National Institute for Health and Clinical Excellence

Preoperative tests

The use of routine preoperative tests for elective surgery

Issued: June 2003

NICE clinical guideline 3

www.nice.org.uk/cg3

Contents

Introduction

The following guidance is based upon the best available evidence. All of the recommendations are grade D recommendations, which are based upon level IV evidence – that is, expert opinion derived from a consensus development process and the clinical experience of the Guideline Development Group. The full guideline (see Section 5) describes the methods used to develop the recommendations. In addition, the views of NHS clinicians were sought on the format and usability of these recommendations, and informed the development of this booklet.

The NICE guideline uses a traffic light system of red, amber and green shading. In this web version, the colours have been replaced by words: red has been replaced by 'no', amber has been replaced by 'consider' and green has been replaced by 'yes'.

Patient-centred care

This guideline offers best practice advice on the care of the appropriate use of routine preoperative tests for patients before elective surgery for children and adults.

Treatment and care should take into account patients' needs and preferences. People having routine preoperative tests 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 also 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. 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 recommendations are in the form of 'look-up' tables. For the following tests the tables are set out by surgery grade (see Box 1) and ASA grade (see Boxes 2 and 3).

- Plain **chest X-ray** (radiograph)
- Resting electrocardiogram (**ECG**)
- **Full blood count**
- **Haemostasis** – including prothrombin time, activated partial thromboplastin time and international normalised ratio
- **Renal function** (including tests for potassium, sodium, creatinine and/or urea levels)
- **Random** blood **glucose**
- **Urine analysis** (urine dipstick tests – test for pH, protein, glucose, ketones, blood/ haemoglobin)
- **Blood gases** – for ASA grades 2 and 3 only
- **Lung function** (peak expiratory flow rate, forced vital capacity and forced expiratory volume) – for ASA grades 2 and 3 only.

There are also recommendations for sickle cell test and pregnancy test.

The recommendations are colour-coded in a similar way to traffic lights.

[No] Test not recommended
[Consider] Test to be considered (the value of carrying out a preoperative test is not known, and may depend on specific patient characteristics)
[Yes] Test recommended

For the tables set out by surgery grade and ASA grade, age categories are shown across the top of each table. For a patient with more than one comorbidity, follow the recommendations in all relevant tables.

Box 1 Surgery grades

	Example
Grade 1 (minor)	Excision of lesion of skin; drainage of breast abscess
Grade 2 (intermediate)	Primary repair of inguinal hernia; excision of varicose vein(s) of leg; tonsillectomy/adenotonsillectomy; knee arthroscopy
Grade 3 (major)	Total abdominal hysterectomy; endoscopic resection of prostate; lumbar discectomy; thyroidectomy
Grade 4 (major+)	Total joint replacement; lung operations; colonic resection; radical neck dissection
Neurosurgery	–
Cardiovascular surgery	–

Box 2 ASA grades

ASA (American Society of Anesthesiologists) grades are a simple scale describing fitness to undergo an anaesthetic. The ASA clearly 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 Grade 2) or that does (ASA Grade 3) limit a patient's activity (see Box 3).

ASA Grade 1	"Normal healthy patient" (that is without any clinically important comorbidity and without clinically significant past/present medical history)
ASA Grade 2	"A patient with mild systemic disease"
ASA Grade 3	"A patient with severe systemic disease"

ASA Grade 4	"A patient with severe systemic disease that is a constant threat to life"

Box 3 Characterisation of 'mild' and 'severe' comorbidity, corresponding to ASA grades 2 and 3, for cardiovascular, respiratory and renal comorbidities

	ASA Grade 2: "A patient with mild systemic disease"	**ASA Grade 3: "A patient with severe systemic disease"**
Cardiovascular disease		
Current angina	Occasional use of GTN spray (2–3 times per month). Does not include patients with unstable angina who would be ASA 3	Regular use of GTN spray (2–3 times per week) or unstable angina
Exercise tolerance	Not limiting activity	Limiting activity
Hypertension	Well controlled using a single anti-hypertensive medication	Not well controlled, requiring multiple anti-hypertensive medications
Diabetes	Well controlled, no obvious diabetic complications	Not well controlled,diabetic complications (e.g. claudication, impaired renal function)
Previous coronary revascularisation	Not directly relevant – depends on current signs and symptoms	Not directly relevant – depends on current signs and symptoms
Respiratory disease		
COAD/COPD	Productive cough; wheeze well controlled by inhalers; occasional episodes of acute chest infection	Breathlessness on minimal exertion (for example, stair climbing, carrying shopping); distressingly wheezy much of the time; several episodes per year of acute chest infection

Asthma	Well controlled by medications/inhalers; not limiting life-style	Poorly controlled; limiting life-style; on high dose of inhaler/oral steroids; frequent hospital admission on account of asthma exacerbation
Renal disease		
	Elevated creatinine (creatinine > 100 µmol/litre and < 200 µmol/litre); some dietary restrictions	Documented poor renal function (creatinine > 200 µmol/litre); regular dialysis programme, (peritoneal or haemodialysis)
COAD, chronic obstructive airways disease; COPD, chronic obstructive pulmonary disease; GTN, glyceryl tinitrate Further examples are available in Appendix 2 of the full guideline (see Section 5)		

Grade 1 surgery (minor)

Grade 1 surgery

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

ASA Grades

Grade 1 Normal healthy patient (i.e. without any clinically important comorbidity and without a clinically significant past/present medical history).

Grade 2 Patient with mild systemic disease.

Grade 3 A patient with severe systemic disease but the disease is not a constant threat to life.

See section 1 for more information.

ASA Grade 1: children < 16 years

Test	Age

	< 6 months	≥ 6 to < 12 months	≥ 1 to < 5 years	≥ 5 to < 12 years	≥ 12 to < 16 years
Chest X-ray	No	No	No	No	No
ECG	No	No	No	No	No
Full blood count	No	No	No	No	No
Haemostasis	No	No	No	No	No
Renal function	No	No	No	No	No
Random glucose	No	No	No	No	No
Urine analysis[a]	No	No	No	No	No
[a] Dipstick urine testing in asymptomatic individuals is not recommended (UK National Screening Committee)					

ASA Grade 1: adults ≥ 16 years

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	No	No	No	No
ECG	No	Consider	Consider	Yes
Full blood count	No	No	Consider	Consider
Haemostasis	No	No	No	No
Renal function	No	No	Consider	Consider
Random glucose	No	No	No	No
Urine analysis[a]	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from cardiovascular disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	No	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Consider	Consider	Consider	Consider
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	No	No	No	No
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from cardiovascular disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider

Lung function	No	No	No	No

ASA Grade 2: adults with comorbidity from respiratory disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	No	Consider	Consider	Consider
ECG	No	Consider	Consider	Consider
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	no	No	Consider	Consider
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from respiratory disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Consider	Consider
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Consider	Consider	Consider	Consider
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider

Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 2: adults with comorbidity from renal disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray[a]	No	No	No	Consider
ECG[b]	No	Consider	Consider	Consider
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	No	No	No	No
Lung function	No	No	No	No

[a] Chest X-ray may be considered if the patient has signs of other comorbidities often associated with renal disease, such as hypertension and coronary heart failure

[b] Depending on the cause of renal disease (e.g. diabetes and hypertension)

ASA Grade 3: adults with comorbidity from renal disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray[a]	No	No	Consider	Consider
ECG	No	Consider	Consider	Consider
Full blood count	Yes	Yes	Yes	Yes

Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

Grade 2 surgery (intermediate)

Grade 2 surgery

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

ASA Grades

Grade 1 Normal healthy patient (i.e. without any clinically important comorbidity and without a clinically significant past/present medical history).

Grade 2 Patient with mild systemic disease.

Grade 3 A patient with severe systemic disease but the disease is not a constant threat to life.

See section 1 for more information.

ASA Grade 1: children < 16 years

Test	**Age**				
	< 6 months	**≥ 6 to < 12 months**	**≥ 1 to < 5 years**	**≥ 5 to < 12 years**	**≥ 12 to < 16 years**
Chest X-ray	No	No	No	No	No
ECG	No	No	No	No	No

Full blood count	No	No	No	No	No
Haemostasis	No	No	No	No	No
Renal function	No	No	No	No	No
Random glucose	No	No	No	No	No
Urine analysis[a]	No	No	No	No	No

ASA Grade 1: adults ≥ 16 years

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	No	No	No	No
ECG	No	Consider	Consider	Yes
Full blood count	No	Consider	Yes	Yes
Haemostasis	No	No	No	No
Renal function	No	No	Consider	Consider
Random glucose	No	Consider	Consider	Consider
Urine analysis[a]	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from cardiovascular disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes

Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Consider	Consider	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	No	No	No	No
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from cardiovascular disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 2: adults with comorbidity from respiratory disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider

ECG	No	Consider	Consider	Consider
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	No	Consider	Consider	Consider
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from respiratory disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Yes	Yes
Full blood count	Consider	Consider	Consider	Yes
Haemostasis	No	No	No	No
Renal function	Consider	Consider	Consider	Consider
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from renal disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**

Chest X-ray[a]	No	No	Consider	Consider
ECG[b]	Consider	Consider	Yes	Yes
Full blood count	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	No	No	No	No
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from renal disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

Grade 3 surgery (major)

Grade 3 surgery

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

ASA Grades

Grade 1 Normal healthy patient (i.e. without any clinically important comorbidity and without a clinically significant past/present medical history).

Grade 2 Patient with mild systemic disease.

Grade 3 A patient with severe systemic disease but the disease is not a constant threat to life.

See section 1 for more information.

ASA Grade 1: children < 16 years

Test	Age				
	< 6 months	**≥ 6 to < 12 months**	**≥ 1 to < 5 years**	**≥ 5 to < 12 years**	**≥ 12 to < 16 years**
Chest X-ray	No	No	No	No	No
ECG	No	No	No	No	No
Full blood count	Consider	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No	No
Renal function	Consider	Consider	Consider	Consider	Consider
Random glucose	No	No	No	No	No

Urine analysis[a]	Consider	Consider	Consider	Consider	Consider

ASA Grade 1: adults ≥ 16 years

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	No	No	Consider	Consider
ECG	No	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	No	No	No	No
Renal function	Consider	Consider	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis[a]	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from cardiovascular disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	No	No	No	No
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider

Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from cardiovascular disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 2: adults with comorbidity from respiratory disease

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Consider	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	No	No	No	No
Renal function	Consider	Consider	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider

Blood gases	Consider	Consider	Consider	Consider
Lung function	No	Consider	Consider	Consider

ASA Grade 3: adults with comorbidity from respiratory disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	No	No	No	No
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from renal disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG[b]	Consider	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider

Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from renal disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

Grade 4 surgery (major+)

Grade 4 surgery

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

ASA Grades

Grade 1 Normal healthy patient (i.e. without any clinically important comorbidity and without a clinically significant past/present medical history).

Grade 2 Patient with mild systemic disease.

Grade 3 A patient with severe systemic disease but the disease is not a constant threat to life.

See section 1 for more information.

ASA Grade 1: children < 16 years

Test	Age				
	< 6 months	**≥ 6 to < 12 months**	**≥ 1 to < 5 years**	**≥ 5 to < 12 years**	**≥ 12 to < 16 years**
Chest X-ray	No	No	No	No	No
ECG	No	No	No	No	No
Full blood count	Consider	Consider	Consider	Consider	Consider
Haemostasis	No	No	No	No	No
Renal function	Consider	Consider	Consider	Consider	Consider
Random glucose	No	No	No	No	No
Urine analysis[a]	Consider	Consider	Consider	Consider	Consider

ASA Grade 1: adults ≥ 16 years

Test	Age (years)			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	No	No	Consider	Consider

ECG	No	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis[a]	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from cardiovascular disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Yes	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from cardiovascular disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Yes	Yes
ECG	Yes	Yes	Yes	Yes

Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 2: adults with comorbidity from respiratory disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Consider	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	Consider	Consider	Consider	Consider

ASA Grade 3: adults with comorbidity from respiratory disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider

ECG	Consider	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	Consider	Consider	Consider	Consider

ASA Grade 2: adults with comorbidity from renal disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	Consider	Consider	Consider	Consider
ECG[b]	Consider	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

ASA Grade 3: adults with comorbidity from renal disease

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**

Chest X-ray	Consider	Consider	Consider	Consider
ECG	Consider	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis	Consider	Consider	Consider	Consider
Blood gases	Consider	Consider	Consider	Consider
Lung function	No	No	No	No

Neurosurgery

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

ASA Grades

Grade 1 Normal healthy patient (i.e. without any clinically important comorbidity and without a clinically significant past/present medical history).

Grade 2 Patient with mild systemic disease.

Grade 3 A patient with severe systemic disease but the disease is not a constant threat to life.

See section 1 for more information.

ASA Grade 1: children < 16 years

Test	Age				
	< 6 months	≥ 6 to < 12 months	≥ 1 to < 5 years	≥ 5 to < 12 years	≥ 12 to < 16 years

Chest X-ray	No	No	No	No	No
ECG	No	No	No	No	No
Full blood count	Consider	Consider	Consider	Consider	Consider
Haemostasis	Consider	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No	No
Urine analysis[a]	Consider	Consider	Consider	Consider	Consider

ASA Grade 1: adults ≥ 16 years

Test	**Age (years)**			
	≥ 16 to < 40	**≥ 40 to < 60**	**≥ 60 to < 80**	**≥ 80**
Chest X-ray	No	No	Consider	Consider
ECG	Consider	Consider	Yes	Yes
Full blood count	Consider	Consider	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis[a]	Consider	Consider	Consider	Consider

Cardiovascular surgery

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

ASA Grades

Grade 1 Normal healthy patient (i.e. without any clinically important comorbidity and without a clinically significant past/present medical history).

Grade 2 Patient with mild systemic disease.

Grade 3 A patient with severe systemic disease but the disease is not a constant threat to life.

See section 1 for more information.

ASA Grade 1: children < 16 years

Test	Age				
	< 6 months	**≥ 6 to < 12 months**	**≥ 1 to < 5 years**	**≥ 5 to < 12 years**	**≥ 12 to < 16 years**
Chest X-ray	Yes	Yes	Yes	Yes	Yes
ECG	Yes	Yes	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes	Yes
Random glucose	No	No	No	No	No
Urine analysis[a]	Consider	Consider	Consider	Consider	Consider

ASA Grade 1: adults ≥ 16 years

Test	Age (years)			
	≥ 16 to < 40	≥ 40 to < 60	≥ 60 to < 80	≥ 80
Chest X-ray	Yes	Yes	Yes	Yes
ECG	Yes	Yes	Yes	Yes
Full blood count	Yes	Yes	Yes	Yes
Haemostasis	Consider	Consider	Consider	Consider
Renal function	Yes	Yes	Yes	Yes
Random glucose	Consider	Consider	Consider	Consider
Urine analysis[a]	Consider	Consider	Consider	Consider

Sickle cell test

Tests for the sickle cell gene in adults and children

[No] Test not recommended

[Consider] Consider this test (see section 1)

[Yes] Test recommended

Appropriateness of testing in patients from the following ethnic groups	
North African	Yes
West African	Yes
South/sub-Saharan African	Yes
Afro Caribbean	Yes
Should informed consent be obtained?	Yes

Notes

- It is important to offer to test all patients in these ethnic groups, and people of other ethnic groups considered to be at risk. The sickle cell gene is found in many nationalities including families that come from Africa, the Caribbean, the Eastern Mediterranean, Middle East and Asia. It has also been detected in Cypriot people and a few other white ethnic groups.
- It is important to offer to test patients before they have an anaesthetic, if there is any uncertainty about whether they have the sickle cell gene. This is especially important for patients who have a family history of homozygous sickle cell anaemia or sickle cell trait and who do not have a surgical history where it may have been detected previously.
- People of ethnic origin considered to be at risk should be offered screening, with genetic counselling before and after screening.
- Some patients may not know their ethnicity, for example those who have been adopted.
- Appropriate counselling for this test is important so that patients are able to give their informed consent, as there may be implications for patients who discover they are carriers of the sickle cell gene. The results of testing, even when negative, should be reported to families, with the patient's consent, and documented in the patient's medical record to avoid unnecessary repeat testing. Counselling should be offered if the result of the test if positive.

Pregnancy test

Pregnancy test

[No] Test not recommended [Consider] Consider this test (see section 1) [Yes] Test recommended

Pregnancy testing should be carried out in the following female patients of reproductive age	
With history of last menstrual period	Consider
Who says that it is not possible for her to be pregnant	Consider
Who says it is possible that she may be pregnant	Yes
Should informed consent be obtained?	Yes

Notes

- The need to test for pregnancy depends on the risk presented by the anaesthetic and surgery to the fetus. All women of child-bearing age should be asked whether or not there is any chance that they may be pregnant.
- Women must be made aware of the risks of surgery to the fetus.
- A pregnancy test should be carried out with the woman's consent if there is any doubt about whether the woman may be pregnant.
- Before having a chest X-ray, all women of childbearing age should be asked sensitively whether they may be pregnant.

Consent

Patient consent

- The issue of consent to undergo preoperative tests is addressed briefly in relation to specific tests in Chapters 4–7 of the full version of the guideline (see Section 5). For further guidance, clinicians should refer to the *Good Practice in Consent*[1] guidance on issues of consent in the NHS.
- This guideline supports the advice given in that publication – that it is "a general legal and ethical principle that valid consent must be obtained before starting treatment or physical examination, or providing personal care, for a patient" and that patients should have access to sufficient information about risks, benefits and alternatives to be able to make an informed decision about whether to consent.
- Staff undertaking clinical preoperative assessments should discuss with patients which tests are recommended (or required), what they involve and why they are being carried out.
- Decisions about whether to test or not should follow discussion between the patient and the doctor or nurse, especially where there is uncertainty about whether a test should be recommended or not. For some tests, a positive result carries a far greater significance for the patient than others, such as testing for previously undetected diabetes, the sickle cell gene and pregnancy.

- Patients should have access to information about the tests and the possible implications of a positive result so that they can give their informed consent. Doctors or nurses carrying out or ordering tests should write in the patient's notes that they have discussed the recommended tests and their implications with the patient.
- Patients should be informed of the results of tests and about the implications for treatment, and any longer term implications for their health, if the results are abnormal.

A version of this guideline for patients, their carers and the public is available.

[1] Department of Health (2002) *Good practice in Consent Implementation Guide: Consent to Examination or Treatment.*

2 Notes on the scope of the guidance

The scope for the guideline is available from the NICE website.

3 Implementation in the NHS

3.1 General

3.1.1 NHS organisations should review their existing practice for preoperative testing against this guideline. The review should consider the resources required to implement fully the recommendations set out in Section 1, the people and processes involved, and the timeline over which full implementation is envisaged. Clearly, it is in the interests of patients that the implementation timeline is as rapid as possible.

3.1.2 Relevant local clinical guidelines, care pathways and protocols should be reviewed in the light of this guidance and revised accordingly.

3.1.3 This guideline should be used in conjunction with the guidance from the NHS Modernisation Agency on preoperative assessment for inpatients and day surgery.[2]

3.2 Audit

3.2.1 Implementation should be audited (in addition to auditing compliance with the guideline) and the methods for auditing implementation should be maintained to provide a mechanism for regular review, ensuring that a revised guideline or relevant new evidence is disseminated promptly as it becomes available and new recommendations are incorporated into local guidance.

3.2.2 To audit compliance with the guideline, it is recommended that data are collected to obtain the following summary statistics.

- the percentage of patients who are **not** tested, in compliance with the guideline
- the percentage of patients who **are** tested, in compliance with the guideline
- the percentage of patients who are **not** tested, against the recommendations of the guideline

- the percentage of patients who **are** tested, against the recommendations of the guideline
- the percentage of patients who are tested and for whom one or more reasons for testing are documented
- the percentage of patients for whom the minimum dataset (see Box 4) is available.

3.2.3 It is recommended that a minimum dataset (see Box 4) is collected, at least when ordering tests in contravention of the guideline or where the guideline is uncertain. Ideally the minimum dataset would be collected when any test is ordered. Auditing compliance with the guideline will be much more difficult if this minimum dataset is not collected at the time of ordering.

3.2.4 Further details on data collection and audit are included in the full guideline (see Section 5).

Box 4 Minimum dataset at time of ordering test

1. ASA grade of patient (potentially available from other sources since it is proposed that this item of information will become part of the Hospital Episode Statistics minimum dataset)
2. Main comorbidity (e.g. renal, respiratory and cardiovascular; main categories could be pre-coded on the test order form)
3. Grade of surgery
4. Reasons for ordering

[2] NHS Modernisation Agency's Operating Theatre and Pre-operative Assessment Programme (2003) *National Good Practice Guidance on Pre-operative Assessment for Inpatients.* Department of Health.

NHS Modernisation Agency's Operating Theatre and Pre-operative Assessment Programme (2002) *National Good Practice Guidance on Pre-operative Assessment for Day Surgery.* Department of Health

4 Research recommendations

Research recommendations have been identified during the development of this guideline. They are detailed in the full guideline (see Section 5).

5 Full guideline

The National Institute for Clinical Excellence commissioned the development of this guidance from the National Collaborating Centre for Acute Care. The Centre established a Guideline Development Group, which reviewed the evidence and developed the recommendations. The full guideline, Preoperative tests. The use of routine preoperative tests for elective surgery. Evidence, methods and guidance, is published by the National Collaborating Centre for Acute Care; it is available on the NICE website.

The members of the Guideline Development Group are listed in Appendix A. Information about the Institute's Guidelines Advisory Committee is given in Appendix B.

The booklet The guideline development process – information for the public and the NHShas more information about the Institute's guideline development process. It is available from the Institute's website.

6 Related NICE guidance

There is no current related guidance.

7 Review

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin earlier than 4 years if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

Appendix A: The Guideline Development Group

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Health Economist

Appendix B: The Guidelines Advisory Committee

The Guidelines Advisory Committee is an independent committee established by NICE to validate the clinical guidelines developed by the National Collaborating Centres. The multidisciplinary Committee includes experts on guideline methodology, health professionals and people with experience of the issues affecting patients and carers. A full list of members of the Guidelines Advisory Committee can be found on NICE website.

For each guideline, a number of Committee members oversee the development of the guideline and take responsibility for monitoring its quality. The Committee members who took on this role for this guideline were:

Professor Martin Eccles (Chairman of the Committee)
Professor of Clinical Effectiveness, Centre for Health Services Research, University of Newcastle upon Tyne.

Miss Amanda Wild
Representative of Association of British Health Industries

Dr Marcia Kelson
Director, Patient Involvement Unit for NICE, College of Health, London

Professor Robert Shaw
Professor of Obstetrics and Gynaecology, University of Nottingham

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 National Collaborating Centre for Acute Care. The Collaborating Centre 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.

We have produced a summary for patients and carers. Tools to help you put the guideline into practice and information about the evidence it is based on are also available.

Changes since publication

February 2012: minor maintenance

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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