

# Preoperative Laboratory Testing



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## KEYWORDS

- Preoperative testing • Preprocedure testing • Choosing wisely • Electrocardiograms
- Pregnancy testing • Coagulation studies • Patient safety • Complication

## KEY POINTS

- Preoperative testing should be based on the patient's history, review of medical records, physical examination, and type of procedure.
- It is important to avoid testing in healthy patients and in those having minimally invasive procedures. Furthermore, it is not necessary to repeat recent testing if there is no change in the patient's condition.
- Preoperative electrocardiograms (ECGs) should not be ordered in asymptomatic persons undergoing low-risk surgical procedures regardless of age. Preoperative ECGs can be considered in patients with coronary heart disease, significant arrhythmia, peripheral arterial disease, cerebrovascular disease, or other significant structural heart disease.
- In institutions that do not require preoperative pregnancy testing, obtaining an accurate menstrual history is essential, and testing should be ordered if there is any doubt. It is appropriate to consider pregnancy testing in any woman of childbearing age.
- Coagulation studies identify clotting factor deficiencies in vitro and are not predictive of clinical bleeding. Therefore, routine coagulation studies are not recommended.

Preoperative Assessment Testing Clinics coordinate preoperative surgical, anesthesia, nursing, and laboratory care.<sup>1</sup> The prior history, medical records, previous tests, and consultations are reviewed, and a medical history and physical examination are conducted. Laboratory testing and electrocardiogram (ECG) should only be ordered if necessary.

Decades ago, advances in technology with the introduction of a multiphasic battery of laboratory tests led to an increase in the number of tests ordered with the

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assumption that early presymptomatic diagnosis will optimize care and reduce medical costs.<sup>2</sup> However, more testing is likely to lead to an increased number of abnormal results, leading to further unnecessary workup with an increase in medical costs and the possibility of increased morbidity from more medical interventions. Further workup is likely to lead to delays or cancellations of a surgical procedure that may be medically necessary and is likely to provoke anxiety and be very inconvenient for the patient. In addition, the medicolegal risk is greater if a test is ordered and not followed than if a test is not ordered based on the patient's history. Preoperative testing should be based on a targeted history and physical examination, on the patient's comorbidities, and on the type of surgery. It is important to avoid repetition of prior testing if there is no change in the patient's condition, and to avoid testing in healthy patients having minimally invasive procedures. Routine testing does not increase safety or the possibility of surgery cancellation, even in elderly patients with multiple comorbidities, for minimally invasive procedures such as cataract surgery.<sup>3</sup> Goal-oriented preoperative testing must first take into account the surgical procedure and a thorough history and physical examination (Fig. 1).

The American Board of Internal Medicine Foundation launched the Choosing Wisely campaign back in 2012 with a goal of advancing a national dialogue on avoiding unnecessary medical tests, treatments, and procedures.<sup>4</sup> The American Society of Anesthesiologists (ASA) is a partner in the Choosing Wisely Campaign and is encouraging ongoing dialogue between patients and anesthesiologists to eliminate unnecessary tests and procedures.<sup>5</sup> The final "Top-Five" list of common low-value activities to question in the field of anesthesiology includes baseline laboratory studies and diagnostic cardiac testing. Baseline laboratory studies, such as complete blood count, basic or complete metabolic panel, and coagulation studies, are not necessary in healthy patients without significant systemic disease, when blood loss is expected to be minimal.<sup>6</sup> Baseline diagnostic cardiac testing, such as transthoracic or transesophageal echocardiogram or cardiac stress test, is not necessary in asymptomatic stable patients with known cardiac disease undergoing low- or moderate-risk noncardiac surgery.<sup>6</sup> These tests were chosen based on how frequently they were ordered (very often), the impact on quality and cost of care (little benefit and expensive), and the evidence for its recommendation (weak).<sup>6</sup> Interestingly, other baseline studies, such as the ECG and chest radiography (CXR), were not included in this list. In addition, baseline pregnancy testing in premenopausal women of childbearing age did not make the list.

In a recent large Canadian retrospective cohort study of preoperative testing before low-risk procedures, Kirkham and colleagues<sup>7</sup> found that ECG was performed before nearly a third of procedures and a CXR before 10.8% of low-risk surgeries. There was a significant regional and institution level variation present, with as much as a 30-fold difference between institutions. Older age, procedure type, and preoperative medicine and anesthesia consultation were associated with routine ECG ordering. Cardiac comorbidities (eg, coronary artery disease, atrial fibrillation) were associated with preoperative ECG and CXR, but the effect sizes were smaller than those mentioned above. The investigators noticed a decrease in testing since 2010, which coincides with the elimination of reimbursement for routine preoperative CXR and ECG before cataract surgery.<sup>7</sup>



Fig. 1. Goal-orientated interdisciplinary process-flow of surgical patients.

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