

# Screening for Chronic Obstructive Pulmonary Disease

## US Preventive Services Task Force Reaffirmation Recommendation Statement

US Preventive Services Task Force

**IMPORTANCE** Chronic obstructive pulmonary disease (COPD) is an irreversible reduction of airflow in the lungs. Progression to severe disease can prevent participation in normal activities because of deterioration of lung function. In 2020 it was estimated that approximately 6% of US adults had been diagnosed with COPD. Chronic lower respiratory disease, composed mainly of COPD, is the sixth leading cause of death in the US.

**OBJECTIVE** To update its 2016 recommendation, the US Preventive Services Task Force (USPSTF) commissioned a reaffirmation evidence update that focused on targeted key questions for benefits and harms of screening for COPD in asymptomatic adults and treatment in screen-detected or screen-relevant adults.

**POPULATION** Asymptomatic adults who do not recognize or report respiratory symptoms.

**EVIDENCE ASSESSMENT** Using a reaffirmation process, the USPSTF concludes with moderate certainty that screening for COPD in asymptomatic adults has no net benefit.

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

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### Summary of Recommendation

Population	Recommendation	Grade
Asymptomatic adults	The USPSTF recommends against screening for chronic obstructive pulmonary disease in asymptomatic adults.	D

USPSTF indicates US Preventive Services Task Force

See the Summary of Recommendation Figure.

### Importance

Chronic obstructive pulmonary disease (COPD) is an irreversible reduction of airflow in the lungs. Progression to severe disease can prevent participation in normal activities because of deterioration of lung function.<sup>1</sup> In 2020 it was estimated that approximately 6% of US adults had been diagnosed with COPD.<sup>2</sup> Chronic lower respiratory disease, composed mainly of COPD, is the sixth leading cause of death in the US.<sup>3,4</sup> Age-adjusted death rates for COPD are higher in men than women. However, over the last 20 years, the age-adjusted death rate has been declining in men while remaining the same in women.<sup>1,5</sup> Prevalence of COPD is highest among Native American/Alaska Native populations, likely because

of disproportionate socioeconomic challenges and health risk behaviors such as smoking.<sup>6,7</sup> Mortality rates from chronic lower respiratory disease (mostly COPD) are highest in White adults, followed by Native American/Alaska Native adults.<sup>8</sup> Black adults have more hospitalizations and worse COPD-related quality of life compared with White adults, despite having lower prevalence of COPD than White adults.<sup>9</sup>

### USPSTF Assessment of Magnitude of Net Benefit

#### Reaffirmation

In 2016, the US Preventive Services Task Force (USPSTF) reviewed the evidence for screening for COPD and issued a D recommendation.<sup>10</sup>

Table. Summary of USPSTF Rationale

Rationale	Assessment
Detection	Externally validated questionnaires have good sensitivity but fair specificity for detecting COPD in primary care populations. There is more limited evidence on the accuracy of pulmonary function tests that are applicable to US primary care populations.
Benefits of early detection and intervention and treatment	<ul style="list-style-type: none"> <li>The USPSTF found inadequate direct evidence that screening for COPD in asymptomatic adults reduces morbidity or mortality or improves health-related quality of life.</li> <li>The USPSTF found inadequate evidence that treatment of asymptomatic COPD reduces morbidity or mortality or improves health-related quality of life.</li> <li>Limitations of the evidence on pharmacologic and nonpharmacologic interventions suggest that treatment benefits in adults with symptomatic moderate COPD are marginal. Therefore, the USPSTF bounds the benefits in asymptomatic adults as no greater than small.</li> </ul>
Harms of early detection and intervention and treatment	<ul style="list-style-type: none"> <li>The USPSTF found inadequate direct evidence on the harms of screening for and treatment of asymptomatic COPD.</li> <li>Given that the opportunity costs associated with screening asymptomatic persons may be large, the USPSTF bounds the magnitude of harms of screening to be at least small.</li> </ul>
USPSTF assessment	Using a reaffirmation deliberation process, the USPSTF concludes with moderate certainty that screening for COPD in asymptomatic adults has no net benefit.

Abbreviations: COPD, chronic obstructive pulmonary disease; USPSTF, US Preventive Services Task Force.

The USPSTF decided to use a reaffirmation deliberation process to update this recommendation. The USPSTF uses the reaffirmation process for well-established, evidence-based standards of practice in current primary care practice for which only a very high level of evidence would justify a change in the grade of the recommendation.<sup>11</sup> In its deliberation of the evidence, the USPSTF considers whether the new evidence is of sufficient strength and quality to change its previous conclusions about the evidence.

Using a reaffirmation process, the USPSTF concludes with moderate certainty that screening for COPD in asymptomatic adults has **no net benefit**.

See the **Table** for more information on the USPSTF recommendation rationale and assessment and the **eFigure** in the Supplement for information on the recommendation grade. See the **Figure** for a summary of the recommendation for clinicians. For more details on the methods the USPSTF uses to determine the net benefit, see the USPSTF Procedure Manual.<sup>11</sup>

## Practice Considerations

### Patient Population Under Consideration

This recommendation applies to asymptomatic adults who do not recognize or report respiratory symptoms. It does not apply to persons who present to clinicians with symptoms such as chronic cough, sputum production, difficulty breathing, or wheezing. The evidence review did not include populations at very high risk for COPD such as persons with  $\alpha$ -1 antitrypsin deficiency (an inherited disorder that increases risk for COPD) or workers with known occupational exposures.

### Definitions

A postbronchodilator spirometry ratio of forced expiratory volume in 1 second to forced vital capacity (FEV<sub>1</sub>/FVC) of less than 0.70 confirms the presence of persistent airway obstruction and a diagnosis of COPD in persons with appropriate symptoms and significant exposures to noxious stimuli.<sup>12</sup> Severity of disease can be classified by the degree of obstruction, symptoms, or both. Airflow obstruction is classified by the postbronchodilator FEV<sub>1</sub>% predicted; 80% or more is mild, 50% to 79% is moderate, 30% to 49% is severe, and less than 30% is very severe. Symptoms are

categorized using scoring from standardized tools assessing symptom burden (eg, shortness of breath, cough, and phlegm production) and history of exacerbations.<sup>12,13</sup>

### Assessment of Risk

Although the USPSTF does not recommend screening for COPD in asymptomatic adults, certain factors may increase a person's risk for COPD. Cigarette smoking is the leading cause of COPD in the US.<sup>1,7</sup> About 15% of current smokers and 8% of former smokers report being diagnosed with COPD, compared with 3% of adults who have never smoked.<sup>7</sup> Exposure to other lung irritants such as secondhand smoke, traffic pollutants, and wood smoke also contribute to COPD. Toxic fumes, dust, and chemicals from workplace exposures are estimated to contribute to 15% of COPD cases. Nonmodifiable risk factors for COPD include history of asthma or childhood respiratory tract infections and  $\alpha$ -1 antitrypsin deficiency.<sup>13</sup>

### Screening Tests

Although the USPSTF does not recommend routine screening for COPD in the general population using any method, screening questionnaires and spirometry without a bronchodilator have sometimes been used to identify persons at increased risk for COPD. If results are positive, such screening tests would require follow-up diagnostic testing.

### Treatment or Interventions

Currently, there is no cure for COPD. 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 (regardless of whether COPD is diagnosed) should receive smoking cessation counseling and be offered behavioral and pharmacologic therapies to stop smoking.<sup>12</sup>

Pharmacologic therapies (eg, bronchodilators and anti-inflammatory therapies) and nonpharmacologic therapies (eg, interventions addressing self-management of disease, diet, exercise, and immunizations) are available for disease management in persons with mild to moderate or minimally symptomatic COPD. Decisions to start or advance treatment are primarily based on symptoms and exacerbations, rather than measured obstruction.<sup>12</sup>

**Figure. Clinician Summary: Screening for Chronic Obstructive Pulmonary Disease**

<b>What does the USPSTF recommend?</b>	<b>Do not screen asymptomatic adults for chronic obstructive pulmonary disease (COPD)</b> <b>Grade: D</b>
<b>To whom does this recommendation apply?</b>	<ul style="list-style-type: none"> <li>• This recommendation applies to adults who do not recognize or report respiratory symptoms.</li> <li>• It does not apply to persons with symptoms such as chronic cough, sputum production, difficulty breathing, or wheezing.</li> <li>• It does not apply to populations at very high risk for COPD, such as persons with <math>\alpha</math>-1 antitrypsin deficiency or workers exposed to certain toxins at their job.</li> </ul>
<b>What's new?</b>	This recommendation is consistent with the 2016 USPSTF recommendation.
<b>How to implement this recommendation?</b>	<ul style="list-style-type: none"> <li>• Do not screen for COPD in patients with no symptoms.</li> <li>• Clinicians can help reduce patients' risk for COPD by supporting them in not starting to smoke and helping them quit if they do.</li> </ul>
<b>What additional information should clinicians know about this recommendation?</b>	<ul style="list-style-type: none"> <li>• Cigarette smoking is the leading cause of COPD.</li> <li>• COPD is most common in Native American/Alaska Native populations, likely due to the effects of societal challenges and high smoking rates.</li> <li>• Death from chronic lower respiratory disease (mostly COPD) is highest in White adults.</li> <li>• Black adults have more hospitalizations and worse COPD-related quality of life than White adults, despite having lower prevalence of COPD than White adults.</li> </ul>
<b>Why is this recommendation and topic important?</b>	<ul style="list-style-type: none"> <li>• Chronic lower respiratory disease, composed mainly of COPD, is the sixth leading cause of death in the US.</li> <li>• The reduction of airflow in the lungs from COPD is irreversible.</li> <li>• Progression to severe disease can prevent participation in normal activities because of deterioration of lung function.</li> </ul>
<b>What are other relevant USPSTF recommendations?</b>	The USPSTF has recommendations that address tobacco smoking cessation in adults, including pregnant persons, and tobacco use in children and adolescents. These recommendations are available at <a href="https://www.uspreventiveservicestaskforce.org/uspstf/">https://www.uspreventiveservicestaskforce.org/uspstf/</a>
<b>What are additional tools and resources?</b>	<ul style="list-style-type: none"> <li>• The Centers for Disease Control and Prevention, the National Institutes of Health, and other federal agencies provide a comprehensive systems-based COPD National Action Plan to reduce the burden of COPD at <a href="https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/copd-national-action-plan">https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/copd-national-action-plan</a></li> <li>• The National Institutes of Health's "Learn More Breathe Better" program provides information about the prevention, diagnosis, and treatment of COPD at <a href="https://www.nhlbi.nih.gov/health-topics/education-and-awareness/copd-learn-more-breathe-better">https://www.nhlbi.nih.gov/health-topics/education-and-awareness/copd-learn-more-breathe-better</a></li> <li>• The US Surgeon General provides tools to prevent tobacco use and promote smoking cessation at <a href="https://www.hhs.gov/surgeongeneral/reports-and-publications/tobacco/index.html">https://www.hhs.gov/surgeongeneral/reports-and-publications/tobacco/index.html</a></li> </ul>
<b>Where to read the full recommendation statement?</b>	Visit the USPSTF website ( <a href="https://www.uspreventiveservicestaskforce.org/uspstf/">https://www.uspreventiveservicestaskforce.org/uspstf/</a> ) or the JAMA website ( <a href="https://jamanetwork.com/collections/44068/united-states-preventive-services-task-force">https://jamanetwork.com/collections/44068/united-states-preventive-services-task-force</a> ) to read the full recommendation statement. This includes more details on the rationale of the recommendation, including benefits and harms; supporting evidence; and recommendations of others.

*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.*

USPSTF indicates US Preventive Services Task Force.

### Additional Tools and Resources

The Centers for Disease Control and Prevention, the National Institutes of Health, and other federal agencies provide a comprehensive systems-based COPD National Action Plan to reduce the burden of COPD (<https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/copd-national-action-plan>).

The National Institutes of Health "Learn More Breathe Better" program provides information about the prevention, diagnosis, and treatment of COPD (<https://www.nhlbi.nih.gov/health-topics/education-and-awareness/copd-learn-more-breathe-better>).

The US Surgeon General provides tools to prevent tobacco use and promote smoking cessation (<https://www.hhs.gov/surgeongeneral/reports-and-publications/tobacco/index.html>).

### Other Related USPSTF Recommendations

The USPSTF recommends that clinicians ask all adults, including pregnant persons, about tobacco use, advise them to stop

using tobacco, and provide interventions for cessation for those who use tobacco.<sup>14</sup> The USPSTF also recommends that clinicians provide interventions, including education or brief counseling, to prevent initiation of tobacco use among school-aged children and adolescents.<sup>15</sup>

### Reaffirmation of Previous USPSTF Recommendation

This recommendation is a reaffirmation of the USPSTF 2016 recommendation statement. In 2016, the USPSTF reviewed the evidence for COPD and found that screening for COPD in asymptomatic adults has no net benefit.<sup>10</sup> The USPSTF found no new substantial evidence that could change its recommendation and, therefore, reaffirms its recommendation against screening for COPD in asymptomatic adults.

## Supporting Evidence

### Scope of Review

To reaffirm its recommendation, the USPSTF commissioned a reaffirmation evidence update.<sup>13,16</sup> The aim of evidence updates that support the reaffirmation process is to identify if there is new and substantial evidence since the previous review that is sufficient enough to change the prior recommendation.<sup>11</sup> The reaffirmation update focused on targeted key questions for benefits and harms of screening for COPD in asymptomatic adults and treatment in screen-detected or screen-relevant adults. A new treatment modality evaluated in this review was nonpharmacologic interventions.

### Accuracy of Screening Tests and Risk Assessment

Based on foundational evidence from the 2016 review, externally validated questionnaires that assess risk factors, symptoms, or both and are applicable to US primary care settings had high sensitivity but poorer specificity for detecting COPD (sensitivity ranged from 67% to 90%; specificity ranged from 25% to 73%).<sup>17</sup> Evidence evaluating the accuracy of pulmonary function tests alone to detect COPD was limited.<sup>17</sup>

### Benefits of Early Detection and Treatment

The USPSTF found no new studies that directly assess the effects of screening for COPD in asymptomatic adults on morbidity, mortality, or health-related quality of life.<sup>13,16</sup>

The USPSTF reviewed 3 trials with newly published analyses (n = 20 058) that evaluated pharmacologic treatment in persons with mild to moderate COPD (based on airway obstruction) and varying levels of symptoms.<sup>13,16</sup> No treatment trials were conducted in asymptomatic populations. Studies included treating persons with COPD with long-acting beta-agonists (LABAs), long-acting muscarinic antagonists (LAMAs), inhaled corticosteroids (ICS), or combination therapy. One large randomized clinical trial (SUMMIT; n = 16 590) in persons with or at risk for cardiovascular disease demonstrated in adults with fairly symptomatic moderate COPD (eg, mean FEV<sub>1</sub> ≈60% predicted) that LABAs, ICS, or LABAs + ICS reduced the annual rate of exacerbations and hospitalizations for exacerbations compared with placebo at a median of 1.8 years of follow-up, although exacerbation rates were low at baseline (<1 exacerbation/y). The percent reduction in the annual rate of moderate to severe exacerbations was higher for LABAs + ICS (29% [95% CI, 22%-35%]) than for LABAs (10% [95% CI, 2%-18%]) or ICS (12% [95% CI, 4%-19%]) alone.<sup>13,16</sup>

Post hoc subgroup analysis of minimally symptomatic patients with moderate COPD (n = 357) in the UPLIFT trial suggests that LAMAs were associated with a reduction in the proportion of persons with exacerbations compared with placebo at 48 months (48% vs 54%, respectively; rate ratio, 0.64 [95% CI, 0.47-0.89]). A post hoc subgroup analysis in the PINNACLE trial (n = 729) comparing LAMAs, LABAs, and LAMAs + LABAs vs placebo in minimally symptomatic adults was underpowered in sample size and follow-up time. No studies showed that treatment reduced cardiovascular morbidity or mortality or all-cause mortality.<sup>13,16</sup> Overall, consistent with the previous review,<sup>17</sup> the evidence showed that pharmacotherapy may reduce exacerbations in adults with fairly symptomatic moderate COPD, which may not be generalizable to an asymptomatic population. Also, the magnitude of these treatment benefits is limited by

portions of the data coming from small post hoc subgroup analysis and persons having low rates of exacerbations at baseline.

The USPSTF reviewed 13 new trials (n = 3658) evaluating non-pharmacologic interventions used in the management of mild to moderate COPD or COPD in persons who are minimally symptomatic: 7 trials of self-management interventions (eg, education on COPD, medications, healthy lifestyle, tobacco cessation, and an exacerbation management/action plan), 1 trial of exercise-only counseling, 3 trials of intensive supervised exercise or pulmonary rehabilitation, and 2 trials of clinician education/training on COPD care. Overall, there was no consistent benefit observed across a range of outcomes (eg, exacerbations, quality of life, difficulty breathing, exercise or physical performance measures, mental health, and smoking cessation) at 26 to 104 weeks.<sup>13,16</sup>

### Harms of Screening and Treatment

The USPSTF reviewed new data from 6 of the included treatment trials and 2 observational studies (n = 243 517) that reported on pharmacologic or nonpharmacologic treatment harms in adults with mild to moderate or minimally symptomatic COPD.<sup>13,16</sup> None of the included treatment trials that reported adverse effects (n = 17 676) found significant harms; however, studies were limited by the small number of included participants and limited length of follow-up. In addition, 2 observational studies addressed the harms of medications. One study of cardiovascular risk associated with treatment with LABAs or LAMAs found an increased risk of a serious cardiovascular event following the initiation of LABAs or LAMAs (n = 183 858; adjusted odds ratio, 1.50 [95% CI, 1.35-1.67] and 1.52 [95% CI, 1.28-1.80], respectively); cardiovascular risk association with LABAs or LAMAs was absent, or even reduced, with prevalent use of inhaled therapy. A second study found that ICS may increase the risk of developing diabetes (n = 9923 for diabetes onset in a subset of persons classified in GOLD [Global Initiative for Chronic Obstructive Lung Disease] category A/B; hazard ratio, 1.32 [95% CI, 1.06-1.64]).<sup>13</sup> These 2 observational studies represent a subset of a much larger body of evidence on serious harms of bronchodilators and ICS in the treatment of COPD, such as heart failure and pneumonia, as described in meta-analyses not included in this review. In addition to potential treatment harms, there are opportunity costs to screening that may include time spent on counseling and providing services and patient referrals for diagnostic testing.

Overall, generally consistent with the previous review,<sup>17</sup> serious harms from treatment trials were not consistently reported. However, large observational studies in screen-relevant populations suggest possible harms for LAMA or LABA initiation or use of ICS.<sup>13,16</sup>

### Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from November 2 to December 6, 2021. The USPSTF updated background information with the most current COPD-related mortality data and disease diagnostic criteria in the Importance and Practice Consideration sections. The USPSTF clarified in the Practice Considerations section that the recommendation does not apply to workers with known occupational exposures. Comments inquired whether smoking history should be a consideration for screening. Although smoking is the primary risk factor for COPD, the evidence reviewed, which included current and former smokers, did not show an overall benefit for

screening for COPD in asymptomatic adults. Comments also questioned whether screening for COPD could increase smoking cessation. Studies have not consistently shown that receipt of spirometry results or information about “lung age” increases smoking cessation. Comments asked for clarification on the benefits and harms of COPD treatment. The USPSTF describes the benefits and harms of pharmacologic and nonpharmacologic COPD treatments in the Supporting Evidence section. The USPSTF acknowledges that there is a larger body of evidence not included in this targeted review that discusses harms of medications used to treat COPD and cites a meta-analysis for further reference.

- The effectiveness of early treatment for asymptomatic, minimally symptomatic, or screen-detected populations to slow disease progression and improve health outcomes, with long-term follow-up.
- The harms of screening in and treatment of persons with asymptomatic or minimally symptomatic COPD.
- The drivers of health disparities in COPD among different racial and ethnic groups and effective prevention strategies that may improve health inequities.

## Research Needs and Gaps

Studies are needed that provide more information on the following.

- The effectiveness of screening asymptomatic adults for COPD to reduce morbidity or mortality or improve health-related quality of life, with long-term follow-up.

## 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. The joint panel recommended against screening for COPD with spirometry in asymptomatic patients.<sup>18</sup>

### ARTICLE INFORMATION

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**Author Contributions:** Dr Mangione had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The USPSTF members contributed equally to the recommendation statement.

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**Additional Information:** 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. Published by JAMA®—Journal of the American Medical Association under arrangement with the Agency for Healthcare

Research and Quality (AHRQ). ©2022 AMA and United States Government, as represented by the Secretary of the Department of Health and Human Services (HHS), by assignment from the members of the United States Preventive Services Task Force (USPSTF). All rights reserved.

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