Special Communication | USPSTF RECOMMENDATION STATEMENT

Screening for Impaired Visual Acuity in Older Adults
US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force (USPSTF)

DESCRIPTION Update of the US Preventive Services Task Force (USPSTF) recommendation on screening for impaired visual acuity in older adults.

METHODS The USPSTF reviewed the evidence on screening for visual acuity impairment associated with uncorrected refractive error, cataracts, and age-related macular degeneration among adults 65 years or older in the primary care setting; the benefits and harms of screening; the accuracy of screening; and the benefits and harms of treatment of early vision impairment due to uncorrected refractive error, cataracts, and age-related macular degeneration.

POPULATION This recommendation applies to asymptomatic adults 65 years or older who do not present to their primary care clinician with vision problems.

RECOMMENDATION The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for impaired visual acuity in older adults. (I statement)

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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 concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for impaired visual acuity in older adults. (I statement) (**Figure 1**)

See the Clinical Considerations section later in this article for suggestions for practice regarding the I statement.

Rationale

Importance

Impairment of visual acuity is a serious public health problem in older adults. In 2011, about 12% of US adults aged 65 to 74 years and 15% of those 75 years or older reported having problems seeing, even with glasses or contact lenses.

Detection

The USPSTF found convincing evidence that screening with a visual acuity test can identify persons with a refractive error. The USPSTF found convincing evidence that screening questions are not as accurate as visual acuity testing for assessing visual acuity. The USPSTF found adequate evidence that visual acuity testing alone does not accurately identify early age-related macular degeneration (AMD) or cataracts.

Benefits of Detection and Early Treatment

The USPSTF found inadequate overall evidence on the benefits of screening, early detection, and treatment to provide a coherent assessment of the overall benefits. Several studies evaluated the direct benefit of screening and reported no reductions in vision disorders or vision-related function in screened populations; however, these studies had limitations, including differing control interventions, high loss to follow-up, and low uptake of treatment. The USPSTF found adequate evidence that early treatment of refractive error, cataracts, and AMD improves or prevents loss of visual acuity.

Harms of Detection and Early Treatment

The USPSTF found inadequate evidence on the harms of screening. The USPSTF found adequate evidence that early treatment of refractive error, cataracts, and AMD may lead to harms that are small to none.

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.	

USPSTF Assessment

The USPSTF concludes that the evidence is insufficient to assess the balance of benefits and harms of screening for impaired visual acuity in older adults. The evidence is lacking to provide a coherent assessment, and the balance of benefits and harms cannot be determined.

Clinical Considerations

Patient Population Under Consideration

This recommendation applies to asymptomatic adults 65 years or older who do not present to their primary care clinician with vision problems (**Figure 2**).

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

In 2011, about 12% of US adults aged 65 to 74 years and 15% of those 75 years or older reported having problems seeing, even with glasses or contact lenses.[1] The prevalence of AMD is 6.5% in adults older than 40 years and increases with age (2.8% in those aged 40-59 years and 13.4% in those aged ≥60 years).[2] About half of all cases of bilateral low vision (ie, best-corrected visual acuity of <20/40) in adults 40 years and older are caused by cataracts. The prevalence of cataracts increases sharply with age; an estimated 50% of US adults 80 years or older have cataracts.[1] The prevalence of hyperopia requiring a correction of +3.0 diopters or more ranges from about 5.9% in US adults aged 50 to 54 years, to 15.2% in adults aged 65 to 69 years, to 20.4% in adults 80 years or older.[1]

Figure 2. Screening for Impaired Visual Acuity in Older Adults: Clinical Summary

Population	Adults 65 years or older who do not present with vision problems
Recommendation	No recommendation. Grade: I (insufficient evidence)

Risk Assessment	Older age is an important risk factor for most types of visual impairment. Additional risk factors for cataracts are smoking, alcohol use, ultraviolet light exposure, diabetes, corticosteroid use, and black race. Risk factors for AMD include smoking, family history, and white race.
Screening Tests	A visual acuity test (such as the Snellen eye chart) is the usual method for screening for visual acuity impairment in the primary care setting. Screening questions are not as accurate as visual acuity testing. Evidence on other tests is lacking.
Treatment and Interventions	Treatments include corrective lenses for refractive error; surgical removal of cataracts; laser photocoagulation, verteporfin, and intravitreal injections of VEGF inhibitors for exudative (or wet) AMD; and antioxidant vitamins and minerals for dry AMD.
Balance of Benefits and Harms	The USPSTF concludes that there is insufficient evidence to assess the balance of benefits and harms of screening for impaired visual acuity in older adults.
Other Relevant USPSTF Recommendations	The USPSTF has made recommendations on screening for glaucoma and interventions to prevent falls in community-dwelling older adults. 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.

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AMD indicates age-related macular degeneration; VEGF, vascular endothelial growth factor.

Older age is an important risk factor for most types of visual impairment. Additional risk factors for cataracts are smoking, alcohol use, UV light exposure, diabetes, corticosteroid use, and black race. Risk factors for AMD include smoking, family history, and white race.[1]

Potential Harms

The harms of screening in a primary care setting have not been adequately studied. Overall, the potential for harms from treatment are small to none. Harms of treatment of refractive error include a potential for increased falls with the use of multifocal lenses; infectious keratitis with the use of contact lenses, laser-assisted in situ keratomileusis (LASIK), or laser-assisted subepithelial keratectomy (LASEK); and corneal ectasia with LASIK. Harms of cataract surgery include posterior lens opacification and endophthalmitis. Treatment of AMD with antioxidant vitamins and mineral supplements is not associated with increased risk of most serious adverse events.

Although there appears to be benefit in longer-term outcomes, a systematic review found that treatment of AMD with laser photocoagulation was associated with greater risk of acute loss of 6 or more lines of visual acuity vs no treatment at 3 months (relative risk [RR], 1.41 [95% CI, 1.08-1.82]).[3] Pooled estimates report a non–statistically significant association between photodynamic therapy and risk of acute loss of 20 or more letters of visual acuity vs placebo at 7 days (RR, 3.75 [95% CI, 0.87-16]) (3 trials).[4,5] One of 2 trials found that treatment of wet AMD with intravitreal vascular endothelial growth factor (VEGF) inhibitor therapy was associated with greater likelihood of withdrawal vs sham therapy; there were no differences in serious or other adverse events, but estimates were imprecise.[1,4,6,7]

Current Practice

About half of US adults older than 65 years reported having an eye examination within the last 12 months in a 2007 study.[8]

Screening Tests

A visual acuity test (eg, the Snellen eye chart) is the usual method for screening for visual acuity impairment in the primary care setting. Screening questions are not as accurate as visual acuity testing for identifying visual acuity impairment. Evidence on the use of other tests for vision screening in primary care, such as the pinhole test (a test for refractive error), the Amsler grid (a test of central vision to detect AMD), genetic testing, or funduscopy (visual inspection of the interior of the eye), is lacking.

Treatment

Several types of treatment are effective for improving visual acuity. Corrective lenses improve visual acuity in patients with a refractive error. Treatment of cataracts through surgical removal of the cataract is effective for improving visual acuity. Treatment of exudative (or wet) AMD includes laser photocoagulation, verteporfin, and intravitreal injections of VEGF inhibitors. Antioxidant vitamins and minerals are an effective treatment for dry AMD.

Other Approaches to Prevention

This recommendation statement does not include screening for glaucoma. The USPSTF's recommendations on screening for glaucoma and falls prevention are available on its website (http://www.uspreventiveservicestaskforce.org).

Other Considerations

Research Needs and Gaps

More evidence is needed on accurate methods of screening in a primary care setting to identify disorders that do not manifest through loss of visual acuity. More studies are needed that evaluate the link between vision screening in older adults and improved function, quality of life, and independence. Further studies are needed on the association between use of corrective lenses and risk of falls, including possible associations with changes in lens prescriptions and the use of multifocal glasses.

Discussion

Burden of Disease

Vision impairment is common in older adults. Older adults have a higher prevalence of primary ocular disease and systemic diseases associated with ocular disease than younger adults; in addition, older adults also have normal age-related changes in vision (ie, presbyopia). In 2011, an estimated 12% of US adults aged 65 to 74 years and 15% of those 75 years or older reported vision loss.[1]

Refractive error, AMD, and cataracts are common causes of vision impairment in older adults. Severe refractive error (requiring correction of ≥+3.0 diopters) affects an estimated 6% of US adults aged 50 to 54 years, 15% of adults aged 65 to 69 years, and 20% of adults 80 years or older.[1] About 60% of all cases of refractive error are deemed correctable to better than 20/40 visual acuity.[9] In the United States, more than 15 million adults older than 65 years have cataracts, and it is the most common cause of blindness in black adults older than 40 years. Age-related macular degeneration affects 1.5 million older adults in the United States and is the most common cause of blindness in white adults.[2,10]

Scope of Review

In 2009, the USPSTF issued an I statement on screening for impaired visual acuity in older adults. To update this I statement, the USPSTF commissioned a systematic review to focus on evidence published since its last review. The USPSTF reviewed evidence on screening for visual acuity impairment associated with uncorrected refractive error, cataracts, and AMD in adults 65 years or older in the primary care setting. The USPSTF also reviewed the evidence on the benefits and harms of screening, the accuracy of screening, and the benefits and harms of treatment of early vision impairment due to uncorrected refractive error, cataracts, and AMD.

Accuracy of Screening Tests

Asking screening questions to elicit self-perceived problems with vision has been studied as a screening method. However, compared with a standard eye chart, screening questions are not accurate for identifying persons with vision impairment.[1,4]

In the United States, a standardized visual acuity test is the usual method for identifying the presence of vision impairment. Visual acuity tests assess the patient's ability to recognize letters of different sizes arranged in rows from a prespecified distance (typically 20 feet). Standardized visual acuity tests are good at identifying refractive error.

Compared with a detailed ophthalmological examination, no visual acuity screening test has both high sensitivity and specificity for the diagnosis of any underlying visual condition (eg, AMD or cataracts). Few studies have focused on the accuracy of the Amsler grid, clinical examination, pinhole test, or fundus examination in the primary care setting. One study on the Amsler grid reported poor accuracy for detecting any visual condition compared with ophthalmological examination, and 1 study reported that geriatricians correctly identified most patients with cataracts and AMD through a clinical examination.[1,4]

Two studies from 2012 evaluated the accuracy of the Computer Vision Screen and its flip-chart version compared with a "gold standard" eye examination that included detailed history, symptoms, and a comprehensive eye examination. These studies reported moderate sensitivity (0.75 to 0.80) and specificity (0.68 to 0.77).[11] A third study from 2009 evaluated the accuracy of the Minimum Data Set 2.0 Vision Patterns section compared with a standard visual acuity test. The study reported poor accuracy, depending on the cutoff score; sensitivity ranged from 0.11 to 0.52 and specificity ranged from 0.25 to 0.96.[12] These studies had methodological limitations, including uncertainty as to whether the reference standard was interpreted independently from the screening test and the lack of a predefined threshold to determine a positive result.

Effectiveness of Early Detection and Treatment

There is limited direct evidence on the effectiveness of screening for visual impairment in the primary care setting. Three fair-quality cluster randomized clinical trials (RCTs) found no difference in vision and other clinical or functional outcomes between vision screening (as part of a multicomponent screening) with visual acuity testing or questions compared with usual care, no vision screening, or delayed screening.[13-15] The application of this evidence to screening in a primary care setting has limitations. Issues with the study methods include failure to report allocation concealment, lack of intention-to-treat analysis, and unclear blinding of outcome assessors.[4] Other limitations relevant to the primary care setting include that the recommended interventions are provided by eye care specialists and that many patients do not get the recommended glasses.

Consistent evidence shows that most older adults with a refractive error can achieve visual acuity better than 20/40 with refractive correction. Evidence from a few trials indicates that immediate correction of refractive error with eyeglasses in older adults is associated with improved short-term vision-related quality of life or function compared with delayed treatment. A 2005 systematic review of 179 RCTs and observational studies found that refractive surgery was highly effective at improving refractive error; 92% to 94% of persons with myopia and 86% to 96% of persons with hyperopia achieved visual acuity of 20/40 or better. However, most of these studies were done in younger adults, limiting its generalizability to older adults.[16]

Cataract surgery is consistently associated with improved visual acuity in observational studies. About 90% of patients have postoperative visual acuity better than 20/40.[1,4,17] The effects of cataract surgery on vision-related quality of life and function are mixed. One trial reported a decreased risk of falls after immediate vs delayed cataract surgery (RR, 0.66 [95% CI, 0.40-0.96]).[18] Another trial reported no effect on falls or fracture risk.[19] Some studies showed improvements in measures of function and quality of life associated with cataract surgery, while others reported no effect on these measures. Evidence from observational studies on the effects of treatment on motor vehicle accidents and death is sparse and inconclusive. No randomized trials were identified that evaluated clinical outcomes associated with cataract surgery vs no surgery.

A systematic review from 2006 reported that antioxidants were effective for slowing the progression of dry AMD; its conclusions were primarily based on 1 large good-quality trial (the Age-Related Eye Disease Study).[20] It found that taking an antioxidant multivitamin (composed of vitamins C and E and beta carotene with zinc) was associated with reduced likelihood of progression to advanced AMD (adjusted odds ratio [OR], 0.68); however, the between-group differences in the likelihood of losing measurable visual acuity did not reach statistical significance. A 10-year follow-up study of the Age-Related Eye Disease Study published in 2009 reported similar results; an antioxidant multivitamin with zinc was associated with reduced likelihood of progression of AMD (OR, 0.66 [95% CI, 0.53-0.83]). The likelihood of losing measurable visual acuity did reach statistical significance in this follow-up study (OR, 0.71 [95% CI, 0.57-0.88]).[21]

For wet AMD, laser photocoagulation is superior to no treatment in slowing the progression of vision loss (≥6 lines of visual acuity) after 2 years (RR, 0.67 [95% CI, 0.53-0.83]), although these studies had important limitations.[3] Two good-quality systematic reviews of photodynamic therapy found verteporfin, a photoreactive agent, to be superior to placebo in preventing loss of visual acuity associated with wet AMD; quality-of-life outcomes were not reported.[5,22] Injection of VEGF inhibitors (eg, pegaptanib and ranibizumab) to suppress growth of abnormal blood vessels associated with wet AMD was effective in reducing risk of visual acuity loss (<15 letters of visual acuity) (RR, 1.46 [95% CI, 1.22-1.75]).[4,23] Evidence on vision-related functional outcomes is limited; 1 trial reported small improvements in vision-related functional scores in the treatment group, and 1 trial reported a higher likelihood of driving in the treatment group.[1]

Potential Harms of Screening and Treatment

No studies are available on the harms of screening in a primary care setting. Several studies evaluated the harms of treatment of refractive error, cataracts, and AMD. Most of these studies are older and were reviewed for the 2009 USPSTF recommendation. Data on harms of treatment of refractive error in older adults are limited. A small observational study reported an association between multifocal lens use and increased risk of falls in older adults.[24] Serious harms, including vision loss, are rare as a result of contact lens use or refractive surgery. Corneal ectasia, a thinning and bulging of the cornea, is a known harm of refractive surgery and occurs at a median rate of 0.2%.[1,4] Cataract surgery can lead to posterior capsule opacification of the implanted lens, requiring further procedures; reported rates of this complication vary widely from 0.7% to 48%.[17,25] A systematic review from 1998 reported an incidence of 28% at 5 years.[26] Endophthalmitis, bullous keratopathy, dislocation of intraocular lens, macular edema, and retinal detachment are other complications associated with cataract surgery.

Pooled data on the harms of treatment of AMD from trials of antioxidant vitamins and minerals reported no association with withdrawal due to gastrointestinal symptoms.[1,4] The largest trial reported an increased risk of hospitalization due to genitourinary causes with zinc and an increased risk of yellowing skin with antioxidants; it found no association with death or lung cancer.[1,4] Two trials on the treatment of early AMD reported no association between supplement use and any adverse event, serious adverse events, serious ocular events, or withdrawal due to adverse events.[1]

Treatment of wet AMD with laser photocoagulation is associated with increased risk of acute visual acuity loss at 3 months after the procedure but, as described earlier, is also associated with reduced risk of visual acuity loss at 2 years.[1,4] Photodynamic therapy with verteporfin carries an initial risk of acute visual acuity loss and greater risk of back pain related to the infusion.[5] Other reported harms of photodynamic therapy include visual disturbance, injection site reactions, and photosensitivity. Potential harms associated with intravitreal injections of VEGF inhibitors include endophthalmitis, uveitis, increased intraocular pressure, traumatic lens injury, and retinal detachment.[1,4] In 3 trials, these outcomes were infrequent, and differences between the intervention and sham therapy groups were not statistically significant; however, estimates were imprecise, with wide CIs given the rarity of these outcomes.[1,6,7,27]

Estimate of Magnitude of Net Benefit

The limited direct evidence from 3 fair-quality cluster RCTs show no difference in vision and other clinical or functional outcomes between vision screening and usual care, no vision screening, or delayed screening.

Although visual acuity testing is adequate for identifying refractive error, it is inadequate for identifying early AMD or early cataracts in a primary care setting. Effective treatments are available for uncorrected refractive error, cataracts, and AMD. The overall harms are small; however, many of the treatments carry a small risk of serious complications, including acute visual loss. Although treatments that entail little harm can correct impaired visual acuity, limited evidence is available on the effect of screening and treatment on quality of life and overall and vision-related function, especially in older adults with screen-detected visual problems.

The limitations of the direct evidence and the inadequacy of the evidence on key pieces of indirect evidence prevent the USPSTF from developing a coherent assessment of the overall net benefit; therefore, the balance of benefits and harms cannot be determined.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from July 21 through August 17, 2015. The USPSTF received very few comments on the draft recommendation statement. One respondent requested that the USPSTF clarify that an I statement is not a recommendation against screening; the USPSTF plans to reinforce when communicating this recommendation statement that an I statement is not a recommendation for or against screening.

Update of Previous USPSTF Recommendation

This recommendation is an update of the 2009 USPSTF recommendation on screening for impaired visual acuity in older adults, which also concluded that the evidence was insufficient to assess the balance of benefits and harms of screening for visual acuity for the improvement of outcomes in older adults.

Recommendations of Others

The American Optometric Association recommends that asymptomatic adults 61 years and older receive an eye examination every year.[28] The American Academy of Ophthalmology recommends a comprehensive eye examination that includes visual acuity testing and dilation every 1 to 2 years for all adults 65 years or older who do not have risk factors or more frequently if risk factors are present.[29] This recommendation is based on descriptive studies, case reports, and expert consensus. The American Academy of Family Physicians' recommendation is consistent with that of the USPSTF statement: the current evidence is insufficient to assess the balance of benefits and harms of screening for impaired visual acuity, or vision impairment, in adults 65 years and older who have not reported problems with vision.[30] The American Congress of Obstetricians and Gynecologists recommends that vision assessment be a part of well-woman visits for all women 65 years or older.[31]

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