

Omaha VAMC Pulmonary Consult Service
Rotation Goals and Objectives
Pulmonary/Critical Care Medicine Fellowship Program
University of Nebraska Medical Center
Revised: March 2010

- I) Rotation Goals
 - A) To evaluate, diagnose and manage patients with a variety of pulmonary illnesses
 - B) To learn how to provide efficient consultative care for patients with severe pulmonary diseases
 - C) To acquire improved procedural skills required by a Pulmonary Disease specialist

- II) Core Competencies for this rotation
 - A) Patient Care
 - 1) Demonstrate an ability to obtain a comprehensive and accurate history of present illness for a variety of pulmonary disease presentations
 - 2) Identify common historical elements for all patients presenting with pulmonary disease including smoking history, occupational history, sleep history, environmental triggers for respiratory symptoms and family history.
 - 3) Demonstrate physical examination skills specific to the respiratory system including examination of the upper airway, neck, chest, abdomen and extremities.
 - 4) Demonstrate the ability to interpret complete pulmonary function testing including spirometry before and after bronchodilator therapy, lung volumes, diffusing capacity and exercise oximetry.
 - 5) Order and interpret radiographic tests related to pulmonary diseases including chest roentgenograms, computed axial tomography scans, ventilation/perfusion studies and pulmonary angiograms to provide a therapeutic plan for the patient.
 - 6) Apply the skills listed above to provide a clear, concise and legible consultation note and/or dictation, which directly answers the question asked by the primary care provider.
 - 7) Demonstrate an ability to perform bronchoscopy, bronchoalveolar lavage and various bronchoscopic biopsy techniques.
 - 8) Demonstrate an ability to interpret cardiopulmonary exercise tests, indirect calorimetry studies, six-minute walk distance and methacholine challenge tests in addition to other specialized tests, which may be performed in the pulmonary function laboratory.
 - 9) Learn the indications and contraindications for insertion of various chest tubes for drainage of fluid and/or air
 - 10) Demonstrate effective communication through the informed consent process for minor procedures
 - 11) Demonstrate caring and respectful behaviors when interacting with patients
 - 12) Gather essential and accurate information from patients
 - 13) Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence and clinical judgment
 - 14) Develop and carry out patient management plans in association with the supervising physician
 - 15) Counsel and educate patients and their families
 - 16) Use information technology to support patient care decisions and patient education
 - 17) Demonstrate competency in all medical and invasive procedures performed on this rotation
 - 18) Demonstrate an ability to work with a variety of health care professionals to provide patient-focused care
 - 19) Evaluation methods for this competency
 - (a) Attending evaluation

- (b) MEU nurses and the PFT Lab staff evaluation
 - (c) Mini-CEX (to be arranged with attending)
- B) Medical Knowledge
- 1) Demonstrate an ability to interject a discussion of recent readings relevant to patients during rounds
 - 2) Develop familiarity with seminal literature covering topics in pulmonary medicine, especially those extant in patients on the pulmonary consult service.
 - 3) Read appropriate material in a Pulmonary Medicine text or electronic resource
 - 4) Read the suggested material listed at the end of this document
 - 5) Evaluation methods for this competency
 - (a) Attending evaluation
 - (b) Chart-stimulated recall sessions
- C) Practice-based Learning and Improvement
- 1) Select one performance measure to work on for improvement over the course of this rotation
 - (a) Examples could include adherence to guidelines regarding care of asthma patients, referrals to pulmonary rehab, etc.
 - 2) Demonstrate an ability to locate and apply scientific evidence to the care of patients including the use of the Cochrane Database and other online sources
 - 3) Demonstrate an ability to read and critically appraise at least one clinical study applicable to a patient seen on the service. This will be judged by informal interaction with the attending therefore the fellow must mention this reading to the attending.
 - 4) Facilitate the learning of other health care professionals by providing at least one lecture to the resident(s) and student(s) and impromptu teaching sessions
 - 5) Evaluation methods for this competency
 - (a) Attending evaluation
 - (b) Chart-stimulated recall sessions
 - (c) Performance on presentation at case conference during the month
- D) Interpersonal & Communication Skills
- 1) Demonstrate an ability to develop a therapeutic and ethically sound relationship with patients and their families
 - 2) Demonstrate an ability to use verbal and non-verbal skills to communicate effectively with patients.
 - 3) Demonstrate effective listening skills
 - 4) Elicit and provide information using effective nonverbal, explanatory, questioning and writing skills
 - 5) Work effectively with others as a member or leader of a health care team
 - 6) Demonstrate an ability to develop professional relationships with residents, students and other members of the health care team
 - 7) Evaluation methods for this competency
 - (a) Attending evaluation
 - (b) Evaluations from key consultants
 - (c) Evaluations from MEU nurses and the PFT Lab staff
 - (d) Mini-CEX
- E) Professionalism
- 1) Demonstrate compassion, respect, integrity and honesty.
 - 2) Accept responsibility for direct patient care activities.
 - 3) Always act in the best interest of the patient.

- 4) Demonstrate a responsiveness to the needs of patients and society that supercedes self-interest
- 5) Demonstrate accountability to patients, society and the profession
- 6) Demonstrates a commitment to excellence and on-going professional development
- 7) Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent and business practices
- 8) Demonstrate sensitivity to patient's culture, ethnicity, age gender and disability.
- 9) Evaluation methods for this competency
 - (a) Attending evaluation
 - (b) Evaluations from key consultants
 - (c) Evaluations from MEU nurses and the PFT Lab staff
 - (d) Mini-CEX

F) System-based Practice

- 1) Understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society
- 2) Practice cost-effective health care and resource allocation that does not compromise quality of care
- 3) Advocate for quality patient care and assist patients in dealing with system complexities.
- 4) Evaluation methods for this competency
 - (a) Attending evaluation
 - (b) Evaluations from key consultants
 - (c) Evaluations from MEU nurses and the PFT Lab staff

III) Instructional Methods

A) Clinical experience

- 1) The PCCM fellow on this rotation spends up to a full calendar month on the Pulmonary Consult Rotation at the Omaha VA Medical Center, providing high quality and timely care to include:
 - (a) Pulmonary consultative care for inpatients of the Omaha VA Medical Center.
 - (i) Evaluate and provide effective consultative care for all consult patients
 - (ii) Write or confirm a daily progress note on all patients on the service
 - (b) Consultative care for outpatients
 - (i) on Tuesday, Thursday and Friday mornings in the Medical Evaluation Unit
 - (ii) in Sleep Disordered Breathing clinic on Monday afternoons
 - (c) Attendance at the VA Chest Conference scheduled on Thursday morning at 8am
- 2) Supervision and Performance of Procedures
 - (a) The fellow will be expected to supervise those procedures that should be performed by the residents. These include but are not limited to thoracentesis and central line placement.
 - (b) The fellow will be expected to perform procedures that are expected of a fellow-level trainee including but not limited to, bronchoscopy and chest tube placement

B) Clinical Teaching

- 1) Faculty will be expected to discuss each clinical presentation by the fellow and provide guidance as needed on diagnosis and treatment
- 2) The fellow will be expected to gather appropriate data and present in a succinct, yet complete manner

C) Performance Feedback

- 1) The faculty will provide feedback on a regular basis, at least weekly, on what the fellow has done well and what could be improved
- 2) Fellow and supervising staff physician will review these goals and objectives at the beginning of the rotation
- 3) Fellow and supervising staff physician should meet in order for the attending to provide written and verbal feedback at the completion of the attending's rotation on service.

D) Didactic Sessions

- 1) Attend all scheduled fellow conferences within the Pulmonary, Critical Care, Sleep Medicine and Allergy Section. These are held each noon Tuesday through Thursday in the Rennard Conference Room, SwH 4009 during July and August. Journal Club/Research Conference is scheduled on Thursdays, September through June and is held in Durham Research Center Rm 1004.
- 2) Attend all Internal Medicine Conferences that do not conflict with Section Conferences. Attendance at Internal Medicine Grand Rounds on Friday at noon in the Durham Research Center Auditorium is strongly suggested.
- 3) Attend VA Chest Conference scheduled Thursday morning at 8am
- 4) The fellow will provide at least one didactic session to students and residents on the service

E) Self-Learning

- 1) Review literature appropriate to care of patients on the service.
- 2) Fellows will be expected to read the appropriate chapters in a Pulmonary Medicine textbook of their choice. Appropriate sections of eMedicine or Up-to-Date may be substituted.
- 3) Complete the reading assignments as outlined below.

IV) Responsibilities

A) First Year Fellows:

- 1) Only first year fellows will be assigned to this rotation
- 2) These guidelines for the Omaha VA Medical Center Pulmonary Consult rotation will be made available to each fellow and must be read prior to starting the rotation
- 3) Participate in all patient care responsibilities expected
 - (a) For each patient seen on the inpatient service, the fellow will prepare or review the diagnostic and management plan and discuss this with the resident.
 - (b) The fellow will evaluate each patient scheduled for the MEU to determine the need for specialized testing prior to the patient's visit
 - (c) Learn the indications for involvement of the pulmonary disease specialist in the care of the patient and learn cooperative care of the patient in conjunction with the primary care provider and/or external pulmonary specialists.
- 4) Attend the following outpatient clinics
 - (a) on Tuesday, Thursday and Friday mornings in the Medical Evaluation Unit
 - (b) Sleep Disordered Breathing clinic on Monday afternoons
- 5) Attend the VA Chest Conference scheduled on Thursday morning at 8am
- 6) Complete required paperwork for VA patients requiring pulmonary services including:
 - (a) Orders for CPAP/BiPAP per recommendations from polysomnography or autotitration study interpretation
 - (b) Orders for Long-term Oxygen Therapy based on evaluations completed by Respiratory Care Services
 - (c) Interpret nocturnal oximetry results and provide orders for further testing or evaluation

- (d) Interpret all testing completed by the Pulmonary Function Laboratory
- (e) Triage all consults to Sleep Medicine and Pulmonary on a daily basis. This will require using CPRS to determine the question to be answered by the consult and to obtain any history that will assist in appropriate triage of the patient. In general, evaluations that may require a procedure such as bronchoscopy, thoracentesis or follow-up of pulmonary nodules should be done in the MEU. Consults for sleep problems should be seen in sleep medicine clinic and those for worsening of a known pulmonary problem should be referred to either CU or UNMC pulmonary clinic based on the physician who has seen the patient previously. All new consults must be seen within 30 days so if there are no available appointments within that time period, the patient should be seen in the MEU as soon as possible even if it requires overbooking the patient.
- 7) Schedule all bronchoscopies with the PFT lab and with the Medical EU as necessary
- 8) Provide education to any residents or students who may be assigned to the service. For residents and students, education (lectures) have priority over service obligations and the fellow should plan accordingly.
- 9) Complete an evaluation of the rotation and the attending.
- 10) Take at-home call as scheduled
- 11) at the end of the first year, the fellow should be expected to:
 - (a) Demonstrate a solid fund of general medical and pulmonary medicine knowledge.
 - (b) Exhibit sound clinical judgment in regards to general medical and most pulmonary medicine problems.
 - (c) Be able to elicit a complete history of present illness and past medical history in regards to pulmonary presentations, including occupational exposures.
 - (d) Perform a complete physical examination of the respiratory system, including the upper airway.
 - (e) Demonstrate competency in insertion of the bronchoscope, via oral and nasal routes and be able to visualize all segments of the lung and to name them using a conventional system.
 - (f) Demonstrate competency in central line placement, including triple lumen catheters and introducers.
 - (g) Achieve competence in establishing and maintaining an open airway in non-intubated, unconscious, paralyzed patients.
 - (h) Achieve competence in ventilator management, including pressure-cycled, volume-cycled, time-cycled, and flow-cycled mechanical ventilation. They should be able to explain, compare and contrast such modes as pressure support, pressure control, volume control, SIMV, and such ventilator management strategies such as inverse ratio ventilation, and permissive hypercapnia.
 - (i) Achieve competencies in choosing an appropriate oxygen delivery device, such as nasal cannula, venturi mask, non-rebreather mask, high flow oxygen systems, and knowledge of the ambulatory sources of oxygen, such as the C, D, and E cylinders, as well as the M-6 cylinder.
 - (j) Utilize weaning parameters and the spontaneous breathing trial for liberation from the ventilator.
 - (k) List indications for and utility of various respiratory therapy techniques, such as bronchial hygiene, and volume expansion therapies.
 - (l) Achieve competency in interpretation of pulmonary function tests, including spirometry, flow volume loops, lung volumes defusing capacity, arterial blood gas analysis, and exercise studies.
 - (m) Achieve competency at interpreting chest roentgenograms and chest CT scans.
 - (n) Achieve competency in obtaining arterial blood gases, placing arterial catheters and insertion of pulmonary artery catheters, including interpretation of waveforms.

- (o) Complete the on-line Blackboard course covering the ACGME competencies.
- B) Second Year Fellows
 - 1) Second year fellows are not assigned to this rotation
- C) Third Year Fellows
 - 1) Third year fellows are not assigned to this rotation
- D) Consult Attending
 - 1) These guidelines for the Omaha VA Medical Center Pulmonary Consult rotation will be made available to the attending and any attending-specific goals and objectives must be reviewed with the fellow at the start of the rotation
 - 2) Supervise procedures performed by the fellow and be available when needed by the fellow
 - 3) Provide education to the fellow in the form of a one on one session at least one hour per week.
 - 4) Complete an evaluation of the fellow.
 - 5) Discuss the evaluation and management of all consults with the consult team.
- E) Rotation
 - 1) Clinic Responsibility
 - (a) Attend each assigned clinic unless excused
 - (b) Be in the clinic at the assigned start time and remain until excused by the attending
 - 2) On Call Responsibility
 - (a) Duty hours at the Omaha VA are from 8:00 am to 5:00 PM and the fellow should be available during those times except for officially sanctioned absences, i.e. noon conferences
 - (b) Take after hours call as assigned by the Program Director.
 - (i) The On-Call fellow will receive a check-out report on each patient on the VAMC service from the fellow going off-call and will give an updated check-out report to the fellow coming on-call the following morning.
 - (c) Take after-hours call at the Omaha VA as scheduled and coordinate with the Creighton resident on the service to cover the VA Pulmonary Consult patients on the weekends that the ICU fellow is covering the VA. The fellow cannot cross-cover both the VA and UNMC on the same night and should not take call when they are post-call at UNMC.
 - 3) Vacation
 - (a) Vacation time may be taken during this rotation. However, this must be arranged after confirming the dates with the attending on service at the time of the planned vacation. The fellow is responsible for contacting the resident on the service to ensure that the resident will not be on vacation at the same time. If vacation days requested overlap, the date of receipt of the request will determine precedence. If both resident and fellow need to be absent on the same day, arrangements must be made with the Creighton VA Chief Resident for resident coverage.
 - (b) Emergency leave may be requested after discussion with the Program Director or surrogate (Consult attending for days to be missed)
- V) Methods of Evaluation

A) Focused Observation and Evaluation

- 1) The Consult Attending should give immediate feedback after rounds each day and a formal verbal evaluation should be given at the mid-point of the rotation

B) Clinical Performance Ratings

- 1) Each consult attending must prepare a written evaluation of the fellow at the conclusion of the attending's rotation. This evaluation will assess each of the competencies as listed in the educational objectives above.
- 2) The attending must also provide verbal feedback at the conclusion of their rotation either in person or by phone and will sign an attestation that this verbal interaction has occurred.

C) 360 degree Assessment

- 1) Evaluations will be sent to health care professionals on the service who interact with the fellow. This will include Nurses, Respiratory Therapists and Clerks. These evaluations will focus on the fellow's professionalism.
- 2) Patients will be asked from time to time to provide written feedback in the form of a questionnaire regarding professionalism as well as interpersonal and communication skills.

D) Fellow Evaluations of Attending(s) and Rotation

- 1) At the conclusion of the fellow's service period, he/she should complete an evaluation form assessing the quality of the rotation; these are available through New Innovations
- 2) He/she should complete an evaluation, available in New Innovations, of the teaching undertaken by the attending physician(s) during the rotation.

VI) Readings are from the ATS Reading List found at:

- A) <http://www.thoracic.org/sections/career-development/fellows-and-fellowships/ats-reading-list-intro.html>

B) PFTs

1) General reviews

- (a) Clinics in Chest Medicine, volume 22, number 4, December 2001 contains reviews on the measurement and interpretation of the entire spectrum of pulmonary function testing. A particular strength is the discussion of how the pathophysiologic changes associated with various disease states are reflected in studies of pulmonary function.
- (b) Pellegrino R, Viegi G, Brusasco V, et al. Interpretative strategies for lung function tests. Eur Respir J 2005; 26:948-68. An excellent comprehensive review of reference equations, types of ventilatory defects, commentary of PFT and DLCO interpretation, severity classifications, bronchodilator response thresholds, central and upper airway processes, and interpretation in changes in pulmonary function.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?itool=abstractplus&db=pubmed&cmd=Retrieve&dopt=abstractplus&list_uids=16264058

2) Exercise Testing

- (a) Weisman IM, Zeballos RJ. Clinical exercise testing. Clin Chest Med 2001;22:679-701. The focus is on cardiopulmonary exercise testing, but this review also briefly

summarizes the 6-minute walk, testing for exercise-induced bronchoconstriction, and cardiac stress testing. An excellent starting point for the novice.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11787659

- (b) ATS/ACCP Statement on cardiopulmonary exercise testing. *Am J Respir Crit Care Med* 2003; 167:211-77. Somewhere between a textbook and a clinical review, this article provides more details on CPET than the above Weisman article.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12524257

C) Community-acquired Pneumonia

1) Diagnosis

- (a) Skerrett SJ. Diagnostic testing for CAP. *Clin Chest Med* 1999;20:531-48. Covers the techniques and yield of non-invasive and invasive diagnostic tests as well as the laboratory diagnosis of specific infections.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10516902

- (b) Metlay JP, Kapoor WN, Fine MJ. Does this patient have CAP? Diagnosing pneumonia by history and physical examination. *JAMA* 1997;278:1440-5. Systematic review found H & P do not reliably predict the presence of pneumonia in acutely symptomatic, ambulatory patients. Physicians' interobserver agreement on exam findings is poor. Article highlights the importance of chest x-rays in diagnosis of pneumonia but the optimal strategy for their use remains unclear.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9356004

2) Treatment

- (a) Niederman MS, Mandell LA, Anzueto A, et al. Guidelines for the management of adults with community-acquired pneumonia: diagnosis, assessment of severity, antimicrobial therapy, and prevention. *AJRCCM* 2001;163:1730-54. Latest recommendations from the ATS.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11401897

- (b) Bartlett JG, Dowell SF, Mandell LA, et al. Practice guidelines for the management of community-acquired pneumonia in adults. (From the IDSA). *Clin Infect Dis* 2000;31:347-82. Weighing in at 35 pages, this is more a reference than a read.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10987697

Confalonieri M, Urbino R, Potena A et al. Hydrocortisone infusion for severe community-acquired pneumonia: a preliminary randomized study. *AJRCCM* 2005;171:242-8. Compared to placebo, 7 days of continuous infusion of hydrocortisone significantly improved mortality, PaO₂: FiO₂, chest radiograph scores, incidence of delayed-onset septic shock, and multi-organ dysfunction scores in 46 subjects.

Limitations of the study include small sample size, greater number of mechanically ventilated patients in the placebo group, and subjects' undocumented adrenal status.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15557131

Ruiz M, Ewig S, Torres A, et al. Severe community-acquired pneumonia. Risk factors and follow-up epidemiology. *AJRCCM* 1999;160:923-9. Study out of Barcelona that is the best on this subject in recent

years. Key findings were that the epidemiology of severe CAP evolves over time and hence, initial empiric treatment needs to as well. Alcohol abuse was the only independent risk factor for severe CAP, while prior ambulatory antimicrobial therapy was protective, emphasizing the potential benefit of early empiric treatment.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10471620

Ruiz-Gonzales AM et al. Is *Streptococcus pneumoniae* the leading cause of pneumonia of unknown etiology? A microbiologic study of lung aspirates in consecutive patients with community-acquired pneumonia. *Am J Med* 1999;106:385-90. Supports long held belief that most CAP cases of unknown etiology are probably pneumococcal.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10225239

Marrie TJ, Lau CY, Wheeler SL, et al. A controlled trial of a critical pathway for treatment of CAP. CAPITAL Study Investigators. *JAMA* 2000; 283:749-55. Instituting a care pathway for CAP resulted in decreased rates of admission of low-risk patients and shorter hospital stays among those admitted without compromising the care of patients.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10683053

Fine MJ, Auble TE, Yealy DM et al. A prediction rule to identify low-risk patients with community-acquired pneumonia. *NEJM* 1997;336:243-50. Oft-cited prediction rule used in above study by Marrie, et al. incorporates patient demographics, co-morbidities, vitals, labs, and chest film to identify patients likely to do well with outpatient treatment of CAP. Rule difficult to memorize and requires an ABG, but otherwise easy to apply.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8995086

Mundy LM, Leet TL, Darst K, et al. Early mobilization of patients hospitalized with community-acquired pneumonia. *CHEST* 2003;124:883-9. A group randomized trial of 458 patients with CAP hospitalized on general medical units found patients undergoing early mobilization had shorter hospital stays without an increase in adverse events compared to usual care.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12970012

Bartlett JG, Gorbach SL. The triple threat of aspiration pneumonia. *Chest* 1975;68:560-6. Classic review of the presentation, pathophysiology, and natural history of chemical pneumonitis, bacterial pneumonia, and airway obstruction resulting from aspiration of toxic fluids, bacteria, and inert matter respectively.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1175415

- 3) Mittl RL, Schwab RJ, Duchin JS et al. Radiographic resolution of community-acquired pneumonia. *AJRCCM* 1994;149:630-5. Prospective follow-up of both inpatients and outpatients with diagnosis of CAP is cited as a guide for when to look for endobronchial lesions in the setting of slowly clearing pneumonia. The study found age and multilobar disease were independent predictors of delayed resolution. Radiographic resolution seen in 51% at 2 weeks, 67% at 4 weeks, and 90% at 12 weeks.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8118630

D) COPD

Overview

Pauwels RA, Buist AS, Calverley PMA et al. Global strategy for the diagnosis, management, and prevention of COPD: GOLD workshop summary. *Am J Respir Crit Care Med* 2001; 163:1256-76. Supported by the NHLBI and WHO and endorsed by the ATS. For the most current version of these guidelines go to: <http://www.goldcopd.com/> Original print version is at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1316667

ATS / ERS Task Force: Standards for the diagnosis and treatment of patients with COPD: A summary position of the ATS / ERS position paper. *Eur Respir J* 2004;23:932-46. This is an abbreviated summary of a serially updated web document: <http://www.thoracic.org/sections/copd/index.html> Original print version is at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15219010

Bronchodilators

Niewoehner DE, Rice K, Cote C, et al. Prevention of exacerbations of chronic obstructive pulmonary disease with tiotropium, a once-daily inhaled anticholinergic bronchodilator. *Ann Intern Med* 2005;143:317-26. A large multi-center RCT of VA patients with moderate to severe COPD (mean baseline FEV1 36%) found tiotropium reduced the proportion of patients with 1 or more exacerbations during 6 months of treatment vs. placebo (27.9 % vs. 32.3 %). These results support using tiotropium in COPD patients with moderate to severe obstruction and frequent exacerbations. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=16144890

Inhaled steroids and risk of non-vertebral fracture

The following are two examples of recent studies indicating the risk of fracture is increased primarily in the setting of high-dose ICS use.

Lee TA, Weiss KB. Fracture risk associated with inhaled corticosteroid use in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2004;169:855-9. This nested case-control study in the VA population found current use of high dose inhaled corticosteroids (>700ug/day of beclomethasone equivalent) was associated with increased risk of nonvertebral fractures (adjusted OR 1.68). http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14711795

Suissa S, Baltzan M, Kremer R, et al. Inhaled and nasal corticosteroid use and the risk of fracture. *Am J Respir Crit Care Med* 2004;169:83-8. Population-based nested case-control study found the overall risk of any type of non-vertebral fracture with current ICS use was not elevated. The rate of upper-extremity fracture increased by 12% with each 1000 mcg increment in daily ICS dose. The risk of hip fracture among patients followed for 8 years increased only with daily doses greater than 2,000 mcg. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14551165&query_hl=25

Impact of inhaled corticosteroids on lung function and exacerbations

Pauwels RA, Lofdahl CG, Laitinen LA, et al. Long-term treatment with inhaled budesonide in persons with mild COPD who continue smoking. *New Engl J Med* 1999;340:1948-1953. Study of inhaled corticosteroid in smokers with mild COPD showed a modest improvement in FEV1 relative to placebo in the first 6 months, but no benefit during the subsequent 2.5 years.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10379018

Burge PS, Calverley PMA, Jones PW, et al. Randomized, double blind, placebo-controlled study of fluticasone propionate in patients with moderate to severe COPD: the ISOLIDE trial. *BMJ* 2000;320:1297-1303. Use of inhaled steroid did not improve the rate of decline in FEV1 compared to placebo. The Flovent group had a median of 0.99 exacerbations/yr vs. 1.32/yr in the placebo arm. Response to oral steroids given in the run-in phase was not predictive of subsequent benefit from inhaled steroid.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10807619

The Lung Health Study Research Group. Effect of inhaled triamcinolone on the decline in pulmonary function in COPD. *New Engl J Med* 2000;343:1902-09. Randomized, controlled study followed over 1000 patients for an average of 4.5 yrs and found no difference in rate of decline in FEV1 in the inhaled steroid group. Patients using triamcinolone had, by some measures, fewer symptoms, but also had a greater rate of decline in bone density that is of unknown clinical significance.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11136260

Van der Valk P, Monninkhof E, van der Palen J, et al. Effect of discontinuation of inhaled corticosteroids in patients with COPD. *Am J Respir Crit Care Med* 2002;166:1358-63. Randomized, blinded, placebo-controlled, single-center study of 244 patients with a mean FEV1% predicted of 57% found more patients in the placebo arm experienced an exacerbation over a 6-month follow-up period (57 vs. 47%; hazard ratio for 1st exacerbation 1.5 [CI] 1.1-2.5). Subgroup analysis found benefit derived primarily by patients with baseline FEV1 < 50% predicted.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12406823

Impact of combinations of inhaled steroid and long-acting bronchodilators on lung function, exacerbations, and mortality

Calverley PM, Anderson JA, Celli B, et al. Salmeterol and fluticasone propionate and survival in chronic obstructive pulmonary disease. *New Engl J Med* 2007; 356:775-89. The much-anticipated TORCH study randomized over 6,000 patients with baseline FEV1 < 60% predicted to placebo vs. salmeterol alone vs. fluticasone alone vs. a combination of salmeterol and fluticasone. Compared to placebo, patients receiving combination therapy had a 2.6% lower all-cause mortality at 3 years (p = .052). Use of salmeterol, fluticasone, or a combination of the 2 reduced the frequency of exacerbations, but p was >.10

for all 3 for reducing risk of COPD-related death. All-cause mortality and COPD-related death were lower with combination therapy than fluticasone alone ($p = .007$ and $.008$, respectively).
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17314337&query_hl=1&itool=pubmed_docsum
Systemic corticosteroids in exacerbations

Niewoehner DE, Erbland ML, Deupree RH, et al. Effect of systemic glucocorticoids on exacerbations of COPD. *New Engl J Med* 1999;340:1941-7. Multicenter, double blind, placebo- controlled study found modest benefit to use of high-dose intravenous steroids. Steroid group had fewer treatment failures (combined endpoint of death, need for intubation, readmission, or intensification of pharmacologic therapy), and shorter hospital stays, but the primary benefit was in decreasing the need to intensify therapy with use of open-label steroids. No benefit from steroids was present at 6 months of f/u, and 2 week and 8 week courses were equally effective.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10379017

Role of antibiotics in exacerbations

Anthonisen NR, Manfreda J, Warren CPW et al. Antibiotic therapy in exacerbations of COPD. *Ann Intern Med* 1987;106:196-204. Famous study often cited by proponents of antibiotic use for COPD exacerbations. Randomized, blinded, controlled study found use of antibiotics in the presence of increased dyspnea, increased sputum production, and increased sputum purulence improved outcomes. The improvement was no longer significant, however, after controlling for use of oral steroids.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3492164

Supplemental oxygen

NOTT group. Continuous or nocturnal oxygen therapy in hypoxemic COPD. *Ann Intern Med* 1980;93:391-8. Famous multicenter study showing use of continuous oxygen therapy (>17 hr/d) resulted in lower mortality than use of nocturnal therapy (12 hr/d) in pts. with PaO₂ 55 mmHg or PaO₂ 59 mmHg and pulmonary hypertension, right-sided failure, or Hct 55%.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6776858

MRC Working Party. Long-term domiciliary oxygen therapy in chronic hypoxic cor pulmonale complicating chronic bronchitis and emphysema. *Lancet* 1981;8222:681-5. Another well known study showing improved survival with continuous oxygen in hypoxemic COPD patients.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6110912

Lung volume reduction surgery

Cooper JD, Trulock EP, Triantafillou AN, et al. Bilateral pneumonectomy (volume reduction) for COPD. *J Thorac Cardiovasc Surg* 1995;109:106-19. This paper revived interest in LVRS for COPD and has generated lots of controversy.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7815786

NETT Research Group. Patients at high risk of death after lung-volume-reduction surgery. *New Engl J Med* 2001;345:1075-83. Early results from NETT found a 16% 30-day mortality following LVRS in the 69 patients with FEV1 < 20% predicted AND homogenous disease per CT OR DLCO < 20% predicted. This population had higher overall mortality than comparable patients randomized to medical treatment. Survivors of LVRS had modest improvements in exercise tolerance and FEV1, but similar measures of quality of life.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11596586

Fishman A, Martinez F, Naunheim K, et al. A randomized trial comparing lung-volume-reduction surgery with medical therapy for severe emphysema: NETT Research Group. *New Engl J Med* 2003;348:2059-73. After excluding the 140 pts identified as having high risk of mortality based on the above interim analysis, a greater proportion of LVRS patients had improved exercise tolerance compared to the medical therapy arm (16% vs. 3%), but there was no survival advantage after 24 months. Subgroup analysis found patients with predominantly upper lobe disease and low exercise capacity had improved mortality, while patients with non-upper lobe emphysema and high exercise capacity had higher mortality following LVRS compared to medical therapy.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12759479

Survival

Traver GA, Cline MG, Burrows B. Predictors of mortality in COPD: A 15-year f/u study. *Amer Rev Res Dis* 1979;119:895-902. Ubiquitously cited study looking at FEV1 and survival. After controlling for age, the FEV1 after bronchodilator was the best predictor of survival, but was less predictive in patients over 65. The observed wide variability in survival of individual patients with similar initial FEV1 values has important implications for patients considering surgical treatments for their COPD.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=453709

Anthonisen NR. Prognosis in COPD: results from multicenter clinical trials. *Am Rev Respir Dis* 1989;140:S95-9. This analysis of previous trials found that COPD patients with hypoxemia had worse survival than non-hypoxemic COPD patients with equivalent FEV1.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3510578

Celli BR, Cote CG, Marin JM, et al. The body-mass index, airflow obstruction, dyspnea, and exercise capacity index in chronic obstructive pulmonary disease. *New Engl J Med* 2004;350:1005-12. This study found a combination of BMI, FEV1, modified MRC dyspnea scale, and 6 minute walk (i.e. the BODE index) was a better predictor of mortality than FEV1 alone. The BODE index may prove to be a better

guide than FEV1 for assessing the efficacy of new treatments and adjusting the aggressiveness of therapy. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14999112&query_hl=31

Casanova C, Cote C, Torres JP et al. Inspiratory- to- total lung capacity ratio predicts mortality in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2005;171:591-7. IC/TLC, a measure of static lung hyperinflation, predicted mortality independent of the BODE index. The best IC/TLC value for death prediction on the receiver operating characteristic (ROC) type II curve was 25%, yielding a sensitivity and specificity of 0.71 and 0.69 respectively. This was better than FEV1, but not as good as the BODE Index. This study reflects a growing interest in using measures of hyperinflation to predict mortality and assess therapeutic response.

1) http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15591470

E) End of Life Care

Withholding and withdrawing life-sustaining therapy. ATS Statement. *Am Rev Respir Dis* 1991;144:726-31. Statement covers patient autonomy, surrogate decision-making, and futility.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1892317

Tonelli MR. Pulling the plug on living wills. *Chest* 1996;110:816-22. Discusses the difficulties and limitations of formulating and applying advanced directives.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8797430

A controlled trial to improve care for seriously ill hospitalized patients. SUPPORT Investigators. *JAMA* 1995;274:1591-8. This landmark study found interventions to increase physician awareness of prognosis and facilitate communication between physicians and patients or surrogates made no significant difference compared to controls. Preference for CPR was discussed with a minority of patients; physicians often were unaware of their patients' preferences for CPR.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7474243

Luce JM. Making decisions about the forgoing of life-sustaining therapy. *Amer J Respir Crit Care* 1997;156:1715-8. Commentary that summarizes much of the recent research in this area. Emphasizes the need to reaffirm patient autonomy and to be cautious in the use of "futility" as a reason to withdraw care. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9412545

Truog RD, Cist AFM, Brackett SE, et al. Recommendations for end-of-life care in the intensive care unit: The Ethics Committee of the Society of Critical Care Medicine. *Crit Care Med* 2001;29:2332-48. Recommendations for clinical care of dying patients in the ICU derived from research and expert opinion. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11801837

Azoulay E, Pochard F, Kentish-Barnes N, et al. Risk of post-traumatic stress symptoms in family members of intensive care unit patients. *Am J Respir Crit Care Med* 2005; 171:987-94. This French

study is noteworthy for evaluating risk factors for stress-related symptoms in a large cohort of family members of ICU patients. Interviews of 284 primary decision makers 90 days after the patients' ICU discharge or death found that 33% were deemed to be at moderate to high risk of PTSD. Risk of PTSD was associated with perception of incomplete information in the ICU, shared decision-making, ICU death of the relative, ICU death of the relative after end-of-life decisions, and sharing in end-of-life decisions. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=15665319&query_hl=40&itool=pubmed_DocSum

- 1) Lautrette A, Darmon M, Megarbane B, et al. A communication strategy and brochure for relatives of patients dying in the ICU. *New Engl J Med* 2007; 356:469-78. This French study of family members of 126 patients that died in an ICU found the use of a brochure on bereavement combined with a proactive communication strategy lowered symptoms of anxiety, depression, and PTSD. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17267907&query_hl=42&itool=pubmed_docsum

F) Interstitial Lung Disease

American Thoracic Society/European Respiratory Society international multidisciplinary consensus classification of the idiopathic interstitial pneumonias. *Am J Respir Crit Care Med* 2002;165:277-304. Written to standardize the diagnostic criteria and terminology for idiopathic interstitial pneumonias, this article nicely summarizes the clinical, radiologic, and histologic features of the ILD alphabet soup. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1790668

Mathieson JR, Mayo JR, Staples CA, Muller NL. Chronic diffuse infiltrative lung disease: comparison of diagnostic accuracy of CT and chest radiography. *Radiology* 1989;171:111-6. First study to assess accuracy of CT-based diagnosis for patients with ILD. Correctly diagnosed UIP in 89% of cases, sarcoid in 77% of cases, and were, for the most part, less accurate in diagnosing less common diseases. Includes an interesting table of the frequency of selected CT findings observed among the 5 most common ILDs in the study (e.g. pleural fluid/thickening seen in only 9% of UIP cases). http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2928513

BOOP

Epler GR, Colby TV, McCloud TC, et al. Bronchiolitis obliterans organizing pneumonia. *New Engl J Med* 1985;312:152-8. Classic article describing idiopathic BOOP (now known as cryptogenic organizing pneumonia) http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3965933

Idiopathic Pulmonary Fibrosis

Demedts M, Behr J, Buhl R, et al, IFIGENIA Study Group. High-dose acetylcysteine in idiopathic pulmonary fibrosis. *New Engl J Med*. 2005; 353:2229-42. Multi-center, double-blind, randomized, placebo-controlled study (N=182) which determined (after one year) that high-dose oral acetylcysteine

added to standard therapy (prednisone and azathioprine) resulted in modest benefit in terms of preserving vital capacity and DLCO but offered no survival advantage. A large proportion of patients dropped out of the study and there is concern that acetylcysteine prevented azathioprine toxicity rather than treated IPF.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16306520&query_hl=6&itool=pubmed_docsum

Martinez FJ, Safrin S, Weycker D, et al. The clinical course of patients with idiopathic pulmonary fibrosis. *Ann Intern Med* 2005;142:963-7. This retrospective study of 168 patients with mild to moderate disease from the placebo arm of the IFN-gamma 1b study found minimal change in physiologic variables among survivors during the 72 weeks of follow-up. 19% of patients died of IPF-related causes, of whom 47% experienced rapid clinical deterioration. These results indicate IPF exacerbations in patients with milder disease are not uncommon, which has implications for listing for lung transplantation.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15968010

Flaherty KR, King TE, Raghu G et al. Idiopathic interstitial pneumonia: what is the effect of a multidisciplinary approach to diagnosis? *Am J Respir Crit Care Med* 2004;170:904-10. This study found radiologists and clinicians with expertise in ILD reliably diagnose IPF without a lung biopsy when the clinical and imaging features are typical of IPF. Combining clinical, radiographic, and pathologic information heavily influenced the final diagnostic impression in non-IPF cases. Histology results had the greatest influence in these instances, but pathologists altered or clarified their diagnosis 19% of the time after receiving radiographic and clinical information.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15256390

Raghu G, Brown KK, Bradford WZ et al. A placebo controlled trial of interferon gamma-1b in patients with idiopathic pulmonary fibrosis. *New Engl J Med* 2004;350:125-33. A RCT of Gamma-1b IFN involving 330 patients found no difference in progression-free survival, pulmonary function, or quality of life in patients with IPF unresponsive to corticosteroid therapy. A trend towards enhanced survival in adherent patients with less severe lung impairment (FVC >62 % predicted) prompted the INSPIRE trial which is in progress.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14711911

Raghu G, Depaso WJ, Cain K, et al. Azathioprine combined with prednisone in the treatment of IPF. *Am Rev Respir Dis* 1991;144:291-6. RCT of prednisone plus azathioprine vs. prednisone alone found some patients had greater benefit with the combination of drugs, but overall differences between groups did not reach statistical significance. Some current trials of new therapies use this combination as the “standard therapy” control group.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1859050

Douglas WW, Ryu JH, Swensen SJ, et al. Colchicine vs. prednisone in the treatment of IPF: a randomized prospective study. *Am J Respir Crit Care Med* 1998;158:220-5. Study found colchicine and prednisone equally ineffective. Colchicine had less toxicity.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9655733

Sarcoidosis

Statement on sarcoidosis. Joint Statement of the American Thoracic Society (ATS), the European Respiratory Society (ERS) and the World Association of Sarcoidosis and Other Granulomatous Disorders (WASOG) adopted by the ATS Board of Directors and by the ERS Executive Committee, February 1999. *Am J Respir Crit Care Med* 1999;160:736-55. Comprehensive and relatively readable.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10430755

Scleroderma

Tashkin DP, Elashoff R, Clements PJ, et al. Cyclophosphamide versus placebo in scleroderma lung disease. *New Engl J Med*. 2006; 354:2655-66. Multi-center, double-blind, randomized, placebo-controlled trial of 158 patients with scleroderma, restrictive lung physiology, dyspnea, and evidence of inflammation based on BAL fluid, thoracic high-resolution computed tomography, or both. One year of oral cyclophosphamide had a modest improvement in FVC (2.5%, $p < .03$), dyspnea, thickening of the skin, and quality of life. The effects on lung function were maintained through the 24 months of the study.
http://www.ncbi.nlm.nih.gov/floyd.lib.umn.edu/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16790698&query_hl=32&itool=pubmed_docsum

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G) Mycobacterial diseases

Atypical Mycobacterium

Griffith DE, Aksamit T, Brown-Elliott BA, et al. The official ATS/IDSA statement :Diagnosis, treatment, and prevention of nontuberculous mycobacterial diseases. *Am J Respir Crit Care Med* 2007; 175:367-416. More comprehensive than its 1997 predecessor, this statement provides a general overview of NTM pathogenesis, presentation, and diagnosis as well as easily retrieved treatment recommendations on specific organisms.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17277290&query_hl=36&itool=pubmed_docsum

Latent tuberculosis

ATS Statement: Targeted tuberculin testing and treatment of latent tuberculosis infection. *Am J Respir Crit Care Med* 2000;161:S221-S247. Emphasizes restricting testing to patients you intend to treat if positive and defines positive for patients with different risk factors. Recommended duration of INH increased to 9 months. Significant risk of hepatotoxicity with combination INH and rifampin reported since this statement published.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10764341

Richeldi L. An update on the diagnosis of tuberculosis infection. *Am J Respir Crit Care Med* 2006; 174:736-42. This perspective paper summarizes the operating characteristics and potential clinical

application of new blood tests that detect T-cell release of IFN-gamma release in response to exposure to tuberculosis-specific antigens.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16799073&query_hl=34&itool=pubmed_docsum

International Union against Tuberculosis Committee on Prophylaxis. Efficacy of various durations of isoniazid preventive therapy for tuberculosis: five years of follow-up in the IUAT trial. Bull WHO 1982;60:555-64. Noteworthy for being the only study of the efficacy and safety of different durations of INH prophylaxis.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6754120

Stead WW. Management of health care workers after inadvertent exposure to TB: a guide for the use of preventive therapy. Ann Intern Med 1995;122:906-12. Based on early TB outbreaks and more recent studies of health care and nursing home exposures, the author makes recommendations for the management of health care workers with heavy exposure to active disease. Specifically, workers with prior positive PPD do not need treatment unless they become symptomatic per the author. Skin test negative workers should receive INH prophylaxis until they are tested for conversion 8 weeks after exposure.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7755225

Active tuberculosis

Blumberg HM, Burman WJ, Chaisson RE, et al. ATS/CDC/IDSA: Treatment of tuberculosis. Am J Respir Crit Care Med 2003;167:603-662. Comprehensive consensus guide to treatment.http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12588714

Gardam MA, Keystone EC, Menzies R, et al. Anti-tumour necrosis factor agents and tuberculosis risk: mechanism of action and clinical management. Lancet Infect Dis 2003;3:148-55. A review of TB progression and reactivation with use of anti-TNF agents.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12614731

Bock NN, McGowan JE, Ahn J, et al. Clinical predictors of tuberculosis as a guide for respiratory isolation policy. Am J Respir Crit Care Med 1996;154:1468-72. Study found upper lobe infiltrate, presence of cavity, self-report of prior positive PPD, and history of TB exposure were predictive of active disease while history of INH prophylaxis was negatively predictive. Basing isolation solely on these criteria, however, would have resulted in failure to isolate 19% of active cases.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8912766

ATS Workshop: Rapid diagnostic tests for tuberculosis: what is the appropriate test? *Am J Respir Crit Care Med* 1997;155:1804-14. The article focuses on the indications and limitations to use of direct amplification tests (DAT) for rapid diagnosis of TB in smear-positive and smear-negative cases.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9154896

Roth BJ. Searching for tuberculosis in the pleural space. *Chest* 1999;116:3-4. Reviews use of ADA in work-up of pleural TB.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10424494 or <http://www.chestjournal.org/cgi/content/full/116/1/3>

Conde MB, Loivos AC, Rezende VM, et al. Yield of sputum induction in the diagnosis of pleural tuberculosis. *Am J Respir Crit Care Med* 2003;167:723-5. Prospective study of 84 patients with pleural tuberculosis found induced sputum culture was helpful in patients with no infiltrate on CXR; 55% of patients with effusion and clear CXR were culture positive, although only 12% had a rapid diagnosis via positive smears.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12598215

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H) Noninvasive Ventilatory Support
In COPD

Brochard L, Mancebo J, Wysocki M, et al. Noninvasive ventilation for acute exacerbations of COPD. *New Engl J Med* 1995; 333:817-22. Landmark prospective, randomized study found use of NIPPV in selected patients with COPD exacerbations resulted in fewer intubations, complications, days in hospital, and lower in-hospital mortality compared to standard treatment.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7651472

Nava S, Ambrosino N, Clini E, et al. Non-invasive mechanical ventilation in the weaning of patients with respiratory failure due to chronic obstructive pulmonary disease. *Ann Intern Med* 1998;128:721-8. Oft-cited RCT included 50 patients intubated for a COPD exacerbation who failed a T-piece trial. Patients randomized to immediate extubation to NIPPV had decreased duration of mechanical ventilation and improved survival compared to the control group undergoing PS wean with twice daily spontaneous breathing trials.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9556465

In hypoxemic respiratory failure (all types):

Declaux C, L'Her E, Alberti C, et al. Treatment of acute hypoxemic nonhypercapnic respiratory insufficiency with CPAP delivered by facemask. *JAMA* 2000;284:2352-60. Prospective, randomized, multicenter study compared oxygen to oxygen plus CPAP in this population (123 patients; 17% cardiac etiology, 83% ALI). Study found no difference in the need for intubation, length of hospital stay, or hospital mortality, and the CPAP group had an increased incidence of adverse events.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1066186

Antonelli M, Conti G, Rocco M, et al. A comparison on NIPPV and conventional mechanical ventilation in patients with acute respiratory failure. *New Engl J Med* 1998; 339:429-35. Randomized study compared NIPPV with immediate intubation and conventional ventilation in 64 patients with acute, non-hypercapnic, hypoxemic respiratory failure (19% cardiogenic and 25% ARDS). Use of NIPPV resulted in gas exchange and survival comparable to conventional ventilation but was associated with fewer serious complications and shorter ICU stays.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9700176

Ferrer M, Esquinas A, Leon M, et al. Non-invasive ventilation in severe hypoxemic respiratory failure: a randomized clinical trial. *Am J Respir Crit Care Med* 2003;168:1140-4. Study of 105 non-hypercapnic patients found NIPPV decreased need for intubation and improved 90-day survival compared to oxygen therapy alone. Unlike some prior studies, subgroup analysis found the 34 patients with pneumonia had the greatest benefit while mask ventilation did not appear to reduce the need for intubation in patients with ARDS and cardiogenic edema.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14500259

In cardiogenic hypoxemic respiratory failure:

Bersten AD, Holt AW, Vedig AE, et al. Treatment of severe cardiogenic pulmonary edema with CPAP delivered by facemask. *New Engl J Med* 1991;325:1825-30. Randomized study of 39 patients with hypercapnic cardiogenic respiratory failure found use of CPAP plus oxygen resulted in better gas exchange in the first 24 hours and less need for intubation than use of oxygen alone.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1961221

Masip J, Bethese AJ, Paez J, et al. Non-invasive pressure support ventilation versus conventional oxygen therapy in acute cardiogenic pulmonary edema: a randomized trial. *Lancet* 2000; 356:2126-32. Study of 37 patients (of whom 43% had hypercapnia) found pressure support by mask reduced the need for intubation (5% vs. 33%). There was no difference in duration of hospital stay or mortality.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11191538

Nava S, Carbone G, DiBattista, N, et al. Non-invasive ventilation in cardiogenic pulmonary edema: a multicenter randomized trial. *Am J Respir Crit Care Med* 2003; 168:1432-7. This larger study (130 patients) found non-invasive pressure support did not improve outcomes compared to conventional therapy. Mask ventilation reduced intubations in the 64 patients with PaCO₂ > 45 mmHg (6% vs. 29%), but this difference was not significant after regression analysis.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12958051

Following extubation

Ferrer M, Valencia M, Nicolas JM, et al. Early noninvasive ventilation averts extubation failure in patients at risk: a randomized trial. *Am J Respir Crit Care Med.* 2006; 173:164-70. This RCT enrolled 162 mechanically ventilated patients who tolerated a spontaneous breathing trial after recovery from the acute episode but had increased risk for respiratory failure after extubation. Early use of noninvasive ventilation averted respiratory failure after extubation and decreased intensive care unit mortality among patients at increased risk.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16224108&query_hl=12&itool=pubmed_DocSum

Esteban A, Frutos-Vivar F, Ferguson ND, et al. Noninvasive positive-pressure ventilation for respiratory failure after extubation. *New Engl J Med* 2004; 350:2452-60. This trial of 221 patients with respiratory failure within 48 hours of being extubated after receiving at least 48 hours of mechanical ventilation randomized patients to noninvasive ventilation by face mask or standard medical therapy. Noninvasive ventilation did not reduce the need for re-intubation and the standard-therapy group had lower ICU mortality (14% vs. 25% in noninvasive group). These results suggest noninvasive positive-pressure ventilation should not be used in unselected patients failing extubation.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15190137&query_hl=33&itool=pubmed_docsum

In neuromuscular weakness

Perrin C, Unterborn JN, Ambrosio CD et al. Pulmonary complications of chronic neuromuscular diseases and their management. *Muscle Nerve* 2004;29:5-27 Concise review including use of non-invasive ventilation and general management of this subset of patients including sleep disordered breathing.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14694494

- I) Bourke SC, Tomlinson M, Williams TL, et al. Effects of non-invasive ventilation on survival and quality of life in patients with amyotrophic lateral sclerosis: a randomised controlled trial. *Lancet Neurol* 2006; 5:140-7. This study of 41 patients found NIV improved survival by a median of 205 days ($p < .01$) in patients with normal or moderately impaired bulbar function. All patients had at least some degree of improved quality of life with NIV, but those with poor bulbar function did not have improved survival.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16426990&query_hl=32&itool=pubmed_docsum

- J) Preoperative Evaluation

Bolliger CT, Perruchoud AP. Functional evaluation of the lung resection candidate. *Eur Respir J* 1998;11:198-212. Good summary of use of PFTs, split function tests, and exercise tests to assess operative risk of lung resection.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9543294

Pollock M, Roa J, Benditt JO, et al. Estimation of ventilatory reserve by stair climbing: a study in patients with chronic airflow obstruction. *Chest* 1993;104:1378-83. Study found linear increases in VO_2 and V_e

with stair climbing. In order to reach a VO₂ of 20ml/kg/min, subjects had to walk 4.6 flights of stairs, suggesting the tradition of walking patients up one or two flights is an inadequate stress to predict tolerance of surgery.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8222791

Thoren L. Post-operative pulmonary complication: observations on their prevention by means of physiotherapy. *Acta Chir Scand* 1954;193-205. Pioneering study on the prevention of post-op pulmonary complications found initiation of chest PT prior to surgery was superior to exclusively post-operative therapy, which in turn was better than no therapy.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=13188561&query_hl=22&itool=pubmed_DocSum

K) Squadrone V, Cocha M, Cerutti E, et al. Continuous positive airway pressure for treatment of postoperative hypoxemia: a randomized controlled trial. *JAMA*. 2005; 293:589-95. Multi-center, unblinded RCT with concealed allocation on 209 consecutive patients who developed severe hypoxemia after major elective abdominal surgery. Patients received oxygen vs. oxygen plus CPAP. Use of CPAP resulted in lower intubation rates, lower risk of pneumonia and sepsis, and shortened ICU stays.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=15687314&query_hl=7&itool=pubmed_docsum

L) Sleep Medicine

Sleep Medicine

Obstructive sleep apnea

Sullivan CE, Berthon-Jones M, Issa FQ et al. Reversal of obstructive sleep apnea by continuous positive airway pressure applied through the nares. *Lancet* 1981 April 18; 1(8225):862-5. First description of CPAP in the treatment of OSA.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6112294

Iber C, O'Brien C, Schluter J, et al. Single night studies in obstructive sleep apnea. *Sleep* 1991;14:383-5. Contrary to the accompanying editorial, this study first documented the effectiveness of split-night studies for the evaluation of OSA and helped establish split-night studies as the standard of care.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1759089.

Flemons WW, Littner MR, Rowley JA, et al. Home diagnosis of sleep apnea: A systematic review of the literature. *Chest* 2003;124:1543-79. A summary of where we are with out-of-lab diagnosis of sleep disordered breathing. Although the effectiveness of these methods may be improving, there still is a lack of consensus on their use.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14555592&query_hl=180&itool=pubmed_docsum

Schwab RJ, Pasirstein M, Pierson R, et al. Identification of upper airway anatomic risk factors for obstructive sleep apnea with volumetric magnetic resonance imaging. *Am J Respir Crit Care Med* 2003; 168:522-30. Elegant publication demonstrating the anatomy behind sleep disordered breathing – how can a patient with a normal BMI have OSA? How can an overweight patient not have OSA? Don't miss the online supplement.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12746251

Young T, Peppard PE, Gottlieb DJ. Epidemiology of obstructive sleep apnea: a population health perspective. *Am J Respir Crit Care Med* 2002; 165:1217-39. This article reviews the epidemiologic studies identifying a high prevalence of undiagnosed OSA in the general population, as well as the association between OSA and increased likelihood of hypertension, cardiovascular disease, and stroke. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11991871&query_hl=1&itool=pubmed_DocSum

Central sleep apnea

Eckert DJ, Jordan AS, Merchia P, et al. Central sleep apnea: Pathophysiology and treatment. *Chest* 2007; 131:595-607. Concise review of the pathophysiology, presentation, and treatment of CSA. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17296668&query_hl=9&itool=pubmed_docsum

Bradley TD, Logan AG, Kimoff RJ, et al. Continuous positive airway pressure for central sleep apnea and heart failure. *New Engl J Med* 2005; 353:2025-33. The oft-cited, randomized CANPAP study of 258 patients found use of CPAP in patients with CHF and Cheyne-Stokes Respirations did not improve mortality. Some believe the lack of benefit compared to previous studies is due to advances in CHF treatment with beta blockers.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16282177&query_hl=13&itool=pubmed_docsum

Sleep Deprivation

Landrigan CP, Rothschild JM, Cronin JW, et al. Effect of reducing interns' work hours on serious medical errors in intensive care units. *N Engl J Med*. 2004; 351:1838-48. Prospective, randomized study determined that interns made substantially more serious medical errors when they worked frequent shifts of 24 hours or more than when they worked shorter shifts. Eliminating extended work shifts and reducing the number of hours interns work per week can reduce serious medical errors in the intensive care unit.

http://www.ncbi.nlm.nih.gov/floyd.lib.umn.edu/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=15509817&itool=iconfft&query_hl=58&itool=pubmed_docsum

Parasomnias

Schenck CH, Bundlie SR, Ettinger MG, et al. Chronic behavioral disorders of human REM sleep: a new category of parasomnia. *Sleep* 1986;9:293-308. The first description of REM Behavior Disorder.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3505730&query_hl=4&itool=pubmed_DocSum

Circadian Rhythm Disorders

Ancoli-Israel S, Cole R, Alessi C, et al. The role of actigraphy in the study of sleep and circadian rhythms. *Sleep* 2003;26:342-92. This review summarizes the role of actigraphy in the evaluation of patients with insomnia and circadian rhythm disorders.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12749557

Restless Legs Syndrome

M) Earley, CJ. Restless legs syndrome. *New Engl J Med* 2003; 348:2103-9. The review offers a concise summary of the evaluation and management of RLS.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12761367

N) Solitary Pulmonary Nodules

Risk factors

Tockman MS, Anthonisen NR, Wright EC, et al. Airways obstruction and the risk for lung cancer. *Annals Intern Med* 1987;106:512-8. This study found smokers with COPD had about a 5-fold risk of developing lung cancer compared to smokers without COPD. The more severe the COPD, the greater the risk.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=826952

Staging

Mountain CF. Revisions in the international system for staging lung cancer. *Chest* 1997;111:1710-1717. The staging revisions were made to better group TNM patterns with similar prognosis and approach to treatment. Includes expected survival for clinically and surgically staged cancer at 1 through 5 years.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=187198

Van Tinteren H, Hoekstra OS, Smit EF, et al. Effectiveness of PET in the preoperative assessment of patients with suspected non-small-cell lung cancer: the PLUS multicenter randomized trial. *Lancet* 2002;359:1388-93. Efficacy study found addition of PET to conventional work-up decreased futile thoracotomies and the combination of PET and conventional workup was 79% sensitive for identifying futile thoracotomies.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11978336

Gould MK, Kuschner WG, Ryzak CE, et al. Test performance of PET and CT for mediastinal staging in patients with non-small-cell lung cancer. *Ann Intern Med* 2003;139:879-92. This meta-analysis found a median sensitivity of 85% and specificity of 90% for PET in determining the presence of mediastinal disease in known or suspected NSCLC. PET's median sensitivity improved to 100% and median specificity fell to only 78% in the presence of lymphadenopathy on CT while PET had a median sensitivity of 82% and median specificity of 93% in the absence of lymphadenopathy.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14644890

Micames CG, McCrory DC, Pavey DA, et al. Endoscopic ultrasound-guided fine-needle aspiration for non-small cell lung cancer staging: a systematic review and metaanalysis. *Chest* 2007; 131:539-48. Among the 18 studies deemed eligible, EUS-FNA had an overall sensitivity of 83% and specificity of 97%. In the 4 studies with patients without mediastinal lymphadenopathy on CT scan, the sensitivity fell to 58%. The procedure is well-tolerated.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17296659&query_hl=32&itool=pubmed_docsum

Screening for lung cancer

The following articles are the basis for the belief that screening with CXR and/or sputum cytology don't improve mortality. Many have expressed concern about the quality of these studies.

Fontana RS, Sanderson DR, Taylor WF, et al. Early lung cancer detection: results of the initial (prevalence) radiologic and cytologic screening in the Mayo Clinic study. *Am Rev Respir Dis* 1984;130:561-5. Also includes a summary of the combined results of the Mayo, Sloan-Kettering, and Johns Hopkins study sites on pp 565-70.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6091507

Melamed MR, Flehinger BJ, Zaman MB, et al. Screening for lung cancer: results of the Memorial Sloan-Kettering study in New York. *Chest* 1984;86:44-53.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6734291

Frost JK, Ball WC, Levin ML, et al. Early lung cancer detection: results of the initial (prevalence) radiologic and cytologic screening in the Johns Hopkins study. *Am Rev Respir Dis* 1984;130:549-54

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6091505

Kubik A, Parkin DM, Khatl M, et al. Lack of benefit from semi-annual screening for cancer of the lung: follow-up of a randomized controlled trial on a population of high-risk males in Czechoslovakia. *Int J Cancer* 1990;45:26-33.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2404878

The following articles address screening with chest CT scans.

The following 2 studies reached discordant conclusions about the value of CT screening. For a nice discussion of this discrepancy, see the following editorial:

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17341714&itool=pubmed_AbstractPlus

Henschke CI, Yankelevitz DF, Libby DM, et al. Survival of patients with stage I lung cancer detected on CT screening. *New Engl J Med.* 2006; 355:1763-71. Very large study (N= 31,567) found screening for lung cancer in asymptomatic at-risk patients for up to 18-months resulted in a lung cancer diagnosis in 484 participants, 412 of whom had clinical stage I disease. The researchers concluded that annual spiral CT screening in at-risk patients can detect lung cancer that is curable.

http://www.ncbi.nlm.nih.gov/floyd.lib.umn.edu/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17065637&itool=iconabstr&query_hl=35&itool=pubmed_docsum

Bach PB, Jett JR, Pastorino U, et al. Computed tomography screening and lung cancer outcomes. *JAMA.* 2007; 297:953-61. This study pooled the results of 3 longitudinal studies of lung cancer screening with CT in asymptomatic current or former smokers (N=3246). The researchers concluded that screening for lung cancer with low-dose CT may increase the rate of lung cancer diagnosis and treatment, but based on models of predicted survival, it does not reduce the risk of death from lung cancer.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17341709&query_hl=14&itool=pubmed_docsum

Henschke CI, McCauley DI, Yankelevitz DF, et al. Early lung cancer action project: overall design and findings from baseline screening. *Lancet* 1999;354:99-105. Study of annual low dose CT in detecting lung cancer in 1000 heavy smokers identified noncalcified nodules in 23% of patients and 12% of nodules were malignant. The yield was extraordinarily high, as 27 of 28 biopsies were positive for malignancy, and 87% of these were stage I. Large scale study to confirm findings and assess long-term survival benefit and costs is in progress.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10408484

Swenson SJ, Jett JR, Hartman TE, et al. CT screening for lung cancer: Five-year prospective experience. *Radiology* 2005;235:259-65. Updated results from Mayo's screening study of 1,520 subjects age > 50 with tobacco use > 20 pack-years. After 5 years, 74% of subjects had at least 1 uncalcified nodule and 2.6% were diagnosed with stage I non-small cell cancer. Compared to previous studies, adenocarcinoma (including bronchioloalveolar carcinoma) was over-represented, which raises the possibility of earlier diagnosis without reduction in mortality. 96% of nodules identified on the prevalence scan and 96% of nodules identified on an incidence scan proved to be benign based on observation or resection. 69% of all participants had at least 1 of these "false-positive" nodules.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15695622&query_hl=11&itool=pubmed_docsum

Solitary pulmonary nodule

Ost D, Fein AM, Feinsilver SH. The solitary pulmonary nodule. *New Engl J Med* 2003; 348:2535-42. Concise review of risks and yield of the currently used diagnostic modalities, including PET scans. Unlike some recently published guidelines, the authors consider both clinical suspicion for malignancy and operative risk in making management recommendations. The authors advocate the use of serial CT scans in patients with low probability of cancer as well as patients with intermediate probability with negative additional workup.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12815140

Torrington KG, Kern JD. The utility of fiberoptic bronchoscopy in the evaluation of the solitary pulmonary nodule. *Chest* 1993;104: 1021-4. Study found low yield for use of FOB in the work-up of radiographic Stage I lung cancer. FOB confirmed the diagnosis of cancer in 30% of cases (no higher yield with use of fluoroscopic guidance), but this did not affect surgical management. Unsuspected synchronous tumor found in only 1% of cases. Study population skewed in that a high proportion (87%) of SPNs were malignant.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8404158

Henschke CI, Yankelevitz DF, Naidich DP, et al. CT screening for lung cancer: suspiciousness of nodules by size. *Radiology* 2004;231:164-8. Based on data from 2897 high-risk subjects in the ELCAP study, non-calcified nodules < 5mm diameter should be followed with a repeat scan in 12 months rather than shorter-term follow-up.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14990809

- O) MacMahon H, Austin JH, Gamsu G, et al. Guidelines for management of small pulmonary nodules detected on CT scans: A statement from the Fleischner Society. *Radiology* 2005; 237:395-400. This statement recommends less aggressive follow-up of small (6 mm or less) pulmonary nodules based on findings from recent lung cancer screening studies.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=16244247&query_hl=5&itool=pubmed_docsum