

Social Determinants of Health: School-Based Health Centers

Task Force Finding and Rationale Statement

Table of Contents

Context.....	2
Intervention Definition	2
Task Force Finding.....	2
Rationale	2
Basis of Finding	2
Differential Effects by Program Characteristics	7
Applicability and Generalizability Issues	7
Data Quality Issues.....	8
Other Benefits and Harms	8
Economic Evidence	8
Considerations for Implementation.....	9
Evidence Gaps	10
References	10
Disclaimer.....	10

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Task Force Finding and Rationale Statement

Context

Children and adolescents from low-income and racial and ethnic minority populations in the United States commonly experience worse health, are less likely to have a usual place of health care, and miss more days of school because of illness than do children and adolescents from the less economically and socially disadvantaged populations. They also are more likely to be hungry and have problems with vision, oral health, or hearing. Addressing these obstacles can be critical to their education and long term health.

Intervention Definition

School-based health centers (SBHCs) provide health services to students preK-12 and may be offered on-site (i.e., school-based centers) or off-site (i.e., school-linked centers). SBHCs are often established in schools that serve predominantly low-income communities and have the following characteristics:

- SBHCs **must** provide primary health care and **may** also include mental health care, social services, dentistry, and health education.
- Primary care services may be provided by a single clinician, or comprehensive services may be provided by multi-disciplinary teams.
- Services may be available only during some school days or hours, and may also be available in non-school hours.
- Student participation requires parental consent, and services provided for individual students may be limited for specific types of care, such as reproductive or mental health.
- Services may be provided to school staff, student family members, and others within the surrounding community.
- Services are often provided by a medical center or provider independent of the school system.

Task Force Finding (March 2015)

The Community Preventive Services Task Force recommends the implementation and maintenance of school-based health centers (SBHCs) in low-income communities, based on sufficient evidence of effectiveness in improving educational and health outcomes. Improved educational outcomes include school performance, grade promotion, and high school completion. Improved health outcomes include the delivery of vaccinations and other recommended preventive services, asthma morbidity, emergency department and hospital admissions, contraceptive use among females, prenatal care and birth weight, and other health risk behaviors.

The Community Preventive Services Task Force also finds evidence that the societal benefits of SBHCs are greater than the intervention costs. Further, SBHCs result in net savings to SBHC users and the Medicaid program.

Most evidence derives from studies of SBHCs in low-income populations. If targeted to low-income communities, SBHCs are likely to reduce educational gaps and advance health equity.

Rationale

Basis of Finding

The Task Force finding is based on evidence from a systematic review of 46 studies (searched until July 2014) which used diverse designs to assess multiple academic and health-related outcomes. Twenty-three studies assessed the effects of SBHCs in overall school populations by comparing all students who had SBHCs in or linked to their schools with all

students who did not (14 studies), or by assessing students before and after implementation of an SBHC (8 studies); one study included both comparisons. In these "whole school" studies the evaluation examined SBHC effects in the student population, including both users and nonusers of the SBHC. Seventeen "SBHC user" studies compared students who received services with students who did not receive services (8 studies) or received care from other sources (9 studies). Four studies included both whole-school and SBHC user study arms. Another two studies compared SBHCs; one compared a SBHC that offered onsite contraceptive services with a SBHC that did not, and the other study reported outcomes from a SBHC before and after implementation of onsite contraceptive services. Table 1 summarizes review results by outcome.

Table 1: Intervention Effects by Outcome

Outcome	Measure (Number of Studies)	Relative Percent Change (Unless Otherwise Noted)*
Educational Outcomes	Rates of high school non-completion (5 studies)	Median decrease of 29.1% (IQR: -53.9% to -14.8%)
	Grade promotion (3 studies)	Average increase of 11.5% (8.4% and 14.6%); 2 studies SBHCs associated with increases in students on pace to graduate; 1 study
	GPA (3 studies)	Median increase of 4.7% (Range: 3.5% to 7.2%)
Healthcare-Related Outcomes	Immunization (4 studies)	Median increase of 15.5 percentage points* (Range: -22.0 to 26.1 percentage points)
	Other recommended preventive services (6 studies)	Median increase of 12.0 percentage points* (IQR: 5.7 to 45.1 percentage points)
	Regular source of health care (7 studies)	Median increase of 2.2% (IQR: -1.8% to 12.4%)
Asthma-Specific Outcomes	Morbidity (2 studies)	Median decrease of 19.3% (36.4% and 2.1%; 2 studies)
	Emergency department visits (4 studies)	Median decrease of 15.8% (Range: -50.0% to -5.9%)
	Hospitalizations (3 studies)	Median decrease of 70.6% (Range: -79.9% to -37.5%)
Other Morbidity-Related Outcomes	Self-reported physical health (7 studies)	Median decrease of 1.2% (Range: -17.4% to 5.6%); 4 studies Mixed results in self-report of physical discomfort and health-related quality of life; 3 studies

Outcome	Measure (Number of Studies)	Relative Percent Change (Unless Otherwise Noted)*
	Self-reported mental health problems (8 studies)	Median decrease of 5.7%; (IQI: -31.6% to 8.9%); 4 studies Favorable, non-significant, effects on psychosocial health; 3 studies Reduction in suicide attempts; 1 study
	Non-asthma-related emergency department visits (15 studies)	Median decrease of 14.5% (IQI: -33.8% to 4.6%)
	Non-asthma-related hospital admissions (2 studies)	Mean decrease of 51.6% (-86.9% and -16.3%; 2 studies)
Risk Behaviors	Smoking (7 studies)	Median increase of 21.0% (IQI: -24.1% to 32.4%)
	Alcohol consumption (6 studies)	Median decrease of 14.8% (IQI: -19.8% to -9.5%)
	Other illicit substance use (5 studies)	Median decrease 27.2% (IQI: -48.2% to 13.6%)
	Any substance use (tobacco, alcohol, or substance use) (1 study)	15.7% decrease in any substance use
	Nutrition, physical activity, and weight- related outcomes (3 studies)	Metrics too diverse to be summarized
Sexual Risk Behavior and Reproductive Outcomes	Contraception Use (7 studies)	Females and Males Combined (4 studies): Median increase of 7.8% (Range: -21.2% to 46.7%) Females only (3 studies): Median increase of 17.8% (Range: -8.5% to 54.9%)

Outcome	Measure (Number of Studies)	Relative Percent Change (Unless Otherwise Noted)*
		Males only (3 studies): Median decrease of 3.1% (Range: -6.2% to 14.5%)
	Sexual Activity (5 studies)	Females and Males Combined (3 studies): Median increase of 19.6% (Range: -0.9% to 83.2%) Females only (2 studies): Median decrease of 3.6% (-16.0% and 8.9%; 2 studies) Males only Median decrease of 8.5% (-12.0% and -4.9%; 2 studies)
	Becoming pregnant or causing pregnancy (5 studies)	Females only (5 studies): Median decrease of 40.0% (IQR: -47.5% to 17.6%) Males only (1 study): Increase 21.5%
	Month of initiation of prenatal care (3 studies)	Pregnant students received prenatal care 0.45 months earlier; 2 studies 15.1 percentage point increase in percent of pregnant students registered for prenatal care during 1st trimester; 1 study
	Received Prenatal Care (4 studies)	Median 27.8% increase in number of prenatal visits (9.4% and 46.2%); 2 studies 25 percentage points increase in percent of pregnant students receiving 12 or more visits; 1 study 87 percentage point increase in percent of pregnant students who received prenatal care; 1 study

Outcome	Measure (Number of Studies)	Relative Percent Change (Unless Otherwise Noted)*
	Low Birth Weight (3 studies)	Median decrease of 58.3% (Range: -60.4% to -14.4%)
	Pregnancy Complications (3 studies)	Median increase of 25% (Range: -16.1% to 76.3%)

IQI, Interquartile interval

*In several studies it is more useful to report results as percentage point gains in intervention versus control populations (e.g., when baseline rates are very low). In these instances, results are reported explicitly in percentage points.

Differential Effects by Program Characteristics

Studies that assessed the effect of SBHCs on emergency department use and hospital admissions (for asthma and other conditions) found rates were lower when SBHCs remained open outside of school hours. Evidence also indicated that greater ranges of services provided by SBHCs were associated with greater reductions in emergency department visits or hospital admissions.

Studies that examined reproductive health outcomes (i.e., pregnancy or birth rates and contraception use) found inconsistent results when comparing the provision of contraception at on-site vs. off-site SBHCs.

Included studies did not provide enough descriptions of service costs to determine whether free services for students were associated with increased utilization.

Applicability and Generalizability Issues

Because most SBHCs are implemented in low-income or racial and ethnic minority communities, SBHCs are likely to advance health equity.

Applicability to younger grade levels is limited, as the majority evaluated high school SBHCs, whereas one study assessed middle school SBHCs, seven studies evaluated pre-K or elementary school SBHCs, and the remaining 12 studies assessed some combination of grade levels.

Most studies of SBHCs were conducted in urban communities. The adaptation of SBHC models in rural areas may be challenging because of low population density that may not be able to sustain SBHC models that are effective in higher density regions.

SBHCs have not been evaluated in higher income communities. Since health care needs in these communities may be fewer and otherwise addressed, it is unclear whether SBHCs would be useful or effective. On the other hand, schools may be an effective way of delivering health care to students.

Most of the included studies assessed on-site SBHCs and several evaluated a combination of on-site and off-site SBHCs. None of the included studies evaluated off-site centers alone, thus the effectiveness of this option is not known.

Data Quality Issues

Limited descriptions of SBHC characteristics (e.g., hours of operation, costs to patients), hindered the ability to assess their contributions to the observed effects.

Many of the included studies did not control for confounding variables (e.g., demographics, health characteristics). Because people who use SBHCs are likely different from people who do not, and because SBHCs are more likely to be implemented in places of greater need, effect estimates may underestimate actual effects.

Other Benefits and Harms

- Reduced parental time in child healthcare is reported in the literature, thus avoiding time-off from work (Lofink et al. 2013).
- Health care provided to community members by some SBHCs (Lofink et al. 2013).

Economic Evidence

The economic review included 21 studies (search period January 1985-September 2014), all of which were conducted in the U.S. Monetary values are presented in 2013 U.S. dollars.

Fifteen of the included studies provided information about intervention cost, which was made of up two components:

- Start-up cost—a one-time, fixed cost that includes the cost of renovating or constructing the school space, the purchase of initial office and medical equipment, and staff salaries for the initial implementation phase.
- Operation cost—annually recurring medical costs (e.g., medical supplies, lab tests) and non-medical costs (e.g. staff salaries and benefits).

Two studies reported start-up costs that ranged from \$41,450 to \$378,704 per SBHC. Fourteen studies reported operation costs that ranged from \$16,322 to \$659,684 per SBHC per year. The wide variation in operation cost was attributed to differences in the local cost of living, work hours for physicians and staff, study setting (nationwide versus state), and data source. Local cost of living and work hours for physicians and staff influenced salaries and benefits—the major components of operation cost. Nationwide studies included multiple states that differed in many aspects. Five studies reported actual operation costs, while nine other studies estimated costs from proxies such as operating budget, grant funding, or operating revenues.

Nine of the included studies reported on intervention benefit, which was categorized into two groups:

- Healthcare cost averted (i.e., averted cost of hospitalization, emergency department use, medications, referrals, private clinic visits, and unintended teen pregnancies)
- Productivity and other loss averted (i.e., averted cost of school time and productivity losses, and averted travel cost and ambulance use)

Benefit studies were conducted from a societal, healthcare payers' (Medicaid), patients', or other perspective. One study used both societal and healthcare payers' perspectives. Three studies that considered a societal perspective reported between \$15,028 and \$912,878 in averted costs per SBHC per year, associated with treatment, productivity losses, and transportation combined with other relevant benefits. The wide range was due mainly to the number of benefit components considered and whether the study included major benefit drivers (averted emergency department use, unintended pregnancy, and productivity loss).

Four studies that used a healthcare payers' perspective showed net savings to Medicaid ranging from \$30 to \$969 per visit, or \$46 to \$1,166 per user. The variation in net savings was due mainly to the number and types of components that were included (net savings tended to be higher when emergency room use was included). Some variation was also attributed to the types of cases treated in SBHCs (care for asthma patients was associated with higher net savings).

Two studies that considered either the perspective of patients or their parents reported per visit savings of \$90 (1 study) and per user savings of \$23,592 (1 study that included the averted cost of child birth from an unintentional pregnancy).

The remaining one study addressed savings per visit to taxpayers. Two of the nine included benefit studies used regression analysis to show that SBHCs reduced costs for Medicaid and hospitalization.

Benefit-cost ratios were calculated from two studies that evaluated seven SBHCs. Results showed that the societal benefit per SBHC exceeded intervention cost, with the benefit-cost ratio ranging from 1.38:1 to 3.05:1. Even though the two studies were similar in terms of SBHC services and the number of users, the calculations of benefit were different. One study calculated benefits in a relatively comprehensive way by including six benefit components, whereas the other included only two major benefit components (emergency department use and unintended pregnancy). In that study, the economic benefit from unintended pregnancies averted included the public cost of children born to teenagers and accounted for more than 85% of the total benefit.

Limitations:

From the cost side, only two studies reported start-up cost. This might cause the annual total cost to be underestimated. However, once the one-time start-up cost was amortized, it would be much lower than annual operation cost. Further, only four studies reported the number of SBHC users, which might cause imprecise estimation of per user cost. Likewise, only two studies provided information on the number of students. In addition, nine studies used proxies such as operating budget, grant funding, or operating revenues to estimate cost, or simply quoted from other studies. However, the range of the estimated costs were similar to the range of the actual costs in the rest of the cost studies.

From the benefit side, only three studies used actual data. The remaining studies estimated benefit based on different assumptions. This could lead to overestimation of the benefit. Further, only six studies clearly specified the time horizon of benefit. Others were somewhat ambiguous, with one study's time horizon implied by the context and methodology.

In summary, school-based health centers provide societal benefits that are greater than the costs. Further, SBHCs result in net savings to SBHC users and the Medicaid program.

Considerations for Implementation

In the implementation of SBHCs, the following issues should be considered:

- Billing and financing is a major challenge to SBHC implementation and sustainability.
- Lack of full uptake of available SBHC services by students for whom the services are available is another challenge of SBHC implementation.
- SBHC benefits likely depend on population density. It may be necessary to develop modified models for low population density and rural settings.
- Included studies indicated that the greater the range of services offered, the greater the benefits. Offering services outside of in addition to within school hours also increases effectiveness.

Evidence Gaps

More research is needed to answer the following questions:

- Although SBHCs are usually located in high-need communities, the proportions of students who enroll, and those enrollees who receive SBHCs services, are often less than those in need of these services. Strategies to increase use of SBHC services should be evaluated.
- The effects of cost to patients on overall SBHC use and outcomes should be evaluated. Does use increase if services are free to users?
- The effectiveness of SBHCs in schools and communities with majorities of higher-income and non-Hispanic white students should be evaluated. Are there thresholds or points of diminishing returns on community income, insurance coverage, and other measures of need above which SBHCs are less effective?
- SBHCs usually offer services to school staff, student family members, and others in the community. What are the effects of SBHCs on the health of these populations?
- The effectiveness of alternative SBHC designs for rural areas with low population density should be evaluated.
- The effectiveness of school-linked and mobile health centers should be evaluated.
- The relative impact on specific outcomes of focused programs—such as intensive asthma programs or programs focused on reproductive health—when compared with general programs should be evaluated.
- What are the components of the SBHCs being assessed and the attributes of populations they serve? Better descriptive information is needed for optimal program evaluation, design, and targeting.
- What are the long-term impacts of SBHCs in academic achievement, income, and health?
- What synergistic effects, mutual support, or redundancies might occur between SBHCs, school health policies or classroom health education?
- The need for SBHCs following full implementation of the Affordable Care Act should be evaluated. Will fewer students need SBHCs when there is greater insurance coverage among low-income households? Or are schools an effective locus for student health care regardless of levels of insurance coverage?
- What is the cost of SBHCs per quality-adjusted life year (QALY)?
- What would the lifetime economic benefits be if studies accounted for reduced health disparity and students' improved academic performance?
- What are the costs and benefit of mobile SBHCs?

The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.

References

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Disclaimer

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provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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