



## Complete Summary

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### GUIDELINE TITLE

Intraoperative parathyroid hormone. Laboratory medicine practice guidelines: evidence-based practice for point-of-care testing.

### BIBLIOGRAPHIC SOURCE(S)

Sokoll LJ, Remaley AT, Sena SF, Wians FH Jr, Wu J, Libutti SK, Udelsman R. Intraoperative parathyroid hormone. In: Laboratory medicine practice guidelines: evidence-based practice for point-of-care testing. Washington (DC): National Academy of Clinical Biochemistry (NACB); 2006. p. 105-19. [99 references]

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
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IDENTIFYING INFORMATION AND AVAILABILITY  
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## SCOPE

### DISEASE/CONDITION(S)

Parathyroid disease, including:

- Primary hyperparathyroidism
- Secondary and tertiary hyperparathyroidism
- Reoperative hyperparathyroidism
- Multiple endocrine neoplasia (MEN) I
- Parathyroid carcinoma

### GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness  
Diagnosis  
Evaluation

### **CLINICAL SPECIALTY**

Endocrinology  
Family Practice  
Internal Medicine  
Surgery

### **INTENDED USERS**

Advanced Practice Nurses  
Allied Health Personnel  
Clinical Laboratory Personnel  
Health Care Providers  
Hospitals  
Nurses  
Physician Assistants  
Physicians  
Public Health Departments

### **GUIDELINE OBJECTIVE(S)**

- To examine the application of evidence-based medicine (EBM) to the form of diagnostic testing known as point-of-care testing (POCT)

**Note:** For the purpose of this document, POCT is defined as "clinical laboratory testing conducted close to the site of patient care, typically by clinical personnel whose primary training is not in the clinical laboratory sciences or by patients (self-testing). POCT refers to any testing performed outside of the traditional, core or central laboratory."

- To systematically review and synthesize the available evidence on the effectiveness of POCT, with specific focus on outcomes in the areas of:
  1. Patient/health
  2. Operational/management
  3. Economic benefit
- To explore clinical questions on the applications of rapid parathyroid hormone (PTH) assay and the impact of the assay on patient health and operational and financial outcomes

### **TARGET POPULATION**

Patients undergoing surgery for parathyroid hormone abnormalities

### **INTERVENTIONS AND PRACTICES CONSIDERED**

Intraoperative parathyroid hormone (PTH) testing

## **MAJOR OUTCOMES CONSIDERED**

- Patient outcomes such as adequacy of resection or cure rates, operative failure and recurrence rates, morbidity and complication rates, operating room time and length of stay
- Economic benefit
- Sensitivity, specificity, and accuracy of parathyroid hormone (PTH) assay

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

For a specific clinical use, pertinent clinical questions were formulated and key search terms were ascertained for the literature search. Searches were conducted on MEDLINE or PubMed and were supplemented with the use of the National Guideline Clearinghouse, the Cochrane Group, or evidence-based medicine (EBM) reviews. Additionally, authors' personal article collections were used. Acceptable citations were limited to peer-reviewed articles with abstracts, those published in English, and those involving human subjects.

To be included in the full systematic review of the clinical question, articles selected for full text review were examined for at least 1 relevant outcomes measurement.

Development of practice guidelines was based on literature searched from the PubMed database (1966, November week 2, 2003) and was limited to articles in English and those with abstracts (Literature Searches 62 to 75 [Appendix B - see the "Availability of Companion Documents" field]).

### **NUMBER OF SOURCE DOCUMENTS**

Not stated

### **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

### **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

#### **Levels of Evidence**

- I. Evidence includes consistent results from well-designed, well-conducted studies in representative populations.

- II. Evidence is sufficient to determine effects, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies; generalizability to routine practice; or indirect nature of the evidence.
- III. Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information.

## **METHODS USED TO ANALYZE THE EVIDENCE**

Systematic Review with Evidence Tables

### **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Abstracts identified by the literature searches were reviewed by 2 individuals to determine initial eligibility or ineligibility for full-text review, using Form 1 (Appendix A - see the "Availability of Companion Documents" field). If there was not consensus, then a third individual reviewed the abstract(s). To be included in the full systematic review of the clinical question, articles selected for full text review were examined for at least 1 relevant outcomes measurement. The systematic review consisted of creating evidence tables using Form 2 (Appendix A - see the "Availability of Companion Documents" field) that incorporated the following characteristics:

1. Study design—Prospective or retrospective, randomized, and controlled, patient inclusion/exclusion criteria, blinding, number of subjects, etc.
2. Appropriateness of controls
3. Potential for bias (consecutive or nonconsecutive enrollment)
4. Depth of method description—full-length report or technical brief
5. Clinical application—screening, diagnosis, management
6. Specific key outcomes and how they were measured
7. Conclusions are logically supported

For the assessment of study quality, the general approach to grading evidence developed by the US Preventive Services Task Force was applied (see the "Rating Scheme for the Strength of the Evidence" field). Once that was done, an assessment of study quality was performed, looking at the individual and aggregate data at 3 different levels using Forms 3 and 4 (Appendix A - see the "Availability of Companion Documents" field). At the first level, the individual study design was evaluated, as well as internal and external validity. Internal validity is the degree to which the study provides valid evidence for the populations and setting in which it was conducted. External validity is the extent to which the evidence is relevant and can be generalized to populations and conditions of other patient populations and point-of-care testing (POCT) settings.

The synthesis of the volume of literature constitutes the second level, Form 5 (Appendix A - see the "Availability of Companion Documents" field). Aggregate internal and external validity was evaluated, as well as the coherence/consistency of the body of data. How well does the evidence fit together in an understandable model of how POCT leads to improved clinical outcome? Ultimately, the weight of the evidence about the linkage of POCT to outcomes is determined by assessing the degree to which the various bodies of evidence (linkages) "fit" together. To what degree is the testing in the same population and condition in the various

linkages? Is the evidence that connects POCT to outcome direct or indirect? Evidence is direct when a single linkage exists but is indirect when multiple linkages are required to reach the same conclusion.

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

The field of point-of-care testing (POCT), diagnostic testing conducted close to the site of patient care, was divided into disease- and test-specific focus areas. Groups of expert physicians, laboratorians, and diagnostic manufacturers in each focus area were assembled to conduct systematic reviews of the scientific literature and prepare guidelines based on the strength of scientific evidence linking the use of POCT to patient outcome.

Final guidelines were made according to Agency for Healthcare Research and Quality (AHRQ) classification (see the Rating Scheme for the Strength of the Recommendations field). The guidelines are evidence based and require scientific evidence that the recipients of POCT experience better health outcomes than those who did not and that the benefits are large enough to outweigh the risks. Consensus documents are not research evidence and represent guidelines for clinical practice, and inclusion of consensus documents was based on the linkages to outcomes, the reputation of the peer organization, and the consensus process used to develop the document. Health outcomes, e.g., benefit/harm, are the most significant outcomes in weighing the evidence and drafting guidelines.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

### **Strength of Recommendations**

**A** - The National Academy of Clinical Biochemistry (NACB) strongly recommends adoption; there is good evidence that it improves important health outcomes and concludes that benefits substantially outweigh harms.

**B** - The NACB recommends adoption; there is at least fair evidence that it improves important health outcomes and concludes that benefits outweigh harms.

**C** - The NACB recommends against adoption; there is evidence that it is ineffective or that harms outweigh benefits.

**I** - The NACB concludes that the evidence is insufficient to make recommendations; evidence that it is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

## **COST ANALYSIS**

Literature Search 66 investigated whether the use of intraoperative parathyroid hormone (PTH) measurements alone or in combination with a unilateral or

minimally invasive surgical procedure for primary hyperparathyroidism improves operating room time, operating room fees, overall hospital costs, or length of stay compared to standard bilateral exploration.

The majority of evidence suggests financial savings to the institution as a result of the use of intraoperative PTH, often incorporated with other techniques and surgical approaches. Most evidence incorporates historical controls for comparison, however. Outcomes examined include operating room time and fees, hospital lengths of stay, and overall hospital charges or costs. In one of the first studies combining preoperative localization of parathyroid tumors via 99mTc sestamibi (MIBI) scintigraphy with a rapid PTH assay, cost-effectiveness was evaluated by comparing operating times for 18 patients with primary hyperparathyroidism to operating time for patients not subjected to these procedures. Operative times decreased to an average of 36 min from 90 min. In a subsequent prospective study by the same surgeon in a consecutive series of 85 patients, the mean operative time was 55 min (range, 21–130 min) with intraoperative PTH. In 42 of 57 patients eligible for surgery in an ambulatory setting, same-day discharge was possible. At that institution, parathyroidectomy performed in an ambulatory setting was charged at a rate 39% less than the rate for patients requiring an overnight admission.

Refer to the original guideline document for more information on cost-effectiveness of PTH testing.

## **METHOD OF GUIDELINE VALIDATION**

Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The guidelines were presented in open forum at the American Association for Clinical Chemistry (AACC) Annual Meeting (Los Angeles, CA, USA) in July 2004. Portions of these guidelines were also presented at several meetings between 2003 and 2005. Participants at each meeting had the ability to discuss the merits of the guidelines and submit comments to the National Academy of Clinical Biochemistry (NACB) Web site for formal response by the NACB during the open comment period from January 2004 through October 2005.

## **RECOMMENDATIONS**

### **MAJOR RECOMMENDATIONS**

Definitions of the levels of evidence (I–III) and grades of the recommendation (A, B, C, I) are presented at the end of the "Major Recommendations" field.

**Note from the National Academy of Clinical Biochemistry (NACB) and the National Guideline Clearinghouse (NGC):** *The Laboratory Medicine Practice Guidelines (LMPG) evidence-based practice for point-of-care testing sponsored by the NACB have been divided into individual summaries covering disease- and test-specific areas. In addition to the current summary, the following are available:*

- [Chapter 1: Management](#)
- [Chapter 2: Transcutaneous Bilirubin Testing](#)
- [Chapter 3: Use of Cardiac Biomarkers for Acute Coronary Syndromes](#)
- [Chapter 4: Coagulation](#)
- [Chapter 5: Critical care](#)
- [Chapter 6: Diagnosis and Management of Diabetes Mellitus](#)
- [Chapter 7: Drugs and Ethanol](#)
- [Chapter 8: Infectious Disease](#)
- [Chapter 9: Occult Blood](#)
- [Chapter 11: pH Testing](#)
- [Chapter 12: Renal Function Testing](#)
- [Chapter 13: Reproductive Testing](#)

### **Primary Hyperparathyroidism**

Does the addition of intraoperative parathyroid hormone (PTH) measurements to surgery for parathyroid disease improve the accuracy of identifying multiglandular disease compared to bilateral exploratory surgery? Does the addition of intraoperative PTH measurements to surgery for parathyroid disease improve the adequacy of resection or cure rate compared to bilateral exploratory surgery alone in patients with primary hyperparathyroidism? Does the addition of intraoperative PTH measurements to surgery for parathyroid disease improve morbidity or complication rate compared to bilateral exploratory surgery alone in patients with primary hyperparathyroidism? Does the use of intraoperative PTH measurements alone or in combination with a unilateral or minimally invasive surgical procedure for primary hyperparathyroidism improve use of local or regional anesthesia or extent of exploration (unilateral versus bilateral) compared to standard bilateral exploration? Does the use of intraoperative PTH measurements alone or in combination with a unilateral or minimally invasive surgical procedure for primary hyperparathyroidism improve use of frozen sections compared to standard bilateral exploration? Does the use of intraoperative PTH measurements alone or in combination with a unilateral or minimally invasive surgical procedure for primary hyperparathyroidism improve operating room time, operating room fees, overall hospital costs, or length of stay compared to standard bilateral exploration? Does the use of intraoperative PTH measurements alone or in combination with a unilateral or minimally invasive surgical procedure for primary hyperparathyroidism improve incision size/cosmetic result or patient satisfaction/pain compared to standard bilateral exploration?

**Guideline 141.** According to evidence for improved patient health and operational and economic outcomes, the guideline developers recommend routine use of intraoperative PTH testing for patients undergoing surgery for primary hyperparathyroidism and strongly recommend routine use in minimally invasive or directed procedures.

**Strength/consensus of recommendation: A/B**

**Level of evidence: I, II, and III** (randomized controlled trials, controlled trials, cohort study, case series, models and simulations, opinion)

### **Other Parathyroid Diseases**

Does the addition of intraoperative PTH measurements to surgery for parathyroid disease improve the adequacy of resection or cure rate compared to bilateral

exploratory surgery alone in patients with secondary or tertiary hyperparathyroidism? (Literature Search 68 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 142.** Numerous case series suggest a role for intraoperative PTH in secondary or tertiary hyperparathyroidism, yet no studies compared outcomes to surgical procedures in which intraoperative PTH testing was not used. In addition, criteria for expected changes in PTH concentrations after total or subtotal parathyroidectomy require further study. Therefore, the guideline developers make no recommendation for or against routinely providing intraoperative PTH testing for this application.

**Strength/consensus of recommendation: I**

**Level of evidence: III** (multiple case series, opinion)

Does the addition of intraoperative PTH measurements to surgery for parathyroid disease improve the adequacy of resection or cure rate compared to bilateral exploratory surgery alone in patients with reoperative disease? (Literature Search 69 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 143.** Evidence with respect to successful surgical outcome shows utility of intraoperative PTH in patients undergoing reoperation, and therefore we recommend that the assay be used routinely in this patient population.

**Strength/consensus of recommendation: B**

**Level of evidence: II and III** (controlled trials, multiple case series)

Does the addition of intraoperative PTH measurements to surgery for parathyroid disease improve the adequacy of resection or cure rate compared to bilateral exploratory surgery alone in patients with multiple endocrine neoplasia (MEN) I? (Literature Search 70 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 144.** The guideline developers make no recommendation for use of intraoperative PTH testing in patients with MEN I. Results were positive in several case studies and several larger retrospective series; however, the studies lacked control groups.

**Strength/consensus of recommendation: I**

**Level of evidence: III** (multiple case series)

Does the addition of intraoperative PTH measurements to surgery for parathyroid disease improve the adequacy of resection or cure rate compared to bilateral exploratory surgery alone in patients with parathyroid cancer? (Literature Search 71 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 145.** The guideline developers conclude that the evidence is insufficient to recommend for or against use of intraoperative PTH measurements in patients with parathyroid cancer.

**Strength/consensus of recommendation: I**

**Level of evidence: III** (multiple case series)

## **Localization**

Does performing intraoperative PTH measurements in the angiography suite aid in identifying PTH gradients and result in a diagnostic study during venous localization compared to performing PTH measurements in the central laboratory? (Literature Search 72 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 146.** Despite limited evidence, the guideline developers recommend that intraoperative PTH measurements be considered as a replacement for traditional laboratory measurements of PTH during venous localization to provide real-time results to the angiography team to guide sampling.

**Strength/consensus of recommendation: B**

**Level of evidence: III** (case reports and series, and opinion)

**Guideline 147.** The guideline developers make no recommendation for use of rapid PTH tests in the operating suite for tumor localization because of conflicting studies. Although this may be a promising application for the rapid assay, additional studies are needed to determine whether this approach is better than more current and improved preoperative scanning techniques and the most appropriate population for use, such as reoperative cases, because routine use is not justified.

**Strength/consensus of recommendation: I**

**Level of evidence: III** (case series)

### **Secondary Questions**

Is there evidence to support use of a specific assay? (Literature Search 73 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 148.** There is no evidence to suggest superiority of an intraoperative intact PTH assay from a particular manufacturer compared to available assays. The guideline developers do not recommend the use of a specific assay for intraoperative PTH monitoring. Additional studies comparing bio-intact or whole PTH rapid intraoperative assays to intact rapid intraoperative assays need to be performed to determine whether improved benefit exists.

**Strength/consensus of recommendation: I**

**Level of evidence: III** (comparative studies)

Is there evidence to support a recommended sampling protocol with respect to timing and number of samples or recommended criteria for interpretation of intraoperative PTH values? (Literature Search 74 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 149.** The guideline developers recommend in patients undergoing parathyroidectomy for primary hyperparathyroidism that baseline samples be obtained at preoperation/exploration and preexcision of the suspected hyperfunctioning gland. Specimens for PTH should be drawn at 5 and 10 min postresection, with a 50% reduction in PTH concentrations from the highest baseline as a criterion. Additional samples may be necessary. Kinetic analyses appear promising; however, more work needs to be done to confirm their utility.

**Strength/consensus of recommendation: A**

**Level of evidence: III** (comparative studies and opinion)

Does performing intraoperative PTH measurements in or adjacent to the operating suite improve turnaround and operative times compared to performing intraoperative PTH measurements in the central laboratory with specimens transported via pneumatic tube or messenger? (Literature Search 75 - Refer to Appendix B - see the "Availability of Companion Documents" field)

**Guideline 150.** Evidence is lacking to recommend the location of intraoperative PTH testing either in or adjacent to the operating room or in the central laboratory. Important considerations such as interaction with the surgical team must be weighed in concert with costs and staffing issues. Studies to evaluate turnaround and operative times related to different locations have not been explicitly performed. Regardless of specific evidence, external validity may limit applicability to individual institutions.

**Strength/consensus of recommendation: I**

**Level of evidence: III** (comparative reports and series, and opinion)

### Summary

In summary, according to strong impressions from relatively few controlled studies, intraoperative PTH is recommended for routine use in patients undergoing surgery for primary hyperparathyroidism, particularly in directed surgical approaches (see the Table below). This recommendation is based on evidence for improved patient/health, operational, and economic outcomes and applies to initial surgeries and in patients undergoing reoperative procedures. In contrast to the setting of primary hyperparathyroidism, further studies are needed to define the role of intraoperative PTH testing in patients with secondary/tertiary hyperparathyroidism, multiple endocrine neoplasia I, and parathyroid cancer. The number of commercial assays available for rapid PTH speaks to the interest in this point-of-care application. However, none of these assays was deemed superior, nor was there a recommendation for testing location. Future studies may serve to refine assay format and specificity, testing location, sampling protocols, and test interpretation, although standardization of some of these aspects of intraoperative PTH testing will be limited by institution-specific conditions. In addition to intraoperative monitoring during surgical resection, rapid PTH assays have potential applications in diagnostic localization. The assay is recommended for use in the angiography suite; however, additional studies are needed to determine whether or not the assay proves useful in the operating suite. Rapid PTH testing has spawned interest in using other rapid hormone tests intraoperatively and for tumor localization. Thus, the future is promising for rapid hormones in nonparathyroid disease applications, following in the footsteps of the rapid PTH model.

**Table. Summary of Recommendations for Intraoperative PTH**

	<b>A Strongly recommended</b>	<b>B Recommended</b>	<b>C Recommended against</b>	<b>I Insufficient evidence</b>
<b>Disease</b>				
Primary hyperparathyroidism	X	X		
Secondary				X

	<b>A Strongly recommended</b>	<b>B Recommended</b>	<b>C Recommended against</b>	<b>I Insufficient evidence</b>
hyperparathyroidism				
Reoperative hyperparathyroidism		X		
Multiple endocrine neoplasia (MEN) I				X
Parathyroid carcinoma				X
<b>Venous/tumor localization</b>				
Presurgery angiography suite		X		
Operating suite				X
<b>Implementation</b>				
Specific assay				X
Testing location				X

**Definitions:**

**Levels of Evidence**

- I. Evidence includes consistent results from well-designed, well-conducted studies in representative populations.
- II. Evidence is sufficient to determine effects, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies; generalizability to routine practice; or indirect nature of the evidence.
- III. Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information.

**Strength of Recommendations**

**A** - The National Academy of Clinical Biochemistry (NACB) strongly recommends adoption; there is good evidence that it improves important health outcomes and concludes that benefits substantially outweigh harms.

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**C** - The NACB recommends against adoption; there is evidence that it is ineffective or that harms outweigh benefits.

**I** - The NACB concludes that the evidence is insufficient to make recommendations; evidence that it is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

**CLINICAL ALGORITHM(S)**

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

It is hoped that these guidelines will be useful for those implementing new testing, as well as those reviewing the basis of current practice. These guidelines should help sort fact from conjecture when testing is applied to different patient populations and establish proven applications from off-label and alternative uses of point-of-care testing (POCT). These guidelines will also be useful in defining mechanisms for optimizing patient outcome and identify areas lacking in the current literature that are needed for future research.

### POTENTIAL HARMS

False-positive results of parathyroid hormone (PTH) testing

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- The material in this monograph represents the opinions of the editors and does not represent the official position of the National Academy of Clinical Biochemistry or any of the cosponsoring organizations.
- Point-of-care testing (POCT) is an expanding delivery option because of increased pressure for faster results. However, POCT should not be used as a core laboratory replacement in all patient populations without consideration of the test limitations and evaluation of the effect of a faster result on patient care.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness

**IOM DOMAIN**

Effectiveness

**IDENTIFYING INFORMATION AND AVAILABILITY**

**BIBLIOGRAPHIC SOURCE(S)**

Sokoll LJ, Remaley AT, Sena SF, Wians FH Jr, Wu J, Libutti SK, Udelsman R. Intraoperative parathyroid hormone. In: Laboratory medicine practice guidelines: evidence-based practice for point-of-care testing. Washington (DC): National Academy of Clinical Biochemistry (NACB); 2006. p. 105-19. [99 references]

**ADAPTATION**

Not applicable: The guideline was not adapted from another source.

**DATE RELEASED**

2006

**GUIDELINE DEVELOPER(S)**

National Academy of Clinical Biochemistry - Professional Association

**SOURCE(S) OF FUNDING**

National Academy of Clinical Biochemistry

**GUIDELINE COMMITTEE**

Guidelines Committee

**COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **GUIDELINE STATUS**

This is the current release of the guideline.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [National Academy of Clinical Biochemistry \(NACB\) Web site](#).

Print copies: National Academy of Clinical Biochemistry publications are available through American Association for Clinical Chemistry (AACC) Press. To make a purchase or request a catalog, contact AACC Customer Service at 202-857-0717 or [custserv@aacc.org](mailto:custserv@aacc.org).

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- Preface and introduction. In: Laboratory medicine practice guidelines: evidence-based practice for point-of-care testing. Washington (DC): National Academy of Clinical Biochemistry (NACB); 2006. p. i-xvi.
- Appendix A: NACB LMPG data abstraction forms. In: Laboratory medicine practice guidelines: evidence-based practice for point-of-care testing. Washington (DC): National Academy of Clinical Biochemistry (NACB); 2006. p. 149-153.
- Appendix B: literature searches. In: Laboratory medicine practice guidelines: evidence-based practice for point-of-care testing. Washington (DC): National Academy of Clinical Biochemistry (NACB); 2006. p. 154-186.

Electronic copies: Available in Portable Document Format (PDF) from the [National Academy of Clinical Biochemistry \(NACB\) Web site](#).

Print copies: National Academy of Clinical Biochemistry publications are available through American Association for Clinical Chemistry (AACC) Press. To make a purchase or request a catalog, contact AACC Customer Service at 202-857-0717 or [custserv@aacc.org](mailto:custserv@aacc.org).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI Institute on August 13, 2007. The information was verified by the guideline developer on September 24, 2007.

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