Screening for Impaired Visual Acuity in Older Adults: U.S. Preventive Services Task Force Recommendation Statement

U.S. Preventive Services Task Force*

Description: Update of the 1996 U.S. Preventive Services Task Force (USPSTF) recommendation statement on screening for visual impairment.

Methods: The USPSTF reviewed evidence published since its last review on screening adults 65 years or older in the primary care setting for visual acuity impairment associated with uncorrected refractive errors, cataracts, and age-related macular degeneration.

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

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For author affiliation, see end of text.

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

The U.S. Preventive Services Task Force (USPSTF) makes recommendations about preventive care services for patients without recognized signs or symptoms of the target condition.

It bases its recommendations on a systematic review of the evidence of the benefits and harms and an assessment of the net benefit of the service.

The USPSTF recognizes that clinical or policy decisions involve more considerations than this body of evidence alone. Clinicians and policymakers should understand the evidence but individualize decision making to the specific patient or situation.

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 visual acuity for the improvement of outcomes in older adults. This is an I statement.

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

See **Table 1** for a description of the USPSTF grades and **Table 2** for a description of the USPSTF classification of levels of certainty about net benefit.

Rationale

Importance

Impairment of visual acuity—best corrected vision worse than 20/50—is a serious public health problem in older adults. The prevalence in adults older than 60 years is approximately 9%.

Detection

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

Benefits of Detection and Early Treatment

There is inadequate direct evidence that screening and early interventions for impairment of visual acuity by primary care physicians improve functional outcomes in older adults. The USPSTF found adequate evidence that early treatment of refractive error, cataracts, and AMD improves or prevents loss of visual acuity. Although the USPSTF found adequate evidence that treatment of refractive error improves visual acuity, there was inadequate evidence that these improvements improve functional outcomes.

Harms of Detection and Early Treatment

There is adequate evidence that early treatment of refractive error, cataracts, and AMD may lead to harms that are small.

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USPSTF Assessment

The USPSTF concludes that the evidence is insufficient on whether screening older adults for visual impairment improves functional outcomes. The balance of benefits and harms cannot be determined.

Clinical Considerations

Patient Population Under Consideration

This recommendation statement applies to adults 65 years or older.

Assessment of Risk

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

Screening Tests

A visual acuity test (for example, 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 is limited on the use of other vision tests, including pinhole testing, the Amsler grid (a chart used to test central vision in order to detect AMD), or funduscopy (visual inspection of the interior of the eye), in screening in primary care to detect visual impairment due to AMD or cataracts.

Treatment

Most older adults will need some type of corrective lenses. The treatment for cataracts is surgical removal of the cataract. Treatments for exudative (or wet) AMD include laser photocoagulation, verteporfin, and intravitreal injections of vascular endothelial growth factor inhibitors. Antioxidant vitamins and minerals are treatments for dry AMD, but evidence about their effectiveness is limited.

Other Approaches to Prevention

This recommendation does not cover screening for glaucoma. The USPSTF review and recommendation statement on screening for glaucoma are available on the Agency for Healthcare Research and Quality Web site (www.preventiveservices.ahrq.gov). The USPSTF is updating the review and recommendation on fall prevention, which will be available at the above Web site.

Other Considerations

Research Needs and Gaps

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 especially needed on the association between fall risk and corrective lenses, including possible associations with changes in lens prescriptions and the use of multifocal glasses.

Costs

Given the high prevalence of vision disorders, implementation of universal screening could lead to substantial costs to the health care system. These costs would include opportunity costs for time spent administering the visual acuity test; costs of treating asymptomatic vision disorders; and an unknown amount of resources spent on potential complications of screening, including falls.

Discussion

Burden of Disease

Vision impairment is common in older adults. Populations of older adults have a higher prevalence of primary ocular disease and systemic diseases associated with ocular disease compared with younger adults; in addition, older adults have normal age-related changes in vision. Older adults may be unaware of or may underreport vision impairment because symptoms may be relatively mild or may progress slowly. Moreover, older adults may also have difficulty recognizing or reporting visual impairment because of the presence of comorbid conditions, such as cognitive impairment. Vision impairment is consistently associated with decreased functional capacity and quality of life in older persons, including the ability to live independently, with more severe vision impairment associated with greater negative effects (1, 2).

In 2000, an estimated 1.8 million older adults in the United States were visually impaired (3). Visual impairment is variably defined as best corrected vision worse than 20/40, or worse than 20/50 but better than 20/200—the threshold for legal blindness. Prevalence of vision impairment increases with age and ranges from 1% in persons age 65 to 69 years to 17% in persons older than 80 years (3). Uncorrected refractive errors, cataracts, and AMD are the most common causes.

Refractive errors were estimated to affect 6.7 million adults older than 65 years in the United States in 2000. Approximately 60% of these refractive errors were deemed correctable to better than 20/40 (4). More than 5 million adults in the United States older than 65 years were estimated to have cataracts, 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 (5, 6).

Scope of Review

In 1996, the USPSTF recommended routine vision screening with the Snellen visual acuity test for elderly persons (grade B recommendation) (7). This recommendation was made on the basis of evidence that vision problems are common in older adults, that the Snellen test readily identifies impaired visual acuity, and that refractive errors are correctable. The evidence was insufficient for the Task Force to recommend for or against routine funduscopic

examination of asymptomatic older adults by the primary care physician.

For this update, the USPSTF focused on evidence published since its last review. It reviewed evidence on screening adults 65 years or older in the primary care setting for visual acuity impairment associated with uncorrected refractive errors, cataracts, and AMD. Impaired visual acuity was defined as best corrected vision worse than 20/40 but better than 20/200, the threshold for legal blindness.

Accuracy of Screening Tests

Screening questions can be used to elicit self-perceived problems with vision. However, compared with a visual acuity test or ophthalmologic examination, they are not accurate for identifying persons with vision impairment (1, 2).

In the United States, a standardized test of visual acuity is the usual test for identifying the presence of vision impairment. It assesses the ability of patients to recognize, from a prespecified distance (typically 20 feet), letters of different sizes arranged in rows. Compared with a detailed ophthalmologic examination, visual acuity screening tests are not accurate in the diagnosis of any underlying visual condition, such as AMD or cataracts. Few studies have focused on the accuracy, in the primary care setting, of the Amsler grid, clinical examination, pinhole testing, or fundus examination. One study on the Amsler grid reported poor accuracy for any visual condition compared with ophthalmologic examination, and 1 study reported that geriatricians correctly identified most patients with cataracts and AMD through a clinical examination (1, 2).

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, controlled trials found no difference with respect to 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 (8–10). 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. Other limitations to the applicability of this evidence to the primary care setting include the fact 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 refractive errors could 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 systematic review of 179 randomized, controlled trials and observational studies found refractive surgery to be highly effective at improving refractive errors, with 92% to 94% of persons with myopia and 86% to 96% of persons with hyperopia achieving visual acuity of 20/40 or better. However, most of these studies were done in younger adults, limiting generalizability to older adults (11).

Cataract surgery is consistently associated with improved visual acuity in observational studies: Approximately 90% of patients have postoperative visual acuity greater than 20/40 (1, 12). Results from studies in adults older than 85 years are mixed. The best evidence suggests that most adults older than 85 years also benefit. Although the proportion is smaller than in younger adults, more than three quarters still seem to benefit. Evidence shows that cataract surgery improves vision-related quality of life and function, but evidence from observational studies on effects on motor vehicle accidents and death is sparse and inconclusive: 1 study reported fewer motor vehicle accidents with cataract surgery, and 1 study reported increased risk for death in patients who do not have cataract surgery (13, 14). No randomized trials were identified that evaluated clinical outcomes associated with cataract surgery versus no surgery. Evidence on the effect of cataract surgery on the risk for falls and fractures is limited and inconsistent (1).

A systematic review reported that antioxidants were effective for slowing the progression of dry AMD, but conclusions are primarily based on 1 large, good-quality trial—the Age-Related Eye Disease Study (15). The systematic review found that a multivitamin (composed of vitamins C and E and β-carotene with the addition of zinc) was associated with reduced likelihood of progression to advanced AMD (adjusted odds ratio, 0.68); however, the differences in the likelihood of losing measurable visual acuity did not reach statistical significance. For wet AMD, laser photocoagulation seems to be superior to no treatment for progression of vision loss (loss of $\geq$6 lines of visual acuity) after 2 years (relative risk, 0.67), although the quality of the trials evaluating this therapy is limited (16). Two good-quality systematic reviews of photodynamic therapy found verteporfin to be superior to placebo for preventing loss of visual acuity; quality-of-life outcomes were not reported from the trials (17, 18). Injections with the vascular endothelial growth factor inhibitors pegaptanib and ranibizumab are effective for reducing the risk for visual acuity loss and blindness (19), but evidence on vision-related functional outcomes is mixed.

Potential Harms of Screening and Treatment

No evidence was found of serious harms from visual screening of asymptomatic older adults. Data on harms of treatment of refractive error in older adults are limited. One fair-quality trial found that vision screening by an optometrist in frail, older adults ($n = 309$) was associated with an increased risk for falls (rate ratio, 1.57 [95% CI, 1.20 to 2.05]; $P = 0.01$). Approximately one half of the

participants were prescribed new eyeglasses or were referred for further treatment (20). A small observational study reported an association between multifocal lens use and increased risk for falls in older adults (21). Serious harms, including vision loss, are rare as a result of contact lens use or refractive surgery. Corneal ectasia, a known harm of refractive surgery, occurs at a median rate of 0.2% (1). Cataract surgery can lead to posterior capsule opacification of the implanted lens, requiring an external laser procedure; reported rates of this complication vary widely from 0.7% to 48% (12, 22). More recent studies report an incidence of 28% at 5 years (23). Endophthalmitis, bullous keratopathy, dislocation of the intraocular lens, macular edema, and retinal detachment are other complications associated with cataract surgery.

Pooled data from trials of antioxidant vitamins and minerals reported no association with withdrawal due to gastrointestinal symptoms. The largest trial reported an increased risk for hospitalizations due to genitourinary causes with zinc and an increased risk for yellow skin with antioxidants; no association with increased hospitalizations, death, or lung cancer was found (1, 2).

Laser photocoagulation for wet AMD is associated with an increased risk for acute visual acuity loss (3 months after the procedure) but, as described earlier, is associated with a reduced risk for visual acuity loss at 2 years. Verteporfin carries an initial risk for acute visual acuity loss and a greater risk for back pain related to the infusion. Harms associated with intravitreal injections of vascular endothelial growth factor inhibitors include endophthalmitis, uveitis, increased intraocular pressure, traumatic cataract, and retinal detachment; studies report no associations with hypertension or thromboembolic events (1, 2).

Estimate of Magnitude of Net Benefit

In the highest-quality trial, universal vision screening identified about 10 times more patients with vision impairment and correctable vision impairment than targeted screening, yet found no difference in the rate of visual acuity worse than 20/60 after 3- to 5-year follow-up (10). As in the previous USPSTF evidence synthesis, no direct evidence indicates that screening for vision impairment in older adults in primary care settings is associated with improved clinical outcomes (7). Limited data from 1 trial reported that vision screening by an optometrist may be associated with an increased risk for falls, possibly because of the need to adjust to the vision correction or increased activities that may predispose to falls (20).

Although visual acuity testing is adequate for identifying refractive errors, it might be inadequate for identifying early AMD or early cataracts. Effective treatments are available for uncorrected refractive error, cataracts, and AMD. Overall harms seem to be small; however, many of the treatments carry a small risk for 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, overall functioning, and vision-related functioning, especially in older adults without self-perceived visual problems. This lack of evidence prevents the USPSTF from assessing the magnitude of net benefit for screening for visual acuity impairment.

How Does Evidence Fit With Biological Understanding?

Treatments can improve or delay the worsening of proximal and distal measures of vision. However, assessing a person's quality of life, vision-related function, and overall function requires measuring outcomes that depend at least in part on their subjective responses (20). Many older adults may not perceive sensory deficits as a problem and may alter their daily lives to adapt to the sensory deficits. This fact creates a challenge to researchers and decision makers to determine whether interventions to improve sensory deficits, such as vision, are beneficial when there is evidence on improvements in objective measures but a lack of evidence of improvements of subjective measures. Furthermore, rapid changes in visual acuity associated with refraction correction, cataract removal, or other treatments may result in increased risk for falls.

Recommendations of Others

The American Academy of Ophthalmology recommends comprehensive eye examinations every 1 to 2 years for persons 65 years or older who have no risk factors. This recommendation is based on descriptive studies, case reports, and expert consensus (24). The American Optometric Association Consensus Panel on Comprehensive Adult Eye and Vision Examination recommends annual eye examinations for adults 61 years or older (25). The American Academy of Family Physicians' recommendation is currently under reconsideration. The American College of Obstetricians and Gynecologists recommends evaluation and counseling about visual acuity screening for all women 65 years or older (26).

From the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, Rockville, Maryland.

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Potential Financial Conflicts of Interest: None disclosed.

Requests for Single Reprints: Reprints are available from the USPSTF Web site (www.preventiveservices.ahrq.gov).

Figure. **Screening for impaired visual acuity in older adults: clinical summary of U.S. Preventive Services Task Force recommendation.**

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USPSTF

SCREENING FOR IMPAIRED VISUAL ACUITY IN OLDER ADULTS
CLINICAL SUMMARY OF U.S. PREVENTIVE SERVICES TASK FORCE RECOMMENDATION*

Population	**Adults 65 Years or Older**
Recommendation	**Grade I: Insufficient Evidence**

Risk Assessment	Older age is an important risk factor for most types of visual impairment. Additional risk factors include: • Smoking, alcohol use, exposure to ultraviolet light, diabetes, corticosteroids, and black race (for cataracts) • Smoking, family history, and white race (for age-related macular degeneration)
Screening Tests	Visual acuity testing (e.g., by the Snellen eye chart) is the usual method for screening for impairment of visual acuity in the primary care setting. Screening questions are not as accurate as a visual acuity test.
Balance of Harms and Benefits	There is no direct evidence that screening for vision impairment in older adults in primary care settings is associated with improved clinical outcomes. There is evidence that early treatment of refractive error, cataracts, and age-related macular degeneration may lead to harms that are small. The magnitude of net benefit for screening cannot be calculated because of a lack of evidence.
Other Relevant Recommendations from the USPSTF	Recommendations on screening for glaucoma and on screening for hearing loss in older adults can be accessed at www.preventiveservices.ahrq.gov.

For a summary of the evidence systematically reviewed in making these recommendations, the full recommendation statement, and supporting documents, please go to www.preventiveservices.ahrq.gov.
*This recommendation does not cover screening for glaucoma.

USPSTF = U.S. Preventive Services Task Force.

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 against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is moderate or high certainty that the net benefit is small.	Offer/provide this service only if other considerations support offering or providing the service in an individual patient.
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 = U.S. Preventive Services Task Force.

Table 2. **U.S. Preventive Services Task Force 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 that are not generalizable to routine primary care practice a lack of information on important health outcomes. More information may allow an estimation of effects on health outcomes.

*The U.S. Preventive Services Task Force (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.

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Appendix: U.S. Preventive Services Task Force

Members of the U.S. Preventive Services Task Force† are Ned Calonge, MD, MPH, *Chair* (Colorado Department of Public Health and Environment, Denver, Colorado); Diana B. Petitti, MD, MPH, *Vice-Chair* (Arizona State University, Phoenix, Arizona); Thomas G. DeWitt, MD (Children's Hospital Medical Center, Cincinnati, Ohio); Allen J. Dietrich, MD (Dartmouth Medical School, Hanover, New Hampshire); Kimberly D. Gregory, MD, MPH (Cedars-Sinai Medical Center, Los Angeles, California); David Grossman, MD (Group Health Cooperative, Seattle, Washington); George Isham, MD, MS (HealthPartners, Minneapolis, Minnesota); Michael L. LeFevre, MD, MSPH (University of Missouri School of Medicine, Columbia, Missouri); Rosanne M. Leipzig, MD, PhD (Mount Sinai School of Medicine, New York, New York): Lucy N. Marion, PhD, RN (School of Nursing, Medical College of Georgia, Augusta, Georgia); Bernadette Melnyk, PhD, RN (Arizona State University College of Nursing & Health Innovation, Phoenix, Arizona); Virginia A. Moyer, MD, MPH (University of Texas Health Science Center, Houston, Texas); Judith K. Ockene, PhD (University of Massachusetts Medical School, Worcester, Massachusetts); George F. Sawaya, MD (University of California, San Francisco, San Francisco, California); J. Sanford Schwartz, MD (University of Pennsylvania Medical School and the Wharton School, Philadelphia, Pennsylvania); and Timothy Wilt, MD, MPH (University of Minnesota Department of Medicine and Minneapolis Veteran Affairs Medical Center, Minneapolis, Minnesota).

† Members of the Task Force at the time this recommendation was finalized. For a list of current Task Force members, go to www.ahrq.gov/clinic/uspstfab.htm.