

# Integrating Eye Health and Vision Care for Underserved Populations into Primary Care Settings

Prepared by the American Optometric Association and the Association of Clinicians for the Underserved with support from The Centene Foundation for Quality Health Care

December 2020





## Introduction

Vision and eye health are linked to overall health, success in school, employability, and independence especially as individuals grow older.<sup>1</sup> Vision loss has been shown to cause substantial social and economic tolls, emotional suffering, social isolation, loss of productivity, and diminished quality of life.<sup>2,3</sup> Despite the importance of vision and eye health on one's quality of life, many people continue to face barriers to accessing eye health and vision care.

Federally qualified health centers (health centers) are uniquely positioned to improve access to eye health and vision care due to their reach in underserved communities and their emphasis in providing integrated, whole-person care to underserved populations. In a National Academies' Health and Medicine Division report, *Making Eye Health a Population Health Imperative: Vision for Tomorrow*, the authors state that "for many underserved and low-income communities, federally funded community and rural health centers may be the only source of eye and vision care services."<sup>3</sup> Yet, most health centers are not equipped to provide comprehensive eye health and vision care.

The discussion below highlights the eye health and vision care needs of underserved populations, challenges to such care delivery, and best practices for delivering eye health and vision care in integrated care settings. Health centers are the primary target for these best practices, but they may be transferrable to similar care settings. Precise implementation will vary based on the needs of specific communities, available payment streams, and state laws.

# Background

## *Vision and eye health in the U.S.*

Eye disease, vision impairment, and blindness are known to be significant public health problems in the United States. At least six million Americans live with chronic vision impairment or blindness.<sup>4</sup> Another 48 million Americans are affected by refractive error that can be treated with spectacles or contact lenses, but almost 33% of these cases go undiagnosed or otherwise uncorrected.<sup>5</sup>

Diabetes (and its complication diabetic retinopathy) is the leading cause of blindness among working age adults age 20-70. According to 2019 Uniform Data System (UDS) figures, diabetes poses a unique challenge for the Health Resources and Services Administration's Health Center Program because 1 in 7 health center patients has diabetes and nearly 1 in 3 of those has uncontrolled diabetes.<sup>6</sup> Cataracts, glaucoma, age-related macular degeneration, and other ocular diseases affect almost 30 million Americans over the age of 40.<sup>7</sup> As age is an independent contributor to vision loss, the aging of the American population will contribute to a dramatic increase in all of these conditions.

Vision disability is one of the most feared disabilities among adults, associated with social isolation, increased risk of falls, and depression.<sup>8</sup> The number of blind and visually impaired people is expected to double by the year 2050.<sup>4</sup> Economically, vision loss and eye disease were estimated to cost the U.S. \$145 billion in 2014. Eye disorders currently rank fifth among the top eight chronic conditions in direct medical costs. As the population ages and demographics shift, this number could quintuple to \$717 billion a year by 2050 unless existing infrastructure and resources are expanded to address vision health.<sup>2</sup>

Even more significant is the fact that chronic vision disorders, such as diabetic retinopathy and glaucoma, have no symptoms in their most treatable stages. According to data from the National Eye Health Education Program (NEHEP) Public Knowledge, Attitudes, and Practices Survey, more than 70% of individuals believe the loss of their eyesight would have the greatest impact on their day-to-day life; however, less than 11% knew that there are no early warning signs of glaucoma and diabetic retinopathy.<sup>9</sup>

## *Disparities in vision and eye health*

Disparities in eye health and vision care generally mirror the overall state of health disparities, in which racial and ethnic minorities have higher rates of chronic disease than whites.<sup>10</sup> Individuals of Hispanic or African descent are more than twice as likely as Caucasians to go blind from vision disorders of diabetic retinopathy and glaucoma.<sup>11</sup>

African Americans over the age of 40 have a higher prevalence of uncorrectable vision impairment and blindness than all other groups.<sup>4</sup> In a study of African-American patients with diabetes at high risk for diabetic retinopathy and vision loss, only 30% of patients screened followed through with their eye care providers' recommendations for comprehensive eye exams. Concerningly, among patients referred for urgent follow-up care (as opposed to a recommended exam within one year), the rate of compliance was

even lower. Even though frequently cited barriers were addressed: exams were low cost or free, the eye doctor was co-located with the patient's usual source of diabetes care, and assistance was offered with making the appointment, patients still frequently failed to receive needed care. The study's researchers concluded that diabetic retinopathy screening programs are not likely to meet public health goals without incorporation of eye health education initiatives successfully promoting adherence to recommended comprehensive eye care for preventing vision loss.<sup>12</sup>

In a population-based study of Latinos 40 years and older living in Southern California, only 36% reported having an eye care visit of any kind in the past year; 19% reported having a comprehensive (dilated) eye exam in past year; and 57% reported having a dilated eye exam ever. Those who had a usual source of care and a usual provider were significantly more likely to use eye care.<sup>13</sup>

These disparities are linked to social determinants of health including access to and receipt of health care, health behaviors, nutrition, employment, discrimination, income, physical and social environments, transportation, and housing.<sup>14</sup> Socioeconomic status itself is an important determinant of visual impairment,<sup>15</sup> and the risk of eye disease and chronic vision impairment is increased in Americans of all ages who are poor, are unemployed, or have less than a high school education.<sup>16</sup> The likelihood that an individual will report having an eye care visit in the preceding 12 months decreases with a lower income and lower level of educational achievement.<sup>17</sup>

Children do not escape the impact of poverty on vision and eye health; a child living below the federal poverty line has nearly twice the risk of being visually impaired when compared to a child living at 200% of the federal poverty line or higher.<sup>18</sup> This disparity can be at least partly explained by the impact of limited access to eye and vision care, which may be within the power of community health centers to mitigate, as approximately one third of the total health center population served are children.

People experiencing homelessness also have higher rates of vision impairment including a significant amount of uncorrected refractive error, as well as eye disease, and reduced rates of eye exams.<sup>19, 20, 21</sup> Studies conducted among homeless populations in Canada, where residents enjoy universal health coverage, might demonstrate better health access and outcomes related to eye care than could be expected in the United States, where lack of coverage correlates with negative health outcomes.<sup>22</sup>

Among rural populations, eye health and vision problems are a significant concern. First, rural populations tend to be older, sicker, and poorer than their urban counterparts, and all of those factors are independent contributors to eye health and vision problems.<sup>23</sup> Even accounting for age difference, rurality was shown to be independently associated with vision loss among older veterans receiving care through the Veterans Health Administration.<sup>24</sup> Rural residents have been shown to be less likely than urban residents to have insurance coverage for eye care services and to cite lack of insurance as a reason to avoid receiving care.<sup>25</sup> As such, rural patients are less likely than urban patients to report receiving a dilated eye exam.<sup>26</sup> Farmworkers are at particular risk for cataracts, due to their high rates of exposure to UV light, eye injury, and other environmental dangers. There is also a documented low uptake of protective eyewear use.<sup>27</sup>

## *Vision service coverage*

In 2019, 23% of health center patients were uninsured, and 48% of patients were covered by Medicaid.<sup>28</sup> In most states, Medicaid covers eye exams and glasses. Earlier research noted Medicaid-covered health center patients were more likely than uninsured health center patients to have had a visit with an eye care provider (39% vs 29%).<sup>29</sup> Health centers in Medicaid expansion states provided more eye and vision care than the health centers located in states that did not expand Medicaid (27% v. 18%).<sup>30</sup>

For adults, private medical insurance plans and Medicare typically do not cover comprehensive eye exams for asymptomatic patients who are not in a specific high-risk category. In 2019, nearly 10% of health center patients were insured through Medicare.<sup>28</sup> According to Medicare Part B claims data from 2017, only 45.25% of Medicare beneficiaries had an eye exam.<sup>31</sup> Because risk of eye problems increases with age, it might be expected that this is the population with highest utilization of services.

Employers generally offer and subsidize group health plans but usually offer vision coverage in a separate, unsubsidized stand-alone plan that beneficiaries opt into purchasing. In 2019, only 26% of private industry workers had access to vision care benefits, and 80% of those with access chose to participate in those plans.<sup>32</sup> Health centers reported that nearly 19% of their patients had private insurance in 2019. While data is not available to determine how many health center patients have vision care benefits, the majority of health center patients live at or below poverty levels and may see such plans as a luxury. Besides, choosing an add-on vision plan is often based on perceived need, but most vision conditions that result in blindness are asymptomatic in their treatable stage.

Children have relatively high rates of insurance coverage compared to adults and, for almost all children, medical insurance coverage includes vision coverage. In 2018, only 5.2% of children were uninsured.<sup>33</sup> The Medicaid Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) benefit program includes screening, diagnosis, and treatment for vision conditions, including eye examinations and eyeglasses. Children receiving insurance through the State Children's Health Insurance Program (CHIP) have access to comparable eye care services. Finally, the essential health benefits provision of the Affordable Care Act required that qualified health plans and all plans in the small group and individual insurance markets include pediatric vision care; for nearly all states, this benefit was defined as an eye exam and eyeglasses annually from birth through age 18. As is typical of insurance coverage, there are variances in co-payment from plan to plan and state to state.<sup>3</sup>

Many uninsured and underinsured populations rely on federally funded community and rural health centers which may often be the only locally available source of eye and vision care services.<sup>3</sup> Yet, access to eye health and vision care within the community health center program is limited. According to the Health Resources and Services Administration, in 2019, health centers employed only 444 full-time equivalent doctors of optometry and ophthalmologists, the physicians qualified to provide comprehensive eye care, across almost 1,400 health centers with around 13,000 service delivery sites. Less than 3% of health center patients received vision care services in 2019, representing 0.89% of clinic visits.<sup>34</sup>

## *Mobile clinics: a temporary solution*

Mobile eye care units or specially scheduled “eye care days” at the health center or other local community facility (including schools) can provide an extension of health center eye health and vision care to reach underserved populations, including people experiencing homelessness, farmworkers, and other unique groups. Such programs should provide comprehensive exams, diagnosis, and initiation of treatment at the point of service, with coordinated referral relationships with local eye doctors for follow-up care.

Researchers at the Casey Eye Institute developed a community outreach program to attempt to mitigate the problem of referral compliance for vision screening programs. Through a partnership with community health and social service organizations, 97% of patients were offered comprehensive eye exams on-site from a physician after volunteers completed diagnostic testing. Diagnosis and initial treatment, including prescription spectacles, via a comprehensive eye exam, were provided in the initial program, eliminating the need for most referrals. Only twenty-one percent of patients were referred for further follow-up care.<sup>35</sup>

Barnes et al. (2010) conducted mobile eye screenings for people experiencing homelessness in Oahu, Hawaii, and determined that dissatisfaction with eye health was widespread among this population, and access to care and knowledge of available services were low.<sup>36</sup> In this study, people experiencing homelessness had an unusually high rate of insurance, 77%, but low service utilization. This was particularly concerning in the case of patients with diabetes, 70% of whom had never been evaluated by an eye doctor as recommended by clinical guidelines. The authors suggested that the mobile eye clinic addressed the specific challenges of transportation and social stigma for people experiencing homelessness in an ambulatory care setting.

Researchers have assessed a variety of mobile and stationary children’s vision screening programs. Hark et al. (2016) showed that with screening programs, children, like adults, suffer from loss of follow-up, even when a social worker pursues the follow-up appointment.<sup>37</sup> Diao et al. (2016) noted that bringing the comprehensive exam unit to the school setting could improve follow-up completion.<sup>38</sup>

The use of trained medical students to provide eye services has also been translated to a mobile eye service model in collaboration with local health centers. In the case of Guerilla Eye Services in Pittsburgh, participants received comprehensive eye exams in the initial stage at no cost, eliminating the challenge of loss to follow-up for the purposes of diagnosis and initial treatment. Patients with appropriate diagnoses were also referred for further care. This study utilized medical students, ophthalmology residents, and an attending physician in order to provide comprehensive care while offering clinical education opportunities. Seventy-two percent of patients completed referrals for follow-up.<sup>39</sup> It should be noted that the use of students to perform this type of care should consider state licensing and liability regulations.

The literature indicates that simple vision screening services offered in a mobile or temporary setting have low rates of success in getting patients needed care. To be effective and to efficiently use limited resources, mobile eye care units and temporary eye care days should offer comprehensive care at the



point of patient contact. They then limit the number of patients who require additional referrals and can better use support resources to ensure those patients get follow-up care. These services should only be offered if there are local referral sources willing to assume the care of complex patients, whether within the health center or elsewhere. Additional challenges to this model may arise at the state level, especially if volunteer clinicians are utilized. Some states limit the use of mobile clinics, and volunteer clinicians may complicate billing insurance plans for insured patients, an important factor if eye health and vision care are to become self-sustaining financially.

## The case for on-site eye health and vision care

The provision of on-site, comprehensive eye and vision care speaks directly to the mission of health centers to provide primary, preventive health care services. A National Academies of Sciences, Engineering, and Medicine (NASEM) report highlights that avoidable vision impairment “occurs because of outdated assumptions, missed opportunities and shortfalls in public health policy and health care delivery in the U.S” and that “promoting optimal conditions (*i.e. access to eye examination*) for vision and health, can positively influence many social ills, including poverty.”<sup>3</sup> Accordingly, adding or expanding eye and vision care at health centers sends a clear message that supports NASEM’s contention that access to comprehensive eye exams is essential for optimum U.S. population health outcomes.

Lacking on-site eye health and vision care, community health centers may have a referral relationship with an outside doctor of optometry or ophthalmologist. This can supplement available health care for patients at the health center. However, it introduces challenges related to transportation, scheduling, and possibly cost for patients. It also demands a more concerted effort to ensure that patients follow through with needed care and that the referring provider at the health center and the outside physician coordinate and communicate about each patient’s health.

A number of studies have considered the role of community health centers in improving access to eye and vision care among rural populations through the use of vision screening by trained medical students and efforts to encourage completion of referrals. In all studies, 70 to 80% of patients met the criteria for referral. In one study, as many as 89% of those referred completed their referral appointments,<sup>40</sup> but the completion rate was much lower in all other studies, around 50% or less.<sup>41 42</sup> Friedman et al. concluded that the screening tools used in these programs lacked the sensitivity and specificity to be effective for screening an adult population and that half of those referred were lost to follow-up.<sup>43</sup> Similar studies and similar effectiveness outcomes of vision screening with 52% lost to follow-up have been documented in the pediatric population as well.<sup>44</sup>

Payment methodology for federally qualified health centers may make referrals less appealing as eye care providers outside of the health center setting may receive lower Medicaid reimbursement for the same services. Reimbursement levels for Medicaid or uninsured patients limit the capacity of local optometrists to provide eye care services to health center patients, relative to such services offered within the health center and billed under the Prospective Payment System (PPS).<sup>45</sup>

By initially contracting with a local eye care provider to work on-site on a part-time basis, health centers can immediately meet the needs of their patients. However, given the exam space required, over time it may be more efficient for health centers to scale up and utilize that capacity on a full-time basis by hiring their own staff as they build out their programs. The Association of Clinicians for the Underserved has [tools](#) to help health centers determine readiness to offer eye health and vision care and calculate the resources needed.

Working with local schools and colleges of optometry and ophthalmology programs can offer opportunities to deliver on-site eye health and vision care while providing clinical experience to students and residents. While externships and residencies for optometry students and doctors of optometry do not offer the same consistency of care that patients might expect from a long-term staff physician, it can expand capacity and offer clinical experience in a unique setting for students and new doctors. As of the writing of this paper, the number of schools and colleges of optometry in the United States has increased to 23, providing increased opportunities for collaborations with health centers.<sup>46</sup> In 2019, health centers trained 581 pre-graduate and 202 post-graduate optometrists and 4 pre-graduate and 39 post-graduate optometrists.<sup>47</sup> Additional loan forgiveness options and inclusion in the National Health Service Corps have potential to increase these numbers.

### *Integrating on-site eye health and vision care into primary care*

Access to comprehensive vision care can help prevent and detect several other chronic diseases in their early stages including hypertension, cardiovascular disease, Graves' disease, multiple sclerosis, herpes zoster, and tumors. In all, 24 common chronic diseases can be impacted in their early or late stages through comprehensive eye care.<sup>48</sup>

Many health centers have looked into the role that eye care providers can have in supporting the comprehensive health care needs of patients diagnosed with diabetes. Retinopathy is the most common diabetes-related eye disease affecting 29% of U.S. adults over the age of 40 who have diabetes. It is also the leading cause of new cases of blindness in working age adults.<sup>49, 50</sup> The longer a patient lives with diabetes, the greater his or her risk of sight-threatening diabetic retinal disease, and if the diabetes is uncontrolled, the risk increases further.<sup>51</sup> Seventy-three percent of persons with diabetic retinopathy are unaware of their condition (diabetic retinopathy), and only about 60% of people with diabetes have recommended yearly screenings for diabetic retinopathy.<sup>52</sup> As such, integrating eye care into primary care services can support quality improvement initiatives related to diabetes outcomes.

In-person comprehensive eye care remains the gold standard (high value). However, teleretinal screening programs may help to supplement comprehensive eye health and vision care services. In 2019, health centers conducted 2,178 vision visits virtually.<sup>34</sup> In one study conducted at a community health center, a teleretinal screening program resulted in a 20% increase in compliance in the first year. In this system, the report from the consulting specialist was sent directly to the primary care doctor at the health center. Referrals for in-person care were made for patients with evidence of retinopathy.<sup>53</sup> Some studies have shown that this tactic can yield cost and time savings for the patient as well, particularly in remote settings.<sup>54</sup>



Integrated care models that include eye and vision care should establish systems where eye care providers share eye health information with others on the care team including primary care providers, case managers, and community health workers. Information provided by eye care providers can prompt primary care providers to conduct baseline evaluations and update care plans accordingly. Case managers and community health workers are valuable resources to help address barriers to attending regular appointments and increase patient understanding of the importance of eye health as it relates to their disease. Referrals should be bidirectional so that eye care providers are notified when high-risk patients require a comprehensive eye examination.

All patients should receive education about their risk, and the need for and availability of eye health and vision care services in the health center setting. Reaching at-risk populations and educating them in a culturally competent way about their risk for eye disease, vision loss, or injury, and the need for and availability of eye health and vision care services offered by the health center should be a programmatic priority. All departments within a health center should be trained in offering basic eye health education to patients and offering referrals to eye health and vision care services in the health center.

## Conclusion

Vision impairment and blindness are large and growing problems in the U.S. The provision of on-site vision care at health centers will improve health outcomes for millions of at-risk individuals seeking care at health centers. Doctors of optometry provide almost 80% of the nation's primary eye care. Where currently available, doctors of optometry also serve to provide the majority of accessible doctor-related eye care within existing health center settings. Yet, there remains a lack of community health center settings across the nation where eye care can be accessed by targeted patient populations. Funding the development and execution of a model to increase comprehensive eye and vision care capacity at health centers, including the integration of vision care throughout all health center services, is critically needed.

The success found with the co-location of oral health service providers and community health centers demonstrates that integrated care can benefit community health center patients by increasing access and referral follow-up rates; this model is promising for the future integration of vision and eye health care.<sup>55</sup> Moreover, health center administrators are eager to establish eye and vision care programs. In a survey of federally qualified health centers in Missouri, for example, of the respondents who did not have eye health and vision care available to their patients, all but one indicated a desire to incorporate it given sufficient funding and space.<sup>56</sup>

Community health centers have long understood the value of exposure to their unique, integrated workplace in inspiring commitment to working with underserved communities. Opportunities exist through current programs such as the National Health Services Corps (NHSC) to support entry into these care settings, but efforts to expand these programs to include doctors of optometry could be valuable to increasing access to care.<sup>57</sup>

# Recommendations for Implementing Eye Health and Vision Care in Health Centers

By utilizing these best practices for implementing eye health and vision care services, community health centers can provide effective, long-term quality eye care and better serve unique patient populations that may otherwise go without needed care.

## Develop a sustainable business model

- Develop local partnerships with eye care specialists who can see patients for acute issues and establish a workflow.
- Explore academic partnerships to build clinical experience in primary care for future practitioners.
- Approach payers about new/alternate payment models that incorporate eye care.
- Evaluate, select, and purchase equipment based on current need.
- Consider how your organization might integrate eye health and vision care into other existing patient assistance programs (e.g., Ryan White Program, Health Care for the Homeless program) to help support the cost of services and prescription glasses.

## Conduct comprehensive eye exams

- Based on age and other risk factors, conduct dilated eye exams to detect and monitor certain chronic diseases with special emphasis on diabetic, hypertensive, and HIV+ populations.
- Assess risk for eye injury including from environmental factors. Providing and encouraging the use of protective eyewear could prevent as much as 90% of injuries among farmworkers.
- If possible, offer specialized testing including visual fields, fundus photographs, optical coherence tomography (OCT), and specialty contact lens fittings in an effort to reduce outside referrals and financial burden on the patient.
- Develop systems that allow for pre-scheduled and walk-in visits that make sense for your service site and population needs.
- If possible, offer affordable and low-cost materials including glasses and medically necessary contact lenses.

## Build in care coordination

- Eye care providers should be fully integrated into the health care team. Coordination of care for patients might be easier when all providers are under the same roof, but it still requires intentional planning and execution.
- Establish a bidirectional referral process between the eye care provider and primary care provider(s).

- Eye care providers should have access to the complete medical record including patient information related to chronic diseases that put people at higher risk for poor eye health, family history of poor vision and eye disease, and medications that have serious eye side effects.
- Design a system to remind primary care teams when patients are due for comprehensive eye exams at the time of visit. Invest in an integrated EHR with internal referring capabilities as well as a reliable recall system.
- Develop workflows that account for outreach and tracking and measuring outcomes (particularly for high-risk groups).
- Case managers and community health workers can conduct outreach to remind patients about appointments, address barriers to attending appointments, and reiterate the importance of eye care.
- Train eye care providers to code claims with chronic condition categories.
- Conduct pre-visit planning and coordinate youth wellness visits and/or annual physicals on days when on-site eye care providers are physically present.
- Integrate diabetic retinopathy screenings and education into diabetes care plans.
- Patients with severe or very severe nonproliferative diabetic retinopathy, early proliferative diabetic retinopathy with risk of progression, or high-risk proliferative diabetic retinopathy should be referred to an ophthalmologist experienced in the management of diabetic retinal disease for possible panretinal photocoagulation (PRP) or intravitreal anti-VEGF treatment.<sup>58</sup>

## Engage in patient education and outreach

- Integrate eye care messaging into patient-facing technology (closed circuit TV, wait time messages for phones, patient portal, and/or text message campaigns.)
- Develop scripts for standardized messaging to patients to remind them of eye care appointments.
- All members of the care team should be trained in offering basic eye health education to patients and offering referrals to eye health and vision care services in the health center.
- All patients should receive education about their risk, and the need for and availability of eye health and vision care services in the health center setting.
- Diabetic retinopathy telehealth programs should incorporate an eye health education initiative to increase success and explain their limitations.<sup>59</sup>
- Educate at-risk populations in a culturally competent way about their risk for eye disease, vision loss or injury, and the need for and availability of eye health and vision care services offered by the health center.

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