Global Pediatric Health
Volume 6: 1–10

DOI: 10.1177/2333794X19884194
journals.sagepub.com/home/gph
SAGE

The Use of Telehealth in School-Based Health Centers

Hayley Love, PhD, MSc[1], Nirmita Panchal, MPH[1], John Schlitt, MSW[1], Caroline Behr, BA[1], and Samira Soleimanpour, PhD, MPH[2]

Abstract

Telehealth is a growing model of delivering health care. School-based health centers (SBHCs) provide access to health care for youth in schools and increasingly use telehealth in care delivery. This article examines the recent growth of telehealth use in SBHCs, and characteristics of SBHCs using telehealth, including provider types, operational characteristics, and schools and students served. The percentage of SBHCs using telehealth grew from 7% in 2007-2008 to 19% in 2016-2017. Over 1 million students in over 1800 public schools have access to an SBHC using telehealth, which represents 2% of students and nearly 2% of public schools in the United States. These SBHCs are primarily in rural communities and sponsored by hospitals. This growing model presents an opportunity to expand health care access to youth, particularly in underserved areas in the United States and globally. Further research is needed to fully describe how telehealth programs are implemented in school settings and their potential impacts.

Keywords

telehealth, school-based health centers, adolescents, underserved populations, rural health

Received April 26, 2019. Received revised August 12, 2019. Accepted for publication September 13, 2019.

Background

Schools are a common-sense place within communities to provide health care, particularly in underserved communities where access barriers prevent children and adolescents from using the health care system.[1] Since the late 1960s, school-based health centers (SBHCs) in the United States have been providing care in school settings, helping children and adolescents and their families overcome barriers that may prevent them from receiving needed health care services, including transportation, time, costs, and lack of continuity of care.[2,3] Schools provide a space for SBHCs to operate, and local health care organizations, such as Federally Qualified Health Centers (FQHCs) or hospitals, bring an array of services delivered by a multidisciplinary team. The team includes primary health care delivered by a physician, nurse practitioner, or physician assistant, and often mental health care, oral health care, reproductive health, nutrition education, vision services, and health promotion.[2]

SBHCs have a positive impact on physical and mental health care access and outcomes for children and adolescents.[4] A recent systematic review of SBHCs by the Centers for Disease Control and Prevention's Community Guide and the US Community Preventive Services Task Force described how their presence and use is associated with many health-related outcomes, including improved delivery of vaccinations and other preventive services, such as comprehensive health assessments, oral health, vision, substance use, nutrition, and other screening services; decreased asthma morbidity; increased use of contraceptives; increased access to and utilization of mental and behavioral health services; and decreased emergency department use and hospital admissions.[5] The presence and use of SBHCs is also associated with student achievement outcomes, including increased time spent learning, and improvements in grade point average, grade promotion, and suspension rates.[5,6] Furthermore, SBHCs have positive economic benefits to the health care system.[7]

[1]School-Based Health Alliance, Washington, DC, USA
[2]University of California, San Francisco, CA, USA

Corresponding Author:
Hayley Love, School-Based Health Alliance, 1010 Vermont Avenue, Suite 600, Washington, DC 20015, USA.
Email: hlove@sbh4all.org

Until recently, school-based health care practitioners were physically located on the school campus and provided care to students and often to their families or caregivers and members of the community. Over the past 10 years, telehealth technology has increasingly opened up new possibilities for providers to deliver health care from a remote location. Telehealth, a term that is frequently used interchangeably with telemedicine, is the delivery and facilitation of health and health-related services including medical care, provider and patient education, health information services, and self-care using telecommunication technologies.[8] Estimates project that health services delivered using telehealth technology across the health care system will increase from less than one tenth of 1% in 2016 to more than 20% within the next 2 decades in the United States[9] and that its use could contribute toward better access to and delivery of integrated care globally.[10,11]

Schools represent one area of telehealth growth and exploration in the United States and globally. The use of telehealth in schools in low-income, medically underserved areas offers an opportunity to improve health care access and equity. The opportunity is particularly strong in rural areas, where health professional shortages and transportation challenges are prevalent.[12] Research shows that students with access to care through telehealth at school show improved health and education outcomes.[13,14] Several research studies show, for example, a relationship between access to care through telehealth at school and improved outcomes for asthmatic students. Two studies found that asthmatic students who had access to care through telehealth in their schools increased the number of symptom-free days[15,16] and another found that asthmatic students experienced improvement in family social activities and fewer asthma attacks.[17] One study of children with type 1 diabetes who had access to telehealth at school found that they had fewer hospitalizations and emergency department visits.[18] Access to health care through telehealth at school may also reduce student absenteeism.[19]

While these studies show promising results for specific health challenges in local settings, little is known at the national level about the use of telehealth in SBHCs. This article describes characteristics of SBHCs employing telehealth, specifically, the growth of telehealth in *traditional* SBHCs that use technology to complement onsite providers, and an emerging model of SBHCs that provide primary care *exclusively* through telehealth. We also examine the characteristics of SBHCs using telehealth, including provider types available through telehealth, operational characteristics, and descriptions of the schools and students with access to SBHCs using telehealth.

Methods

Instrumentation

Since 1998, and every 3 years after that, the School-Based Health Alliance ("the Alliance") has administered the National School-Based Health Care Census ("the Census"), which collects descriptive information about SBHC locations, providers, populations served, and funding sources.[2] The 2016-2017 Census is the primary data source for this article. Census data collected for school years 2007-2008, 2010-2011, and 2013-2014 were used to report trends.

The Census questions related to telehealth have evolved to reflect how SBHCs are using the technology. In the 2007-2008 and the 2010-2011 Census surveys, respondents were asked about the use of a "telemedicine system (eg, telehealth, or telemental health)" to complement services being provided by onsite providers. In the 2013-2014 Census, questions were added about the specific types of providers using telehealth to deliver care and the frequency of services, though the focus remained on how telehealth was being used to complement onsite providers.

By the 2016-2017 Census, the Alliance redefined SBHC delivery models given the growth of telehealth and increased awareness of SBHCs providing primary care *exclusively* through telehealth. Four SBHC delivery models were defined based on the location of the patient and the provider: traditional, school-linked, mobile, and telehealth exclusive. In traditional SBHCs, clients access care at a fixed site on a school campus and providers are physically onsite, although some services may be delivered remotely using telehealth. In telehealth exclusive SBHCs, clients access care at a fixed site on a school campus and providers are available remotely for primary care services (other services such as behavioral health, oral health care, nutrition, and vision providers and/or health educators may be available physically onsite or remotely). The location of the providers in telehealth exclusive SBHCs is frequently described as the distant site. The medical sponsoring organization that manages the distant site(s) is responsible for managing clinical staff, coordinating with partnering schools, purchasing and maintaining equipment (which is stored at the school site), identifying and training staff on proper use of equipment to facilitate telehealth encounters, complying with security regulations pertaining to transmission of health data, billing for services as appropriate and available, and ensuring continuity of care for patients seen at the school sites. Partnering schools serve as the originating site where the client is located at the time of the telehealth encounter. Schools are typically responsible for housing the telehealth equipment (not

unlike traditional SBHCs that provide space for facilities), providing broadband Internet connection, and identifying a telepresenter, who is the individual facilitating the interaction between the health care provider at the distant site and the patient at the originating site. Two other SBHC models were defined as school-linked health centers (a fixed site near a school campus) and mobile health centers (a specially equipped van or bus parked on or near a school campus).

Respondents who identified their programs as telehealth exclusive were asked to complete an additional set of questions in the Census designed to help the Alliance better understand operational characteristics specific to telehealth exclusive SBHCs. These questions asked about parent/guardian consent requirements, appointment scheduling, follow-up with clients, memorandum of understanding requirements between the telehealth provider and the school, and qualifications and employers of the telepresenter.

Procedure and Participants

The Alliance maintains a national database of SBHCs that is updated regularly based on state and affiliate rosters and news announcements on SBHC openings and closures. More information on how this database is maintained is available from the authors. For the 2016-2017 Census, the Alliance cross-referenced federal databases, including the Bureau of Primary Health Care's 2015 Uniform Data System dataset and the Federal Office of Rural Health Policy's Office for the Advancement of Telehealth school-based telehealth grantees.[20,21] SBHCs that were not in the Alliance database and were operational in the 2016-2017 school year were added to the database.

Data for the 2016-2017 Census were collected from May to December 2017. Representatives from all identified SBHCs were invited to complete the Census online through a secure web-based system. Mail, email, and phone calls were used to encourage survey completion by Alliance staff and an external survey research firm that supported data collection. The survey asked that the person(s) with the most knowledge about the care delivered by the SBHC complete the survey. The respondents included health care program directors, managers, administrators, providers, and administrative staff members.

The Census identified 2584 SBHCs that provided primary care, 90% of which completed the Census. The final Census sample comprised 2317 SBHCs that completed the Census and reported providing primary care services onsite or using telehealth by a physician, nurse practitioner, physician assistant, or any combination thereof. Among the 2317 sites, 1894 were traditional SBHCs, and 267 were telehealth exclusive and comprise the current study sample. The remainder were classified as school-linked (87) and mobile (69) and were excluded from this analysis.

Identifying Characteristics of Schools and Students Served by SBHCs. Data from the National Center for Education Statistics (NCES) Public Elementary/Secondary School Universe Survey for 2015-2016 were used to examine characteristics of the schools identified in the Census to have access to an SBHC.[22] School and student data from NCES included grade levels served, ethnic/racial profile of the students, free or reduced-price lunch program eligibility, school enrollment, and Title I program status.

Data Analysis

Data were analyzed using summary and descriptive statistics in STATA software, version 15.[23] Missing data and "do not know" responses in the Census were excluded. SBHCs that did not identify schools with access to the SBHC or whose schools were not found in the NCES dataset were excluded from the school-level analyses (n = 51, SBHCs). School grade-level types were identified based on the grades offered at the school(s) with access to the SBHC. Elementary schools were defined as those offering prekindergarten, kindergarten, or both through fifth or sixth grade; middle schools started with sixth or seventh grade and ended with eighth or ninth grade; high schools started with 9th or 10th grade and ended with 12th grade; and other schools were those offering any other grade combination.

Ethical Approval and Informed Consent

This research did not involve human subjects.

Results

Growth in Number and Location of SBHCs Using Telehealth

In the 2007-2008 Census, 7% (n = 64) of SBHCs reported using telehealth. In 2013-2014, 7% (n = 127) used telehealth and 4 of these respondents described for the first time that all services were delivered exclusively through telehealth. In 2016-2017, the number of traditional SBHCs using telehealth to complement onsite providers increased to 167 SBHCs located in 26 states (Table 1), but still represented 7% of SBHCs in the Census. Additionally, 267 telehealth exclusive SBHCs

Table 1. Number of SBHCs That Do and Do Not Use Telehealth by State, 2016-2017.

State	# of Traditional SBHCs Not Using Telehealth[a]	# of Traditional SBHCs Using Telehealth	# of Telehealth Exclusive SBHCs
AR	22	3	0
AZ	4	3	0
CA	117	5	0
CO	50	3	0
FL	91	11	0
GA	17	9	73
IL	42	4	0
IN	33	6	3
KS	2	7	0
LA	57	6	0
MA	44	2	0
MD	75	0	6
MI	77	11	5
MN	19	1	0
MO	6	2	0
MS	66	1	0
NC	26	10	35
NE	5	4	0
NJ	3	1	0
NM	47	2	0
NY	179	16	0
OR	72	7	0
SC	6	20	30
TN	4	15	2
TX	78	3	113
WA	40	3	0
WV	114	12	0

Abbreviation: SBHC, school-based health center.
[a]The following states also had traditional SBHCs with no telehealth services: AK (6), AL (4), CT (159), DC (7), DE (30), HI (15), IA (8), ID (1), KY (97), ME (9), MT (1), NH (1), NV (10), OH (53), OK (1), PA (21), UT (2), VA (5), and VT (1). There were no SBHCs in Wisconsin or North Dakota during the 2016-2017 school year.

were identified through the Census. The telehealth exclusive SBHCs were sponsored by 13 organizations and located in 8 states (Table 1). Overall, 19% of all SBHCs in 2016-2017 reported using telehealth.

Characteristics of SBHCs Using Telehealth

Provider Types. Among the 167 traditional SBHCs using telehealth, half had primary care providers available both onsite and by telehealth (49%), 11% had primary care providers available only by telehealth, and 40% had primary care providers onsite only. Nearly all traditional SBHCs using telehealth were staffed by a nurse practitioner (93%) and/or a physician (55%) either onsite or using telehealth. Eighty-one percent of traditional SBHCs using telehealth had one or more behavioral health providers as a member of the care team. In 38% of traditional SBHCs using telehealth, behavioral health providers were available onsite and via telehealth and in 23% behavioral health provider(s) were only available through telehealth (Table 2). Twenty percent of traditional SBHCs with telehealth had oral health providers available by telehealth.

Almost all telehealth exclusive SBHCs employed physicians (97%) and/or nurse practitioners (93%) as primary care providers. Behavioral health providers were available in 27% of telehealth exclusive SBHCs. Among these providers, 85% were available using telehealth technology, 5% were available directly onsite, and 10% were available in a combination of telehealth and onsite. Health educators were available in 38% of sites (Table 2). Only one telehealth exclusive SBHCs reported having an oral health provider on their care team.

Medical Sponsorship. Approximately one third of traditional SBHCs using telehealth were sponsored by

Table 2. Characteristics of Provider Types in SBHCs That Do and Do Not Use Telehealth, 2016-2017.

	Traditional SBHCs Not Using Telehealth	Traditional SBHCs Using Telehealth	Telehealth Exclusive SBHCs
Total number of SBHCs	1727	167	267
Primary care provider types (onsite or using telehealth), n[a]	N = 1727	N = 167	N = 266
Physician	506 (29%)	92 (55%)	257 (97%)
Nurse practitioner	1437 (83%)	156 (93%)	247 (93%)
Physician assistant	354 (21%)	27 (16%)	60 (23%)
Providers types by location, n			
Primary care provider	N = 1727	N = 167	N = 266
Onsite only	1,722 (100%)	67 (40%)	0 (0%)
Telehealth only	N/A	18 (11%)	266 (100%)
Onsite and telehealth	N/A	82 (49%)	0 (0%)
Behavioral health provider	N = 1202	N = 135	N = 73
Onsite only	1202 (100%)	53 (39%)	4 (5%)
Telehealth only	N/A	31 (23%)	62 (85%)
Onsite and telehealth	N/A	51 (38%)	7 (10%)
Oral health provider	N = 549	N = 56	N = 2
Onsite only	549 (100%)	45 (80%)	1 (50%)
Telehealth only	N/A	9 (16%)	1 (50%)
Onsite and telehealth	N/A	2 (4%)	0 (0%)
Nutrition provider	N = 245	N = 32	N = 19
Onsite only	245 (100%)	29 (91%)	19 (100%)
Telehealth only	N/A	3 (9%)	0 (0%)
Onsite and telehealth	N/A	0 (0%)	0 (0%)
Vision provider	N = 25	N = 7	N = 1
Onsite only	25 (100%)	5 (71%)	0 (0%)
Telehealth only	N/A	2 (29%)	1 (100%)
Onsite and telehealth	N/A	0 (0%)	0 (0%)
Health educator	N = 376	N = 20	N = 100
Onsite only	376 (100%)	19 (95%)	3 (3%)
Telehealth only	N/A	1 (5%)	97 (97%)
Onsite and telehealth	N/A	0 (0%)	0 (0%)

Abbreviation: SBHC, school-based health center.
[a]Respondents can select more than one response to the survey question.

FQHCs (36%), and 32% were sponsored by hospitals or medical centers (Table 3). Nearly half of the telehealth exclusive SBHCs (48%) were sponsored by hospitals or medical centers, followed by nonprofits or community-based organizations (21%). No telehealth exclusive SBHCs were sponsored by FQHCs (Table 3).

Operations. On average, traditional SBHCs with telehealth services had been operational for nearly 10 years (Table 3). We do not know in which year the SBHCs started delivering services using telehealth. On average, telehealth exclusive SBHCs had been open for 2.7 years. Nearly half (46%) of the traditional SBHCs using telehealth and 3% of telehealth exclusive SBHCs were open in the summer.

School and Student Populations With Access to SBHCs Using Telehealth. Nearly 1 million students (911 855) in 1522 schools had access to traditional SBHCs using telehealth (Table 4). More than half provided access to care to communities located in rural areas (52%). Four out of 5 schools with access to traditional SBHCs with telehealth (79%) were eligible for the Title I program, which provides financial assistance to local educational agencies and schools with high percentages of children from low-income families.[24] Students in the schools with access to traditional SBHCs using telehealth were predominantly Hispanic and black, and the majority were eligible for free or reduced lunch (76% on average).

Approximately 165 000 students in 291 schools had access to telehealth exclusive SBHCs (Table 4). More than half provided access to care to communities located in rural areas (56%) and in schools that served elementary school-aged children (51%). Nearly all schools with access to telehealth exclusive SBHCs

Table 3. Characteristics of SBHCs That Do and Do Not Use Telehealth, 2016-2017.

	Traditional SBHCs Not Using Telehealth	Traditional SBHCs Using Telehealth	Telehealth Exclusive SBHCs
Total number of SBHCs	1727	167	267
Sponsor type, n (%)	N = 1716	N = 167	N = 266
FQHC or look-alike	1035 (60%)	60 (36%)	0 (0%)
Hospital or medical center	264 (15%)	53 (32%)	127 (48%)
Nonprofit/CBO	138 (8%)	6 (4%)	57 (21%)
Local health department	102 (6%)	9 (5%)	8 (3%)
School system	110 (6%)	17 (10%)	0 (0%)
Other	67 (4%)	22 (13%)	74 (28%)
Geographic location of community served, n (%)	N = 1720	N = 167	N = 267
Urban	905 (53%)	54 (32%)	62 (23%)
Rural	511 (30%)	87 (52%)	149 (56%)
Suburban	304 (18%)	26 (16%)	56 (21%)
Operations	N = 1697-1718	N = 166-167	N = 262-267
Average years open (years)	10.8	9.7	2.7
Open during summer, n (%)	578 (34%)	76 (46%)	7 (3%)

Abbreviations: SBHC, school-based health center; FQHS, Federally Qualified Health Center; CBO, community based organization.

Table 4. Characteristics of Schools and Students With Access to SBHCs That Do and Do Not Use Telehealth, 2016-2017.

	Traditional SBHCs Not Using Telehealth	Traditional SBHCs Using Telehealth	Telehealth Exclusive SBHCs
Total # schools with access, n[a]	8669	1522	291
Total # students enrolled in schools, n[a]	5 340 628	911 855	165 762
School type,[b] n (%)			
Elementary	3552 (41%)	420 (28%)	147 (51%)
Middle	1104 (13%)	140 (9%)	46 (16%)
High	1536 (18%)	242 (16%)	40 (14%)
Other	2477 (29%)	720 (47%)	58 (20%)
Title I, n (%)			
Title I eligible schools (TAS or SWP)	6544 (76%)	1205 (79%)	269 (92%)
Racial/ethnic profile, % (mean ± SD)			
Hispanic	39.8 ± 33	36.9 ± 34	26.4 ± 28
White	28.1 ± 30	24.5 ± 30	39.9 ± 33
Black	23.5 ± 29	32.4 ± 36	29.0 ± 28
Asian	4.0 ± 8	2.9 ± 7	1.4 ± 3
Two or more races	3.1 ± 4	2.5 ± 3	2.7 ± 2
Hawaiian Native/Pacific Islander	0.8 ± 5	0.2 ± .5	0.1 ± .2
American Indian/Alaska Native	0.7 ± 3	0.5 ± 2	0.5 ± 1
Socioeconomic characteristics, % (mean ± SD)			
Free lunch	62.6 ± 26	73.6 ± 26	73.9 ± 19
Reduced price lunch	6.2 ± 6	3.1 ± 4	5.6 ± 5
Free or reduced price lunch	69.4 ± 26	76.2 ± 25	78.4 ± 17

Abbreviations: SBHC, school-based health center; TAS, targeted assistance; SWP, schoolwide program.
[a]There is duplication in schools and students across the 3 delivery models.
[b]Elementary schools were defined as those offering pre-kindergarten and/or kindergarten through fifth or sixth grade; middle schools offered sixth and/or seventh grade through eighth and/or ninth grade; high school offered 9th and/or 10th grade through 12th grade; and "other" schools were those offering any other grade combinations. SBHCs that provided access to multiple schools of different grade-level types were classified as "other" school types.

(92%) were eligible for the Title I program. Students in the schools with access to telehealth exclusive SBHCs were predominantly White (40% on average), and the majority were eligible for free or reduced lunch (78% on average).

In total, 1 077 617 students in 1813 schools had access to using telehealth, representing 2% of students and 2% of public schools in the United States.[22]

Other Characteristics of Telehealth Exclusive SBHCs. The most common qualification of a telepresenter was a registered nurse (92%), followed by a medical assistant/aide (50%), licensed practical nurse (16%), and nonclinical personnel trained to present (15%). The majority of respondents (86%) reported that the school employed the telepresenter.

Clients were seen by both walk-in (81%) and appointment (89%). Appointments were most often scheduled by the school nurse/nurse's aide (100%), followed by a parent/guardian (26%), other school staff (15%), health care provider (14%), coordinator (6%), telepresenter (4%), and student (2%). Nearly all (97%) telehealth exclusive SBHCs had a protocol for follow-up with clients, the responsibility for which belonged to school nurses (59%) and/or sponsors (49%).

Discussion

Telehealth technology is used both to complement onsite providers where traditional SBHCs exist and to connect students with community providers who are unavailable to be at the school site (telehealth exclusive). Findings from this study describe not only how telehealth is being used to provide primary care and other services in school settings, but contribute to a larger conversation about the evolution of telehealth in general, and how technology can be leveraged to broaden the reach of health care to underserved school-aged populations.

Sponsorship and Sustainability

The profile of telehealth exclusive SBHCs looks strikingly similar to that of traditional SBHCs in their formative years. In 1998, hospitals and medical centers were among the dominant sponsors of SBHCs, and private foundation grants were a mainstay of financial support. Over time, FQHCs outpaced hospitals and medical centers and now account for more than half of all SBHC sponsoring organizations.[25] Today, although hospitals and medical centers represent a shrinking proportion of all SBHC sponsors, they account for almost half of the medical sponsors of telehealth exclusive SBHCs. Telehealth technology may be helping to renew interest among innovation-driven hospitals and medical centers in providing care to youth at school. Hospitals and medical centers may also view telehealth exclusive SBHCs as an opportunity for service area expansion. Or, perhaps, the sustainability challenges they faced with implementing traditional SBHCs may be diminished given the economies of scale made possible with telehealth.

Other challenges for implementing sustainable telehealth in schools remain. The landscape of laws, policies, and regulations defining telehealth operations and payment is ever-changing as states attempt to keep pace with the rapidly expanded use of technology. State Medicaid agencies are defining parameters for telehealth, including the types of providers who are authorized to deliver care, the kinds of services that can be reimbursed, the technology modalities that are acceptable, and location of patients (schools are trending as an eligible originating site according to one industry authority).[14] Although many states are creating a more conducive practice environment, others are strictly limiting its reach.[26]

Health and Educational Agency Partnerships

Among telehealth exclusive SBHCs, school nurses often served as the telepresenter at the originating site, making it possible to connect remote health care providers with students. The school nurse seems a logical choice, as they are often the sole health provider onsite, are deeply integrated into the school, and can serve as advocates for clients (eg, by attending an Individualized Education Program meetings and liaising with parents). Little is known, however, about the perception of school nurses regarding their role. Future research should explore details of the school nurse role as telepresenter (including outreach, enrollment and consent, medical provider communication, and follow-up), as well as training needs to ensure technical proficiency. Does technology create efficiencies or new burdens for school nurses? How is their time split between the responsibilities as school nurse and telepresenter? Are schools drawing reimbursement (called a facility or transmission fee) for their role in the telehealth interaction, and, if so, is it being reinvested into historically under-resourced school nursing services?

Access to Care

SBHCs using telehealth were more likely to serve rural communities than SBHCs not using telehealth. Telehealth has the potential to expand the reach and scope of services provided by SBHCs. Telehealth holds

particular promise in areas with limited access to health care, especially rural areas where health care providers and facilities are scarce. In rural communities, telehealth can eliminate well-documented access barriers, including health professional shortages, long distances to providers, and lack of transportation. Data analysis from the US Census Bureau's American Community Survey[27] found that over 13 million children under the age of 18 years lived in rural communities, many of whom live in communities with health provider shortages.[12] These health care access inequities lead to poorer health care outcomes in rural communities. States with some of the largest rural populations, however, are seeing an increasing number of SBHCs providing primary care through telehealth technology, particularly in southern US states. This increase is also reflected in the cumulative growth of SBHCs serving rural communities since 1998, an increase due in part to the increasing use of telehealth. Comparatively, the cumulative growth of SBHCs serving urban areas (where the model initially prospered) is lower.[25]

Questions and challenges emerge related to access in telehealth exclusive SBHCs. Telehealth exclusive SBHCs were far less likely to be multidisciplinary compared with traditional SBHCs. Nearly three quarters of traditional SBHCs had a behavioral health provider, compared with one quarter of telehealth exclusive SBHCs. Traditional SBHCs with telehealth were also more likely to include oral health providers as members of the team; 20% had oral health providers via telehealth while only one telehealth exclusive SBHC reportedly had oral health providers. Furthermore, on average, traditional SBHCs using telehealth were 10 times more likely to be open in the summer than telehealth exclusive SBHCs, which can affect continuity of care. There is a great opportunity to expand service scope and hours of operation of telehealth exclusive SBHCs.

Last, the emerging model of telehealth exclusive SBHCs has implications for the evolution of telehealth in general and how traditional sources of care are expanding through the use of telehealth. Telehealth exclusive SBHCs are an opportunity, in the United States and globally, for hospitals, medical centers, and other health systems to expand into low-resourced schools and neighborhoods whose populations have historically underutilized the health care system. This model requires low investment of resources, using the school itself as a location to deliver care and often relying on the school nurse as telepresenter, unlike traditional SBHCs. The approach of using nontraditional settings to organize telehealth services need not be limited to schools; one could easily envision this model expanding to other parts of children's ecosystems.

Future Research

Though the Census provided preliminary information about the use of telehealth in SBHCs, a more in-depth exploration is warranted. For example, what are the necessary conditions for its successful implementation? What are its limitations with respect to meeting the diverse and multi-dimensional needs of children and adolescents?

Furthermore, anecdotal evidence shows that there is considerable variation in how telehealth is received by SBHC providers, school nurses, and users. While some SBHC professionals and advocates consider its adoption to be an effective and efficient way of expanding health care access, others find it disruptive to staff and clients or scrutinize its underutilization. Further exploration into the experience of care from the perspectives of all participants—at the originating and distant sites—may shed more light on how the approach can be improved, as well as what youth lose and gain from receiving care in this way. As children and adolescents are accustomed to video technology, it is possible that its use could improve their experience of care. For example, a research study shows that young people are inclined to divulge more during a telehealth consultation than in an in-person session.[28]

Last, dimensions of quality, cost, and data security must be studied. Are measures for quality and performance in telehealth and traditional SBHCs one and the same?[29] Is there a standard threshold by which utilization justifies the capital investment in technology? How are data privacy and security ensured in the operation of telehealth programs in schools?

Limitations

Some limitations should be taken into consideration. First, despite extensive efforts to identify SBHCs to participate in the Census, there may be additional programs that were not identified through the Alliance's methods. The Alliance is also aware of SBHCs that were awarded grants from Federal Office of Rural Health Policy's Office for the Advancement of Telehealth; however, they were not operational until the 2017-2018 school year, and therefore were not included in the 2016-2017 Census. These SBHCs were opening in several states, including Montana and Virginia, and will be contacted in the next cycle of the Census administration. Second, while SBHC contacts were instructed to have the person with the most knowledge about the program complete the survey, there may have been some data that were not available or familiar to respondents. Third, some participants did not identify schools

with access to their SBHCs; thus, school data, particularly the number of students with access, might be slightly underrepresented. Moreover, data were not collected on schools with access using the same methods in previous Census administrations; thus, comparisons could not be made across years to examine how school and student characteristics have changed over the years.

Despite these limitations, this article provides one of the first investigations to our knowledge on the growth and characteristics of telehealth use in SBHCs across the United States. By connecting students and providers through telehealth technology, SBHCs may be able to eliminate traditional barriers to care, such as transportation, and enable communities that have poorer access, including low-income and rural communities, to easily access health care services. Future research is needed to better understand how telehealth is implemented in school settings, in the United States and globally, and its impacts on access to care.

Acknowledgments

We gratefully acknowledge the support of advisors John Dougherty, Sarah Knipper, Steve North, and Amanda Martin, as well as school-based health center professionals who generously provided data for their programs.

Author Contributions

All authors participated in survey development, implementation, analysis, and manuscript development.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The 2016-2017 National School-Based Health Care Census was supported by grants from the Robert Wood Johnson Foundation and the Atlantic Philanthropies, as well as the Health Resources and Services Administration (HRSA) of the US Department of Health and Human Services (HHS) under cooperative agreement number U30CS09738-08-00, award title "Technical Assistance to Community and Migrant Health Centers and Homeless," and Grant Number: U45MC27804, title, "State Adolescent and Young Adult Health Capacity Building Program." This information or content and conclusions are those of the authors and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS, the US Government, or any other foundation.

ORCID iD

Hayley Love https://orcid.org/0000-0002-4420-0739

References

1. Irwin CE Jr, Adams SH, Park MJ, Newacheck PW. Preventive care for adolescents: few get visits and fewer get services. *Pediatrics*. 2009;123:e565-e572.
2. School-Based Health Alliance. National School-Based Health Care Census. http://www.sbh4all.org/school-health-care/national-census-of-school-based-health-centers/. Accessed August 1, 2019.
3. Kisker EE, Brown RS. Do school-based health centers improve adolescents' access to health care, health status, and risk-taking behavior? *J Adolesc Health*. 1996;18:335-343.
4. Arenson M, Hudson PJ, Lee N, Lai B. The evidence on school-based health centers: a review [published February 19, 2019]. *Glob Pediatr Health*. 2019;6:2333794X19828745. doi:10.1177/2333794X19828745.
5. Knopf JA, Finnie RK, Peng Y, et al; Community Preventive Services Task Force. School-based health centers to advance health equity: a community guide systematic review. *Am J Prev Med*. 2016;51:114-126.
6. Keeton V, Soleimanpour S, Brindis CD. School-based health centers in an era of health care reform: building on history. *Curr Probl Pediatr Adolesc Health Care*. 2012;42:132-158.
7. Ran T, Chattopadhyay SK, Hahn RA; Community Preventive Services Task Force. Economic evaluation of school-based health centers: a community guide systematic review. *Am J Prev Med*. 2016;51:129-138.
8. NEJM Catalyst. What is telehealth? https://catalyst.nejm.org/what-is-telehealth/. Published February 1, 2018. Accessed February 13, 2019.
9. Jones K. New Bipartisan Legislation promotes telemedicine. Provider reimbursement for Telemedicine continues to gain ground. https://www.americanwell.com/new-bipartisan-legislation-promotes-telemedicine/. Published February 4, 2016. Accessed October 7, 2019.
10. International Development Research Centre. *Telehealth in the Developing World*. London, England: Royal Society of Medicine Press; 2009.
11. Stroetmann KA, Kubitschke L, Robinson S, Stroetmann V, Cullen K, McDaid D. *How Can Telehealth Help in the Provision of Integrated Care?* Copenhagen, Denmark: World Health Organization; 2010.
12. Rosenblatt RA, Hart LG. Physicians and rural America. *West J Med*. 2000;173:348-351.
13. Sanchez D, Reiner JF, Sadlon R, Price OA, Long MW. Systematic review of school telehealth evaluations. *J Sch Nurs*. 2019;35:61-76.
14. Reynolds CA, Maughan ED. Telehealth in the school setting: an integrative review. *J Sch Nurs*. 2015;31:44-53.
15. Halterman JS, Fagnano M, Tajon RS, et al. Effect of the School-Based Telemedicine Enhanced Asthma Management (SB-TEAM) program on asthma morbidity: a randomized clinical trial. *JAMA Pediatr*. 2018;172:e174938.
16. Romano MJ, Hernandez J, Gaylor A, Howard S, Knox R. Improvement in asthma symptoms and quality of life in pediatric patients through specialty care delivered via telemedicine. *Telemed J E Health*. 2001;7:281-286.

17. Bergman DA, Sharek PJ, Ekegren K, Thyne S, Mayer M, Saunders M. The use of telemedicine access to schools to facilitate expert assessment of children with asthma. *Int J Telemed Appl*. 2008:159276.
18. Izquierdo R, Morin PC, Bratt K, et al. School-centered telemedicine for children with type 1 diabetes mellitus. *J Pediatr*. 2009;155:374-379.
19. McConnochie KM, Wood NE, Kitzman HJ, Herendeen NE, Roy J, Roghmann KJ. Telemedicine reduces absence resulting from illness in urban child care: evaluation of an innovation. *Pediatrics*. 2005;115:1273-1282.
20. Health Resources & Services Administration. Uniform Data System (UDS) Resources. Washington, DC: US Department of Health and Human Services; 2015.
21. US Department of Health & Human Services, Federal Office of Rural Health Policy. Telehealth Network Grant Program (HRSA-16-012). https://www.hrsa.gov/ruralhealth/programopportunities/fundingopportunities/?id=daf45ff5-c607-43ec-8fcd-5a87b18403a9. Accessed October 7, 2019.
22. National Center for Education Statistics. 2015-16 Public elementary/secondary school universe survey data. https://nces.ed.gov/ccd/pubschuniv.asp. Accessed October 7, 2019.
23. Stata-Corp. *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LP; 2017.
24. US Department of Education. Parents/prepare my child for school. Improving basic programs operated by local educational agencies (Title I, Part A). https://www2.ed.gov/programs/titleiparta/index.html. Accessed October 7, 2019.
25. Love H, Schlitt J, Soleimanpour S, Panchal N, Behr C. Twenty years of school-based health care growth and expansion. *Health Aff (Millwood)*. 2019;38:755-764.
26. Kwong M. *State Telehealth Laws and Reimbursement Policies: A Comprehensive Scan of the 50 States and District of Columbia*. Sacramento, CA: Center for Connected Health Policy; 2018.
27. US Census Bureau. American Community Survey: 2015—New census data show differences between urban and rural populations. https://www.census.gov/newsroom/press-releases/2016/cb16-210.html. Published December 8, 2016. Accessed August 1, 2019.
28. Cunningham DL, Connors EH, Lever N, Stephan SH. Providers' perspectives: utilizing telepsychiatry in schools. *Telemed J E Health*. 2013;19:794-799.
29. School-Based Health Alliance. Quality counts: clinical performance measures QI toolkit. https://tools.sbh4all.org/s/clinical-performance-measures-playbook/. Accessed August 1, 2019.