](#) to help you with this.

### ***Implementation and uptake of NICE guidance***

The [ERNIE](#) (Evaluation and review of NICE implementation evidence) database is a source of information on the implementation and uptake of NICE guidance.

ERNIE will provide:

- a bank of guidance-specific NICE implementation uptake reports
- references to external literature
- a simple classification system summarising the uptake of NICE guidance.

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## Share learning

Have you got some tips to share with other organisations on implementing NICE clinical or public health guidance? Or would you like to learn from other people's experiences? If so, the Institute's ['shared learning' database](#) can help.

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### Share learning

If during your stakeholder engagement, you find an example of shared learning you think would be helpful, remember to get it added to the database so that you can link to it from here. Remember to check the shared learning database to see if there are any existing examples you could link to.

## Acknowledgements

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- Mary Burt, Northampton General Hospital NHS Trust
- Terry Holdcroft, North Tees and Hartlepool NHS Foundation Trust
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