

# Routine preoperative tests for elective surgery

NICE guideline

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[www.nice.org.uk/guidance/ng45](https://www.nice.org.uk/guidance/ng45)

## Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the [Yellow Card Scheme](#).

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should [assess and reduce the environmental impact of implementing NICE recommendations](#) wherever possible.

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This guideline replaces CG3.

## Overview

This guideline covers routine preoperative tests for people aged over 16 who are having elective surgery. It aims to reduce unnecessary testing by advising which tests to offer people before minor, intermediate and major or complex surgery, taking into account specific comorbidities (cardiovascular, renal and respiratory conditions and diabetes and obesity). It does not cover pregnant women or people having cardiothoracic procedures or neurosurgery.

## Who is it for?

- Healthcare professionals
- People having elective surgery, their families and carers

This guideline updates and replaces NICE guideline CG3 (published June 2003).

# Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [NICE's information on making decisions about your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

The tests covered by this guideline are:

- chest X-ray
- echocardiography (resting)
- electrocardiography (ECG; resting)
- full blood count (haemoglobin, white blood cell count and platelet count)
- glycated haemoglobin (HbA1c) testing
- haemostasis tests
- kidney function (estimated glomerular filtration rate, electrolytes, creatinine and sometimes urea levels)
- lung function tests (spirometry, including peak expiratory flow rate, forced vital capacity and forced expiratory volume) and arterial blood gas analysis
- polysomnography
- pregnancy testing
- sickle cell disease/trait tests
- urine tests.

The recommendations were developed in relation to the following comorbidities:

- cardiovascular
- diabetes
- obesity
- renal
- respiratory.

## Recommendations relevant for all types of surgery

A [colour poster version of these recommendations can be downloaded from tools and resources](#).

### 1.1 Communication

- 1.1.1 When offering tests before surgery, give people information in line with recommendations (including those on consent and capacity) made in the [NICE guideline on patient experience in adult NHS services](#).
- 1.1.2 Ensure that the results of any preoperative tests undertaken in primary care are included when referring people for surgical consultation.

### 1.2 Considering existing medicines

- 1.2.1 Take into account any medicines people are taking when considering whether to offer any preoperative test.

### 1.3 Pregnancy tests

- 1.3.1 On the day of surgery, sensitively ask all women of childbearing potential whether there is any possibility they could be pregnant.

- 1.3.2 Make sure women who could possibly be pregnant are aware of the risks of the anaesthetic and the procedure to the fetus.
- 1.3.3 Document all discussions with women about whether or not to carry out a pregnancy test.
- 1.3.4 Carry out a pregnancy test with the woman's consent if there is any doubt about whether she could be pregnant.
- 1.3.5 Develop locally agreed protocols for checking pregnancy status before surgery.
- 1.3.6 Make sure protocols are documented and audited, and in line with statutory and professional guidance.

## **1.4 Sickle cell disease or sickle cell trait tests**

- 1.4.1 Do not routinely offer testing for sickle cell disease or sickle cell trait before surgery.
- 1.4.2 Ask the person having surgery if they or any member of their family have sickle cell disease.
- 1.4.3 If the person is known to have sickle cell disease and has their disease managed by a specialist sickle cell service, liaise with this team before surgery.

## **1.5 HbA1c testing for people without diagnosed diabetes**

- 1.5.1 Do not routinely offer HbA1c testing before surgery to people without diagnosed diabetes.

## 1.6 HbA1c testing for people with diabetes

- 1.6.1 People with diabetes who are being referred for surgical consultation from primary care should have their most recent HbA1c test results included in their referral information.
- 1.6.2 Offer HbA1c testing to people with diabetes having surgery if they have not been tested in the last 3 months.

## 1.7 Urine tests

- 1.7.1 Do not routinely offer urine dipstick tests before surgery.
- 1.7.2 Consider microscopy and culture of midstream urine sample before surgery if the presence of a urinary tract infection would influence the decision to operate.

## 1.8 Chest X-ray

- 1.8.1 Do not routinely offer chest X-rays before surgery.

## 1.9 Echocardiography

- 1.9.1 Do not routinely offer resting echocardiography before surgery.
- 1.9.2 Consider resting echocardiography if the person has:
- a heart murmur **and** any cardiac symptom (including breathlessness, pre-syncope, syncope or chest pain) **or**
  - signs or symptoms of heart failure.

Before ordering the resting echocardiogram, carry out a resting electrocardiogram (ECG) and discuss the findings with an anaesthetist.

## **Recommendations for specific surgery grades (minor, intermediate, and major or complex) and ASA grades**

The following recommendations are specific to surgery grade and ASA grade.

## **Surgery grades**

### **Minor**

Examples:

- excising skin lesion
- draining breast abscess

### **Intermediate**

Examples:

- primary repair of inguinal hernia
- excising varicose veins in the leg
- tonsillectomy or adenotonsillectomy
- knee arthroscop

### **Major or complex**

Examples:

- total abdominal hysterectomy
- endoscopic resection of prostate
- lumbar discectomy
- thyroidectomy
- total joint replacement
- lung operations

## **ASA grades**

The [American Society of Anesthesiologists \(ASA\) Physical Status Classification System](#) is a simple scale describing fitness to undergo an anaesthetic. The ASA states that it does not endorse any elaboration of these definitions. However, anaesthetists in the UK often qualify (or interpret) these grades as relating to functional capacity – that is, comorbidity that does not (ASA 2) or that does (ASA 3) limit a person's activity.

**ASA 1:** A normal healthy patient

**ASA 2:** A patient with mild systemic disease

**ASA 3:** A patient with severe systemic disease

**ASA 4:** A patient with severe systemic disease that is a constant threat to life

**Table 1 Minor surgery**

Test	ASA 1	ASA 2	ASA 3 or ASA 4
Full blood count	Not routinely	Not routinely	Not routinely
Haemostasis	Not routinely	Not routinely	Not routinely
Kidney function	Not routinely	Not routinely	Consider in people at risk of AKI (see recommendation in the <a href="#">NICE guideline on acute kidney injury</a> )
ECG	Not routinely	Not routinely	Consider if no ECG results available from past 12 months
Lung function/arterial blood gas	Not routinely	Not routinely	Not routinely

**AKI**, acute kidney injury

## Key to recommendations

**[Yes]** Offer the test

**[Not routinely]** Do not routinely offer the test

**[Consider]** Consider the test (the value of carrying out the test may depend on specific patient characteristics)

**Table 2 Intermediate surgery**

Test	ASA 1	ASA 2	ASA 3 or ASA 4
Full blood count	Not routinely	Not routinely	Consider for people with cardiovascular or renal disease if any symptoms not recently investigated
Haemostasis	Not routinely	Not routinely	<p>Consider in people with chronic liver disease</p> <ul style="list-style-type: none"> <li>• If people taking anticoagulants need modification of their treatment regimen, make an individualised plan in line with local guidance</li> <li>• If clotting status needs to be tested before surgery (depending on local guidance) use point-of-care testing. Note that currently the effects of direct oral anticoagulants (DOACs) cannot be measured by routine testing.</li> </ul>
Kidney function	Not routinely	Consider in people at risk of AKI (see recommendation in the <a href="#">NICE guideline on acute kidney injury</a> )	Yes
ECG	Not routinely	Consider for people with cardiovascular, renal or diabetes comorbidities	Yes

Test	ASA 1	ASA 2	ASA 3 or ASA 4
Lung function/ arterial blood gas	Not routinely	Not routinely	Consider seeking advice from a senior anaesthetist as soon as possible after assessment for people who are ASA grade 3 or 4 due to known or suspected respiratory disease

**AKI**, acute kidney injury

## Key to recommendations

**[Yes]** Offer the test

**[Not routinely]** Do not routinely offer the test

**[Consider]** Consider the test (the value of carrying out the test may depend on specific patient characteristics)

**Table 3 Major or complex surgery**

Test	ASA 1	ASA 2	ASA 3 or ASA 4
Full blood count	Yes	Yes	Yes
Haemostasis	Not routinely	Not routinely	<p>Consider in people with chronic liver disease</p> <ul style="list-style-type: none"> <li>If people taking anticoagulants need modification of their treatment regimen, make an individualised plan in line with local guidance</li> <li>If clotting status needs to be tested before surgery (depending on local guidance) use point-of-care testing. Note that currently the effects of direct oral anticoagulants (DOACs) cannot be measured by routine testing.</li> </ul>

Test	ASA 1	ASA 2	ASA 3 or ASA 4
Kidney function	Consider in people at risk of AKI (see recommendation in the <a href="#">NICE guideline on acute kidney injury</a> )	Yes	Yes
ECG	Consider for people aged over 65 if no ECG results available from past 12 months	Yes	Yes
Lung function/ arterial blood gas	Not routinely	Not routinely	Consider seeking advice from a senior anaesthetist as soon as possible after assessment for people who are ASA grade 3 or 4 due to known or suspected respiratory disease

**AKI**, acute kidney injury

### Key to recommendations

**[Yes]** Offer the test

**[Not routinely]** Do not routinely offer the test

**[Consider]** Consider the test (the value of carrying out the test may depend on specific patient characteristics)

## Context

In 2003, NICE first issued guidance on the use of routine preoperative tests for people having elective surgery. Many apparently healthy people are tested before surgery to check for undetected conditions that might affect their treatment. This can provide a benefit where test results yield additional information that cannot be obtained from a patient history and physical examination alone. However, excessive preoperative testing can cause significant anxiety, delays in treatment and unnecessary, costly and possibly harmful treatments when false positive results are obtained. Even genuinely abnormal results often do not result in any significant change in perioperative management in relatively healthy people.

Since 2003 there has been a reduction in the ordering of routine tests for young, healthy people having minor surgery ([Czoski Murray et al. 2012](#)). However, there remains a concern that some unnecessary tests continue to be requested. According to [NHS Digital's Hospital Episode Statistics, Admitted Patient Care, England - 2012–13](#), the NHS in England completed 10.6 million operations compared with 6.61 million in 2002–03 (see [NHS Digital's Hospital Episode Statistics 2002–03](#)), an increase of 60%. Therefore even a small percentage of unnecessary preoperative testing can affect a large number of people.

Over the past 12 years preoperative assessment has changed radically. Most people are now seen well in advance of surgery in a preoperative assessment clinic, where a structured history and targeted examination are performed by experienced nursing staff. Some preoperative tests have been abandoned in favour of others (for example random blood glucose in favour of HbA1c), while new tests have been developed that are increasingly being used in some people having elective surgery (for example non-invasive cardiac stress tests, cardiopulmonary exercise test and polysomnography).

# Recommendations for research

The guideline committee has made the following recommendations for research.

## 1 Polysomnography

- a) Does preoperative screening of people who are at risk of obstructive sleep apnoea with polysomnography identify those at higher risk of postoperative complications?
- b) Does treating obstructive sleep apnoea perioperatively improve outcomes?

### Why this is important

Obstructive sleep apnoea is a common condition, particularly in people who are obese, and is associated with adverse postoperative outcomes. However, it is frequently undiagnosed before surgery. Work is ongoing to examine whether obstructive sleep apnoea is associated with a variety of postoperative outcomes (morbidity, mortality, quality of life) in specific surgical populations. However, there is currently no robust evidence or any ongoing trials studying whether preoperative assessment and diagnosis of obstructive sleep apnoea leads to preoperative intervention or improved postoperative outcomes.

## 2 Glycated haemoglobin testing

Does optimisation of HbA1c in people with poorly controlled diabetes improve surgical outcomes?

### Why this is important

Diabetes is the most common metabolic disorder in the UK and people with diabetes increasingly need surgical procedures. Diabetes leads to increased morbidity, length of stay and inpatient costs. Evidence suggests that doctors often fail to identify high-risk patients before surgery and do not provide perioperative interventions to control HbA1c levels. However, the impact of optimising HbA1c levels before surgery has not been assessed in a randomised clinical trial.

## Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the [NICE topic page on surgical care](#).

For full details of the evidence and the guideline committee's discussions, see the [full guideline](#). You can also find information about [how the guideline was developed](#), including details of the committee.

NICE has produced [tools and resources to help you put this guideline into practice](#). For general help and advice on putting our guidelines into practice, see [resources to help you put NICE guidance into practice](#)

# Update information

**April 2016**

This guideline is an update of NICE guideline CG3 (published June 2003) and replaces it.

New recommendations and 1 recommendation for research have been added for the following tests that were not included in the original guideline:

- echocardiography (resting)
- HbA1c testing
- polysomnography.

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## Accreditation

