School-Based Health Services in Virginia and the COVID-19 Pandemic

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ABSTRACT

BACKGROUND: Schools have a long history of delivering health services, but it is unclear how the COVID-19 pandemic may have disrupted this. This study examined changes in school-based health services and student needs before and during the pandemic and the factors important for delivering school-based health services.

METHODS: A web-based survey regarding the impact of the pandemic on school-based health services was distributed via email to all 1178 Virginia public elementary schools during May 2021.

RESULTS: Responding schools (N = 767, response rate = 65%) reported providing fewer school-based health services during the 2020-2021 school year than before the pandemic, with the largest declines reported for dental screenings (51% vs 15%) and dental services (40% vs 12%). Reports show that mental health was a top concern for students increased from 15% before the pandemic to 27% (P < .001). Support from families and school staff were identified by most respondents (86% and 83%, respectively) as very important for the delivery of school-based health services.

CONCLUSIONS: Schools reported delivering fewer health services to students during the 2020-2021 school year and heightened concern about students' mental health. Understanding what schools need to deliver health services can assist state and local education and health officials and promote child health.

Keywords: school-based health; surveys; COVID-19; school nurse; elementary schools; social determinants of health.

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Schools have a long history of delivering health services to students, which is a widely recommended strategy for increasing access to care, particularly for underserved children.1-3 Bringing medical, dental, and mental health services directly to children at schools can help to reduce barriers to care due to cost, transportation, and other logistical challenges. The American Academy of Pediatrics recommends that all schools have a full-time school nurse and most public schools (82%) have at least a full- or part-time nurse.1,4 School nurses have many responsibilities, including providing direct care and case management, coordinating care, and helping students and families access needed care. Additional providers of school-based health services include physical and occupational therapists, speech pathologists, dental hygienists, school psychologists, and other mental health providers.

The COVID-19 pandemic has led to disruptions across all aspects of life, particularly in schools. To date, 3 surveys have provided some insight into the delivery of school-based health services during the pandemic.5-7 These surveys were primarily focused on reopening and pandemic-related health and safety concerns in schools, as they were conducted during the spring and summer of 2020, when guidance on school reopening was evolving.8 The pandemic’s impact on the delivery of school-based health services remains unknown as many students have returned to in-person instruction and vaccines have become widely available in the United States. We hypothesized that schools may have reduced the number of services provided if school nurses lack sufficient time or resources to manage their prior workloads with the additional responsibilities associated with...
COVID-19, such as creating communications plans for the school community, setting up isolation spaces, and testing and tracking cases. Conversely, some schools may have sought to expand access to medical, dental, or mental health services if these services were viewed as essential to keeping children safe and healthy. Notably, the Centers for Medicare and Medicaid Services (CMS) reported 3.2 million fewer child screening services, 6.9 million fewer outpatient mental health services, and 7.6 million fewer dental services paid by Medicaid and the Children’s Health Insurance Program (CHIP) during March to May 2020 compared to the same months in 2019—highlighting likely unmet need among children in low-income households. In response, school administrators may have invested more in the delivery of these much-needed health services. Furthermore, the pandemic may have facilitated closer collaborations between schools, community partners, and local health departments as communities work together to fight the pandemic; a strategy that has been encouraged for school nurses. These collaborations may offer additional staff or resources to assist schools in the delivery of health services. However, it remains uncertain whether the pandemic thus far may have impeded or bolstered the delivery of health services at schools.

During May 2021, we conducted a survey of all public elementary schools in Virginia to examine changes in the provision of school-based health services and student needs before the pandemic and during the first year of the pandemic. In addition, we asked respondents to identify factors expected to be important for the delivery of school-based health services. We examined these factors across all schools and across key school- and community-level characteristics.

METHODS

Participants and Data Sources

We developed a survey to describe how the pandemic affected the delivery of school-based health services in elementary schools in Virginia. This web-based survey was sent to all 1178 public elementary schools in Virginia (schools serving grades pre-Kindergarten through 5). We linked survey data to publicly available data about enrolled students, COVID-19 case rates, and COVID-19 vaccination rates. This study was approved by the Georgetown University-MedStar Health Institutional Review Board.

Instrument

The goal of the survey was to document the strategies and challenges related to the delivery of medical, dental, and mental health services reported by school staff at all elementary schools in Virginia during the pandemic. Survey items were developed based on a review of the literature and interviews with subject matter experts, including 6 school nurses, 3 dental hygienists, and 2 district-level staff members serving elementary schools in Virginia. We requested and received comments on the draft survey from the Virginia Department of Education, Virginia Association of Elementary School Principals, and the National Association of School Nurses. We also pilot tested the survey and conducted cognitive interviews with 4 school nurses located outside of Virginia to ensure that the survey items elicited the intended information. The survey is available to interested readers upon request.

Procedure

The web-based survey was distributed via email to all public elementary schools in Virginia in May 2021. When an email address for a school nurse was not available, a survey was sent to a principal with instructions that the survey should be completed by someone with detailed school-level knowledge about the delivery of health services for students. If we received more than 1 complete survey from a school, we used the survey completed by the school nurse. Informed consent was obtained electronically. The survey was designed to be completed within 15 minutes and was available from May 13 to June 23, 2021. We offered respondents an incentive of a $50 gift card for survey completion.

Variables

Survey items were used to explore 3 main topics: changes in the provision of school-based health services, changes in student needs, and factors respondents expected to be important to the delivery of school-based health services in Fall 2021. Respondents were asked, in 2 separate questions, to respond “yes” or “no” to items asking if the respondent or someone else at their school provided any of the listed health services to students before the pandemic and at the time of the survey. The survey asked about the provision of 11 types of health services: screenings (3 items), mental health services (2 items), dental services (2 items), immunizations (2 items), occupational and psychical therapy (2 items).

Respondents were also asked, in 2 separate items, to rank their top 3 concerns for students at their school before the pandemic and at the time of the survey. There were 5 response options: “education outcomes,” “mental health outcomes or access to mental health care,” “physical health or access to health care,” “oral health outcomes or access to dental care,” or “social determinants of health.” We examined items identified as the number one concern before the pandemic and at the time of the survey.
Finally, respondents were asked to rate the relative importance of specific factors that were likely to impact the delivery of school-based health services during Fall 2021. Respondents could rate each factor as “not at all important,” “somewhat important,” or “very important.” These items addressed support from school staff, families, and the community (3 items), funding needs (3 items), education needs (1 item), workforce needs (1 item), and electronic consent forms (1 item).

Because factors important to the delivery of school-based health may vary based on the proportion of students receiving in-person instruction, we asked “Has this school provided in-person instruction to at least some students since the start of the 2020-2021 school year?” Individuals responding “yes” were asked to estimate how many students in their school were receiving at least some in-person instruction at the time of the survey (response options: “none,” “fewer than half,” “about half,” “more than half,” or “all or almost all”). Response options were collapsed to “fewer than half,” “about half,” or “all or almost all.” We linked our school-level survey data to county-level population counts, counts of COVID-19 cases, and counts of individuals who received 1 or more COVID-19 vaccine doses as of the end of May 2021 from the Virginia Open Data Portal.12 We calculated the cumulative COVID-19 case rate per 100,000 population for each county in Virginia. Schools were assigned the cumulative case rate of their county and categorized into quartiles based on this rate. We calculated each county’s vaccination rate by dividing the total number of individuals who received 1 or more vaccine doses in a county by a count of county residents aged 14 and older. Schools were assigned the percentage of county residents aged 14 and older who had 1 or more COVID-19 vaccine doses and then categorized into quartiles based on their county vaccination rate. Although individuals aged 12 and older were eligible to receive a COVID-19 vaccine as of May 12, 2021, we were unable to find county population counts of residents aged 12 and older. Therefore, our estimated vaccination rate may slightly underestimate the true rate. We also linked our survey data to school-level data from the Virginia Department of Education,13 providing information on region, total students, percentage of students from economically disadvantaged households, the percentage with a disability, and the percentage with limited English proficiency. The US Department of Education provided data on the percentage of students in each school participating in the national school lunch program.14

Data Analysis

We examined if responding schools differed from non-responding schools by linking our survey to the public school-level data sources described above. We conducted tests of statistical significance, using t-tests for continuous variables and chi-square tests for dichotomous variables, to compare responding and non-responding schools. To compare responses regarding the provision of school-based health services and the top needs of students before and during the pandemic, we calculated descriptive statistics and conducted significance testing using chi-square tests. We calculated descriptive statistics to describe the factors important to the delivery of school-based health and used chi-square tests to determine if these factors differed significantly among schools with <50% vs ≥50% of students receiving in-person instruction,2 schools in counties with the highest (>75th percentile) and lowest (<25th percentile) COVID-19 case rates, and3 schools in counties with the highest (>75th percentile) and lowest (<25th percentile) COVID-19 vaccination rates. All analyses used SAS Version 9.4 and a significance level of .05.

RESULTS

Among 767 responding elementary schools in Virginia (response rate = 65.1%), 88.8% of surveys were completed by school nurses. Responding schools were similar to non-responding schools across nearly all variables examined (Table 1). Responding schools had significantly higher percentages of students eligible to participate in the national school lunch program (54.7% vs 49.7%, P = .004). When considering geography, non-responding schools were more likely to be in the Tidewater and Western Virginia regions than responding schools and less likely to be in Central Virginia than responding schools.

Among responding schools, about 3-in-4 respondents (76.4%) indicated that about half or more of students received at least some in-person instruction during May 2021. At the end of May 2021, the average county-level vaccination rate in Virginia was 53.5% (standard deviation [SD] = 10.1%) and the average cumulative COVID-19 case rate was 80.5 cases per 100,000 (SD = 16.5) among responding schools.

Provision of Health Services

Many respondents reported that their schools provided fewer school-based health services for students during the 2020-2021 school year than before the pandemic (Figure 1). The largest declines were reported for dental screenings and services. The percentage of respondents who indicated that dental screenings and dental services were provided at their schools declined from 50.7% and 41.0%
before the pandemic to 15.3% and 12.0% during the 2020-2021 school year, respectively (P-values for both comparisons were <.0001). Fewer respondents reported that their schools provided group mental health services during the 2020-2021 school year than before the pandemic (51.8% vs 66.5%, P < .001). No meaningful change in rates of reported vision, hearing, and speech screenings were observed before and during the pandemic; reported rates for all 3 types of screenings remained at or above 95%.

**Top Concerns for Students**

More than 1 in 4 respondents indicated physical health or access to health care or social determinants of health was their top concern for students before the pandemic (Figure 2). The percentage of respondents indicating physical health or access to health care was their top concern for students declined from 30.2% before the pandemic to 23.1% as of May 2021 (P < .01). The percentage of respondents indicating that mental health or access to mental health care was their top concern for students increased from 15.0% before the pandemic to 27.6% as of May 2021 (P < .001). The percentage of respondents indicating that education outcomes was their top concern was similar before the pandemic and at the time of the survey (21.3% vs 22.2%, P = .67).

**Factors Important for Delivering Health Services**

The factors identified by most respondents as expected to be very important to the delivery of school-based health services during Fall 2021 were support for student health from families (85.5%) and school staff (83.2%) (Table 2). More than 70% of respondents expected that guidance about how to safely deliver health services (73.4%) and having an adequate workforce to support the delivery of health care services (70.8%) would be very important, and these percentages were similar across all subgroups examined (ie, schools with <50% vs ≥50% of students receiving in-person instruction, schools in counties with the highest and lowest COVID-19 case rates, and schools in counties with the highest and lowest COVID-19 vaccination rates).

We observed variation in other responses by subgroup. Respondents were significantly more likely to indicate that funding for new technology to support care delivery (59.1% vs 48.8%, P = .02) and guidance about how to safely deliver health services (79.0% vs 71.7%, P = .05) were very important if fewer than 50% of students received at least some in-person instruction during May 2021. Respondents were significantly more likely to indicate that support for student health from school staff was expected to be very important if there were higher COVID-19 rates (77.2% vs 84.3%, P = .01) and lower vaccination rates.

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| Characteristics of school | Non-Responding Schools (N = 411) | Responding Schools (N = 767) | P-value† |
|---------------------------|---------------------------------|-----------------------------|---------|
| No. of students, mean (SD)| 549 (219)                       | 525 (203)                   | .061    |
| Percent of students from economically disadvantaged households, mean (SD) | 43.2% (20.5%) | 44.4% (20.1%) | .326    |
| Percent of students who are eligible to participate in the national school lunch program, mean (SD) | 49.7% (27.9%) | 54.7% (28.7%) | .004    |
| Percent of students who have a disability, mean (SD) | 13.7% (4.0%) | 13.5% (4.0%) | .421    |
| Percent of students who have limited English proficiency, mean (SD) | 9.8% (14.0%) | 10.7% (15.1%) | .314    |
| Characteristics of county |                                |                             |         |
| Percent of population aged 14 and older with 1 or more COVID-19 vaccine doses as of May 2021, mean (SD) | 53.6% (10.1%) | 53.5% (10.1%) | .851    |
| Cumulative coronavirus cases per 100,000 population as of May 2021, mean (SD) | 79.6 (13.2) | 80.5 (16.5) | .347    |
| No. in region, N (%) |                                |                             | <.0001  |
| Central Virginia | 29 (7.1)                       | 128 (16.7) |         |
| Northern Neck | 18 (4.4)                       | 46 (6.0) |         |
| Northern Virginia | 14 (34.1) | 230 (30.0) |         |
| Southside | 5 (1.2)                       | 28 (3.7) |         |
| Southwest | 23 (5.6)                       | 72 (9.4) |         |
| Tidewater | 101 (24.8)                     | 125 (16.3) |         |
| Valley | 40 (9.7)                       | 82 (10.7) |         |
| Western Virginia | 55 (13.4) | 56 (7.3) |         |

† We conducted significance tests, using t-tests for continuous variables and chi-square tests for dichotomous variables, to compare schools responding to the survey and schools not responding to the survey.
rates (88.0% vs 77.7%, \( P < .01 \)) in their county. Similarly, respondents were significantly more likely to indicate that community partners were expected to be very important in helping students obtain health care services in counties with higher COVID-19 rates (62.6% vs 75.4%, \( P = .01 \)) and lower vaccination rates (75.5% vs 67.5%, \( P = .03 \)). Fewer than half of respondents indicated that funding to modify physical space (49.7%) and electronic consent forms were expected to be very important to the delivery of school-based health services (43.2%).

DISCUSSION

The COVID-19 pandemic caused widespread disruptions to educational instruction and receipt of school-based health services for elementary school-aged children. Results of this survey indicate that elementary schools in Virginia offered fewer school-based health services to students during the 2020-2021 school year than before the COVID-19 pandemic. Consistent with findings from national surveys,6,15 respondents reported heightened concern about students’ mental health. Our survey findings suggest that the resources schools need to deliver health services during the pandemic may vary across school and community characteristics, including instructional mode and community case and vaccination rates.

Students’ mental health was the top concern for 28% of respondents at the time of our survey, conducted just over a year into the COVID-19 pandemic, and an increase of 13 percentage points from before the pandemic. Concern about students’ mental health was also reported in a national survey of school nurses.7 Increased concern about students’ mental health happened at the same time that fewer schools reported providing mental and behavioral health services to students during the 2020-2021 school year than before the pandemic. In light of concerns about student mental health, and with assistance from federal pandemic relief funding, many school and district leaders are taking steps to address mental health.16 In a nationally representative survey conducted in spring 2021, 63% of principals reported that they would prioritize hiring staff to address students’ mental health for the 2021-2022 school year.17 Furthermore, 70% of district leaders surveyed in spring 2021 reported that their district will provide mental health services and programming for students in 2021-2022. Importantly, 20% of district leaders...
said they planned to newly offer these services in fall 2021.18

Schools reported large declines in dental services during the 2020-2021 school year, with rates of schools reporting school-based dental screenings and dental services declining by 35 percentage points and 29 percentage points, respectively. These findings align with reports of declines in dental care nationally due to the pandemic.10,19 CMS reported 69% fewer dental services were received among children enrolled in Medicaid and the CHIP during March through May 2020 than the same period in 2019.10 Despite these declines, fewer than 3% of respondents indicated oral health or access to dental care was their top concern for their students either before the pandemic or at the time of this survey. Declines in dental care provided at schools were likely driven by the suspension of many school-based dental programs, including those in Virginia.20 These evidence-based programs typically involve a dental provider visiting schools a few days per year to provide screenings and preventive services.21 Responses from a survey of state dental directors conducted during the first 6 months of 2021 indicate that schools primarily suspended school-based dental programs due to concerns about the spread of COVID and schools only offering remote instruction.20 With school-aged children now eligible for vaccination and guidance for how to safely deliver dental services in schools available,22,23 nearly all surveyed dental directors indicated they were planning for some type of school-based dental programs during the 2021-2022 school year.20

Despite the disruptions associated with the pandemic, at least 95% of schools reported vision, hearing, and speech screenings were provided to students both before the pandemic and at the time of our survey. Although such screenings are typically mandated by the Virginia Department of Education, the Secretary of Education waived the mandate for the 2020-2021 school year.24 These high rates are notable considering the waiver and the disruptions to in-person schooling during the 2020-2021 school year. That said, we did not collect data on the number of students who actually received screenings or other services. The ability of school nurses to continue to provide screenings is uncertain given reports of emergent shortages of school nurses during the 2021-2022 school year, coupled with the additional COVID-related responsibilities that school nurses must perform.25,26 Indeed, nearly 71% of the schools in our study responded that adequate workforce to support the delivery of health care services was very important for supporting the delivery of school-based health services during Fall 2021.

Limitations
First, findings from our cross-sectional survey are not causal. Second, although we conducted cognitive testing of the survey instrument, respondents might
Table 2. Factors Reported as Very Important for Supporting the Delivery of School-Based Health Services During Fall 2021

| Factor                                                                 | All Responding Schools (%) | Percentage of Students Receiving at Least Some In-Person Instruction as of May/June 2021 (%) | Cumulative COVID-19 Case Rate in County (%) | County Population with at Least 1 COVID-19 Vaccine Dose (%) |
|-----------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------|
|                                                                       | (N = 767)                  | <50% (N = 181)                                                               | >50% (N = 586)                                        | <25th Quartile (N = 206)                                   | >75th Quartile (N = 191)                                   | <25th Quartile (N = 192)                                   | >75th Quartile (N = 197)                                   |
| Support from families regarding the importance of student health      | 85.5                      | 86.7                                                                           | 85.2                                                   | 78.2                                                   | 88.0                                                   | 92.7**                                                   | 78.2**                                                   |
| Support from school staff regarding the importance of student health  | 83.2                      | 85.6                                                                           | 82.4                                                   | 77.2**                                                   | 84.3**                                                   | 88.0**                                                   | 77.7***                                                   |
| Guidance about how to safely deliver health services                  | 73.4                      | 79.0                                                                           | 71.7                                                   | 69.4                                                   | 75.9                                                   | 75.5                                                    | 74.1                                                    |
| Additional community partners to help students obtain health care services | 71.4                      | 72.9                                                                           | 71.0                                                   | 62.6**                                                   | 75.4**                                                   | 75.5**                                                   | 67.5**                                                   |
| Adequate workforce to support delivery of health care services         | 70.8                      | 74.0                                                                           | 69.8                                                   | 68.4                                                   | 71.2                                                   | 69.3                                                    | 72.1                                                    |
| Funding to hire staff members to support delivery of health care services | 63.8                      | 66.3                                                                           | 63.0                                                   | 59.7                                                   | 64.9                                                   | 63.0                                                    | 64.0                                                    |
| Funding for new technology to support care delivery                    | 51.2                      | 59.1**                                                                         | 48.8*                                                   | 51.0                                                   | 55.0                                                   | 53.1                                                    | 52.8                                                    |
| Funding to modify physical space to safely deliver care                | 49.7                      | 53.6                                                                           | 48.5                                                   | 48.1                                                   | 55.0                                                   | 47.9                                                    | 49.7                                                    |
| Electronic consent forms                                              | 43.2                      | 46.4                                                                           | 42.2                                                   | 48.1                                                   | 39.8                                                   | 41.7                                                    | 44.7                                                    |

Chi-square tests compared responses across each subgroup, *P < .05, **P < .01, ***P < .001. Among COVID-19 county case rates, schools in the lowest quartile had rates ranging from 23.6 to 67.5 cases per 100,000 and schools in the highest quartile had rates ranging from 88.4 to 185.0 cases per 100,000. Among county vaccination rates, schools in the lowest quartile had rates ranging from 33.6% to 45.6% and schools in the highest quartile had rates ranging from 62.4% to 74.4%.

have interpreted the survey questions in different ways. Third, survey responses may suffer from social desirability bias if respondents answered items in a way they thought would be viewed favorably instead of accurately. Fourth, the elementary schools responding to our survey were highly similar to the non-responding elementary schools in Virginia, but the results may not be generalizable to schools in other states. That said, we obtained high participation rates from schools located throughout the state including both urban and rural areas, suggesting these results are likely applicable to many schools in other geographically and economically diverse states. Finally, surveys were fielded in May and June 2021 before the emergence of the Delta and Omicron variants, and it is unknown if responses would differ today.

Conclusions

With fewer children receiving vaccinations, primary care visits, and other recommended health services during the COVID-19 pandemic than prior to the pandemic, the pandemic’s impact on children’s access to medical, dental, and mental health services remains a significant concern. Schools are key access points for health services. Understanding what schools need to deliver health services—and their top concerns for students—can inform decision-making for state and local education and health officials and ensure children receive needed care. Knowledge of schools’ needs and priorities in delivering such services is especially important during large-scale disruptions to schooling, such as the COVID-19 pandemic, that close school buildings and suspend in-person instruction for long periods of time. Our results add to the growing body of evidence that, during the COVID-19 pandemic, more than learning has been lost.

IMPLICATIONS FOR SCHOOL HEALTH

The results of this study highlight next steps that school administrators may want to consider:

- Prioritize the mental health needs of students. Concerns for students’ mental health were a growing priority among respondents, findings that are echoed nationally. Schools should consider devoting a larger share of available funding to students’ mental health needs. Federal pandemic relief funding could be used to hire more counselors or social workers, or to develop or strengthen community partnerships with mental health service providers.
- Engage with external partners to meet the health needs of students. Local and state health departments and community health centers can help school nurses obtain guidance about how to safely deliver care, assist with referrals for health care...
needs, and potentially offset staffing challenges—all of which were identified by respondents are very important for the delivery of school-based health services.

- Encourage parents and school staff to value and prioritize student health. Regardless of the rate of students receiving in-person instruction, the community COVID-19 case rate, or the community vaccination rate, respondents reported that support from parents and school staff regarding the importance of student health was likely to be very important for the delivery of school-based health services. School administrators should foster learning environments that prioritize more than just academic achievement. Resources from the US Centers for Disease Control and Prevention’s Whole School, Whole Community, Whole Child model related to parent engagement may be useful for administrators.29

- Beyond the pandemic, our findings are important for federal, state, and local education and health officials who must plan for how to respond in the aftermath of natural disasters, such as hurricanes, tornados, floods, and fires. Like the pandemic, natural disasters can disrupt schools and cause psychological distress and anxiety for school-aged children. Although the disruptions associated with natural disasters may be of shorter duration than the ongoing COVID-19 pandemic, such events are increasingly more common. Our findings highlight the need for schools’ pandemic and natural disaster response preparedness plans to be attentive to the role that schools play in addressing the medical, dental, and mental health needs of school-aged children.

Human Subjects Approval Statement
This study was approved by the Georgetown University-MedStar Health Institutional Review Board (FWA00001080).

Conflict of Interest
All authors of this article declare they have no conflicts of interest.

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