1. Background information

Guideline issue date: 2003
7 year review: 2010 (first review was 2007)
National Collaborating Centre: National Clinical Guidelines Centre (formally Acute Care)

2. Consideration of the evidence

Literature search
From initial intelligence gathering and a high-level randomised controlled trial (RCT) search clinical areas were identified to inform the development of clinical questions for focused searches. Through this stage of the process 3 studies were identified relevant to the guideline scope. The identified evidence was related to the following areas within the guideline:

- Clinical utility of preoperative tests in ambulatory surgery including cataract surgery
- Clinical utility of preoperative tests for planned/elective surgery, according to BMI and surgical classification.
- Random glucose tests for planned/elective surgery in adult patients with ASA grade 1 to 3.

Six clinical questions were developed based on the clinical areas above, qualitative feedback from other NICE departments and the views expressed by the Guideline Development Group, for more focused literature searches. The results of the focused searches are summarised in the table below.
references identified through the initial intelligence gathering, high-level RCT search and the focused searches can be viewed in Appendix 1.
### Clinical area 1: Clinical utility of preoperative tests in ambulatory surgery including cataract surgery

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<th>Clinical question</th>
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| What are the diagnostic accuracy and clinical utility of preoperative testing in ambulatory surgery, including cataract surgery? | Through the focused search 4 studies relevant to the clinical question were identified as follow:  
   - One systematic review and one prospective randomised controlled trial showed that routine preoperative testing did not increase the safety of cataract surgery.  
   - A large randomised controlled trial showed that there was no increase in the peri-operative adverse events as a result of no preoperative testing (complete blood count, electrolytes, blood glucose, creatinine, electrocardiogram, and chest radiograph) in patients with ASA grade 1 to 3 undergoing ambulatory surgery.  
   - A prospective audit found that ECG was of limited value in the risk stratification of patients selected for day-case surgery.                                                                                       | Potential new evidence that may change current recommendations                                           |
Overall, there was evidence that suggested the elimination of preoperative testing in ambulatory surgery/day-case surgery, including cataract surgery.

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<th>Clinical area 2: Clinical utility of preoperative tests for planned/elective surgery, according to BMI and surgical classification.</th>
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<td>For people with a diagnosis of obesity, what are the differences on diagnostic accuracy and clinical utility of different preoperative tests in predicting complications, adverse events or changes in management for planned/elective surgery, according to BMI and surgical classification?</td>
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<td>A prospective observational study showed that peri-operative lung volumes decreased significantly with increasing BMI in patients undergoing breast surgery and lower abdominal laparotomy. The study concluded postoperative reduction in spirometric volumes was related to BMI.</td>
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<td>Obesity alone may be considered as comorbidity in deciding the need for preoperative testing.</td>
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Clinical area 3: Random glucose tests for planned/elective surgery in adult patients with ASA grade 1 to 3

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| What are the diagnostic accuracy and clinical utility of random glucose tests in predicting complications, adverse events or changes in management for planned/elective surgery in adult patients with ASA Grade 1 to 3 (as defined in the guideline)? | Through the focused search 5 studies relevant to the clinical question were identified as follow:  
- One observational study showed that peri-operative glucose levels were associated with higher risk of death in patients without a history of diabetes after non-cardiac general surgery. Another case control study also showed that preoperative hyperglycemia is associated with increased cardiovascular mortality in patients undergoing non-cardiac and non-vascular surgery.  
- An observational study showed that, independent of previous cardiac disease, diabetes or other comorbidities, increasing operative day glucose was independently associated with perioperative stroke or transient ischemic attack, myocardial infarction and death in patients undergoing carotid endarterectomy. | Potential new evidence that may change current recommendations |
- Another case series also showed that preoperative hyperglycemia was significantly associated with infected knee replacement. The study suggested that preoperative screening of plasma glucose is an efficient way to identify patients in increased risk of infection following primary total knee replacement. However,

- A retrospective cohort study showed that blood glucose increase was not statistically associated with higher mortality or infection rate in patients undergoing coronary artery bypass grafting with and without diabetes. However, peri-operative hyperglycemia was associated with increased resource utilization in patients undergoing coronary artery bypass grafting with and without diabetes.

Overall, there was some evidence suggesting random glucose test may have clinical utility in predicting adverse events in adult patients with ASA grade 1 to 3.
Clinical area 4: Cardiovascular risk assessment tests (apart from ECG) for planned/elective surgery in adult patients with mild or systemic co-morbidity (ASA grade 2 and 3) from cardiovascular, respiratory and renal disease

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| What are the diagnostic accuracy and clinical utility of cardiovascular risk assessment tests (apart from ECG) in predicting complications, adverse events or changes in management for planned/elective non-cardiac surgery in adult patients with mild or systemic comorbidity from cardiovascular disease, respiratory and renal disease (ASA Grade 2 & 3 in the guideline)? | Through the focused search 10 studies relevant to the clinical question were identified. **Non-invasive stress testing:**  
- A population based retrospective cohort study showed that preoperative non-invasive cardiac stress testing is associated with improved one year survival and length of hospital stay in patients undergoing elective intermediate to high risk non-cardiac surgery. These benefits principally applied to patients with risk factors for perioperative cardiac complications.  
- A retrospective data analysis showed that non-invasive stress testing in patients with cardiovascular disease or risk factors who underwent bariatric surgery resulted in a high rate of false-positive results and uncommonly led to | Potential new evidence on new tests that may need to be included in the guideline. |
intervention.

**Stress/exercise echocardiography:**
- A meta-analysis showed that stress echocardiography (SE) was superior to thallium imaging (TI) in predicting postoperative cardiac events in patients at risk for myocardial infarction (MI) scheduled for elective non-cardiac surgery.
- An observational study showed that, in patients 75 years and older undergoing intermediate- or high-risk cancer surgery, an abnormal preoperative exercise echocardiography significantly predicted postoperative adverse cardiovascular events, which in turn was associated with increased hospital length of stay.
- Another observational study also showed that, in patients undergoing intermediate- or high-risk renal transplantation, a positive preoperative stress echocardiography predicted a sevenfold higher risk of cardiovascular events regardless of the need for revascularization before the transplant.
**Dobutamine stress echocardiography (DSE):**
- An observational study showed that, in patients undergoing renal transplantation, DSE could effectively identify those at low and high risk of major adverse cardiac events.
- Another observational study also showed that a positive DSE did not reliably identify patients at high cardiac risk during liver transplantation, but a negative DSE was strongly predictive of no myocardial injury.

**Myocardial Perfusion Imaging:**
- An observational study showed that, in patients undergoing non-cardiac surgery, abnormal preoperative gated myocardial perfusion imaging (G-SPECT) could predict cardiac events.
- Two other observational studies also showed that, in patients undergoing renal transplantation or liver transplantation, those with normal images of preoperative myocardial perfusion imaging (SPECT) had significantly
Overall, there was some evidence indicated that, apart from ECG, other cardiovascular risk assessment tests may have clinical utility in predicting cardiac events in grade 3 and 4 non-cardiac surgery.

### Clinical area 5: Cardiopulmonary Exercise test for planned/elective non-cardiac and non-pulmonary surgery in adult patients with mild or systemic co-morbidity (ASA grade 2 and 3) from cardiovascular, respiratory and renal disease

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<td>What are the diagnostic accuracy and clinical utility of cardiopulmonary exercise testing (CPX) in predicting complications, adverse events or changes in management for planned/elective non-cardiac and non-pulmonary surgery in adult patients with mild or systemic co-morbidity (ASA grade 2 and 3) from cardiovascular, respiratory and renal disease</td>
<td>Through the focused search 2 studies relevant to the clinical question were identified. One observational study identified that CPX testing is of limited value in predicting postoperative cardiopulmonary morbidity in patients undergoing esophagectomy. Another observational study also demonstrated that CPX testing could not predict postoperative mortality and pulmonary complications.</td>
<td>No conclusive evidence was identified that would invalidate current guideline recommendations.</td>
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For female aged 12 to 16 years, what will be the appropriate and sensitive approaches to gain information regarding pregnancy status, as well as obtaining consent for pregnancy test before elective surgery?

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<tr>
<td>Through the focused search no studies relevant to the clinical question were identified.</td>
<td>No evidence was identified that would invalidate current recommendations.</td>
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As such, no sufficient conclusive new evidence was identified which would warrant an update of the guideline recommendations at this time.
An ongoing HTA project on ‘Pre-operative testing: evidence synthesis, cost effectiveness and value of information analysis’ was also identified. This study will identify, assess and combine the evidence for three of the most common pre-operative tests (full blood count, electrolytes, renal function through urea); and pulmonary function tests (PFT); in order to provide a definitive account of their clinical worth and an assessment of whether this is sufficient to justify their cost. The study is due to publish early 2012.

Guideline Development Group and National Collaborating Centre perspective
A questionnaire was distributed to GDG members and the National Collaborating Centre to consult them on the need for an update of the guideline. Four responses were received with respondents highlighting the following areas:

- The likely impact of the ongoing HTA project on ‘Pre-operative testing: evidence synthesis, cost effectiveness and value of information analysis’.
- The clinical utility of blood glucose test for people with undiagnosed type 2 diabetes and poorly controlled diabetes prior to all grades of surgery and the ‘Group and Save Testing’ for Major (3) and Major+ (4) surgeries
- Consider the inclusion of new tests in the guideline, for example, static Echo, stress Echo, myocardial perfusion scanning, and cardiopulmonary exercise test
- To address the sensitive and important issue of assessing the pregnancy status of 12-16 year olds
Feedback from the GDG and NCC contributed towards the development of the clinical questions for the focused searches.

**Implementation and post publication feedback**

In total 33 enquiries were received from post-publication feedback, most of which were routine. Key themes emerging from post-publication feedback were preoperative tests before ASA grade 1 surgery for patients older than 60 years and cardiopulmonary exercise testing (CPX) to determine preoperative fitness. This feedback contributed towards the development of clinical questions described above.

Feedback from NICE implementation uptake report mentioned a study that found patients have blood tests performed in excess of the NICE guideline with coagulation screens requested in excess of guideline 17.8% of cases.

No new evidence was identified through post-publication enquiries or implementation feedback that would indicate a need to update the guideline.

**Relationship to other NICE guidance**

No NICE guidance is related to CG03.

**Anti-discrimination and equalities considerations**

No evidence was identified to indicate that the guideline scope does not comply with anti-discrimination and equalities legislation. The original scope included ASA grade 1 (adults and children) and ASA grade 2 and 3 (adults only) undergoing elective surgery.

**Conclusion**

From the evidence and intelligence identified through the process, it suggests that some areas of the guideline may need updating at this stage, particularly in relation to:

- Preoperative testing in ambulatory surgery including cataract surgery
• The clinical utility of cardiovascular risk assessment tests (apart from ECG) before grade 3 and 4 non-cardiac surgery
• The clinical utility of random glucose test for adult patients with ASA grade 1 to 3
• Preoperative testing according to BMI

As the ongoing HTA project on ‘Pre-operative testing: evidence synthesis, cost effectiveness and value of information analysis’ would have a significant impact on current recommendations on the most common pre-operative tests (full blood count, electrolytes, renal function through urea), the publication of its results in 2012 needs to be considered in the update of the guideline.

3. Review recommendation

The guideline should be considered for an update, pending on the publication of the HTA project in 2012.

Centre for Clinical Practice
10.02.11
APPENDIX 1:


Beattie, W.S., Abdelnaem, E., Wijeysundera, D.N., & Buckley, D.N. 2006. A meta-analytic comparison of preoperative stress echocardiography and nuclear scintigraphy imaging. Anesthesia & Analgesia, 102, (1) 8-16


Ho, C. 2007. An audit of the value of pre-operative electrocardiograms before surgery (general anaesthetic) in a day surgery unit. Scottish Medical Journal, 52, (2) 28-30


