

Screening for Depression in Children and Adolescents: U.S. Preventive Services Task Force Recommendation Statement

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Description: Update of the 2009 U.S. Preventive Services Task Force (USPSTF) recommendation on screening for major depressive disorder (MDD) in children and adolescents.

Methods: The USPSTF reviewed the evidence on the benefits and harms of screening; the accuracy of primary care-feasible screening tests; and the benefits and harms of treatment with psychotherapy, medications, and collaborative care models in patients aged 7 to 18 years.

Population: This recommendation applies to children and adolescents aged 18 years or younger who do not have a diagnosis of MDD.

Recommendation: The USPSTF recommends screening for MDD in adolescents aged 12 to 18 years. Screening should be implemented with adequate systems in place to ensure accurate diagnosis, effective treatment, and appropriate follow-up. (B recommendation)

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for MDD in children aged 11 years or younger. (I statement)

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* For a list of USPSTF members, see the **Appendix** (available at www.annals.org).

The U.S. Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without 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 RECOMMENDATIONS AND EVIDENCE

The USPSTF recommends screening for major depressive disorder (MDD) in adolescents aged 12 to 18 years. Screening should be implemented with adequate systems in place to ensure accurate diagnosis,

effective treatment, and appropriate follow-up. (B recommendation)

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for MDD in children aged 11 years or younger. (I statement)

See the **Figure** for a summary of the recommendations and suggestions for clinical practice.

Appendix Table 1 describes the USPSTF grades, and **Appendix Table 2** describes the USPSTF classification of levels of certainty about net benefit (both tables are available at www.annals.org).

RATIONALE

Importance

Depression is a leading cause of disability in the United States. Children and adolescents with MDD typically have functional impairments in their performance at school or work, as well as in their interactions with their families and peers. Depression can also negatively affect the developmental trajectories of affected youth. Major depressive disorder in children and adolescents is strongly associated with recurrent depression in adulthood; other mental disorders; and increased risk for suicidal ideation, suicide attempts, and suicide completion.

In nationally representative U.S. surveys, about 8% of adolescents reported having major depression in the past year. Little is known about the prevalence of MDD in children. Among children and adolescents aged 8 to 15 years, 2% of boys and 4% of girls reported having MDD in the past year.

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Figure. Screening for depression in children and adolescents: clinical summary.**Annals of Internal Medicine**

Population	Adolescents aged 12 to 18 y	Children aged ≤11 y
Recommendation	Screen for major depressive disorder (MDD). Adequate systems should be in place to ensure accurate diagnosis, effective treatment, and appropriate follow-up. Grade: B	No recommendation. Grade: I (insufficient evidence)
Risk Assessment	Risk factors for MDD include female sex; older age; family (especially maternal) history of depression; prior episode of depression; other mental health or behavioral problems; chronic medical illness; overweight and obesity; and, in some studies, Hispanic race/ethnicity. Other psychosocial risk factors include childhood abuse or neglect, exposure to traumatic events (including natural disasters), loss of a loved one or romantic relationship, family conflict, uncertainty about sexual orientation, low socioeconomic status, and poor academic performance.	
Screening Tests	Two instruments that have been most often studied are the Patient Health Questionnaire for Adolescents and the primary care version of the Beck Depression Inventory.	
Screening Interval	The optimal interval for screening for MDD is not known. Opportunistic screening may be appropriate for adolescents, who may have infrequent health care visits.	
Treatment and Interventions	Treatment options for MDD include pharmacotherapy, psychotherapy, collaborative care, psychosocial support interventions, and complementary and alternative medicine approaches.	
Balance of Benefits and Harms	Screening for MDD in adolescents aged 12 to 18 y has a moderate net benefit.	The evidence on screening for MDD in children aged ≤11 y is insufficient, and the balance of benefits and harms cannot be determined.
Other Relevant USPSTF Recommendations	The USPSTF has made recommendations on screening for suicide risk in adolescents, adults, and older adults. Other USPSTF recommendations on mental health topics pertaining to children and adolescents, including illicit drug and alcohol use, can be found on the USPSTF Web site (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 www.uspreventiveservicestaskforce.org.

Detection

The USPSTF found adequate evidence that screening instruments for depression can accurately identify MDD in adolescents aged 12 to 18 years in primary care settings. The USPSTF found no studies of screening instruments for depression in children aged 11 years or younger in primary care (or comparable) settings and concluded that the evidence is inadequate.

Benefits of Early Detection and Intervention and Treatment

The USPSTF found no studies that directly evaluated whether screening for MDD in adolescents in primary care (or comparable) settings leads to improved health and other outcomes. However, the USPSTF found adequate evidence that treatment of MDD detected through screening in adolescents is associated with moderate benefit (for example, improved depression severity, depression symptoms, or global functioning scores).

The USPSTF found no studies that directly evaluated whether screening for MDD in children aged 11

years or younger in primary care (or comparable) settings leads to improved health and other outcomes and found inadequate evidence on the benefits of treatment in children with screen-detected MDD.

Harms of Early Detection and Intervention and Treatment

The USPSTF found no direct evidence on the harms of screening for MDD in adolescents. Medications for the treatment of depression, such as selective serotonin reuptake inhibitors (SSRIs), have known harms. However, the magnitude of the harms of pharmacotherapy is small if patients are closely monitored, as recommended by the U.S. Food and Drug Administration (FDA). The USPSTF found adequate evidence on the harms of psychotherapy and psychosocial support in adolescents and estimates that the magnitude of these harms is small to none.

The USPSTF found inadequate evidence on the harms of screening for or treatment of MDD in children aged 11 years or younger.

USPSTF Assessment

The USPSTF concludes with moderate certainty that screening for MDD in adolescents aged 12 to 18 years has a moderate net benefit.

The USPSTF concludes that the evidence on screening for MDD in children aged 11 years or younger is insufficient. Evidence is lacking, and the balance of benefits and harms cannot be determined.

CLINICAL CONSIDERATIONS**Patient Population Under Consideration**

This recommendation applies to children and adolescents aged 18 years or younger who do not have a diagnosis of MDD. This recommendation focuses on screening for MDD and does not address screening for other depressive disorders, such as minor depression or dysthymia.

Assessment of Risk

The USPSTF recommends screening for MDD in all adolescents but notes that several risk factors might help identify patients who are at higher risk. The causes of MDD are not fully known and likely involve a combination of genetic, biological, and environmental factors. Risk factors for MDD in children and adolescents include female sex; older age; family (especially maternal) history of depression; prior episode of depression; other mental health or behavioral problems; chronic medical illness; overweight and obesity; and, in some studies, Hispanic race/ethnicity. Other psychosocial risk factors include childhood abuse or neglect, exposure to traumatic events (including natural disasters), loss of a loved one or romantic relationship, family conflict, uncertainty about sexual orientation, low socioeconomic status, and poor academic performance.

Screening Tests

Many MDD screening instruments have been developed for use in primary care and have been used in adolescents. Two that have been most often studied are the Patient Health Questionnaire for Adolescents (PHQ-A) and the primary care version of the Beck Depression Inventory (BDI). Data on the accuracy of MDD screening instruments in younger children are limited.

Screening Intervals

The USPSTF found no evidence on appropriate or recommended screening intervals, and the optimal interval is unknown. Repeated screening may be most productive in adolescents with risk factors for MDD. Opportunistic screening may be appropriate for adolescents, who may have infrequent health care visits.

Treatment or Interventions

Treatment options for MDD in children and adolescents include pharmacotherapy, psychotherapy, collaborative care, psychosocial support interventions, and complementary and alternative medicine approaches. Fluoxetine is approved by the FDA for treatment of MDD in children aged 8 years or older, and escitalopram is approved for treatment of MDD in adolescents aged 12 to 17 years. The FDA has issued a boxed warn-

ing for antidepressants, recommending that patients of all ages who start antidepressant therapy be monitored appropriately and observed closely for clinical worsening, suicidality, or unusual changes in behavior (1). Collaborative care is a multicomponent, health care system-level intervention that uses care managers to link primary care providers, patients, and mental health specialists.

Suggestions for Practice Regarding the I Statement

In deciding whether to screen for MDD in children aged 11 years or younger, primary care providers should consider the following issues.

Potential Preventable Burden

Little is known about the prevalence of MDD in children aged 11 years or younger. The mean age of onset of MDD is about 14 to 15 years. Early onset is associated with worse outcomes. The average duration of a depressive episode in childhood varies widely, from 2 to 17 months.

Potential Harms

The USPSTF found inadequate evidence on the harms of screening for MDD in children. The USPSTF concluded that screening itself is unlikely to be associated with significant harms, aside from opportunity costs, labeling and potential stigma associated with a positive result, and referral for further evaluation and treatment.

The USPSTF concluded, on the basis of a previous review, that the use of SSRIs in children is associated with harms, specifically risk for suicidality. Evidence on the harms of psychotherapy alone or in combination with SSRIs in children is limited. Newer studies provide little additional evidence on treatment harms in children and adolescents but do not suggest more risks. Only 4 studies examined the harms of treatment with SSRIs in children and adolescents. These studies found no increased risk for suicidality associated with antidepressant use, but risk for rare events could not be precisely determined because the studies had limited statistical power. No trials of psychotherapy or combined interventions in children examined harms.

Current Practice

The USPSTF found no evidence on the current frequency of or methods used in primary care for screening for MDD in children.

Additional Approaches to Prevention

The Community Preventive Services Task Force recommends collaborative care for the management of depressive disorders, based on strong evidence of effectiveness in improving depression symptoms, adherence and response to treatment, and remission and recovery from depression. For this and related recommendations from the Community Preventive Services

Task Force, go to www.thecommunityguide.org/mentalhealth/index.html.

Useful Resources

In a separate recommendation statement, the USPSTF concluded that the current evidence is insufficient to assess the balance of benefits and harms of screening for suicide risk in primary care settings, including among adolescents (I statement). Other USPSTF recommendations on mental health topics pertaining to children and adolescents, including illicit drug and alcohol use, can be found on the USPSTF Web site (www.uspreventiveservicestaskforce.org).

OTHER CONSIDERATIONS

Implementation

Many screening tools are available to identify depression in children and adolescents, and some have been used in primary care. The number of items in each tool, the administrative time required to complete them, and the appropriate ages for screening vary. A positive result on an initial screening test does not necessarily indicate the need for treatment. Screening is usually done in 2 phases: The initial screening is followed by a second phase in which skilled clinicians take into account contextual factors surrounding the patient's current situation, through either additional probing or a formal diagnostic interview. In instances where treatment is recommended, it can be initiated by the screening provider or through referral to another set of treatment providers. A negative result on a screening test, however, does not always preclude referral when clinical judgment or parental concerns suggest it is warranted.

The USPSTF recommends that screening be implemented with adequate systems in place to ensure accurate diagnosis, effective treatment, and appropriate follow-up. Depression can be managed in the primary care or specialist setting or collaboratively in both settings. Treatment options for depression include pharmacologic, behavioral, multimodal, and collaborative care models, some of which require coordination. Finally, inadequate support and follow-up may result in treatment failures or harms, as indicated by the FDA boxed warning. "Adequate systems in place" refers to having systems and clinical staff to ensure that patients are screened and, if they screen positive, are appropriately diagnosed and treated with evidence-based care or referred to a setting that can provide the necessary care. These essential functions can be provided through a wide range of arrangements of clinician types and settings.

Research Needs and Gaps

The systematic evidence review identified several critical research gaps, including the need for studies of screening for and treatment of MDD in children younger than 11 years. Large, good-quality randomized, controlled trials (RCTs) are also needed to better understand the overarching effects of screening for MDD on intermediate and long-term health outcomes.

It would be helpful to quantify the proportion of persons with screen-detected MDD who are treated or referred as well as their willingness and ability to be assessed and treated.

The systematic review excluded studies with participants who had comorbid disorders. Children and adolescents with MDD more often have comorbid conditions than those without MDD, particularly in primary care settings. This underscores the importance of additional research in child and adolescent populations that are similar to those found in primary care settings to study the effects of comorbid conditions on screening accuracy, type of MDD treatment selected, and benefits and harms.

For treatment of MDD, research needs include well-designed studies of psychotherapy and combined treatments, as well as studies of the benefits and harms of other treatments (such as non-SSRI medications and complementary or alternative approaches). For rare events, meta-analyses are needed that include only children and adolescents with MDD and focus on current FDA-approved medications. Studies with long-term follow-up are also needed.

DISCUSSION

Burden of Disease

Although it is normal for children and adolescents to experience occasional feelings of sadness and other symptoms of depression, those with MDD have 1 or more major depressive episodes that last at least 2 weeks and cause significant functional impairment across social, occupational, or educational domains. In some children and adolescents with MDD, these symptoms may present as periods of disruptive mood and irritability rather than as a sad mood and may last for weeks, months, or even years. Major depressive disorder is associated with significant morbidity and mortality. Morbidity in children and adolescents may be demonstrated through decreased school performance, poor social functioning, early pregnancy, increased physical illness, and substance abuse. Depressed adolescents have more psychiatric and medical hospitalizations than those who are not depressed. Children with depressive disorders have increased health care costs (including general medical and mental health care) compared with those without mental health diagnoses or those with other mental health diagnoses (except conduct disorder). Major depressive disorder also increases the risk for suicide. Ten percent of children aged 5 to 12.9 years and 19% of adolescents aged 13 to 17.9 years with MDD attempt suicide (2).

The mean age of onset of MDD in childhood and adolescence is about 14 to 15 years, and onset is earlier in girls than boys. In 2 nationally representative U.S. surveys, about 8% of adolescents reported having MDD in the past year. Little is known about the prevalence of the disorder in children. The 2005 National Health and Nutrition Examination Survey found that among children and adolescents aged 8 to 15 years, 2% of boys and 4% of girls reported having MDD in the

past year. However, the prevalence of depression in primary care settings is often higher in studies with community samples of children and adolescents. Only 36% to 44% of children and adolescents with depression receive treatment, suggesting that the majority of depressed youth are undiagnosed and untreated (3).

Scope of Review

The USPSTF commissioned a systematic evidence review to update its 2009 recommendation on screening for child and adolescent MDD among primary care populations (3, 4). To focus on the population most likely to benefit from screening and intervention, the scope of the review was narrowed to focus on screening for and treatment of MDD. In addition, studies of paroxetine were excluded because of the 2003 FDA recommendation that it not be used to treat MDD in children and adolescents because of reports of possible suicidal ideation and suicide attempts in children and adolescents receiving paroxetine for depression. As a result, many studies included in the 2009 review were not included in the updated review. The USPSTF examined the evidence on the benefits and harms of screening; the accuracy of primary care-feasible screening tests; and the benefits and harms of treatment with psychotherapy, medications, and collaborative care models in patients aged 7 to 18 years. Treatment studies were limited to those that were implemented in or received referrals from primary care settings to ensure that the patient population was similar to those who would be identified through screening.

Accuracy of Screening Tests

The USPSTF found 5 good- or fair-quality studies of the accuracy of MDD screening instruments in children and adolescents. One study recruited adolescents from a primary care setting and compared the PHQ-A with a full diagnostic interview by a mental health professional. Four studies recruited adolescents from school settings and compared the screening test with a diagnostic interview or a different screening test. One study evaluated the BDI, 1 evaluated the Center for Epidemiologic Studies Depression Scale (CES-D), 1 evaluated the BDI and the CES-D, and 1 evaluated the Clinical Interview Schedule-Revised. No studies included children younger than 11 years.

The PHQ-A study had the highest positive predictive value. The authors did not report a diagnostic cutoff score but reported sensitivity of 73% and specificity of 94% for a positive test result (5). Results were not stratified by age, sex, or ethnicity. The 2 BDI studies reported sensitivity ranging from 84% to 90% and specificity ranging from 81% to 86% when a cutoff score of 11 was applied (6, 7). One study (7) reported a higher area under the curve for males than for females, but neither of the BDI studies reported results by age or ethnicity.

The CES-D studies used different diagnostic cutoff scores (7, 8). One study enrolled a slightly younger population than the other (age range of 11 to 15 years vs. average age >16 years). Sensitivity ranged from

18% to 84% and specificity ranged from 38% to 83%, depending on the cutoff score used. Results by sex were inconsistent, and neither study stratified results by age or ethnicity. One study evaluated the Clinical Interview Schedule-Revised (9). The mean age was 15.7 years, and sensitivity and specificity were 18% and 97%, respectively. The study did not report other outcomes or stratify results by age, race, or ethnicity.

Effectiveness of Treatment

The USPSTF found 8 fair- or good-quality RCTs that reported health outcomes in children or adolescents with screen-detected MDD who were treated with SSRIs (4 RCTs), psychotherapy (2 RCTs), SSRIs combined with psychotherapy (1 RCT), or collaborative care (1 RCT). Most trials were restricted to adolescents aged 12 to 14 years or older; only 2 of the SSRI trials included children aged 7 or 8 years. Outcomes included treatment response, which was defined differently across studies; symptom severity; and global functioning. Depression outcomes were reported after 8 to 12 weeks of SSRI treatment or psychotherapy, whereas the collaborative care study reported outcomes at 52 weeks.

SSRIs

One good-quality study ($n = 221$) compared fluoxetine with placebo in adolescents aged 12 to 17 years (10-12). Two fair-quality studies ($n = 268$ and 316) compared escitalopram with placebo in children and adolescents (13) and adolescents only (14). One fair-quality study ($n = 178$) compared citalopram with placebo in children and adolescents (15). The absolute difference in response favored SSRIs in all 4 studies (range, 2.4% to 25%) and was significant in 2 of the 4 trials. When other outcomes, such as symptom severity or global functioning, were reported, they also favored the SSRI group. One trial examined the efficacy of escitalopram by age group (children vs. adolescents) and found that it was superior to placebo in improving depression symptoms, depression symptom severity, and global functioning in adolescents but not children (13). No trials examined efficacy across sex or race/ethnicity subgroups.

Psychotherapy

Two studies evaluated the benefits of cognitive behavioral therapy (CBT) compared with placebo (waitlist control or clinical monitoring) in adolescents with MDD and reported nonsignificant improvements in response (43.2% vs. 34.8%) and recovery (odds ratio [OR], 2.15 [95% CI, 0.87 to 5.33]) (10, 11, 16). Results for remission (16% vs. 17%) did not differ significantly between groups.

SSRIs Combined With Psychotherapy

One CBT study also compared CBT plus fluoxetine with placebo (10). The CBT plus fluoxetine group showed a 71% response rate versus a 35% response rate in the placebo group, which received a placebo drug and weekly clinical monitoring ($P = 0.001$).

Collaborative Care

One recent RCT ($n = 101$) evaluated a 12-month collaborative care intervention in adolescents aged 13 to 17 years who screened positive for depression (60% with MDD) in 9 primary care clinics within 1 health system (17). The intervention was based on the IMPACT (Improving Mood–Promoting Access to Collaborative Treatment) model and was adapted for adolescents. Patients randomly assigned to the collaborative care group had an initial in-person session that included their parents, choice of treatment type, and regular follow-up with depression care managers (28% received psychotherapy alone, 4% received pharmacotherapy alone, and 54% received both). Patients randomly assigned to the usual care control group received screening results and could access mental health services through the usual health care system. Compared with the control group, patients in the collaborative care group had greater reductions in depressive symptoms at 6 and 12 months (8.5- and 9.4-point reductions on the Children's Depression Rating Scale–Revised, respectively; $P < 0.0001$ for interaction), better response rates ($\geq 50\%$ score reduction from baseline) at 12 months (OR, 3.3 [CI, 1.4 to 8.2]) and 6 months (not significant), and higher likelihood of remission at 6 months (OR, 5.2 [CI, 1.6 to 17.3]) and 12 months (OR, 3.9 [CI, 1.5 to 10.6]).

Potential Harms of Screening and Treatment

The USPSTF found no direct evidence on the harms of screening for MDD in adolescents or children.

SSRIs

Five SSRI trials reported on harms and found no significant differences between intervention groups, although none of these studies were powered to detect these differences. Four trials (2 for escitalopram, 1 for citalopram, and 1 for fluoxetine) reported on suicidality (this included worsening suicidal ideation or a suicide attempt; no completed suicides were reported). No studies found significant differences but, again, none were sufficiently powered for this outcome. No studies examined subgroup differences in harms. The USPSTF found no evidence on the long-term (>12 weeks) effects of SSRIs.

Psychotherapy

One CBT trial reported on harms and found no apparent differences in harms-related, suicide-related, or psychiatric adverse events between the CBT and placebo groups (10).

SSRIs Combined With Psychotherapy

The same trial also reported on the harms of CBT plus fluoxetine versus placebo and found no apparent differences (10).

Collaborative Care

The single trial of collaborative care found no differences in the number of psychiatric hospitalizations between the intervention and control groups (6% vs. 4%). More patients in the control group had an emergency department visit with a primary psychiatric diagnosis (10% vs. 2%). However, this study was not powered to detect differences (17).

Estimate of Magnitude of Net Benefit

The USPSTF found adequate evidence that screening tests can accurately identify MDD in adolescents. It also found adequate evidence that treatment of adolescents with screen-detected MDD is associated with beneficial reductions in symptoms. Although the data are limited, the USPSTF concludes that the evidence on the frequency of medication-related adverse events in adolescents is adequate to estimate that the magnitude of harms of pharmacotherapy is small if patients are closely monitored. The USPSTF concludes that the evidence on the harms of psychotherapy and collaborative care in adolescents is adequate to estimate that the magnitude of harms is small to none. Therefore, the USPSTF concludes with moderate certainty that screening for MDD in adolescents aged 12 to 18 years is associated with moderate net benefit.

The USPSTF found inadequate evidence that screening tests can accurately identify MDD in children and inadequate evidence on the effectiveness of treatment of children with screen-detected MDD. As a result, the USPSTF concludes that the evidence is insufficient to make a recommendation on screening for MDD in children aged 7 to 11 years.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF Web site from 8 September to 5 October 2015. Many comments focused on the phrase “adequate systems.” Some commenters requested a more detailed definition of what constitutes an adequate system for screening, others recommended removing the conditional term “when,” and others recommended that the requirement for adequate systems be stronger. To clarify the recommendation, the USPSTF separated it into 2 statements: one to support screening, and a second to explain how screening should be implemented. The USPSTF also revised the section on implementation to clarify that a range of staff types, organizational arrangements, and settings can support the goals of depression screening.

UPDATE OF PREVIOUS USPSTF RECOMMENDATION

In 2009, the USPSTF recommended screening for MDD in adolescents (aged 12 to 18 years) when systems are in place to ensure accurate diagnosis, psychotherapy (CBT or interpersonal), and follow-up and concluded that the evidence was insufficient to make a recommendation for children (aged 7 to 11 years). The current recommendation reaffirms these positions but

removes the mention of specific therapies in recognition of decreased concern over the harms of pharmacotherapy in adolescents when they are adequately monitored.

RECOMMENDATIONS OF OTHERS

The American Academy of Pediatrics' Bright Futures program recommends annual screening in child and adolescent patients for emotional and behavioral problems (18). Medicaid's child health component, the Early and Periodic Screening, Diagnosis, and Treatment program, recommends screening to detect physical and mental conditions at periodic, age-appropriate intervals and, if risk is identified, follow-up with diagnostic and treatment coverage (19). The Canadian Task Force on Preventive Health Care states that there is insufficient evidence to recommend for or against screening for depression in children or adolescents in primary care settings (20).

From the U.S. Preventive Services Task Force, Rockville, Maryland.

Note: This recommendation statement is being published simultaneously in *Pediatrics*.

Disclaimer: Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

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Requests for Single Reprints: Reprints are available from the USPSTF Web site (www.uspreventiveservicestaskforce.org).

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APPENDIX: U.S. PREVENTIVE SERVICES TASK FORCE

Members of the USPSTF at the time this recommendation was finalized† are Albert L. Siu, MD, MSPH, *Chair* (Mount Sinai School of Medicine, New York, and James J. Peters Veterans Affairs Medical Center, Bronx, New York); Kirsten Bibbins-Domingo, PhD, MD, MAS, *Co-Vice Chair* (University of California, San Francisco, San Francisco, California); David C. Grossman, MD, MPH, *Co-Vice Chair* (Group Health Research Institute, Seattle, Washington); Linda Ciofu Baumann, PhD, RN, APRN (University of Wisconsin, Madison, Wisconsin); Karina W. Davidson, PhD, MASc (Columbia University, New York, New York); Mark Ebell, MD, MS (University of Georgia, Athens, Georgia); Francisco A.R. García, MD, MPH (Pima County Department of Health, Tucson, Arizona); Matthew Gillman, MD, SM (Harvard Medical School and Harvard Pilgrim Health Care Institute, Bos-

ton, Massachusetts); Jessica Herzstein, MD, MPH (independent consultant, Washington, DC); Alex R. Kemper, MD, MPH, MS (Duke University, Durham, North Carolina); Alex H. Krist, MD, MPH (Fairfax Family Practice, Fairfax, and Virginia Commonwealth University, Richmond, Virginia); Ann E. Kurth, PhD, RN, MSN, MPH (New York University, New York, New York); Douglas K. Owens, MD, MS (Veterans Affairs Palo Alto Health Care System, Palo Alto, and Stanford University, Stanford, California); William R. Phillips, MD, MPH (University of Washington, Seattle, Washington); Maureen G. Phipps, MD, MPH (Brown University, Providence, Rhode Island); and Michael P. Pignone, MD, MPH (University of North Carolina, Chapel Hill, North Carolina).

† For a list of current USPSTF members, go to www.uspreventiveservicestaskforce.org/Page/Name/our-members.

Appendix Table 1. 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/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/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/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.

Appendix Table 2. 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; and 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 that are not generalizable to routine primary care practice; and a lack of information on important health outcomes. More information may allow an 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 on the basis of the nature of the overall evidence available to assess the net benefit of a preventive service.