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It's Time to Rethink Adult Glaucoma Screening Recommendations

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PERSPECTIVE:

It's Time to Rethink Adult Glaucoma Screening Recommendations

Though glaucoma is one of the leading causes of irreversible blindness in the United States (US) and the prevalence is expected to increase from 3 million to 6.3 million people by 2050,[41] the US Preventive Services Task Force (USPSTF) concluded in both their 2013 and 2022 recommendations that there is insufficient evidence to assess the balance of benefits and harms of screening for primary open angle glaucoma (POAG) in adults.[2–4] One challenge that the USPSTF points out is that because there is a relatively low prevalence of POAG in the general population, even accurate screening tests will generate too many false positive referrals, burdening both the patient and the health system. This challenge needs to be weighed against the reality that 50% of people with glaucoma remain undiagnosed.[5] The report also states there is a lack of evidence on ways to help identify persons at increased risk who could benefit from screening. However, numerous community-based studies over the past ten years - occurring in geographically diverse settings - have been published providing evidence that targeted screening in high risk populations is highly sensitive in identifying those with both early and later stages of glaucoma.[6–10]

The National Academy of Science, Engineering and Medicine has recommended a call to action to make eye health a population health imperative to address eye care disparities.[11] African Americans are 6 to 8 times more likely to experience blindness from glaucoma

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and 15 times more likely to be visually impaired from glaucoma, as compared to White Americans.[12,13] Communities with a high proportion of people living in poverty, older adults and those who identify as Black and/or Hispanic, have higher rates of glaucoma and suspected glaucoma – a 20% case detection rate – as opposed to the 6-8% case detection rate in the general population.[7] The USPSTF seems to have concluded that in the general population, there is insufficient evidence for glaucoma screening, but fails to consider the need to target glaucoma screening to high-risk individuals (Black Americans, Hispanics, those who have a family history of glaucoma or perhaps those with a high genetic risk score).[14]

In 2019, the Centers for Disease Control and Prevention (CDC) Vision Health Initiative funded three 5-year research grants to design innovative glaucoma screening strategies among high-risk populations to generate evidence on how to best provide targeted glaucoma screening.[15] The Screening and Interventions for Glaucoma and Eye Health through Telemedicine (SIGHT) Studies are taking place in Michigan, New York City, and Alabama (SIGHTSTUDIES.org).[16]

The Michigan Screening and Intervention for Glaucoma and Eye Health through Telemedicine Study (MI-SIGHT) has partnered with a free clinic and a Federally Qualified Health Center (FQHC) to set up a telemedicine-based eye health screening program in these primary care clinics that each serve small urban cities with high rates of poverty and high proportions of people who identify as Black.[17] The MI-SIGHT study enrolled 2091 participants from July 2020 to June 2022; 66% earned less than $30,000 per year, 56% identified as Black and 11% identified as Hispanic. To date, 24% screened positive for glaucoma or suspected glaucoma and 39% need follow-up ophthalmic care for identified eye diseases. A total of 58% reported their last eye exam was more than 2 years ago or that they never had one. In order to support people who screened positive for glaucoma and eye disease in obtaining the necessary follow-up eye care, the program also provides education and health care navigation, an important step in ensuring that those who screen positive for eye disease obtain treatment to mitigate vision loss. The MI-SIGHT study is testing whether personalized education and coaching will improve follow-up adherence for those referred to ophthalmology compared to usual care.

In New York City (NYC-SIGHT), Columbia University Ophthalmology researchers designed the Manhattan Vision Screening and Follow-up Study to conduct community-based eye health screening and eye exams by an optometrist where people live.[18] By partnering with the NYC Housing Authority (NYCHA) and the NYC Department for the Aging (DFTA), recruitment targets high-risk residents living in affordable (public) housing buildings or those attending DFTA senior centers, who have high rates of poverty and high proportions of people who identify as Black and Hispanic. The NYC-SIGHT study enrolled 708 participants from March 2020 to June 2021; 100% were at the NYC poverty level, 52% identified as Black and 42% identified as Hispanic. To date, 28% screened positive for glaucoma or suspected glaucoma and 66% need follow-up ophthalmic care for identified eye diseases. A total of 53% reported their last eye exam was more than 2 years ago or that they never had one. The Columbia study is providing patient navigators and free eyeglasses

to residents randomized to the intervention group to determine if this support will improve follow-up adherence for those referred to ophthalmology compared to usual care.

The Alabama Screening and Intervention for Glaucoma and Eye Health through Telemedicine (AL-SIGHT) Study has implemented a telemedicine-based detection and management strategy for glaucoma associated diseases and other eye diseases in patients seen at FQHCs located in rural Alabama.[14] This region is characterized by one of the highest concentrations of people who identify as Black in the US. This region also has high rates of poverty, unemployment, and un-insurance, alongside inadequate educational systems, transportation and community resources. There are only a few optometrists who largely practice in retail settings to provide eye care in this region and there are no ophthalmologists specializing in glaucoma who serve this region. The AL-SIGHT studies, whether using portable measurements of visual function and optic nerve and retinal structure, aim to increase the detection rates of glaucoma and eye diseases. The AL-SIGHT study enrolled 600 participants from November 2020 to September 2022; 46% identified as Black and 2% identified as Hispanic. To date, 25% screened positive for glaucoma or suspected glaucoma and 47% needed follow-up ophthalmic care for identified eye diseases. A total of 34% reported their last eye exam was more than 2 years ago or that they never had one. The AL-SIGHT study is also testing whether evidence-based glaucoma education, combined with financial incentives, improves adherence to recommended follow-up glaucoma care.

Among these three SIGHT studies, 25% of participants screened positive for glaucoma. Certainly ascertainment bias may play a role - where those who know they have risk factors for disease are more likely to participate in a screening program. However, this bias works in favor of targeted screening because the overall population contains a larger number of people at greater risk of eye disease. Yet it is hard to fully quantify this effect, as many people who have risk factors for glaucoma may still have very limited knowledge about the importance of glaucoma screening.[19]

In 2022, Dr. Khawaja and colleagues in the United Kingdom (UK) analyzed the positive predictive value and false discovery rate for glaucoma screening to understand how the prevalence of disease impacts these values using 73% sensitivity and 96% specificity rates for screening with complete eye exams with measurement of intraocular pressure, central corneal thickness, and visual field. They found that even at these high levels of sensitivity and specificity, because the prevalence of glaucoma among adults over age 50 in the UK is 0.9%, the positive predictive value of the test is only 14% while the false discovery rate is very high at 86%.[20] In a similar fashion, for the general population over the age of 18 in the US, there is a 1.4% prevalence of glaucoma, and so the positive predictive value would be only 21% while the false discovery rate would remain high at 79%. This high false discovery rate leads to undue burden on the healthcare system and the patient. However, at the level of disease prevalence identified in the SIGHT studies cohorts - 25% - the positive predictive value for bringing a patient in for further ophthalmic examination would be 86% and the false discovery rate would fall to 14%, which would put many fewer people at risk of overtreatment and help many more people gain access to appropriate management and treatment. Even if the rate of screening positive in a targeted program was 15%, the

positive predictive value would be 76% and the false discovery rate would remain low at 24%. Given the successes of these three studies in 1) engaging individuals at high risk for eye disease and underutilization of eye care, and 2) detecting high rates of glaucoma and glaucoma suspect in these populations, we believe that targeting glaucoma screening in high-risk populations is warranted.

Further, research in patient reported outcome measures to assess vision-related quality of life has identified that even people with mild and moderate glaucoma have decreased quality of life, underscoring the importance in identifying and treating disease early, even before vision is lost.[21] To truly reduce the population level burden of visual impairment and lost vision-related quality of life from glaucoma, it would be helpful if the USPSTF could re-imagine a paradigm in which screening and support for treatment for high-risk people could be widely implemented in our country and make recommendations to support such an imperative effort. Given the evidence of how treatment for glaucoma mitigates blindness that disproportionately affects minorities and underserved individuals, we hope that the USPSTF will provide more nuanced recommendations for glaucoma screening in this current report such as recommending screening for high-risk individuals. It's time to rethink the *USPSTF Glaucoma Screening Recommendations in Adults* due to the mounting evidence to support targeting high-risk groups.

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