A Comparison Study of an Elementary School–Based Health Center

Effects on Health Care Access and Use

David W. Kaplan, MD, MPH; Claire D. Brindis, DrPH; Stephanie L. Phibbs, MPH; Paul Melinkovich, MD; Kelly Naylor, PhD; Karin Ahlstrand, MA

Objective: To assess the effects of an elementary school–based health center (SBHC) on access to and the use of physical and mental health services by children aged 4 to 13 years.

Study Design: A retrospective cohort analysis of parent surveys from a comparable intervention (SBHC) and a comparison of urban elementary schools.

Intervention: Elementary SBHC services, including preventive physical health care; the care of minor short-term illnesses, injuries, and stable ongoing medical conditions; dental screenings; and mental health counseling.

Participants: All parents of students at both schools were asked to complete a survey. Return rates on the survey were 78.3% (570/728) and 77.0% (440/571) at the intervention and comparison schools, respectively.

Main Outcome Measures: The use of health services, access to health services, and health service satisfaction.

Results: Compared with respondents at comparison schools, respondents whose children had access to an SBHC had less difficulty (P = .01) receiving physical health care for their children, ie, treatment of illnesses and injuries, immunizations, and physical examinations (odds ratio, 0.66; 95% confidence interval, 0.48-0.91). Access to an SBHC was independently and significantly related to less emergency department use (odds ratio, 0.63; 95% confidence interval, 0.40-0.99; P < .05), a greater likelihood of having had a physician’s visit since the school year began (odds ratio, 1.92; 95% confidence interval, 1.39-2.65; P < .01), and a greater likelihood of having had an annual dental examination (odds ratio, 1.36; 95% confidence interval, 1.01-1.83; P < .05). Measured by a 12-item scale, respondents who reported the SBHC as their most-used health service were significantly more satisfied with their service than respondents who mostly used community clinics (z = −5.21; P < .01) or hospital clinics (z = −4.03; P < .01).

Conclusions: Independent of insurance status and other confounding variables, underserved minority children with SBHC access have better health care access and use than children without SBHC access, signifying that SBHCs can be an effective component of health delivery systems for these children.


Editor’s Note: This study adds to the growing literature that school-based clinics are effective. The “captive audience” phenomenon doesn’t hurt.

Catherine D. DeAngelis, MD

In 1996, 14.8% of the children in the United States, 10.6 million children, did not have health insurance, which represented an increase from the previous year of 800,000 children. Nearly 14% of children younger than 6 years, 14.6% of those aged 6 to 11 years, and 16.1% of children aged 12 to 17 years were uninsured. Children from minority racial and ethnic groups were more likely than white children to be uninsured—ie, 28.9% of Hispanic children, 18.8% of African American children, 15.8% of Asian and Pacific Islander children, and 10.6% of white non-Hispanic children were uninsured.

Previous studies document that uninsured children, compared with insured children, are 2.3 times less likely to have obtained medical care and 2.5 times less likely to obtain dental care in a 12-month period. Less than half (44.8%) of all uninsured preschool-aged children receive recommended well-child care. Uninsured children are 7 times less likely than insured children to have a regular place of health care. Insurance appears to be an important moderator of children’s health service use.

Studies that cite differences between insured and uninsured populations’ health care service access and use often neglect to control for important con-
SUBJECTS AND METHODS

STUDY POPULATION AND SETTING

The intervention school (SBHCS) and a neighboring comparison school (CS), both located in Denver, Colo, were selected based on comparable ethnicity and SES. At each school, the ethnic population was 93% Hispanic, 4% white, and 3% American Indian, African American, or Asian. Both schools reported similar rates of students' receipt of free or low-cost lunches (89% at the SBHCS and 86% at the CS). At the time of the study, the SBHC had been operating for 2 years, providing a full range of physical and behavioral health services at the elementary school. The communities served by the schools were similar ethnically and demographically. Each community is predominantly composed of low-income working families of Hispanic origin. A high percentage of the children in these communities are uninsured. The main sources of primary care for uninsured children in these communities are 2 community clinics that are part of the Denver Community Health Center Network. The SBHC is also part of that network and was located at the intervention school because students at that school appeared to have greater barriers to health care than those at other schools in the neighboring communities.

SBHC INTERVENTION

Staffing at the elementary SBHC included the following bilingual staff: 1.0–full-time-equivalent (FTE) physician assistant and 0.1-FTE physician who provided preventive health care, treatment of short-term health problems and minor trauma, and the care of stable long-term illnesses; 1.0-FTE master's-prepared licensed professional counselor who provided individual, group, and family therapy; 1.0-FTE community outreach worker who was responsible for making home visits, managing cases, organizing health-related events (health fairs and classes for parents), and recruiting students for clinic registration; and 1.0-FTE health technician who was responsible for office management, updating the clinical services tracking system, scheduling appointments, and assisting in the management of the clinic. The intervention school, independent of the SBHC, also employed an 0.8-FTE school nurse, a 0.7-FTE social worker, and a 0.4-FTE school psychologist. The CS employed a 0.4-FTE school nurse, a 0.45-FTE social worker, a 0.4-FTE psychologist, and a 1.0-FTE community outreach worker.

The services provided at the SBHCS included the standard school nursing services required by state law—eg, health screenings, immunization compliance, triage, and referrals—plus a wide range of primary physical and mental health services and limited dental services through the SBHC. Services at the SBHC were provided at no cost to the students and were coordinated with the students' medical home, if one existed. As shown with data presented later in this article, this SBHC served as a prime source of medical care for a large proportion of the student population. It operated as one of many primary care sites of an integrated community health network in Denver.

Services available through the SBHC were used extensively. During the 1995-1996 academic year, an estimated 83% of parents with students attending the school gave permission for their child to use this SBHC. This SBHC provided 2443 visits to 591 students. Of the total number of visits, 67% were for medical health and 33% were for mental health. Students using SBHC medical services made an average of 3.4 visits to the SBHC, and those using the SBHC mental health services made an average of 3.4 visits.\(^1\)

STUDY DESIGN

This comparison study was conducted in the spring of 1997. We recruited all elementary school students' parents in both the SBHCS and the CS (prekindergarten to fifth grade) for participation in the study of elementary school children's health care access and use. Parents' experiences obtaining health care for their children were elicited using a self-completed questionnaire. This questionnaire was developed from a self-completed questionnaire we had previously designed for SBHC evaluation studies. Using the original questionnaire as a prototype, data were collected from the same groups during the fall of the 1996-1997 academic year. The resultant information suggested that focus groups might help improve the questionnaire for the high- and low-acculturated portions of the population. Focus groups were conducted to clarify the English- and Spanish-language versions of the questionnaire. The revised questionnaire was piloted, further refined, and backtranslated, and final minor revisions were made.

Parents were recruited by sending home an envelope with students that contained the self-administered questionnaire and a letter requesting parents' participation signed by the school principal, research personnel, and the executive director of the Denver Public School's Department of Student Services. The letter also requested that completed surveys be returned, sealed in a provided envelope, to the child's classroom teacher by the end of the week. Teachers helped to remind students to return materials and often called parents to request that materials be sent back to school. Teachers' recruitment efforts were rewarded with gift certificates for educational supplies. As a result of these strategies, we obtained an overall response rate of 77.8% (1010/1299). This study was approved by the Colorado Multiple Institutional Review Board.

OUTCOME VARIABLES

We explored 3 types of outcome variables from the questionnaire: health care access, health care use, and health service descriptors.

Health Care Access

Parents were asked to describe how difficult it had been to obtain 3 types of services, ie, physical health services, emotional health services, and dental services (physical health service access was measured with 3 variables—physical health services in general, immunizations, and physical examinations—that formed a reliable scale \[n = 798, \alpha = .82\]). Access variables were coded 1 if any difficulty had been experienced and 0 if there had been no difficulty. Respondents who said that a specific service had not been needed were eliminated from that specific analysis.
Health Care Use

There were 5 health care use outcome variables. Parents were asked to report whether or not their child had received a "physical" (physical examination) and whether or not the child had received a routine dental examination in the past year; responses were coded yes or no. Parents were also asked to check the box corresponding to the number of times a student had visited the following since the start of the school year: hospital emergency department, a counselor or social worker, and a physician; outcome variables were coded 0 or 1 or more times.

Health Service Descriptor

Respondents were asked where they had gone most often for their child’s health care during the past academic year, ie, SBHC, community clinic, health maintenance organization or private physician’s office, or the hospital clinic. Then they were asked to endorse up to 12 items that described positive attributes of that facility. Parents could choose to endorse any of the following:

- The people there are good with the children.
- I feel comfortable with the people there.
- The hours are convenient.
- The people there communicate well with me.
- My child gets an appointment quickly.
- My child gets good follow-up care.
- The cost is good.
- The appointments don’t take very long.
- It is easy for my child to get there.
- My child doesn’t miss much school.
- The people there help me understand my child’s sickness.
- Other (respondent liked something else about the service used most for their child’s health care).

The 12 items constituted a valid service satisfaction scale (n = 928, α = .82), with each respondent receiving a score (1-12) based on the number of items endorsed.

INDEPENDENT VARIABLES

The main independent variable studied for association with the outcome variables was whether the student had access to an SBHC, ie, whether a student attended the school with an SBHC or the CS. Twelve dichotomous variables and 4 continuous variables were used to assess an intervention or CS comparability (Table 1). These variables encompass those that were hypothesized to influence service access or use: family composition (number of adults and children in the household and presence of mother and father in the household), SES indicators (mother’s education, receipt of public assistance, and receipt of free meals at school), demographics (acculturation and student age), life events in the family during the past year (illness in family, divorce, marriage, death, job loss, and number of school transfers), and insurance status. Where necessary, these variables were used to control for confounding of the relationship between SBHC service provision and the outcome variables.

Acculturation was measured by a 5-item standardized language-based acculturation scale that measures the use of English and Spanish.22 The mean score of the scale ranges between 1 and 5, where 1.00 to 2.99 represents a low level of acculturation and 3.00 to 5.00 signifies a high level of acculturation (Fabio Sabogal, PhD, oral communication, September 1997). The reliability of the standardized acculturation scale was confirmed for this population (n = 937, α = .90). Fifty-three respondents (5.2% of all respondents) completed only 2 of 4 of the 5-scale items, from which an acculturation score was extrapolated.

DATA ANALYSIS

We first established the bivariate relationships between SBHC availability (SBHCS or CS) and each of the 16 independent variables to establish comparability of the 2 schools. All 16 variables had 6.0% or fewer missing values. These profile variables confirmed that the 2 schools’ populations were similar in 9 of the 16 variables but were different in some important characteristics (Table 1). The 7 variables that were significantly different between the SBHCS and the CS (father in the home, mother’s education, acculturation, receipt of public assistance, receipt of subsidized lunches, parental job loss in the last year, and school transfer) had 3.5% or fewer missing values and were further examined by entering each independent variable into univariate logistic regression models with each of the 8 outcome variables. Variables that were significantly (P < .10) related to both the independent variable coding for school (Table 1) and the outcome variable of interest were confirmed as confounding variables that were used in multivariate modeling techniques. Insurance status, also known to influence health care use, was entered into multivariate models where univariate analyses confirmed a significant relationship (P < .10) between insurance status and an outcome variable.

The independent effect of SBHC access on the 2 main outcomes, health care access and use, was analyzed with multivariate logistic regression modeling. Final multivariate regression models included confounders specific to each of the outcome variables, and all final regression models also included the independent variable coding for access to an SBHC (SBHCS or CS).

Because the adjusted odds ratio (OR) reflects an adjustment for all the independent variables included in the model, and because the predictive ability of a given independent variable may be explained away by another correlated independent variable, we assessed the correlations among the 8 possibly confounding variables used in multivariate models, ie, father living in the house, mother’s education, acculturation level, insurance status, public assistance, free meal receipt, parental job loss, and school transfer. We report only the significant correlations (r > .20).

Higher acculturation was significantly correlated (P < .01) with mother’s educational attainment (r = .29), being insured (r = .36), living in a home without a father (r = .35), and the receipt of public assistance (r = .27). Uninsured students were more likely to have fathers living in the home (r = .20; P < .01) and were less likely to report receiving any public assistance (r = −.34; P < .01). Similarly, children with fathers living in the home were less likely to be receiving public assistance (r = −.37; P < .01). The strength of the logistic regression is that the independent

Continued on next page
relationship between the independent and outcome variables, ie, SBHC access and health care access and use, is reflected in the adjusted ORs resulting from multivariate techniques.

The nonparametric equivalent of the 1-way analysis of variance of skewness was used to assess the overall difference in skewed satisfaction scores, and for post hoc analyses, we used Mann-Whitney tests. Differences between the groups’ endorsement of specific items in the satisfaction scale were established with χ² analyses. All analyses were performed using a commercially available software package (Statistical Package for the Social Sciences, Version 7.5, SPSS Inc, Chicago, Ill), using standard univariate and multivariate logistic regression, Student t tests, correlation coefficients, and χ² analyses where appropriate.

The difference in health care use between different ethnic groups remains, even when controlled for insurance status. In one study in which Hispanic children and white non-Hispanic children were all enrolled in Medicaid managed care, Hispanic children fared worse than the white children in immunization status at 1 year, suggesting that ethnicity, poverty, transportation difficulties, parental education, or some related factor moderates health care use. Similarly, another study showed that African American and Hispanic infants’ rates of immunization at 24 months were not related to insurance status, although the type of primary care provider did affect immunization rates. Factors other than insurance play a part in health care use.

A sizable literature points to the numerous nonfinancial barriers to health care use, ie, structural and social barriers that independently influence health care access and that are not addressed by traditional delivery systems. The largest growing minority population in the United States, Hispanic children, has the highest rate of being uninsured. It also represents a group that is likely to experience nonfinancial access barriers, including language and cultural barriers, that are not addressed by traditional systems of care. Health care delivery systems that address other barriers to care, ie, parental work schedules, parental knowledge, and provider access, are suggested to improve health care access for even relatively affluent populations. A health care delivery system that addresses both financial- and population-specific nonfinancial barriers has the greatest potential to provide health services to the large number of underserved minority children and adolescents in the United States.

One health care delivery option that has been used to serve uninsured underserved populations is the school-based health center (SBHC) model. School-based health centers were originally designed to increase adolescents’ use of health services by eliminating their financial, structural, and social access barriers. Studies of SBHCs have documented improved appropriate health services and use by an elementary school–aged population. SBHCs have documented improved appropriate health services and use by an elementary school–aged population.

### Table 1. Independent Variables by School

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>SBHC School (n = 570)</th>
<th>Comparison School (n = 440)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household composition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of children living in house</td>
<td>2.9 ± 1.5</td>
<td>3.0 ± 1.4</td>
</tr>
<tr>
<td>No. of adults living in house</td>
<td>2.3 ± 1.0</td>
<td>2.4 ± 1.4</td>
</tr>
<tr>
<td>Mother lives in home</td>
<td>512 (91.6)</td>
<td>399 (90.7)</td>
</tr>
<tr>
<td>Father lives in home</td>
<td>374 (66.9)</td>
<td>251 (57.0)</td>
</tr>
<tr>
<td>Socioeconomic status indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother completed high school†</td>
<td>211 (38.2)</td>
<td>204 (47.9)</td>
</tr>
<tr>
<td>Family receives public assistance‡</td>
<td>104 (18.7)</td>
<td>103 (23.8)</td>
</tr>
<tr>
<td>Child receives subsidized lunches§</td>
<td>499 (89.7)</td>
<td>368 (85.6)</td>
</tr>
<tr>
<td>Demographic variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acculturation level†</td>
<td>2.0 ± 1.4</td>
<td>2.7 ± 1.7</td>
</tr>
<tr>
<td>Age of students</td>
<td>8.4 ± 1.9</td>
<td>8.4 ± 1.8</td>
</tr>
<tr>
<td>Life events in past year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness in family</td>
<td>37 (6.7)</td>
<td>39 (9.0)</td>
</tr>
<tr>
<td>Parental divorce</td>
<td>57 (10.3)</td>
<td>34 (7.9)</td>
</tr>
<tr>
<td>Parental remarriage or new relationship</td>
<td>37 (6.7)</td>
<td>35 (8.0)</td>
</tr>
<tr>
<td>Death in family</td>
<td>101 (18.4)</td>
<td>90 (20.7)</td>
</tr>
<tr>
<td>Parental job loss‡</td>
<td>130 (23.8)</td>
<td>81 (18.9)</td>
</tr>
<tr>
<td>Transferred schools ≥1 time in school year‡</td>
<td>91 (16.1)</td>
<td>91 (20.8)</td>
</tr>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student is uninsured</td>
<td>296 (53.2)</td>
<td>209 (48.2)</td>
</tr>
</tbody>
</table>

*Data are given as mean ± SD or number (percentage). Missing values for each variable listed, less than or equal to 6%; missing values for variables that differ significantly between intervention and comparison school, less than or equal to 3.5%.

SBHC indicates school-based health center.

†P < .01.
‡P < .10.
§P < .05.
We describe the results of the first intervention-comparison study of elementary SBHCs. We hypothesized that, independent of insurance, parental education, acculturation, family composition, and other confounders of health service access, SBHC service provision would affect elementary school–aged students’ access to and use of health services.

**RESULTS**

**STUDY POPULATION**

In all, 78.2% (570/728) of parents at the SBHCS and 77.0% (440/571) of parents at the CS returned a survey. Profiles of respondents from each of the schools are presented in Table 1. The 2 samples have large households, a low level of education, a high level of public assistance, and a low level of acculturation. A large proportion of respondents experienced job loss and death in the family during the past year. Nearly half of the students are uninsured. In contrasting the 2 populations, 7 variables were significantly different between the 2 schools. More households from the SBHCS than from the CS included a father. Mothers at the CS were more likely to have completed high school than those at the SBHCS. Questionnaire respondents were less acculturated at the SBHCS than at the CS. Compared with children at the CS, children at the SBHCS were significantly less likely to receive public assistance, more likely to receive subsidized lunches, more likely to have experienced parental job loss, and less likely to have transferred schools during the 1996-1997 school year.

**OVERVIEW OF OUTCOME RESULTS**

Respondents with SBHC access were more likely to have gone to a physician, a dentist, a counselor, or a social worker and were less likely to have used the hospital ED, than respondents without SBHC access. Compared with users of other health services, SBHC users scored highest on overall health service satisfaction.

The 8 access and use outcome variables are presented in 2 ways, stratified descriptive data (Table 2) and multivariate logistic regression models (Table 3 and Table 4). Health service satisfaction results are presented in Table 5.
School-based health care access was not related to difficulty receiving dental health or emotional health services in these models. Insurance status seems to influence access to physical and dental services but not emotional health services. This insurance finding is not surprising because most insured children were insured through Medicaid, in which medical and dental services were covered benefits, whereas outpatient mental health coverage was limited. Furthermore, a father living in the house appears to be related to greater difficulty in obtaining services. Although the reason for this association is unclear, this variable may represent another aspect of family dynamics or acculturation in Hispanic households that might warrant further qualitative investigation. Those with economic hardship, as indicated with the variables receipt of subsidized lunch and parental job loss, also had more difficulty obtaining health services.

Table 4 shows the independent associations of SBHC presence with the 5 health service use outcome variables. Independent of confounding factors, access to an SBHC was significantly associated with a greater likelihood of the child having had at least 1 visit to a physician since the start of the school year (OR, 1.92; CI, 1.39-2.65; P<.01) and with the child having received a yearly dental examination (OR, 1.36; CI, 1.01-1.83; P<.05). School-based health care access was independently associated with a lower likelihood of having made a hospital ED visit (OR, 0.63; CI, 0.40-0.99; P<.05) and a trend toward an increased use of mental health services (OR, 1.42; CI, 0.94-2.14; P<.10). It was not associated with the receipt of physical examinations, most likely a result of respondents’ misinterpretation of the question, which is discussed later in more detail.

Insurance status did not independently influence hospital ED use or the use of mental health services but did influence the use of physicians, dentists, and the receipt of physical examinations. In these analyses, higher acculturation, parental education, or both were independently related to an increased use of medical services (hospital ED and physician’s office visits and receipt of physical examinations).

### ANALYSES OF STRATIFIED DESCRIPTIVE DATA

The data for the 8 health care access and use outcomes were stratified by school and insurance status (Table 2), allowing for the differences between the 2 schools within each insurance category to be examined. School-based health care access, independent of insurance status, improves various access and use outcomes. Specifically, among insured respondents, SBHC access was significantly associated with a lower likelihood of visiting the ED and a greater likelihood of having visited a physician during the school year. Among uninsured respondents, SBHC access was associated with significantly less difficulty getting physical health and dental services, less hospital ED use, and a greater likelihood of using physician and dental services.

Insured students at the CS were more likely to have obtained dental services than insured students at the SBHCS. We hypothesized that this finding may be confounded by acculturation because less acculturated populations are less likely to obtain these services. Insured respondents from the SBHCS were significantly less acculturated than their CS counterparts (SBHCS mean, 3.40; CS mean, 1.51; t = −6.07; P<.01). In multivariate logistic regression models of insured respondents, controlled for acculturation, the results of insured respondents more closely resemble those of the uninsured group—ie, school attended is not associated with receiving a dental examination (results not shown). Final multivariate analyses are presented in the next section.

### MULTIVARIATE LOGISTIC REGRESSION ANALYSES

Table 3 shows the adjusted multivariate logistic regression models that were formed to measure health care access. The first model shows that, independent of insurance status, students with SBHC access had less difficulty obtaining physical health care (OR, 0.66; 95% confidence interval [CI], 0.48-0.91; P = .01). Uninsured students were more likely to have difficulty obtaining health care.

---

**Table 4. Independent Effects of SBHC Presence and Confounding Variables on Health Care Use**

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Hospital ED</th>
<th>Physician or Physician Assistant Visit</th>
<th>Annual Dental Examination</th>
<th>Counselor or Social Worker</th>
<th>Annual Physical Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>School has SBHC</td>
<td>0.63 (0.40-0.99)†</td>
<td>1.92 (1.39-2.65)‡</td>
<td>1.36 (1.01-1.83)†</td>
<td>1.42 (0.94-2.14)§</td>
<td>NS</td>
</tr>
<tr>
<td>No insurance</td>
<td>NS</td>
<td>0.67 (0.49-0.94)†</td>
<td>0.41 (0.30-0.57)‡</td>
<td>0.47 (0.30-0.73)‡</td>
<td>0.42 (0.31-0.57)‡</td>
</tr>
<tr>
<td>Father lives in home</td>
<td>0.51 (0.32-0.81)‡</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Acculturation level</td>
<td>1.19 (1.02-1.39)‡</td>
<td>1.15 (1.04-1.28)‡</td>
<td>1.12 (0.98-1.29)§</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Mother graduated high school</td>
<td>1.64 (1.04-2.58)‡</td>
<td>2.09 (1.42-2.95)‡</td>
<td>NS</td>
<td>1.29 (0.96-1.72)§</td>
<td></td>
</tr>
<tr>
<td>Family receives public assistance</td>
<td>...</td>
<td>...</td>
<td>2.17 (1.46-3.22)‡</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Child receives subsidized lunches</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Parental job loss</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>0.45 (0.28-0.72)‡</td>
</tr>
<tr>
<td>Child has transferred schools</td>
<td>...</td>
<td>NS</td>
<td>NS</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

* Data are adjusted odds ratios (95% confidence intervals). SBHC indicates school-based health center; ED, emergency department; NS, the variable was entered in the model and is not significant at P<.10; and ellipses, the variable was not included in the model.
†P<.05.
‡P<.01.
§P<.05.

©1999 American Medical Association. All rights reserved.
The objective of this study was to assess how providing SBHC services to elementary school-aged students would affect access to and use of health services and to describe health service attributes that might mediate health care access and use.

This study corroborates results of other studies\textsuperscript{13,24,27} that have shown that health insurance alone is insufficient to ensure access to and use of care. Access to the SBHC, independent of insurance status and other confounders, was shown to result in improved health care use. Students with SBHC access were 0.63 times as likely to have used a hospital ED and nearly twice as likely to have visited a physician. Having access to an SBHC was associated with 1.4 times greater likelihood of having obtained both routine dental examinations and mental health services in the past year.

The lack of a significant association between access to an SBHC and difficulty obtaining dental and emotional health services deserves explanation. These health care access results (Table 3) conflict with the health care use results (Table 4). This may be due to the different portions of the population being used in the analyses. Whereas the health care use questions incorporated all respondents, health care access questions used only respondents who reported that a service was needed. In Hispanic community, nearly a quarter of respondents said that dental care was “not needed,” and about 70% of respondents said that mental health care was “not needed.”

The nonsignificant relationship between SBHC availability and the receipt of a physical examination could be due to the lack of understanding about the difference between the receipt of a physical examination and a physician visit by Hispanic parents. Despite extensive instrument development efforts, these terms may not have been adequately conveyed to the population that was surveyed, bringing into question the face validity of this survey item.
As other studies have shown,^{11,24} health insurance is not the exclusive mediator of health care access and use. Nonfinancial barriers, personal barriers (acceptability, culture, language, attitudes, and education or income) and structural barriers (availability, organization, and transportation)^{10} need to be addressed by the health care delivery system to guarantee health care accessibility. Transportation difficulties, language barriers, and waiting times can discourage populations, especially minority populations with low SES, from accessing health care.^{26,27} It is, therefore, significant that users of the SBHC described their health service with a higher number of positive attributes than did users of any other health service delivery system. It appears that the SBHC eliminated personal barriers to health care access, including respondents’ comfort with staff and waiting times. Regarding structural barriers, SBHC users reported that their primary health care site had convenient hours, had quickly obtainable appointments, was easy to get to, and required students to miss little school. These attributes attest to the limited experience of structural and personal access barriers in the population served by an SBHC. These findings are reinforced with the finding that SBHC respondents were 0.66 times less likely than comparison counterparts to have experienced difficulties obtaining physical health services.

Several study limitations deserve mention. The strongest limitation of this study is that self-report data are unverifiable, although self-report surveys have been shown to result in reliable reports of health care encounters.^{28} We tried to minimize this limitation by conducting extensive survey development efforts, including focus groups, translating and backtranslating procedures, and piloting efforts. Question responses were developed with community members—ie, when asked about visits to a physician, we included names of specific people and of community clinics that would be familiar to respondents. The nonresponse rate (22.2% [289/1299]) is also of some concern, although the multivariate modeling techniques made meaningful comparisons between the 2 schools possible. This study cannot be generalized to the uninsured population as a whole. Yet, the results suggest that services that are culturally acceptable and geographically accessible increase the overall accessibility to health services for uninsured students. A cost-benefit analysis was beyond the scope of this study but would undoubtedly further this field of research. Other confounders of the relationships between SBHC access and the outcome variables that we did not measure may also influence our results. Further studies on other ethnic minorities, as well as Mexican Americans in other regions of the country, should be conducted to confirm the success of this delivery method for various populations.

In this study population, independent of insurance status, the SBHC significantly increased accessibility to and use of health services. Recent legislation, the State Children’s Health Insurance Program, part of the 1997 Budget Reconciliation Act,^{29} allocates to states additional funds to provide health services for about half of the nation’s uninsured children. The ultimate success of this legislation will likely hinge on the delivery systems implemented to address structural and personal barriers to care. For the following several reasons, SBHCs could play a meaningful role in providing health services to this newly insured population:

- States must submit to the federal government a plan that includes the assurance of health care access for the target population. Findings from this report have shown that SBHCs, independent of insurance status, can increase access to and use of health services for minority elementary school-aged students with low SES.
- Some states may try to fulfill access requirements by allocating substantial funds for transportation. Findings from this study also show that SBHCs can effectively address transportation barriers because students have established means of reaching school.
- Whether states expand Medicaid programs or create other child health insurance programs, providing access to care and encouraging parents to enroll children in these programs are required to be a component of the state plan. Both for state-based and Medicaid programs, SBHCs may be a successful venue through which a portion of the estimated 30% of uninsured children^{30} might be enrolled.

CONCLUSIONS

This is the first comparison study to show that SBHC service provisions increase health care access and use for an elementary school-aged population. Results from this study suggest that improved access to and use of health care resources might be attributed to the SBHC being able to address a number of structural and personal barriers to health care. Increased use of primary medical, dental, and emotional health resources, coupled with a decreased likelihood of ED use reported in this study, suggest that SBHCs might be an excellent avenue through which health services are delivered to lower SES children.

Accepted for publication August 24, 1998.

This work was supported by grant B 6391 from The Carnegie Corporation of New York, New York.

We are grateful for the commitment of Valdez Elementary School and Bryant-Webster Elementary School administrators, faculty, and staff in actively recruiting participants for this study. We also thank the parents at these 2 elementary schools who took the time to complete questionnaires and Wayne D. Eckerling, PhD, of Denver Public Schools, Office of Planning, Research, and Program Evaluation, for his help in the evaluation.

Reprints: David Kaplan, MD, MPH, Department of Adolescent Medicine, The Children’s Hospital, 1056 E 19th Ave, Denver, CO 80218 (e-mail: kaplan.david@tchden.org).

REFERENCES

3. Monheit AC, Cunningham PJ. Children Without Health Insurance: The Future


Pediatric Endocrinology Subspecialty examination:
Pediatric Gastroenterology Subspecialty examination:
Pediatric Infectious Diseases Subspecialty examination:

Pediatric Medicine Subspecialty examination:
Neonatal-Perinatal Medicine Subspecialty examination:

*If you are applying through the ABIM for the 1999 Adolescent Medicine Certifying Examination, you must contact ABIM for registration dates.

You must contact the ABP for application material. Each application will be considered individually and must be acceptable to the Subboard. The eligibility requirements may be obtained by contacting the American Board of Pediatrics, 111 Silver Cedar Ct, Chapel Hill, NC 27514; telephone: 919-929-0461; fax: 919-929-9255; or through the ABP web site: http://www.abp.org.