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Screening for Chronic Obstructive Pulmonary Disease: US Preventive Services Task Force Recommendation Statement

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Special Communication | USPSTF RECOMMENDATION STATEMENT

Screening for Chronic Obstructive Pulmonary Disease
US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force (USPSTF)

IMPORTANCE About 14% of US adults aged 40 to 79 years have chronic obstructive pulmonary disease (COPD), and it is the third leading cause of death in the United States. Persons with severe COPD are often unable to participate in normal physical activity due to deterioration of lung function.

OBJECTIVE To update the 2008 US Preventive Services Task Force (USPSTF) recommendation on screening for COPD in asymptomatic adults.

EVIDENCE REVIEW The USPSTF reviewed the evidence on whether screening for COPD in asymptomatic adults (those who do not recognize or report respiratory symptoms) improves health outcomes. The USPSTF reviewed the diagnostic accuracy of screening tools (including prescreening questionnaires and spirometry); whether screening for COPD improves the delivery and uptake of targeted preventive services, such as smoking cessation or relevant immunizations; and the possible harms of screening for and treatment of mild to moderate COPD.

FINDINGS Similar to 2008, the USPSTF did not find evidence that screening for COPD in asymptomatic persons improves health-related quality of life, morbidity, or mortality. The USPSTF determined that early detection of COPD, before the development of symptoms, does not alter the course of the disease or improve patient outcomes. The USPSTF concludes with moderate certainty that screening for COPD in asymptomatic persons has no net benefit.

CONCLUSIONS AND RECOMMENDATION The USPSTF recommends against screening for COPD in asymptomatic adults. (D recommendation)

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Editorial page 1343

Author Audio Interview at jama.com

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The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

Summary of Recommendation and Evidence

The USPSTF recommends against screening for chronic obstructive pulmonary disease (COPD) in asymptomatic adults. (D recommendation) (**Figure 1**)

Rationale

Importance

About 14% of US adults aged 40 to 79 years have COPD, and it is the third leading cause of death in the United States.[1,2] Persons with severe COPD are often unable to participate in normal physical activity due to deterioration of lung function.

Detection

Chronic obstructive pulmonary disease is defined as airflow limitation that is not fully reversible. Chronic obstructive pulmonary disease is associated with an abnormal inflammatory response of the lung to harmful particles or gases. Diagnosis is based on postbronchodilator spirometry, which detects fixed airway obstruction; a forced expiratory volume in 1 second to forced vital capacity (FEV_1/FVC) ratio of less than 0.70 is the current criterion for a positive COPD diagnosis. Persons with COPD often, but not always, have symptoms such as dyspnea (difficulty breathing or shortness of breath), chronic cough, and chronic sputum production. Patients

Figure 1. US Preventive Services Task Force Grades and Levels of Certainty

What the USPSTF Grades Mean and Suggestions for Practice

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the Clinical Considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as the number, size, or quality of individual studies. inconsistency of findings across individual studies. limited generalizability of findings to routine primary care practice. lack of coherence in the chain of evidence. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of the limited number or size of studies. important flaws in study design or methods. inconsistency of findings across individual studies. gaps in the chain of evidence. findings not generalizable to routine primary care practice. lack of information on important health outcomes. More information may allow estimation of effects on health outcomes.
The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.	

often have a history of exposure to risk factors such as cigarette smoke or heating fuels or occupational exposure to dusts or chemicals. Although postbronchodilator spirometry is required to make a definitive diagnosis, prescreening questionnaires can elicit current symptoms and previous exposures to harmful particles or gases.

Benefits of Detection and Early Treatment

The USPSTF found inadequate evidence that screening for COPD in asymptomatic persons using questionnaires or spirometry improves health outcomes.

Harms of Detection and Early Treatment

The USPSTF found inadequate evidence on the harms of screening. However, given the lack of benefit of early detection and treatment, the opportunity cost associated with screening asymptomatic persons may be large. The amount of time and effort required to screen for COPD in asymptomatic persons (using screening spirometry with or without prescreening questionnaires) is not trivial.

USPSTF Assessment

The USPSTF determined that early detection of COPD, before the development of symptoms, does not alter the course of the disease or improve patient outcomes. The USPSTF concludes with moderate certainty that screening for COPD in asymptomatic persons has no net benefit. Thus, screening is not recommended in persons who do not have symptoms suggestive of COPD. The USPSTF recommends against screening for COPD in asymptomatic adults.

Figure 2. Screening for Chronic Obstructive Pulmonary Disease: Clinical Summary

Population	Asymptomatic adults who do not present with respiratory symptoms
Recommendation	Do not screen for chronic obstructive pulmonary disease (COPD). Grade: D

Risk Assessment	Risk factors include history of exposure to cigarette smoke or heating fuels; occupational exposure to toxins, dusts, or industrial chemicals; exposure to environmental pollution, such as wood smoke and traffic pollutants; history of asthma or childhood respiratory tract infections; and α_1-antitrypsin deficiency.
Screening Tests	Primary care screening involves either risk assessment via a formal prescreening questionnaire and, if positive, follow-up with diagnostic spirometry testing or screening spirometry administered without a bronchodilator and, if positive, follow-up with diagnostic spirometry testing.
Treatment and Interventions	Medications used to treat COPD include long-acting β-agonists, inhaled corticosteroids, long-acting anticholinergics, and combination therapy with corticosteroids and long-acting β-agonists.
Balance of Benefits and Harms	The USPSTF concludes with moderate certainty that screening for COPD in asymptomatic persons has no net benefit.
Other Relevant USPSTF Recommendations	The USPSTF recommends that clinicians ask all adults, including pregnant women, about tobacco use and provide tobacco cessation interventions for those who use tobacco products. The USPSTF also recommends that clinicians provide interventions, including education or brief counseling, to prevent initiation of tobacco use in school-aged children and adolescents. These recommendations are available on the USPSTF website (http://www.uspreventiveservicestaskforce.org).

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to http://www.uspreventiveservicestaskforce.org.

U.S. Preventive Services TASK FORCE

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Clinical Considerations

Patient Population Under Consideration

This recommendation statement applies to asymptomatic adults who do not recognize or report respiratory symptoms (**Figure 2**). It does not apply to at-risk persons who present to clinicians with symptoms such as chronic cough, sputum production, dyspnea, or wheezing. It also does not apply to persons with a family history of α_1-antitrypsin deficiency.

Risk Assessment

Exposure to cigarette smoke or toxic fumes increases the risk for COPD. Epidemiological studies have found that 15% to 50% of smokers develop COPD.[3] More than 70% of all COPD cases occur in current or former smokers. Occupational exposure to toxins, dusts, or industrial chemicals contributes an estimated 15% of all COPD cases. Environmental pollution, including wood smoke and traffic pollutants, is also associated with increased risk for COPD. Nonmodifiable risk factors for COPD include history of asthma or childhood respiratory tract infections and α_1-antitrypsin deficiency.

Screening Tests

Screening adults in primary care involves either risk assessment via a formal prescreening questionnaire and, if positive, follow-up with diagnostic spirometry testing or screening spirometry administered without a bronchodilator and, if positive, follow-up with diagnostic spirometry testing. Patients identified as high risk by a prescreening questionnaire or screening spirometry are referred for diagnostic spirometry testing. Diagnosis by spirometry requires persistent airway obstruction after administration of an inhaled bronchodilator, such as albuterol (ie, postbronchodilator spirometry). Chronic obstructive pulmonary disease is diagnosed when the patient has a postbronchodilator FEV_1/FVC ratio of less than 0.70. Severity is defined by the percentage of predicted postbronchodilator FEV_1; 80% or more is mild, 50% to 79% is moderate, 30% to 49% is severe, and less than 30% is very severe.

Other Approaches to Prevention

Prevention of exposure to cigarette smoke and other toxic fumes is the best way to prevent COPD. Interventions to prevent the initiation of tobacco use are an effective way to prevent exposure to cigarette smoke. Current smokers should receive smoking cessation counseling and be offered behavioral and pharmacological therapies to stop smoking.

Useful Resources

The USPSTF recommends that clinicians ask all adults, including pregnant women, about tobacco use and provide tobacco cessation interventions for those who use tobacco products. The USPSTF also recommends that clinicians provide interventions, including education or brief counseling, to prevent initiation of tobacco use in school-aged children and adolescents. These recommendations and their supporting evidence are available on the USPSTF website (http://www.uspreventiveservicestaskforce.org).

Other Considerations

Research Needs and Gaps

The USPSTF reviewed studies whose participants included former and current smokers, but many studies, including those that examined the accuracy of screening tools, did not report results separately by smoking status (ie, current vs former smokers). Future studies that stratify risk by smoking status could help identify different risk groups that may benefit from screening. In addition, trials are needed that assess the effects of screening among current and previous smokers in primary care on long-term health outcomes. Long-term trials of treatment of COPD in screen-detected patients are also needed. Better treatment options for COPD and long-term epidemiological studies of the natural history and heterogeneity of COPD progression could also help identify patients who are at greatest risk for clinical deterioration.

Discussion

Burden of Disease

About 13.7 million US adults are affected annually by COPD.[4] As lung function deteriorates over time, patients with COPD experience significant restrictions in their ability to work and participate in other activities of daily living. In 2013, COPD was responsible for about 10.3 million physician visits and 1.5 million emergency department visits.[4] Health care costs associated with COPD are an estimated $32 billion per year.[3] The prevalence of COPD and its associated mortality have been rising among women, possibly due to increasing smoking rates, environmental exposures, or biological mechanisms that increase susceptibility to COPD. Among different racial/ethnic groups, the prevalence of COPD is highest among non-Hispanic white individuals (14.9%) and non-Hispanic black individuals (12.8%).[2,5]

Scope of Review

Since the 2008 USPSTF recommendation, there is still no evidence that screening for COPD in asymptomatic persons improves health-related quality of life, morbidity, or mortality. The USPSTF commissioned a systematic review to examine whether screening for COPD improves the delivery and uptake of targeted preventive services, such as smoking cessation or relevant immunizations. In addition to the potential benefits of screening, the USPSTF also examined the possible harms of screening for and treatment of mild to moderate COPD. The diagnostic accuracy of screening tools (including prescreening questionnaires and spirometry) was not part of the previous systematic review but was evaluated in the current review.[3,6]

Accuracy of Prescreening and Screening Tests

The USPSTF identified 3 externally validated questionnaires based on risk factors, symptoms, or both: the COPD Diagnostic Questionnaire,[7,8] the Lung Function Questionnaire,[9] and the COPD Population Screener.[10] In addition, 3 other questionnaires are currently in development but have not yet been externally validated.[3] The COPD Diagnostic Questionnaire is an 8-item questionnaire; using a cutoff of greater than 16.5, it has a sensitivity of about 90% and specificity of about 40% for identifying persons with COPD in a primary care population.[3] The Lung Function Questionnaire is a 5-item questionnaire; using a cutoff of 18 or greater, it has a sensitivity of approximately 88% and specificity of approximately 25% in a primary care population of current and former smokers.[3] The COPD Population Screener is a 5-item questionnaire; using a cutoff of 4 or greater, it has a sensitivity of 67% and specificity of 73% in a general population in Japan.[3]

The USPSTF found 2 heterogeneous international studies of screening with handheld peak flow meters that were not considered applicable to a US primary care population.[3] Screening with pulmonary function tests (without bronchodilators) was studied in primary care populations in Australia and Sweden[3] and yielded sensitivity of about 50% and specificity of 90% for a cutoff of less than 0.70. Another screening study conducted in Greece evaluated postbronchodilator spirometry and yielded sensitivity of 80% and specificity of 95% for the same cutoff.[3] The USPSTF found no pulmonary function screening studies conducted in the United States.[3]

Effectiveness of Early Detection and Treatment

The USPSTF found no studies that directly assessed the effects of screening for COPD in asymptomatic adults on morbidity, mortality, or health-related quality of life. The USPSTF also found no studies that examined the effectiveness of screening on relevant immunization rates. The USPSTF identified 5 studies that assessed the effects of screening on smoking cessation.[11-15] These studies primarily examined the incremental value of adding spirometry testing to existing smoking cessation programs. One trial showed a statistically significant increase in smoking cessation rates between participants who received explanations of their spirometry results using "lung age" and those who did not.[11] The other 4 trials did not report any significant differences in smoking abstinence rates.

The USPSTF examined the treatment efficacy of 4 classes of medications used to treat COPD: long-acting β-agonists (LABAs), inhaled corticosteroids, long-acting anticholinergics (tiotropium), and combination therapy with corticosteroids and LABAs.[3] No treatment trials were conducted in asymptomatic or screen-detected populations; all were conducted in populations with moderate COPD. Two studies of LABAs found no difference in all-cause mortality but found decreased exacerbation of COPD symptoms in the treatment vs control group in post hoc subanalysis. Decreased exacerbation of COPD symptoms was reported for patients with moderate to severe symptoms of COPD. However, rates of COPD exacerbation were extremely low at baseline (<1 episode per year), even among participants reporting symptoms. Six trials of inhaled corticosteroids found decreased exacerbation of COPD symptoms but no difference in all-cause mortality, dyspnea, or quality of life. One trial of combination therapy with corticosteroids and LABAs found decreased exacerbation of COPD symptoms but no differences in mortality or quality of life. Five trials of anticholinergics found decreased exacerbation of COPD symptoms but insufficient evidence on other outcomes. For all classes of medications, the one consistent finding was that treatment decreases exacerbation of COPD symptoms in persons with moderate COPD but has no consistent effects on all-cause mortality, dyspnea, or quality of life. There was insufficient evidence on the effects of treatment on exercise capacity and functional status.

Estimate of Magnitude of Net Benefit

The potential harms of using prescreening questionnaires and screening spirometry are false-positive and false-negative results. The USPSTF found no evidence to estimate the short- or long-term harms of these screening tests. Potential harms of treatment include pneumonia with use of LABAs and inhaled corticosteroids and decreased bone density and increased fractures with use of inhaled corticosteroids. However, data were sparse, with few adverse events, and there were no differences between the intervention and control groups.[3]

Because all of the treatment trials were conducted in persons with mild to moderate COPD, it is unclear how these results would apply to asymptomatic populations. The potential treatment benefit of decreased exacerbation of symptoms may not apply to patients who report no symptoms to begin with. Given the lack of potential benefits of treatment in asymptomatic persons and the not-trivial work of screening, the USPSTF determined that there is no net benefit of screening.

How Does the Evidence Fit With Biological Understanding?

To date, treatment trials of COPD have found modest treatment benefits in patients with mild to moderate COPD. Because the majority of COPD cases result from exposure to cigarette smoke and other toxic fumes, the most effective way to prevent COPD is to limit such exposure. Persons with a history of exposure and symptoms such as dyspnea, chronic cough, or sputum production should be evaluated for the diagnosis of COPD.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from August 18 to September 14, 2015. The USPSTF received requests for clarification about whether high-risk groups, such as current smokers, were included in the systematic review. In response, the USPSTF clarified that both current and former smokers were included in the studies reviewed. However, the lack of stratified results by smoking status limits the USPSTF's ability to make a separate recommendation for screening in persons who are at higher risk for COPD. The USPSTF recognizes that patients who have mild COPD may underreport symptoms. The USPSTF encourages clinicians to offer smoking cessation interventions to all patients who currently smoke and to pursue active case-finding for COPD in patients with risk factors, such as exposure to cigarette smoke or heating fuels, occupational exposure to dusts or chemicals, or a family history of α_1-antitrypsin deficiency.

Update of Previous USPSTF Recommendation

This is an update of the 2008 USPSTF recommendation. In 2008, the USPSTF recommended against screening for COPD with spirometry in asymptomatic adults (D recommendation). This recommendation was based on the conclusion that screening for COPD had no net benefit and large associated opportunity costs.

Recommendations of Others

In 2011, the American College of Physicians, American College of Chest Physicians, American Thoracic Society, and European Respiratory Society issued joint guidelines recommending that spirometry be used to diagnose airflow obstruction in patients with respiratory symptoms.[16] The joint panel recommended against screening for COPD with spirometry in asymptomatic patients, citing the lack of benefit. Similarly, in 2010, the UK National Institute for Health and Care Excellence recommended against screening for COPD in asymptomatic patients.[17] Recent guidelines from the Global Initiative for Chronic Obstructive Lung Disease recommended case-finding in symptomatic patients but did not recommend screening in asymptomatic populations.[18]

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