# Complete Summary

## GUIDELINE TITLE

The physiologic evaluation of patients with lung cancer being considered for resectional surgery.

## BIBLIOGRAPHIC SOURCE(S)

Beckles MA, Spiro SG, Colice GL, Rudd RM. The physiologic evaluation of patients with lung cancer being considered for resectional surgery. Chest 2003 Jan;123(1 Suppl):105S-14S. [69 references] PubMed

## GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
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IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
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## SCOPE

### DISEASE/CONDITION(S)

Lung cancer

### GUIDELINE CATEGORY

Evaluation
Risk Assessment

### CLINICAL SPECIALTY

Oncology
Pulmonary Medicine

### INTENDED USERS

Physicians

## GUIDELINE OBJECTIVE(S)

To provide clinically relevant, evidence-based guidelines for the identification of patients at high risk for perioperative complications and long-term disability from lung cancer resection surgery

## TARGET POPULATION

Patients considered for surgical resection of lung cancer

## INTERVENTIONS AND PRACTICES CONSIDERED

### Spirometry and diffusing capacity measurements

1. Forced expiratory volume in 1 second ($FEV_1$)
2. Diffusing capacity of the lung for carbon monoxide (DLCO) and forced expiratory volume in 1 second for patients with interstitial lung disease or dyspnea on exertion

### Additional evaluation

1. Estimate of pulmonary reserve postresection (predicted postoperative [ppo] lung function) in patients with compromised preoperative lung function
2. Cardiopulmonary exercise testing (CPET) if perfusion lung scan and percentage of predicted postoperative (%ppo) $FEV_1$ and DLCO are borderline (stair climbing, the shuttle walk, and the 6-min walk should be considered if cardiopulmonary exercise testing is unavailable)
3. Further physiologic testing for patients with arterial saturations less than 90%

### Perioperative risk reduction methods

1. Lung volume reduction surgery (LVRS) and lung cancer resection limited to patients with heterogeneous emphysema

### Perioperative risk reduction methods considered but of little benefit

1. Smoking cessation before surgery
2. Preoperative pulmonary rehabilitation

## MAJOR OUTCOMES CONSIDERED

- Perioperative cardiopulmonary complications from lung cancer resection
- Morbidity and mortality rates

# 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

As a first step in identifying the evidence for each topic, the guideline developers sought existing evidence syntheses including guidelines, systematic reviews, and meta-analyses. They searched computerized bibliographic databases including MEDLINE, Cancerlit, CINAHL and HealthStar, the Cochrane Collaboration Database of Abstracts of Reviews of Effectiveness, the National Guideline Clearinghouse, and the National Cancer Institute Physician Data Query database. Computerized searches through July 2001 used the MeSH terms lung neoplasms (exploded) and bronchial neoplasms or text searches for lung cancer combined with review articles, practice guidelines, guidelines, and meta-analyses. They also searched and included studies from the reference lists of review articles, and queried experts in the field. An international search was conducted of Web sites of provider organizations that were likely to have developed guidelines. Abstracts of candidate English language articles were reviewed by two physicians (one with methodological expertise and one with content area expertise) and a subset was selected for review in full text. Full-text articles were reviewed again by two physicians to determine whether they were original publications of a synthesis and were pertinent to at least one of the topics of the guideline. Articles described as practice guidelines, systematic reviews, or meta-analyses were included, as were review articles that included a "Methods" section. Included articles were classified according to topic.

## NUMBER OF SOURCE DOCUMENTS

Not stated

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

Expert Consensus
Weighting According to a Rating Scheme (Scheme Given)

## RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

The USPSTF scheme offers general guidelines to assign one of the following grades of evidence: good, fair, or poor. In general, good evidence included prospective, controlled, randomized clinical trials, and poor evidence included case series and clinical experience. Trials with fair quality of evidence, for instance, historically controlled trials or retrospective analyses, were somewhere in between. In addition to the strength of the study design, however, study quality also was considered. The USPSTF approach considers well-recognized criteria in rating the quality of individual studies for a variety of different types of study design (e.g., diagnostic accuracy studies and case-control studies). The thresholds for distinguishing good vs fair and fair vs poor evidence are not explicit but are left to the judgment of panelists, reviewers, and members of the executive committee.

### Assessment of the Scope and Quality of Clinical Practice Guidelines

Clinical practice guidelines identified from the systematic search were evaluated by at least four reviewers using the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument.

## METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

## DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Informal Consensus

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Each writing committee received a comprehensive list of existing systematic reviews and meta-analyses as well as guidelines published by other groups. In addition, for five key topics (prevention, screening, diagnosis, and staging [invasive and noninvasive], new systematic reviews were undertaken [see "Description of Methods Used to Collect the Evidence" and "Description of Methods Used to Analyze the Evidence" fields]). For all other topics, writing committees were responsible for identifying and interpreting studies that were not otherwise covered in existing syntheses or guidelines.

The guidelines developed by the writing committee were distributed to the entire expert panel, and comments were solicited in advance of a meeting. During the meeting, proposed recommendations were reviewed, discussed, and voted on by the entire panel. Approval required consensus, which was defined as an overwhelming majority approval. Differences of opinion were accommodated by revising the proposed recommendation, the rationale, or the grade until consensus could be reached. The evidence supporting each recommendation was summarized, and recommendations were graded as described. The assessments of level of evidence, net benefit, and grade of recommendation were reviewed by the executive committee.

### Values

The panel considered data on functional status, quality and length of life, tolerability of treatment, and relief of symptoms in formulating guideline recommendations. Cost was not explicitly considered in the guideline development process. Data on these outcomes were informally weighted, without the use of explicit decision analysis or other modeling. The values placed on types of outcomes varied with clinical scenarios. For example, in some situations they considered life expectancy, such as the effects of early detection. In other

situations they weighed quality of life more heavily, such as in palliative care and in interpreting small increases in life expectancy with chemotherapy for stage IV disease.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The guideline developer´s grading scheme is a modification of the United States Preventive Services Task Force (USPSTF) grades to allow recommendations for a service when (1) evidence is poor, (2) the assessment of the net benefit is moderate to high, and (3) there is consensus among the expert panel to recommend it. This change was necessary because, unlike preventive services (i.e., the routine offering of tests or treatments to well people) in which the burden of proof is high, clinical decisions about the treatment of patients with lung cancer often must be based on an interpretation of the available evidence, even if it is of poor quality. This adaptation distinguished between interventions with poor evidence for which there is consensus (grade C) and interventions with poor evidence for which there is not consensus (grade I).

### Grades of Recommendations and Estimates of Net Benefit

The grade of the strength of recommendations is based on both the quality of the evidence and the net benefit of the service (i.e., test, procedure, etc).

Grade A The panel strongly recommends that clinicians routinely provide [the service] to eligible patients. An "A" recommendation indicates good evidence that [the service] improves important health outcomes and that benefits substantially outweigh harms.

Grade B The panel recommends that clinicians routinely provide [the service] to eligible patients. A "B" recommendation indicates at least fair evidence that [the service] improves important health outcomes and concludes that benefits outweigh harms.

Grade C The panel recommends that clinicians routinely provide [the service] to eligible patients. A "C" recommendation indicates that there was consensus among the panel to recommend [the service] but that the evidence that [the service] is effective is lacking, of poor quality, or conflicting, or the balance of benefits and harms cannot be reliably determined from available evidence.

Grade D The panel recommends against clinicians routinely providing [the service]. A "D" recommendation indicates at least fair evidence that [the service] is ineffective or that harm outweighs benefit.

Grade I The panel concludes that the evidence is insufficient to recommend for or against [the service]. An "I" recommendation indicates that evidence that [the service] is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined, and that the panel lacked a consensus to recommend it.

### Net Benefit

The levels of net benefit are based on clinical assessment. Estimated net benefit may be downgraded based on uncertainty in estimates of benefits and harms.

Substantial Benefit: Benefit greatly outweighs harm

Moderate Benefit: Benefit outweighs harm

Small/weak Benefit: Benefit outweighs harm to a minimally clinically important degree

None/negative Benefit: Harms equal or outweigh benefit, less than clinically important

### COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

### METHOD OF GUIDELINE VALIDATION

Peer Review

### DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

After extensive review within the expert panel and executive committee, the guidelines were reviewed and approved by the American College of Chest Physicians (ACCP) Health and Science Policy Committee and then by the American College of Chest Physicians Board of Regents.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

Each recommendation is rated based on the levels of evidence (good, fair, poor), net benefit (substantial, moderate, small/weak, none/negative), and the grades of the recommendations (A, B, C, D, I). Definitions are presented at the end of the "Major Recommendations" field.

1. Patients with lung cancer should be seen by physicians interested in the management of this disease. Level of evidence, fair; benefit, substantial; grade of recommendation, B
2. Patients with lung cancer should be assessed by a multidisciplinary team for their suitability for surgery; there should be liaison between the chest physician, thoracic surgical team, and oncologist in all cases prior to surgery. Level of evidence, poor; benefit, substantial; grade of recommendation, C
3. Patients with lung cancer should not be denied lung resection surgery on the grounds of age alone. Level of evidence, fair; benefit, substantial; grade of recommendation, B

4. Patients with lung cancer undergoing surgery should have a preoperative cardiologic evaluation carried out according to established guidelines. Level of evidence, fair; benefit, substantial; grade of recommendation, B
5. In patients being considered for lung cancer resection, spirometry should be performed. If the forced expiratory volume in 1 second ($FEV_1$) is >80% predicted normal or >2 L, the patient is suitable for resection including pneumonectomy without further evaluation. If the $FEV_1$ is >1.5 L, the patient is suitable for a lobectomy without further evaluation. Level of evidence, fair; benefit, substantial; grade of recommendation, B
6. In patients being considered for lung cancer resection, if there is evidence of interstitial lung disease on radiographic studies or undue dyspnea on exertion, even though the $FEV_1$ might be adequate, the diffusing capacity of the lung for carbon monoxide (DLCO) should be measured. Level of evidence, fair; benefit, substantial; grade of recommendation, B
7. In patients being considered for lung cancer resection, if either the $FEV_1$ or DLCO are < 80% predicted, postoperative lung function should be predicted through additional testing. Level of evidence, fair; benefit, substantial; grade of recommendation, B
8. In patients with lung cancer being considered for surgical resection, either percentage of predicted postoperative (%ppo) $FEV_1$ <40% or %ppo DLCO <40% indicate a high risk for perioperative death and cardiopulmonary complications. These patients should undergo exercise testing preoperatively. Level of evidence, fair; benefit, substantial; grade of recommendation, B
9. In patients with lung cancer being considered for surgical resection, either a product of %ppo $FEV_1$ and % ppo DLCO <1,650 or %ppo $FEV_1$ <30% indicate a very high risk for perioperative death and cardiopulmonary complications. These patients should be counseled about nonoperative treatment options. Level of evidence, poor; benefit, substantial; grade of recommendation, C
10. In patients with lung cancer being considered for lung resection, maximal oxygen consumption ($VO_2$max) <10 mL/kg/min indicates a very high risk for perioperative death and cardiopulmonary complications. These patients should be counseled about nonoperative treatment options. Level of evidence, poor; benefit, substantial; grade of recommendation, C
11. Patients being considered for lung cancer resection who have maximal oxygen consumption <15mL/kg/min and both %ppo $FEV_1$ and DLCO <40% should be considered at very high risk for perioperative death and cardiopulmonary complications. These patients should be counseled about nonoperative treatment options. Level of evidence, poor; benefit, substantial; grade of recommendation, C
12. Patients being considered for lung cancer resection who walk < 25 shuttles on two shuttle walks or less than one flight of stairs should be considered at very high risk for perioperative death and cardiopulmonary complications. These patients should be counseled about nonoperative treatment options. Level of evidence, poor; benefit, substantial; grade of recommendation, C
13. In patients being considered for lung cancer surgery, hypercapnea ($PaCO_2$ > 45 mm Hg) is not an independent risk factor for increased perioperative complications; however, further physiologic testing is advised. Level of evidence, poor; benefit, substantial; grade of recommendation, C
14. In patients being considered for lung cancer surgery, arterial oxygen saturation ($SaO_2$) < 90% indicates an increased risk for perioperative

complications, and further physiologic testing is advised. Level of evidence, poor; benefit, substantial; grade of recommendation, C

15. In patients with very poor lung function, combined lung volume reduction surgery (LVRS) and lung cancer resection may be considered if emphysema is heterogeneous and involves primarily the lobe to be resected. Level of evidence, poor; benefit, substantial; grade of recommendation, C

Definitions:

Grades of Recommendations and Estimates of Net Benefit

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None/negative Benefit: Harms equal or outweigh benefit, less than clinically important.

### 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

A preoperative physiologic assessment will enable the physician to identify patients at high risk for perioperative complications and long-term disability from lung cancer resection surgery. In addition, the physician will be able to provide the patient with counseling on treatment options and risks so that the patient can make a truly informed decision, and identify possible steps to reduce the risks of perioperative complications and long-term pulmonary disability.

### POTENTIAL HARMS

Not stated

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

1. The American College of Chest Physicians (ACCP) is developing a set of PowerPoint slide presentations for physicians to download and use for physician and allied health practitioners education programs.
2. The ACCP is developing a Quick Reference Guide (QRG) in print and PDA formats for easy reference.

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

### IOM CARE NEED

Getting Better
Living with Illness

### IOM DOMAIN

Effectiveness
Patient-centeredness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Beckles MA, Spiro SG, Colice GL, Rudd RM. The physiologic evaluation of patients with lung cancer being considered for resectional surgery. Chest 2003 Jan;123(1 Suppl):105S-14S. [69 references] PubMed

### ADAPTATION

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

### DATE RELEASED

2003 Jan

### GUIDELINE DEVELOPER(S)

American College of Chest Physicians - Medical Specialty Society

### GUIDELINE DEVELOPER COMMENT

The guideline development panel was composed of members and nonmembers of the American College of Chest Physicians (ACCP) who were known to have expertise in various areas of lung cancer management and care, representing multiple specialties from the following 13 national and international medical associations:

- Alliance for Lung Cancer Advocacy, Support, and Education (a patient support group)
- American Association for Bronchology
- American Cancer Society
- American College of Physicians
- American College of Surgeons Oncology Group
- American Society of Clinical Oncology
- American Society for Therapeutic Radiology and Oncology
- American Thoracic Society
- Association of Community Cancer Centers
- Canadian Thoracic Society
- National Comprehensive Cancer Network
- Oncology Nursing Society
- Society of Thoracic Surgeons

The specialties included pulmonary/respiratory medicine, critical care, medical oncology, thoracic surgery, radiation oncology, epidemiology, law, and medical ethics.

### SOURCE(S) OF FUNDING

Funding for both the evidence reviews and guideline development was provided through an unrestricted educational grant from Bristol-Myers Squibb, which had no other role in the evidence review or guideline development process or content.

## GUIDELINE COMMITTEE

American College of Chest Physicians (ACCP) Expert Panel on Lung Cancer Guidelines

## COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Authors: Michael A. Beckles, MB, BS; Stephen G. Spiro, MD; Gene L. Colice, MD, FCCP; Robin M. Rudd, MD

## FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Information about potential conflicts of interest were collected from each member of the expert panel or writing committee at the time of their nomination in accordance with the policy of the American College of Chest Physicians. Information on conflicts of interest for each panelist is listed in the guideline.

## GUIDELINE STATUS

This is the current release of the guideline.

## GUIDELINE AVAILABILITY

Electronic copies: Available to subscribers of Chest - The Cardiopulmonary and Critical Care Journal.

Print copies: Available from the American College of Chest Physicians, Products and Registration Division, 3300 Dundee Road, Northbrook IL 60062-2348.

## AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

Background Articles:


- Alberts WM. Lung cancer guidelines. Introduction. Chest 2003 Jan;123(1 Suppl):1S-2S.
- McCrory DC, Colice GL, Lewis SZ, Alberts WM, Parker S. Overview of methodology for lung cancer evidence review and guideline development. Chest 2003 Jan;123(1 Suppl):3S-6S.
- Harpole LH, Kelley MJ, Schreiber G, Toloza EM, Kolimaga J, McCrory DC. Assessment of the scope and quality of clinical practice guidelines in lung cancer. Chest 2003 Jan;123(1 Suppl):7S-20S.
- Alberg AJ, Samet JM. Epidemiology of lung cancer. Chest 2003 Jan;123(1 Suppl):21S-49S.

Electronic copies: Available to subscribers of Chest - The Cardiopulmonary and Critical Care Journal.

Print copies: Available from the American College of Chest Physicians, Products and Registration Division, 3300 Dundee Road, Northbrook IL 60062-2348.

## PATIENT RESOURCES

None available

## NGC STATUS

This NGC summary was completed by ECRI on June 30, 2003. The information was verified by the guideline developer on July 25, 2003.

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