

Missed Vision Screenings for School-Age Children During The COVID-19 Pandemic: A Survey Based Study of NASN Representatives

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Abstract

During the 2020–21 academic year, COVID-19-related educational disruptions impacted school-based vision screenings. However, limited information regarding changes in vision screening and the number of students impacted has been reported. Delayed screenings can negatively impact students' referral to eye care providers, which may affect a child's ability to see clearly and academic success. This study aims to describe changes in school-based vision screening practices through a survey of National Association of School Nurses state representatives ($n = 49$). Among states with vision screenings mandates, participants reported that 23.7% (9/38) states waived screenings, 31.6% (12/38) continued screenings, and 36.8% (14/38) modified requirements, such as grades screened or assessments included (e.g., color vision and stereoacuity screenings). These results suggest that millions of students across the United States missed vision screenings during the 2020–21 academic year. Efforts by education and school health stakeholders should be directed towards addressing the pandemic-related disruption in vision screening.

Keywords

vision screening, pediatric eye care, COVID-19, school nursing, public health, health disparities, screening/risk identification

Introduction

Vision screenings are important to identify children at risk for visual impairment. Referral of children who did not pass vision screening to receive comprehensive eye examinations allows timely detection of uncorrected refractive errors and other previously unidentified eye conditions. Suboptimal vision in school-age children may have an overall negative impact in their learning and reading development (Collins et al., 2017; Maples, 2003). In addition, students who are ultimately provided with eyeglasses may improve their academic performance (Neitzel et al., 2021). Thus, vision screenings are a cornerstone tool for decreasing the lag between diagnosis and treatment of eye conditions. In addition, screenings are key to decreasing the negative impacts of vision problems on learning. In the United States, 40 states and the District of Columbia require vision screening for school-age children at least once between kindergarten and 12th grade (Wahl et al., 2021). Of these, 59% ($n = 24$) conduct vision screenings in school settings (Wahl et al., 2021). During the 2020–21 academic year, when the COVID-19 pandemic impacted in-person learning, many routine screenings, including vision, were affected (Antonio Aguirre et al., 2021; Boutzoukas et al., 2021).

In March 2020, school closures impacted over 50 million students in 48 states and the District of Columbia (EducationWeek, 2020). During the 2020–21 academic year, some states officially waived all school vision screenings, while others developed guidelines to conduct modified versions of screenings. Inevitably these waivers and modifications resulted in an unknown number of missed screenings. While deemed necessary at the time as part of broad public health COVID-19 mitigation strategies, these alterations in vision screening requirements will have long-term implications for children's eye care (Greninger, 2022; Wang et al., 2021).

Without measures to make up for missed screenings, many more children may be advancing to higher grades

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with undetected vision problems because of delayed access to vision care for evaluation and treatment. Delayed or undetected eye conditions can impact their ability to see clearly and affect academic performance (Collins et al., 2017; Maples, 2003; Neitzel et al., 2021). The risk of missed or delayed screening, and subsequent delay in referrals for follow-up eye care, is compounded by reported rising incidence of myopia in children globally after the first year of the pandemic, likely due to home confinement and increased screen time (Lanca & Saw, 2020; Wang et al., 2021). Looking ahead, vision screenings will play an even more significant role in helping to detect these students with incident myopia.

Estimating how much the first year of the COVID-19 pandemic impacted continuation school-based vision screenings becomes challenging due to the wide range of state-level responses. In a previous study, we reported on the limited publicly accessible information about state mandates for vision screening operations during the pandemic (Antonio Aguirre et al., 2021). In addition, we demonstrated a trend across states toward modifying vision screening requirements. This study aims to build upon this prior work by reporting first-hand information on vision screening practices during the 2020–21 academic year. It also provides an estimate on the number of students that missed vision screening as a direct result of state vision screening waivers. We conducted a survey-based study of National Association of School Nurses (NASN) state representatives to assess the impact of COVID-19 on vision screening practices during the 2020–21 academic year.

Methods

Design

We performed a cross-sectional study to evaluate the effect of the COVID-19 pandemic on school-based vision screenings during the 2020–21 academic year across the United States. Data from a survey conducted in February 2021 by a NASN board member to the NASN state board representatives was used for this analysis. The purpose of the survey was to evaluate the continuity of screening activities (e.g., vision, hearing, scoliosis) and changes associated with COVID-19-related school disruptions. This study used data from the original survey to answer vision screening related questions. No individual identifiers were included in the dataset shared for the analysis. The Johns Hopkins University School of Medicine Institutional Review Board approved the study.

Participants and Data Collection

On February 25, 2021, a 5-question survey was emailed to state NASN representatives, including the District of Columbia ($n = 49$). Hawaii and North Dakota do not have

a NASN representative and were not included in the survey. The survey was distributed to all NASN state representatives, regardless of whether their state had mandated vision screening requirements for school-age children.

Two reminders were sent to non-responders, one on March 28, 2021, and a second on April 4, 2021. All survey responses were collected and stored on a secure server. All responses were read, analyzed, and coded independently by two investigators. Investigators then reviewed the dataset together to adjudicate and come to a consensus on any differences in data interpretation. The original survey is available at Supplemental Table S1. Using the data from the survey, we aimed to understand the impact of the COVID-19 pandemic on vision screening for school-age children by addressing the following (1) the status of vision screening requirements for the 2020–21 academic year; (2), how vision screenings were modified, if applicable; and (3) what guidance was available from the state Department of Education (DOE) or Department of Health (DOH).

Data Analysis

Data were summarized using descriptive statistics. To group and analyze the data, vision screening status was defined as (1) required if all screenings were required or if the state had not issued any official waiver; (2) waived if all screenings were suspended; (3) modified if some components (e.g., exempt grades or student populations) of the state requirements were changed, and (4) not applicable if the state does not mandate vision screening for school-age children. In some cases, respondents provided details in addition to their responses to the three primary survey questions. Additional details included information about (1) protective measures and mitigation efforts (e.g., use of personal protective equipment (PPE), cleaning, and disinfection), (2) use of automated (instrument-based) screening, and (3) links to states guidelines or websites about the screening experience in their state. If respondents provided this information, we recorded it and included it in Supplemental Table S2. All analysis and figures were created in R (R Core Team, 2020).

Results

Forty-five of 49 NASN state representatives completed the survey for a response rate of 91.8% (Table 1). Among the 45 respondents, 84.4% (38/45) had state-mandated vision screening requirements and 15.6% (7/45) had no state-mandated requirements for vision screenings as of 2020. Of the 38 states with vision screening requirements, NASN representatives reported that 23.7% (9/38) waived all vision screenings requirements, 31.6% (12/38) continued to mandate screenings, and 36.8% (14/38) continued with certain modifications (Figure 1). A table version of Figure 1 is available at Supplemental Table S3. For three

Table 1. Reported Modifications in Vision Screening Requirements 2020-2021 Academic Year.

Characteristic	States N
States surveyed	49 ^a
Response rate	45 (91.8)
Vision screening (VS) requirements status	
States without VS mandates	7 / 45
States with VS mandates	38 / 45
Required screenings for 2020–21	12 / 38
Modified screenings for 2020–21	14 / 38
Waived screenings for 2020–21	9 / 38
Insufficient information	3 / 38
Modified vision screening requirements (n = 14) ^b	
Flexible requirements ^c	5 / 14
Exempted virtual learning students	2 / 14
Exempted VS components (e.g., color vision testing)	3 / 14
Limited screenings to specific student groups (e.g., SE, new students, specific grades)	3 / 14
Guidance provided by state DOE/DOH in states with VS requirements (n = 38)	
Guidance available ^d	15 / 38
No guidance available	9 / 38
Insufficient information	20 / 38

Abbreviations: VS: vision screening, SE: special education, DOE: department of education, DOH: department of health.

^aHawaii and North Dakota do not have a NASN representative. Count includes the District of Columbia.

^bCategories are non-exclusive, more than one option was possible.

^cFlexible requirements: includes extended deadlines for screening completion, opt-in or opt-out systems and screening at nurse discretion.

^dSouth Carolina (state without mandated vision screening, not included in this count) mentioned that DOH provided guidance on how to perform vision screenings during the pandemic.

states with vision screening requirements, the survey respondents did not provide sufficient information to determine what changes, if any, had been made to their vision screening practices during the 2020–21 academic year.

States with Waived Requirements

Among the 38 states with mandated vision screening, 23.6% (9/38) states waived screenings during the 2020–21 academic year. However, in 44.4% (4/9) of these states, NASN representatives mentioned that school nurses were still encouraged by the state DOE or DOH to conduct screenings whenever possible. In addition, state guidance about how to conduct vision screening was provided for 22.2% (2/9) of these states despite waived screenings, and 33.3% (3/9) of them mentioned performing screening by request of parents or teachers.

States with Modified Requirements

In 36.8% (14/38) of states screenings continued with certain modifications to their previous requirements. Of these,

35.7% (5/14) of them allowed flexible provision of screenings, including extended deadlines for screening completion in 20% (1/5), other 20% (1/5) allowed nurses to conduct screenings at their discretion, and the remaining 60% (3/5) implemented opt-in or opt-out systems for students to participate. Screenings for virtual learning students were waived in 14.3% (2/14) of states, while 57.1% (8/14) continued screening remote students. In 21.4% (3/14) of states, specific vision screening components were waived, including color vision deficiency screening in 66.6% (2/3) and stereoacuity screening 33.3% (1/3). In 21.4% (3/14) states, only certain groups, such as new students or transfers, or specific grades, were screened.

State Guidance on Vision Screening

Among the 38 states that responded and had mandated vision screening requirements, 39.5% (15/38) of states received some type of guidance from the DOE or DOH on how to conduct screenings during COVID-19. In at least 86.6% (13/15) of these states, the guidance mentioned PPE and other protective measures during health screening activities (Supplementary Table 2). Cleaning and disinfection instructions were detailed in at least 73.3% (11/15) of these. Instrument-based screenings were allowed as a primary method for all grade levels screened, if the equipment was available, only in 20% (3/15) of the states.

States Without Vision Screening Requirements

The 18.4% (7/38) of states that responded and had no mandated vision screening requirements, included Alabama, Missouri, Montana, New Hampshire, South Carolina, Wisconsin, and Wyoming. Of these, 42.8% (3/7) states mentioned conducting screenings even without an official requirement. In addition, one state had guidance to conduct vision screenings provided by the DOH; the remainder of the states did not conduct any screenings.

Discussion

The COVID-19 pandemic has negatively impacted vision screenings in the school setting. In a previous study, we showed that only 17 states had publicly available information from state DOE or DOH on vision screening and COVID-19-related changes (Antonio Aguirre et al., 2021). As a result, we were unable to estimate the impact of missed vision screenings during the 2020–21 academic year. This survey addressed the lack of accessible information and aimed to provide more comprehensive updated data about the impact of the pandemic on school-based vision screening. Using on-the-ground experiences from NASN state representatives, we learned that approximately 1/3 of states continued vision screening operations as usual, while slightly greater than 1/3 modified screening requirements. One-quarter of states officially waived all

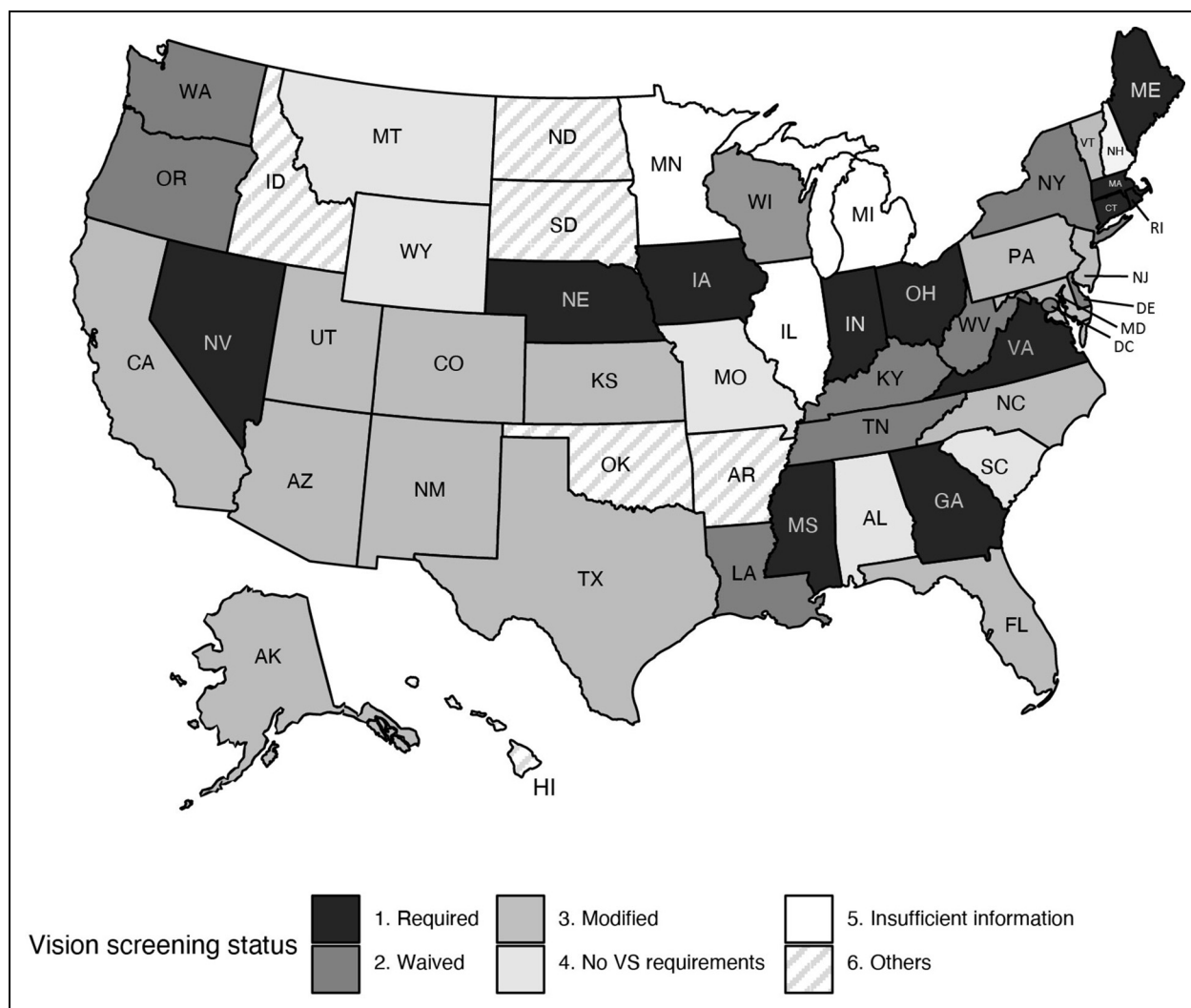


Figure 1. Reported modifications in state vision requirements 2020–21 academic year. Abbreviations: VS, vision screening. Others: include non-responders and states without a NASN representative.

screenings. While statewide vision screening numbers are not reported by the state, it seems likely that fewer children received screenings compared to previous years. If we only consider states that waived screening, this could mean that over 3 million students missed vision screening during the 2020–21 academic year (National Center for Education Statistics, 2021). For screenings that occurred as usual or were modified, the numbers still would have been impacted due to high rates of absenteeism, intermittent school disruptions, and transitions to virtual learning during the pandemic (Black et al., 2021; Dorn et al., 2020; Johnson et al., 2020; Kuhfeld et al., 2020). In addition, for states that continued any vision screening during the 2020–21 school year, there was marked variation in protocols adopted, with some modifying screening and others limiting the number of grades screened. This potentially means that many more children may not have been screened. Delayed screenings can negatively impact students' timely referral to eye care providers

for evaluation and treatment. This delay not only impacts a child's ability to see clearly but may also impact their academic success (Collins et al., 2017; Maples, 2003; Neitzel et al., 2021).

Limitations and Recommendations

There are limitations to the research study. First, we obtained responses from one representative per state. While the information provided reflects each state's general picture, there may have also been variation, responses from the NASN representatives suggested that some states may either be doing more than what is recommended by their state or not having the capacity to meet state requirements. In addition, the information captured on screening status and state requirements may have changed over time. Also, it is possible that some states with vision screenings requirements adopted some of the measures mentioned by the states

with modified requirements such as flexible dates or opt-in options. However, we were limited to the information that each participant provided. Some NASN representatives may have had neither current nor accurate information about screening requirements and waivers in their state. Despite these limitations, these results emphasize a gap in population health services for children during the pandemic, which risks delay in detection of potentially correctable vision problems that could impact vision health and academics.

Moving forward, it will be essential to capture the number of children who missed vision screening either by accessing state databases, if available, or collecting additional details from state representatives. In addition, future studies should compare the number of students screened during the pandemic to those screened during the pre-pandemic years. Protocols for identifying and screening these students should be developed collectively by health and education stakeholders. This becomes even more salient given the marked learning loss documented during the pandemic, the inter-relatedness of vision and learning, and the critical role that vision screenings play in detecting children at risk for vision disorders (Donnelly & Patrinos, 2021; Hoofman & Secord, 2021; Neitzel et al., 2021; Ulum, 2022). Further studies are needed to report plans to conduct missed screenings and continue reporting the incidence of myopia and other eye conditions after the first two years of the pandemic. Although we must initially address children without recent screening, states need to continue making efforts to screen students on a regular basis. Some factors, such as prolonged screen time and less outdoor time during government-imposed lockdowns, may be directly implicated in the increasing reports of myopia in the pediatric population during the pandemic. We will need to analyze the trends to understand any changes in prevalence of both refractive and non-refractive ocular conditions.

Moreover, it will be important to understand not only the changes that have occurred, but also compliance with screening requirements. Specifically, it will be important to gather information regarding the state's ability to comply with the implemented modifications, such as contacting and scheduling remote learning students or performing exams in open areas. Compliance in states without waivers or modifications is also a question to be addressed in further reports. In addition, it will be important to evaluate if students who did not pass vision screenings are being successfully connected with follow-up care for comprehensive eye examination and further treatment, when indicated.

To date, there is no comprehensive data reporting system for vision screening, and thus, we can only provide an estimate of children who may have missed vision screening due to the COVID-19 pandemic. Reporting activities at the state level must be improved to provide more specific numbers on the incidence of screening and annual compliance. Adequate data reporting may also allow a more well-rounded understanding of barriers to vision screenings by area.

As we look beyond the current pandemic and plan for future pandemics, it would be helpful to develop consensus guidelines on how to continue vision screenings for students in the event schools were to close again.

Applications to School Nursing Practice

School nurses are key to supporting the vision screening process and represent a bridge between health care and the education system. Our results underscore the importance of their role in identifying students at-risk for vision problems and those who missed vision screening during the 2020–21 academic year and who need access to pediatric eye care. Delaying eye care can negatively impact a children's learning and reading development (Collins et al., 2017; Neitzel et al., 2021). Addressing missed school-based vision screenings and their continuation are key to decreasing academic and health disparities among students. Allocating additional resources to support the role of school nurses will be necessary to make up for missed examinations exacerbated during the COVID-19 pandemic. Efforts should be made to increase the school nursing workforce and funding to address missed screenings. Increasing the workforce becomes even more important as school nurses' scope of work has expanded to include COVID-19 services (e.g., contact tracing, testing, immunizations, case management) during the pandemic (National Academies of Sciences, Engineering, & Medicine, 2021), often without additional staffing or funding. Looking ahead, it will also be important for school nurses to continue their role as health educators by providing information to the school community that can be shared with students and their parents/guardians about the emerging risks to eye health seen during the pandemic.

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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