Pulmonary Pearls for Primary Care Physicians

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Pulmonary Pearls for Primary Care Physicians

- COPD over-diagnosis
- Asthma under and over-diagnosis
- Lung cancer screening
- Follow up on pulmonary nodules
- Pneumonia over-diagnosis

COPD Overdiagnosis

- COPD diagnosed by history and physical exam alone, which is non-specific and shared by many pulmonary and nonpulmonary conditions (Asthma, RLD, fibrosis, CHF, obesity, vocal cord dysfunction, etc.)
- COPD is commonly underdiagnosed and overdiagnosed because of lack of spirometry testing among symptomatic patients. **"Everything is COPD until the correct diagnosis is made"**

COPD Overdiagnosis

- 2018 definition: COPD is a common, preventable, and treatable disease that is characterized by **persistent** respiratory symptoms and **airflow limitation** (FEV1/FVC < 0.7)
- The new 2018 guidelines recommend repeat spirometry if FEV1/FVC 0.6 - 0.8 range to account for day-to-day biologic variability and to increase specificity of diagnosis. In borderline cases, repeat spirometry in 3-6 months (15% - 27% become not COPD after smoking cessation)
- More detailed evaluation with full PFTs when symptoms are discordant with physiologic measures of disease severity

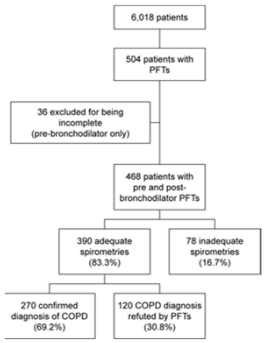
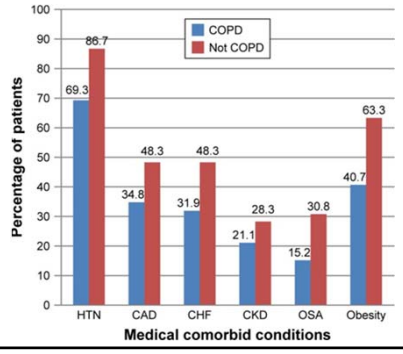


Table 3. Risk Factors Associated with Overdiagnosis and Underdiagnosis of Chronic Obstructive Pulmonary Disease

Overdiagnosis	Underdiagnosis
Underuse of spirometry in making diagnosis (17)	Underuse of spirometry in making diagnosis (17)
Technical errors in performing and interpreting spirometry (31–35)	Codiagnosis of asthma (16)
Younger age (16)	Male sex (7)
Diagnosis by an older physician (16)	Lower education levels (7)
Nonsmoking history (16)	Ethnic minority background (9)
Other comorbidities affecting spirometry interpretation or comorbidities that present with clinical symptoms that overlap with symptoms of COPD:	Minimization of symptoms and underreporting of symptoms to physicians (9, 16)
Obesity	
Congestive heart failure	
Asthma	

Definition of abbreviation: COPD = chronic obstructive pulmonary disease.



COPD Overdiagnosis

- One out of three patients admitted to the hospital with the diagnosis of COPD may be overdiagnosed
- Obesity/OSA/HTN/CHF/CAD are associated with overdiagnosis
- Diagnosis is more accurate if the patient is a current or former smoker and has a low BMI
- Spirometry is needed to confirm the diagnosis of COPD. It is cheap, available, and easy to do prior to discharge.

Pitfalls of Asthma Diagnosis

- 2018 Global Initiative for Asthma (GINA) definition: Heterogeneous disease, defined by history of respiratory symptoms such as wheezing, shortness of breath, chest tightness, and cough that **vary** over time and in intensity together with **variable** expiratory airflow limitation
- Diagnosis of asthma should not be made based on symptoms alone
- Studies showed 7-10% of adults and pediatric population have current asthma. 20-73% remain undiagnosed

Pitfalls of Asthma Diagnosis

Factors associated with underdiagnosis:

- Patient underreporting of symptoms
- Poor diagnostic sensitivity of office spirometry (29% sensitivity, 77% PPV, 53% NPV)

Pitfalls of Asthma Diagnosis

- Confusion due to FEV1/FVC. What is the proper FEV1/FVC for asthma?
- GINA
  - Adults: > 0.7-0.8
  - Children: >0.90
- NHLBI
  - 8-19 years: >0.85
  - 20-39 years: >0.80
  - 40-59 years:0.75
  - 60-80 years: >0.70
- GOLD
  - Fixed >0.70

Pitfalls of Asthma Diagnosis

- 33% if asthma ruled out by study assessment including longitudinal spirometry and weaning from asthma medication
- More likely to retain the diagnosis of asthma if the original diagnosis was made with spirometry
- Sizable proportion of patients who believe they have asthma no longer have it or never had it to start with
- Helpful steps to avoid underdiagnosis: greater use of spirometry, clinical evaluation, step-down approach

Overdiagnosis of Asthma

- 30-35% falsely positive diagnosis of asthma
- Failure to use objective tests of lung functions (asthma mimickers - vocal cord dysfunction, bronchitis, airway lesions, etc.)
- Up to one third of young adults and children can go into remission
- Obesity - 30-41% of obese patients with previous physician diagnosis of asthma did not demonstrate bronchial hyperresponsiveness

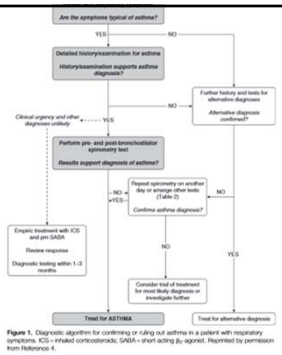


Figure 1. Diagnostic algorithm for confirming or ruling out asthma in a patient with respiratory symptoms. ICS – inhaled corticosteroids; SABA – short-acting β_2-agonist. Reprinted by permission from Reference 4.

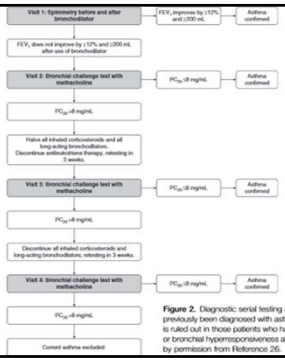


Figure 2. Diagnostic serial testing algorithm to confirm or exclude asthma in patient previously been diagnosed with asthma and who are receiving asthma medications. is ruled out in those patients who have no evidence of worsening of symptoms or airf or bronchial hyperresponsiveness after being gradually tapered off all asthma medicat by permission from Reference 26.

Pitfalls of Asthma Diagnosis - Summary

- Diagnosis of asthma should not be based on symptoms alone
- Normal spirometry findings do not rule out the diagnosis of asthma
- Positive test is not sufficient to definitively establish the diagnosis of asthma (>12% improvement in FEV1 can be seen in COPD, bronchiectasis, bronchiolitis)
- Negative methacholine bronchoprovocation testing reliably excludes the diagnosis of asthma

Lung Cancer Screening

National lung cancer screening trials found that yearly CT as compared to CXR decreased mortality by 20%

1. For asymptomatic smokers and former smokers age 55 to 77 who have smoked 30 pack years or more and either continue to smoke or have quit within the past 15 years, we suggest that annual screening with low-dose CT should be offered. (Weak recommendation, moderate-quality evidence)

2. For asymptomatic smokers and former smokers who do not meet the smoking and age criteria in Recommendation #1 but are deemed to be at high risk of having/developing lung cancer based on clinical risk prediction calculators, we suggest that low-dose CT screening should not be routinely performed. (Weak recommendation, low-quality evidence)

Lung Cancer Screening

3. For individuals who have accumulated fewer than 30 pack years of smoking or are younger than age 55 or older than 77, or have quit smoking more than 15 years ago, and do not have a high risk of having/developing lung cancer based on clinical risk prediction calculators, we recommend that low-dose CT screening should not be performed. (Strong recommendation, moderate-quality evidence)

4. For individuals with comorbidities that adversely influence their ability to tolerate the evaluation of screen-detected findings, or tolerate treatment of an early-stage screen-detected lung cancer, or that substantially limit their life expectancy, we recommend that low-dose CT screening should not be performed. (Strong recommendation, low-quality evidence)

Lung Cancer Screening

5. We suggest that low-dose CT screening programs develop strategies to determine whether patients have symptoms that suggest the presence of lung cancer, so that symptomatic patients do not enter screening programs but instead receive appropriate diagnostic testing, regardless of whether the symptomatic patient meets screening eligibility criteria. (Ungraded Consensus-Based Statement)

6. We suggest that screening programs define what constitutes a positive test on the low-dose CT based on the size of a detected solid or part-solid lung nodule, with a threshold for a positive test that is either 4 mm, 5 mm, or 6 mm in diameter. (Weak recommendation, low-quality evidence)

Lung Cancer Screening

7. We suggest that low-dose CT screening programs develop a comprehensive approach to lung nodule management, including multi-disciplinary expertise (Pulmonary, Radiology, Thoracic Surgery, Medical and Radiation Oncology), and algorithms for the management of small solid nodules, larger solid nodules, and sub-solid nodules. (Ungraded Consensus-Based Statement)

8. We suggest that low-dose CT screening programs develop strategies to minimize overtreatment of potentially indolent lung cancers. (Ungraded Consensus-Based Statement)

Lung Cancer Screening

9. For current smokers undergoing low-dose CT screening, we recommend that screening programs provide evidence-based tobacco cessation treatment as recommended by the US Public Health Service. (Strong recommendation, low-quality evidence)

10. We suggest that low-dose CT screening programs follow the ACR/STR protocols for performing low radiation dose chest CT scans. (Ungraded Consensus-Based Statement)

11. We suggest that low-dose CT screening programs use a structured reporting system to report the exam results. (Ungraded Consensus-Based Statement)

Incidental Pulmonary Nodules
(Fleischner Society 2017)

- Screening lung cancer trials noted that lung nodules detected in 51% of participants
- More than 95% of these nodules are benign
- High risk nodules (ACCP) estimated cancer risk of at least 65%:
  - Older age
  - Heavy smoking
  - Larger nodule size
  - Irregular or spiculated margins
  - Upper lobe location

Incidental Pulmonary Nodules

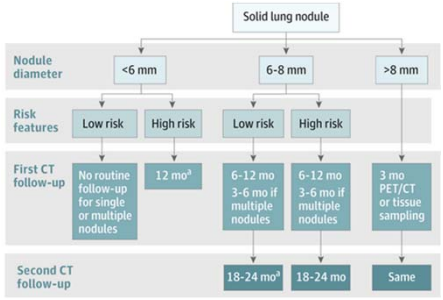
- Low risk, estimated risk of cancer < 5%:
  - Young age
  - Less smoking
  - Small nodules
  - Regular margins
  - Not in upper lobes
- Intermediate risk, 5-65% risk of cancer:
  - Family history
  - Emphysema
  - Pulmonary fibrosis
  - Known exposure to carcinogens

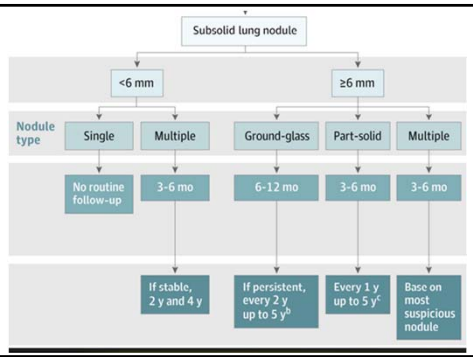
Incidental Pulmonary Nodules

- Strong imaging recommendations
  - Use 1 mm thin cuts (CT)
  - Low dose radiation protocol
  - Routine comparison with prior CT

Incidental Pulmonary Nodules

- Solid nodules
  - Round or irregular opacities with mean axial diameter of 0.3 - 3.0 cm completely obscuring underlying bronchial and vascular margins
- Subsolid nodules
  - Round or irregular opacities with mean axial diameter of 0.3 - 3.0 cm that **do not** completely obscure underlying structures
- Ground-glass nodules
  - < 6 mm: often transient due to infection or hemorrhage
  - Persistent GGN carry high risk of malignancy
  - Partly solid nodules have risk of cancer, but if solid component <6 mm they are less likely to be aggressive
  - If multiple solid nodules at least 6-8 mm or larger, the most suspicious nodule should determine follow up





Pneumonia Over-Diagnosis

- IDSA/ATS definition:
  - New lung infiltrate PLUS clinical evidence that infiltrate is of infectious origin which includes
    - New onset of fever (80%)
    - Purulent sputum (cough 90%, ⅔ productive)
    - Leukocytosis
    - Decreased oxygenation
    - Increased respiratory rate (45-70%)

Pneumonia Over-Diagnosis

- Standard definition of pneumonia by US Food & Drug Administration for clinical trials:
  - All of the following
    - New or increasing infiltrate on CXR or CT
    - Fever
    - Increased WBC or 10% bands or left-shift
    - At least 2 signs or symptoms of the following (cough, dyspnea, egophony)

Issues leading to over-diagnosis of Pneumonia

- Not following standardized criteria for diagnosis of pneumonia
- Huge clinical overlap between pneumonia and many other conditions with similar symptom
- 27% of hospitalized patients and 43% of outpatients diagnosed with CAP have negative CXR
- Pressure on ER to start first dose of antibiotics within 4 hours
- Clinical picture not clear, but (start antibiotics just in face) and not revisited
- Certain quality measures encourage physicians to favor pneumonia diagnosis over another diagnosis such as bronchitis, atelectasis, etc
- No one sign, symptom or finding is sufficient to diagnose pneumonia
- Microbiological confirmation is often of little assistance

Summary

- COPD over-diagnosis
  - Spirometry required for diagnosis
- Asthma under and over-diagnosis
  - Negative spirometry does not r/o asthma
  - Negative methacholine challenge essentially r/o asthma
- Lung cancer screening
  - Follow standardized protocol for correct f/u and avoid over-ordering imaging studies
- Follow up on pulmonary nodules
  - Follow standardized guidelines for f/u
- Pneumonia over-diagnosis
  - No one sign, symptom or imaging study sufficient to diagnose pneumonia

THANK YOU

QUESTIONS?