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Evaluation of a Comprehensive Oral Health Services Program in School-Based Health Centers

Tara Trudnak Fowler[1] · Gregory Matthews[1] · Cydny Black[1] · Hendi Crosby Kowal[1] · Pamella Vodicka[2] · Elizabeth Edgerton[2]

Abstract

Objectives In 2011, the Maternal and Child Health Bureau, within the Health Resources and Services Administration, awarded a 4-year grant to increase access to and assure the delivery of quality oral health preventive and restorative services to children. The grant was awarded to organizations serving high-need communities through school-based health centers (SBHCs). This article describes an independent evaluation investigating program efficacy, integration, and sustainability. *Methods* Program process and outcomes data were gathered from interim and final reports. Interviews with key informants were conducted by phone, and analyzed in *NVivo* qualitative software. *Results* Students had great need for comprehensive services: on average, 45% had dental caries at enrollment. Enrollment increased from 5000 to more than 9700, and the percent receiving preventive services increased from 58 to 88%. Results of the analytically weighted linear regression show statistically significant increases in the proportion of enrollees who had their teeth cleaned in the past year ($t(4) = 5.19$, $\beta = 8.85$, $p < 0.05$) and those receiving overall preventive services ($t(4) = 13.52$, $\beta = 10.93$, $p < 0.01$). Grantees integrated into existing programs using clear, consistent, and open communication. Grantees sustained the full suite of services beyond the grant period by increasing billing and insurance claims while still offering free and reduced-cost services to those uninsured or otherwise unable to pay. *Conclusions for Practice* This project demonstrates that access to comprehensive oral health care for children can be expanded through SBHCs. State Title V Block Grant and other similar federal initiatives can learn from the strategic approaches used to overcome challenges in the school-based environment.

Keywords School-based health · Oral health · Evaluation · Program sustainability · Program efficacy · Program integration

Significance

While many SBHCs offer basic dental screening, there is a need for comprehensive oral healthcare, particularly for children in high-need communities. Statistics related to dental disease prevalence, disparities, access to care, and the effectiveness of prevention and early treatment are well documented in a robust body of research. This evaluation of the MCHB oral health grant program highlights key factors that contribute to program success and adds to the on-going discourse on SBHC oral health program impact.

Introduction

Significant gaps in access to oral health persist among children in the U.S. (Culyer et al. 2014). Untreated dental disease has been found to have negative impacts on children's

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✉ Tara Trudnak Fowler
tara.fowler@altarum.org

[1] Altarum, 2000 M Street NW Suite 400, Washington, DC 20036, USA

[2] Health Resources and Services Administration, Maternal and Child Health Bureau, 5600 Fishers Ln, Rockville, MD 20852, USA

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learning, speech development, nutritional intake, self-esteem, social development, and quality of life (Colak et al. 2013). Young, poor children, particularly Black, non-Hispanic, and Mexican-American children are especially vulnerable to dental disease, and are more than twice as likely to have untreated decay on their primary teeth (U.S. Department of Health and Human Services 2000). To address issues of access and to improve children's oral health, the Maternal and Child Health Bureau (MCHB) funded a four-year grant program for School-Based Comprehensive Oral Health Services (SBCOHS). The goal of the grant program was to enhance school-based oral health offerings by integrating SBCOHS within existing school-based health centers (SBHCs) offering on-site primary care medical services to vulnerable youth.

At the end of the grant program, MCHB contracted a third-party team of researchers to evaluate and identify factors that improved and inhibited program success. The evaluation was conducted in close contact with MCHB staff and grantees over a 9-month period, with a team of four research consultants skilled in mixed methods program evaluation approaches.

Nine grantee programs were assessed in this evaluation. The programs were diverse in terms of location, setting, and population served. While each program existed in unique contexts and had their own service model, the goal was consistent: to provide oral health services to the most underserved children and youth in their communities.

Objectives

In assessing the success of a SBCOHS program, we measured three main domains, *efficacy, integration* and *sustainability*.

The evaluation objectives by domain are as follows:

1. *Efficacy: Assess the impact integrated oral health services have on improved access to care and improved oral health outcomes*. Measures for this domain were primarily quantitative measuring the number of students who received dental services and treatment, although qualitative data were also used to provide an enhanced depth of understanding.
2. *Integration: Assess the success of the grant programs in integrating comprehensive oral health services into existing SBHCs and schools*. Qualitative measures were the primary mode of evaluating this domain. Administrators were asked about the degree to which the program disrupted school activities, the level of school and community awareness and buy-in, whether the SBCOHS had found a committed program champion, and any barriers identified in the integration process and strategies implemented to overcome them.
3. *Sustainability: Assess whether and how oral health services would be provided after the grant period ended*. Because the grant had recently ended at the time of the evaluation, sustainability was assessed by asking key informants to discuss their strategies in place and the degree of confidence in the ability of the program to continue beyond the funding period. Sustainability measures examined, whether the program was still running 6 months post grant, whether the program was expected to expand, whether new sources of funding had been identified, and whether funding and/or other sustainability challenges had been identified and addressed.

Methods

Twelve programs were originally part of the SBCOHS grant program but only nine were included in the evaluation. The remaining three programs were excluded from the evaluation by the funding agency, due to their inability to provide sufficient data and/or complete the grant program. Table 1 provides a detailed profile of each grantee site evaluated.

The evaluation design consisted of a mixed-methods approach.

Quantitative Data Collection and Analysis

Minimally required data sets from each grantee were received in Excel format, and consisted of the process and outcome measures related to *SBCOHS enrollment, reimbursements received, number/type of preventive dental services provided, number/type of treatment services provided, rates of dental caries*, and *utilization of dental services*. Analysts standardized and compiled the data to assess aggregate trends. There were no designated benchmarks or comparison sites, therefore outcome data were assessed to examine changes over time using analytically weighted least squares linear regression models to test for statistically significant trends. Due to a lack of patient-level data, aggregate treatment services, including restorative services and extractions, were operationalized as a negative proxy of oral health; the need for treatment services indicated worse oral health (Cappelli and Mobley 2008; Sen et al. 2013).

Qualitative Data Collection and Analysis

Qualitative data were collected from key informant interviews, grantee applications, and annual progress reports. Informant interview guides were created based on the evaluation objectives to assess efficacy, integration, and sustainability, and were reviewed and edited by key MCHB staff

Table 1 SBCOHS grantee profiles

Grantee	Location	Scope of service	Description of population served	Staffing[a]	Enrollment[b]
Dental Health Foundation/Center for Oral Health	Oakland, CA[c] (urban)	Serves multiple schools using portable oral health unit	95 and 91% of students enrolled in free lunch program at two serviced schools, respectively; > 40% of student population non-native English speaker, large immigrant population; from 2009 to 2010, 1314 of 3951 students visiting SBHC received dental screenings; of these, 684 presented w/dental caries and 827 had "notable poor oral hygiene"	Program Manager, Management Consultant, Dentist, Dental Assistant, Administrative Coordinator	1175
Children's Dental Services	Minneapolis, MN (urban)	Located at fixed site in high school; provides services to multiple schools	92.4% of students receiving services are enrolled in free and reduced lunch programs; > 89% of students receiving services are non-white, large immigrant population	Exec Director, Dental Director, Program Manager, Staff Dentist, Staff Dental Hygienist, Staff Dental Assistant, Outreach Coordinator, Outreach Staff, Evaluation and CQI Specialist (3.65 FTEs)	1533
Health Mobile	Santa Clara, CA (mixed)	Not located in SBHC; serves multiple schools in the area via mobile unit	52.8% of the students in serviced schools deemed "socioeconomically disadvantaged" (defined by grantee as participation in free or reduced-price lunch program or students whose parents have not received a high school diploma); 49% of students on free and reduced lunch	Program Manager, Supervising Dentist, Dental Hygienist, Dental Assistant, Chief Operating Officer, Drivers (2 FTEs + additional staff as needed)	1458
Integrated Health Services, Inc	East Hartford, CT (urban)	Serves multiple schools w/portable oral health unit; most schools have oral health space within SBHCs	92% of the city's students qualify for free and reduced lunch; 43% live in non-English speaking households; 2004–2009 (pre-grant) service population—25% untreated dental decay annually of over 500 serviced children; 2010 rate drop to 8.5%—result of previous IHS oral health grant	President/CEO, SBHC Director, Billing Administrator, Dentist, Dental Hygienist, Dental Assistant, SBHC Secretary, Dental Program Director	966
Lemon Grove Elementary School Clinic	Lemon Grove, CA (urban)	Oral health services located within SBHC at Lemon Grove	Reports from one of the serviced schools indicate only 16.7% of the student population has fluent English proficiency and 67.5% of the students are on free or reduced-price meal	Dental Associate, Administrative Assistant, Dental Hygienists Evaluation Manager; 1.25 FTEs + volunteer staff, which includes patient and program liaisons	368

Table 1 (continued)

Grantee	Location	Scope of service	Description of population served	Staffing[a]	Enrollment[b]
Mary Imogene Bassett Hospital	Cooperstown, NY (rural)	Oral health services provided w/in multiple SBHCs; in some cases w/in schools	In service area, 1 in 3 individuals lives below 200% of the federal poverty level; ~50% of students at each SBHC eligible for free or reduced-price lunch; 44.8% of responding households in area health survey did not have dental insurance or could not get a dentist to accept their insurance; None of the counties serviced met the 2010 goals for low income 3rd grader dental sealants	Project Director, Project Coordinator/CQI specialist, Registered Dental Hygienists, Dental Assistant, Supervising Dentist, Contract Dentist(s), SBH Director. (3.5 FTEs)	790
Health Services NYS Department of Health	Albany, NY (rural)	Fixed and portable oral health units. Housed within SBHCs and some transport students to receive services	Service county classified as dental health professional shortage area due to low-income status of county residents and high rates of participation in Medicaid; of 62 licensed dentists, 44 practice, 10 accept Medicaid; per 2005 data: 66% of all county 3rd graders reported caries, 75% when controlling for low income; 57% of all 3rd graders in the county had untreated decay, 69% for low income children	Project Director, Technical Assistant, Project Coordinator, Dental Director, SBHC Clinic Coordinator, Computer Information Specialist, Dentists (3), Dental hygienists (3)	1020
Summit Community Care	Frisco, CO (mixed)	Serves multiple schools in the area via mobile unit	25% of children who received screenings report significant unmet dental needs; district-wide, 32% of students on free and reduced lunch; per 2004 data: 90% of Hispanic parents of children enrolled in SBHC reported no dental coverage, 86% reported they could not afford dental insurance; rural mountain community with access to care issues	Program Administrator Dentist, Dental Hygienist, Dental Assistant (1.65 FTEs)	2189

Table 1 (continued)

Grantee	Location	Scope of service	Description of population served	Staffing[a]	Enrollment[b]
University of Colorado Denver	Aurora, CO (urban)	Began with mobile van but was problematic; relocated to indoor clinic housed in the middle school	Majority of communities serviced designated "Medically Underserved" or adjacent to Medically Underserved Area; Service area designated "High Poverty Priority"; 38.8% and growing Hispanic population (2009); large Spanish-speaking immigrant population w/ many undocumented families; 10% of students in the school district annually identified as "residing in a homeless situation for part of the year."; 83% of children in school district eligible for free or reduced-price lunches; Less than 10% of area dentists accept Medicaid	Dentist, Dental Assistant, Dental Hygienist, Dental Director, Reception Billing, Billing Coder, IT support, SHS Director (4 FTEs)	251

[a]The staffing is based on the "Staffing Plan" outlined in each grantee application and includes number and role of employees and FTEs if available

[b]Total enrollment by end of grant period

[c]While Oakland, California is where the "Dental Health Foundation" is located, the program was implemented in Los Angeles County

who had extensive knowledge of the SCBOHS programs. All interviews were confidential; interviewees' identities were not linked to their responses in reports to MCHB. Interviews were conducted by phone, recorded, transcribed and were coded in *NVivo* qualitative software by two independent coders. All kappa scores were above 0.8, reflecting satisfactory reliability between coders.

Initial Key Informant Interviews

There were two series of initial interviews: one with SBCOHS grantee representatives and another with school and SBHC staff. Evaluators invited key informants to participate in a 75-min semi-structured phone interview. Evaluators contacted each program manager and used a *snowball sampling technique* to obtain information from their SBHC and school administrative colleagues. These subsequent interviews were conducted with a range of representatives, including SBCOHS project directors and co-directors, program coordinators and managers, dentists, and dental hygienists.

The evaluating team completed one initial interview with at least one representative from each grantee (n = 9), though there were often multiple representatives present. Additionally, they completed four interviews with representatives from the schools (e.g. principals, school nurses, school administrators), and three interviews with non-oral health program SBHC medical staff (e.g. nurse practitioners).

Expanded Key Informant Interviews

Following preliminary data analysis, a series of expanded interviews (n = 7) were conducted with grantees to confirm themes, fill in missing information, and resolve outstanding questions. Expanded key informant interviews averaged 45 min. Transcripts were coded in an identical fashion to the initial interviews and were used to develop, confirm and finalize evaluation findings.

Results

Communities Served

The analysis confirmed that grants were made to communities with great oral health needs; on average, nearly 45% of patients had dental caries at the time they were enrolled. Programs served urban and rural populations where communities have relatively low earnings and low rates of health insurance. Many grantee communities were composed largely of immigrants and ethnic and racial minorities. Data quality on the demographics of enrollees was insufficient for more refined analysis. Table 1 provides information on the staffing, location and setting, scope of services, communities served, and total enrollment in each of the grantee programs evaluated.

Quantitative Findings

Results are based on data reported; these data were not uniform (e.g. some grantees reported on age, others did not) and the majority of the quantitative analysis is therefore based on aggregate data. There were 9750 patients enrolled in the fourth and final year of the grant, up from 5197 in year one (see Fig. 1).

Preventive Services

The percentage of enrolled patients who received preventive services increased from 58 to 89%. Preventive services include sealant applications and teeth cleaning. Sealants were applied to at least 7155 patients throughout

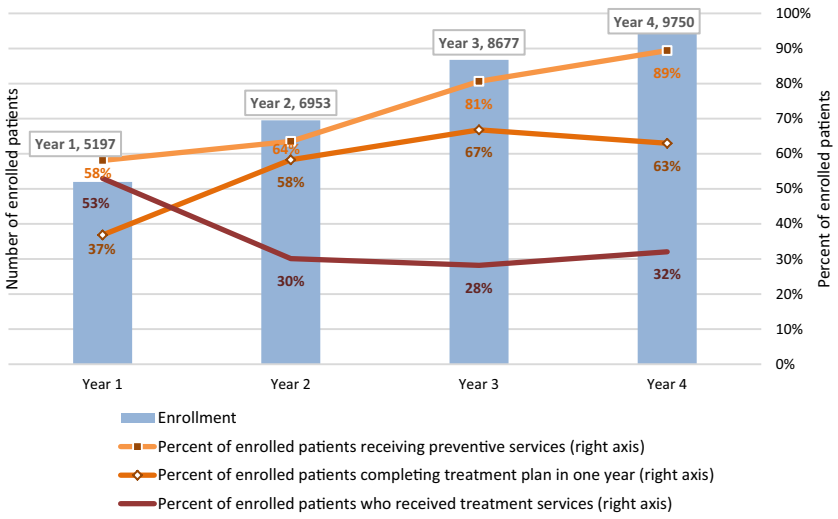


Fig. 1 Increasing enrollment, preventive services, treatment services, and treatment plan completion

the 4 years, increasing the share of enrolled patients who received them from an average of 16% in year 1 to 33% in year 4. Only about one-third of patients who enrolled in the first year had their teeth cleaned; by the end of the grant period this increased to 63% of those enrolled. Results of the analytically weighted linear regression show statistically significant increases in the proportion of enrollees who had their teeth cleaned in the past year ($t(4) = 5.19$, $\beta = 8.85$, $p < 0.05$) and those receiving overall preventive services ($t(4) = 13.52$, $\beta = 10.93$, $p < 0.01$). (See Table 2: average percent change in services over the grant period.)

Treatment Services

The percentage of enrolled patients who completed a treatment plan within 1 year also increased from 37 to 63% over the grant period. Treatment services (including restorative work and extractions) were needed by and provided to 53% of enrolled patients in year 1 which declined to 32% of enrolled patients by year 4. Figure 1 illustrates enrollment, preventive and treatment services, and completion of treatment plan. There was a decrease in the share of enrolled patients given restorations from 48% in the first year to 27% by the end of the grant period. Similarly, extractions fell from 14 to 4% over this time period. See Fig. 2.

Though large changes were observed, results of the analytically weighted linear regression analysis did not show

Table 2 Average percent change in services over the grant period. Reproduced with permission from MCHB SBCOHS grantee reported data, 2011–2015

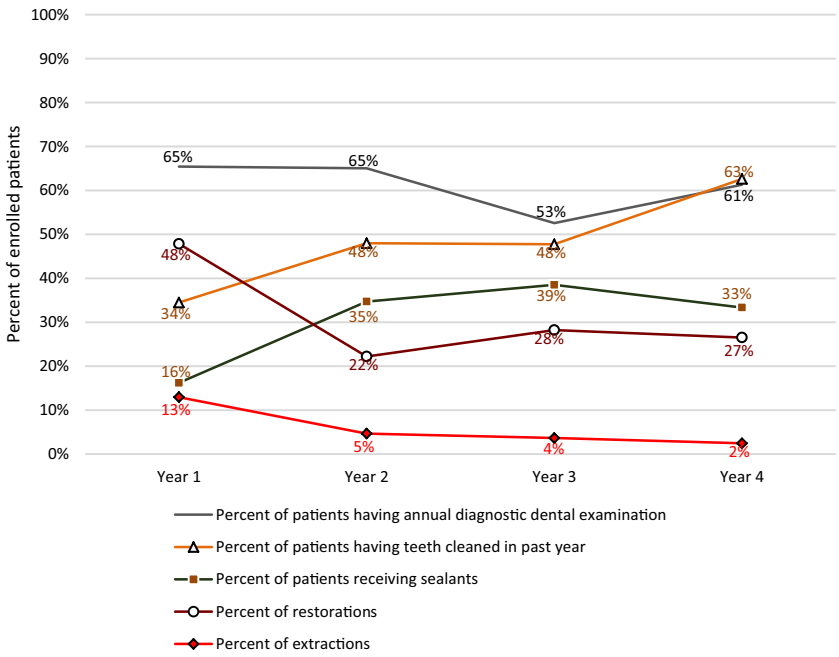
	Cleaning in past year (SE) n = 2425	Annual exam (SE) n = 2446	Prevalence of caries (SE) n = 2836	Preventive services (SE) n = 2081	Received sealants (SE) n = 2080	Completing treatment plan (SE) n = 1822	Received treatment services (SE) n = 2034	Restoration services (SE) n = 2826	Extractions (SE) n = 1901
Average change (%)	8.85* (1.71)	−1.49 (2.18)	−1.48 (3.91)	10.93** (0.81)	2.15 (3.94)	5.56 (3.68)	−3.96 (4.68)	−6.76 (3.50)	−2.41 (1.06)
Intercept	25.88 (6.22)	63.97 (7.08)	46.44 (13.36)	45.77** (3.03)	28.12 (12.42)	43.66 (12.65)	43.84 (15.30)	49.02 (11.50)	11.21 (3.69)

Change over time estimated using analytically weighted linear regression models

Percent change and population size based on sites reporting data for each assessment or service

* p < 0.05; ** p < 0.01; *** p < 0.001

Fig. 2 Service utilization



statistically significant differences in the proportion of enrollees utilizing treatment services.

Qualitative Findings

Efficacy

Staffing The factor most often identified by the grantees as having the strongest influence on success was having highly capable staff; interviewees stressed the importance of having staff who worked well as a team and with school staff, communicated well, were highly organized in scheduling appointments and conducting follow up, and who had a strong understanding of the student population. Key informants reported that these staff members understood the culture of, and were integrated within, the community, and were knowledgeable about dental billing and electronic record systems. The grantees employed a range of 1.5–4 full-time employees; several noted staff turn-over that occurred over the course of the grant period. Budget constraints and program location in urban or rural communities of need posed challenges for recruiting qualified staff. Some strategies used to overcome these obstacles were to hire retired dentists, recruit dental students or interns, and to partner with local dental offices to provide services to patients.

Enrollment Grantees made concerted efforts to increase enrollment. Originally, some programs struggled to reach their desired level of program utilization. Strategies to boost enrollment included integrating school, SBHC, and SBCOHS enrollment forms and gaining community buy-in by educating school staff, students, and families about the importance of oral health. One grantee spoke about their promotion methods and said, "We [sent] a flyer home… explaining who we are…and there's an open house at the beginning of the school year…we have a table and we show our clinic off." Another cited some challenges they faced with enrollment stating, "The big challenge…is kids filling out the paperwork and bringing it back…" Grantees indicated that over the course of the grant period enrollment became easier because the program had been established and word of mouth increased.

Integration

Clear, consistent, and open communication between entities was the most-frequently reported factor contributing to successful integration. Key informants consistently reported that the stronger the relationship between stakeholders, the more seamless the integration. One grantee said, "We work together as a team…We have team huddles every morning… or [we communicate] via the electronic health record…" Another grantee said, "For both of our programs to be sustainable, we really need each other. It's like a…symbiotic relationship. In order for us to get referrals, in order for [the SBHC] to get referrals, the best way is to really just continue to cross-refer." Other areas of success with integration were the implementation of an integrated Electronic Health Record (EHR) system to help mitigate difficulty in sharing patient information between medical and dental staff, and having a program champion in the form of a school nurse, principal, or SBHC nurse practitioner, to aid programs in fully integrating and being supported at the school.

Grantees cited several challenges to school integration, including space sharing, difficulties working around school schedules, school staff turnover, and a lack of interest on the part of school staff (e.g., teachers prioritized students' time spent in their classes over health appointments). The primary strategy used to address these challenges was building a strong and open relationship with the school nurse and principal. One grantee stated, "Even something so simple [as] the principal coming down to us to let us know, 'Hey, we're doing a mock fire drill. Make sure you don't have somebody on the chair at 9:00.'" Some programs invited the school nurse to program meetings and to sit on their advisory boards. Others recruited a SBHC staff member to work as a coordinator with the school and community, to schedule appointments and champion the program. Grantees that were able to share enrollment forms with the school and the SBHC found that strategy supported integration.

Sustainability

A major finding from this evaluation is that at the time of the final interviews conducted 6 months *after* the grant period ended, all programs were still in operation. All key informants indicated that they felt confident that, at least in the near term, they would sustain their current programs. Two grantees reported that they were able to expand their services. Four grantees reported employing dental students or interns to help keep program costs low.

While programs were able to continue post-grant, identifying and maintaining sufficient funding was a persistent challenge. The most prominent mitigation strategy was to gain revenue through insurance reimbursement. Several of the grantees cited that, they developed methods to ensure maximum allowable reimbursement. One grantee said, "[Establishing other revenue streams] really is key… these other revenue streams… pay higher reimbursement than the Medicaid reimbursement." Diversifying reimbursement also included analysis of denied claims and billing procedures, getting accurate insurance information before the visit, and connecting eligible patients to Medicaid, Children's Health Insurance Program (CHIP), or the health insurance marketplace. Additionally, some grantees established sliding scale, income-based fee schedules for patients. Nearly all programs

applied for federal quality health center (FQHC) and FQHC Look-Alike status, leveraged in-kind donations, or applied for additional grants mainly to expand or fund equipment purchases.

Multiple grantees also embraced innovative workforce models by allowing trained hygienists and assistants to expand their traditional job functions. Other factors that contributed to sustaining the program include continued supportive relationships within the communities, schools, and SBHCs (e.g. presence on coalitions and boards), and continued education of oral health providers on billing, electronic health record systems, and operations. Accurately and consistently collecting data was also noted as a factor that can lead to successful sustainability. One grantee said, "The other… sustainability piece that's crucial is data collection…just providing the services even if you could bill and get reimbursed for them is one thing but having the data to support the future expansion is key."

Discussion

This project demonstrates that children's access to comprehensive oral health care can be expanded and sustained through SBHCs. Each grantee included in this evaluation succeeded in providing comprehensive oral health services to underserved populations by integrating within SBHCs and implementing strategies that allowed them to provide sustainable services. Many programs overcame challenges through strong partnerships, relationships with staff, and improved communication. By the end of the 4-year grant, comprehensive oral health services became an institutionalized part of SBHC operations. Sustaining comprehensive oral health services beyond the grant period is an ongoing process, but thus far has been achieved.

Our research found that preventive service provision among students enrolled in the SBCOHS program increased throughout the period of the grant. Relatedly, sealants were applied to thousands of patients and treatment plans were completed for a growing share of enrollees. Of note, over the course of the grant period the rate of prevention services rose, while the rate of treatment services fell. This indicates that (1) the school-based oral health services were greatly needed, as many of the students early-on needed treatment for caries, etc., and (2) as enrollment increased, more children were instead provided with preventative services, while the need for treatment (as reflected by the services provided) decreased. This trend aligns with research showing that prompt prevention can reduce the need for restorative care (Cappelli and Mobley 2008; Sen et al. 2013). Future research should consider tracking patient-level data on disease before and after comprehensive oral health services are integrated within SBHCs to establish the causal relationship hypothesized here.

Lessons Learned and Implications for Future Programming

Highlighting Collaboration

Though programs faced integration issues—such as coordinating with school and SBHC staff, limited space, and fitting within school policies and schedules, grantees were able to effectively merge their services within the existing SBHCs. Grantee data indicates that collaboration between SBHC staff, school staff, community partners, and oral health service providers is critical to success, a finding that is also reflected by other research (Blank 2015). Specifically, grantees identified the importance of establishing good relationships with school principals (who help make decisions about school polices), school nurses (who often are the first to see students who may be in need of oral health services) and SBHC staff (who worked directly with the grantees, often in the same space).

Securing Staffing

The acquisition, professional development, and retention of qualified program staff members were challenges. Many of the grantees in our evaluation devised creative strategies, such as hiring retired dentists or using dental students. Several also employed an alternative dental workforce model, with dental hygienists playing a primary role in dental care. A recent study, on the effectiveness of an alternative dental workforce model in a school-based setting, found that the number of encounters with dental hygienists can improve the oral health status of low-income students who would not otherwise have received oral health services (Simmer-Beck et al. 2015).

Sustaining Programming

While many programs reported facing obstacles to sustaining programming beyond the grant period, at least 6 months after the grant ended, all nine SBCOHS programs included in this evaluation were still in operation. Grantees reported that becoming an FQHC, developing a governance structure, enacting third-party billing, and maintaining dedicated staff for grant writing and management were essential components of sustainability. SBHC programs that are able to sustain their efforts use several strategies such as diversifying income options, developing communication and marketing infrastructure, improving record keeping and data management, educating allies and securing sponsors (Keeton et al. 2012).

Dedicated Champion

Similar to findings from other oral health integration initiatives (Bernstein et al. 2016), having a champion for each program was an essential component and contributed to all other areas of success. The program champions varied in roles at each program, but were all leaders who had a vision and helped guide others to collaborate, communicate, hire appropriate staff, market services, and implement proper protocol for sustainability.

Policy and Programming Implications

Public policies that encourage more federal and state investment can help establish comprehensive dental programs within existing school-based clinics. Specifically, an increase in funding would help to support the planning process, start-up, and maintenance costs of these programs. At the state level, policies geared toward simplifying the credentialing process for dental professionals and expanding work force development strategies (i.e. for dental hygienists to expand roles) would help to increase program efficacy. Moreover, assuring adequate Medicaid/CHIP reimbursement within states would support the financial viability and overall sustainability of these programs.

State Title V Block Grant, HRSA's Health Center Program, and other federal initiatives implementing similar programs can learn from the strategic approaches used to overcome challenges in the school-based environment documented in this research. A consideration for future grant programs is to standardize data collection and reporting methods at the onset, in order to provide rich and comprehensive data that will better inform program development and collective impact for future oral health interventions. Findings from this evaluation can help inform other SBHCs as they implement oral health services into delivery models.

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