A Community Guide Health Equity Review of the Effectiveness of School-based Health Centers for Improving Health and Academic Outcomes

Robert A. Hahn, PhD, MPH
Division of Public Health Information Dissemination
Center for Surveillance, Epidemiology, and Laboratory Services
U.S. Centers for Disease Control and Prevention

Webinar: “Towards Health Equity: School Based Health Care Effectiveness and Innovation”
DC-Baltimore Research Center on Child Health Disparities
November 2, 2015
Disclaimer

The findings and conclusions in this presentation do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they 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.

The Centers for Disease Control and Prevention “provides administrative, research, and technical support for the Community Preventive Services Task Force.”

[PHS Act §399U[c]]
Presentation Theme

The Community Preventive Services Task Force recommends the implementation and maintenance of school-based health centers in low-income communities. School-based health centers are associated with

Improved health outcomes:

• Increased vaccinations and other preventive services
• Fewer asthma incidents
• Fewer emergency department and hospital admissions
• Increased contraceptive use among females
• Increased prenatal care and birth weight
• Better health risk behaviors

Improved educational outcomes:

• School performance
• Grade promotion
• High school completion
Agenda

Guide to Community Preventive Services
Intervention background and definition
Analytic framework
Research questions
Methods
Results
Summary of findings
Finding statement
Review Coordination Team

Staff Team
Robert A. Hahn
John Knopf
Ramona Finnie
Yinan Peng

Task Force Members
Robert Johnson (Rutgers New Jersey Medical School)
Jonathan Fielding UCLA Fielding School of Public Health)

Task Force Liaison Member
Regina Davis Moss (APHA)
CDC Library Specialist:
Onnalee Gomez (OSELS/EAPPO)

CDC Partners (CDC Office)
Benedict I. Truman (NCHHSTP)
Camara Jones (OSELS)
Pete Hunt (NCHHSTP)
Mary Vernon-Smiley (NCHHSTP)
Joi Hudson (NCCDPHP)
Ingrid Hall (NCCDPHP)
Gia Rutledge (NCCDPHP)

External Partners
Bobby Milstein (Hygeia)
Carles Muntaner (U Toronto)
Jacqueline Buckley (US Dept Education)
Mindy Fullilove (Columbia)
Steven Barnett (NIEER)
David Williams (Harvard)
Irene Dankwa-Mullan (NIH)
Consultants for this Review

• Veda Johnson, MD, MPH
  • Department of Pediatrics, Emory University School of Medicine
• Hayley Lofink, PhD
  • School-Based Health Alliance
The Community Guide

Systematic reviews
Evaluate and analyze all available evidence on the effectiveness of community-based programs, services, and policies in public health
Assess the economic benefit of all effective programs, services, policies
Highlight evidence gaps

Evidence-based findings and recommendations
Developed by the Community Preventive Services Force (Task Force)
Help inform decision-making

www.thecommunityguide.org
Community Preventive Services Task Force

A non-federal, independent panel
Renowned experts in public health research, practice, and policy
Members are appointed by CDC Director
Serve without compensation for this work
  CDC provides scientific, technical and administrative support for the Task Force
In General, a Conclusion on Effectiveness Requires:

A Body of Evidence

More than one study
Fewer if high quality
More if lower quality

A Demonstration of Effectiveness

Consistency of Effect

“Most” studies demonstrated an effect in the direction of the intervention

Sufficient Magnitude of Effect

The effect demonstrated across the body of evidence is “meaningful”
School-Based Health Centers: Definition

School-Based Health Centers (SBHCs) are systems of health services provided to students at centers within PreK-12 schools (i.e., school-based) or at off-site health facilities linked to the schools (i.e., school-linked). Most SBHCs are targeted to low-income students.

- Services must include primary health care.
- Services may also include mental health care, social services, dentistry, and health education.
- Minimally, primary care services are provided by a single clinician (e.g., nurse practitioner, physician assistant, or physician). Comprehensive services may be provided by multi-disciplinary teams.
- Services need not be available during all school hours or days.
- Student participation requires parental consent, and services may be limited for specific forms of care, such as reproductive and mental health.
- Services may also be provided to school staff, student family members, and others in the surrounding community.
Analytic Framework: School-Based Health Centers to Promote Health Equity

**Health education:**
- Nutrition
- Sexual behavior
- Substance abuse
- Physical activity
- Mental health

**Patient comfort/satisfaction**

**Increased use of recommended preventive services**

**Increased access to services (medical, mental health, dental, social)**

**Increased/earlier diagnosis**

**Reduced risk behavior**

**Reduced teen births**

**Increased/earlier treatment:**
- Infectious diseases
- Chronic diseases
- Dental health
- Mental health

**Reduced transportation time, cost**
**Reduced parental health-care time**
**Decreased fragmentation of care**

**Increased proportion with medical home**

**Improved school achievement**

**Reduced health care misuse**

**Reduced morbidity and injury**

**Improved health of low-income and minority students**

**Health Equity**

**Federal, state, local policies**

**Key Effect Modifier**
- Available community health care
- Parental engagement
- School-based/linked
- Record Sharing
Research Questions

1. How effective are SBHCs in improving health and educational outcomes in student bodies?

2. Does the use of SBHCs improve the health and educational outcomes of users?
Research Questions, Cont’d

3. Is intervention effectiveness affected by:
   • Extent of services (number/kinds of providers; medical, mental, dental services)?
   • Availability in time (hours/days per week) and space (proximity)?
   • Demographic and socioeconomic characteristics of the community served?

4. How do specific SBHC features, such as the availability of contraceptives on site (versus by referral to other settings) moderate SBHC effects on specific outcomes, e.g., pregnancy?
METHODS
Review Outcomes

1. Preventive services (per USPSTF/CG/ACIP)*

2. Morbidity—acute and chronic conditions
   - Overall health measures*
   - Asthma incidents, ER visits, hospitalizations*
   - Injury
   - Mental health – depression, anxiety, suicidal behavior*
   - Untreated conditions

3. Inappropriate utilization
   - ER Use; may be distinguished as urgent/non-urgent*
   - Hospitalization*

4. Source of regular health care services*

5. Reproductive health
   - Sexual behaviors*
   - Childbearing*

6. Other risk behaviors
   - Substance use*
   - Physical activity
   - Nutrition
   - Violence

7. Educational outcomes
   - Grades/test scores
   - Retention
   - High school completion*

* Outcome presented below
Search for Evidence

Databases
- PubMED, CINAHL, PsycINFO, Cochrane Library, ERIC

Search articles/review papers

Period
- Beginning of computerized databases to July 2014

Search terms
- School/School-based/school-linked
- Health care clinics/centers/services
- School health/mental health/dental health/social services
- School nurse
- Outcomes: health-related, school/educational
Inclusion Criteria

• Studies evaluating program effectiveness must meet the following criteria:
  • Published in English, and
  • Acceptable study design: pre- post- with comparison; time series; before-after study with no separate control population, cross sectional with control for confounding.

• Studies must evaluate programs that meet following criteria:
  • Provide primary care in school-based or school-linked setting,
  • Have a primary care provider; maximally full range of medical, mental health, dental, social services (not school nurse alone),
  • Report student health, risk behavior, health care utilization/delivery, or educational outcomes, and
  • Be implemented in high-income nation.
Exclusion Criteria

Cross sectional studies without control for confounding.

Studies that ONLY reported asthma prevalence; utilization of services not specifically recommended by USPSTF, CPSTF, ACIP; or school attendance.
RESULTS
# Body of Evidence (N=48)

<table>
<thead>
<tr>
<th>Quality of Execution (# penalties)</th>
<th>Suitability of Study Design (# studies)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greatest</td>
</tr>
<tr>
<td>Good (0-1)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Britto 01, Gibson 13, Guo 05, Guo 08, Key 02, Ricketts 06, Robinson 03, Wade 05, Walker 10</td>
</tr>
<tr>
<td>Fair (2-4)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Kerns 11, Kisker 96, Lewin 97*, McNall 10, Warren 00, Weist 93</td>
</tr>
<tr>
<td>Limited (&gt;4)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Bourne 71, Dallas ISD 06, Jennings 00, Jones 97</td>
</tr>
</tbody>
</table>

Included studies: 44  
Excluded studies: 4  
* Citations in red include separate studies with different features
Effects of School-Based Health Centers on Health-Related Outcomes: Immunization

Author Year, Vaccine (Baseline %)

Klosterman00 (67)
Zimmer-Gembeck97 (34)

Allison07§, HepB (20.1)
Federico10§, HepB (83.9)
Federico10§, HepA (50.3)
Federico10§, Td (53.4)
Federico10§, Tdap (61.7)
Allison07§, Td booster (21.5)
Federico10§, IPV (84.9)
Federico10§, varicella (12.9)
Federico10§, MMR (82.9)

Favor Intervention

SBHC vs. Non-SBHC

SBHC Users vs. Community Users

Median: 15.5 pct pts
Range: -22, 26.1 pct pts

All data points collapsed to calculate one effect estimate for that study

Td: Tetanus, Diphtheria
Tdap: Tetanus, Diphtheria, Pertussis
MMR: Measles, Mumps, and Rubella
IPV: Inactivated Polio Vaccine
MCV4: Meningococcal Conjugated Vaccine
HPV: Human Papillomavirus

Absolute Percent Point Change or Difference

16
Effects of School-Based Health Centers on Health-Related Outcomes: Other Recommended† Preventive Screening/Counseling

Author Year (Outcome, BL)

Gibson13§ (S/C Emotions, 12%)
Santelli96 (S/C Emotions, 18%)
Gibson 13§ (S/C Sex and/or birth control, 20%)

Barnett03§ (S/C Depression/suicide, 7%)
Kaplan98§ (S/C Emotional health, 2.9%)
Klein07§ (S/C Feeling sad or hopeless, 18.1%)
Barnett03§ (S/C Consistent condom use, 15%)
Kaplan98§ (S/C Sexual activity, 31%)

Ethier11 (S STI, 19.3%)
Kaplan98§ (S/C STD risk, 12%)
Klein07§ (S/C Pregnancy and STDs, 68.0%)
Kaplan98§ (S/C Tobacco use, 17.2%)
Klein07§ (S/C Cigarettes/smoking, 49.8%)
Kaplan98§ (S/C Violence, 0.2%)
Klein07§ (S/C Violence Prevention, 38.7%)

†USPSTF and CPSTF (intervention includes service, or equivalent to recommendation)
§All data points collapsed to calculate one effect estimate for that study

-40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100

Absolute Percentage Point Change or Difference

SBHC vs non-SBHC

SBHC User vs. Community Care User

MDD Screen
STI Screen/ Counsel
Tobacco Ed/ Counsel
SB violence programs

Favors Intervention

Median: 12.0 pct pts
IQL: 5.7 to 45.1 pct pts
Effects of School-Based Health Centers on Asthma-related Outcomes:
Hospitalization, Emergency Department (ED) Use, and Morbidity

<table>
<thead>
<tr>
<th>Author Year (Baseline%)</th>
<th>Before-after w/comparison</th>
<th>Before-after</th>
<th>Cross-sectional</th>
<th>4 studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webber 03 (17.1%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hospitalization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SBHC vs non-SBHC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lurie 01 (14.9%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-post SBHC Implementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guo 05 (7.1%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SBHC users vs Community users</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silberberg 08 (NR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webber 03 (44.4%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lurie 01 (35.6%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-post SBHC Implementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guo 05 (32.2%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webber 03 (72.6%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lurie 01 (4.8 days/night*)</td>
<td>Pre-post SBHC Implementation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Number of days or nights in past 4wks child had asthma symptoms
Effects of School-Based Health Centers on Other Morbidity-Related Outcomes: Self-Reported Health Status

Author Year (Outcome, BL)

Britto 01§
- % no chronic illness† (65.6%)
- % health status excellent (28.5%)
Kisker 96 (% very good or excellent health, 55.0%)

Lewin 97§
- Elementary School (% no physical health problems 26.0%)
- Middle/high school (% no physical health problems 51.0%)

Silberberg 08§
- % no medical condition‡ (72.3%)
- % no dental problems (89.7%)

[Lewin 97§]
- Elementary School (% no physical health problems 31.0%)
- Middle/high school (% no physical health problems 61.0%)

§All data points collapsed to calculate one effect estimate for that study
† Does not include asthma
[ ] Not included to calculate median

SBHC vs non-SBHC

Median: -1.2%
Range: -17.4% to 5.6%

User vs Non-user

Favors Intervention

Relative Percent Change or Difference

-50 -45 -40 -35 -30 -25 -20 -15 -10 -5 0 5 10
Effects of School-Based Health Centers on Other Morbidity-Related Outcomes: Non-Asthma-Related Emergency Department (ED) Utilization and Hospitalization

Author Year (Outcome)(BL)

Britto 01 (% with ED visit) (29.7)
Gance-Cleveland 05 (% with ED visit) (18.4)
Gance-Cleveland 05 (Hospitalization) (0.8)
Hutchinson 12 (% with ED visit) (35.1)
Kaplan 99 (% with ED visit) (13.0)
Key 02 (avg # ED visit) (0.7)
Kirby 89/91 - (avg # ED visit) (0.45)
Kisker 96 (avg # ED visit) (0.28)
Santelli 96 (% with ED visit) (37.0)
Santelli 96 (Hospitalization) (18.0)
Silverberg 08 (% with ED visit) (23.2)
Wade 05 (% with ED visit) (NR)
Young 01$ (# of non-urgent ED visit) (44.0)
Young 01$ (# of urgent ED visit) (18.0)
Juszczak 03 (% with ED visit) (NR)
Kaplan 98 (% with ED visit) (55.5)
Allison 07 (% with ED visit) (33.8)
Lewin 97$
Elementary school (% with ED visit) (26.0)
Middle/high school (% with ED visit) (46.0)
[ Wade 05 (% with ED visit) (28.5) ]

$All data points collapsed to calculate one effect estimate for that study
[ ] Not included in calculation of median

SBHC vs. Non-SBHC

ED
Median: -14.5%
IQI: -33.8% to 4.6%

Hospitalization
Average: -51.6%
Values: -86.9%, -16.3%

SBHC User vs. Community User

User vs. Non-User

Favors Intervention

Relative Percent Change or Difference

-120 -100 -80 -60 -40 -20 0 20 40 60 80
Effects of School-Based Health Centers on Health-Related Outcomes: Having Regular Source of Health Care

Author Year (Baseline %)

- Kisker 96 (76.0%)
- Gibson 13 (70%)
- Hutchinson 12† (71.7%)
- Lewin 97§ (usual medical care)
  - Elementary school, 78.5%
- Lewin 97§ (usual dental care)
  - Elementary school (78.5%)
  - Middle/high school (78.5%)
  - Lurie 01 (97.0%)
- Silberberg 08§
  - Usual medical care (89.4%)
  - Usual dental care (80.3%)
  - Usual mental health care (64.4%)
  - Wade 05 (96.9%)

[ ] Not included to calculate median

SBHC vs. Non-SBHC

Median: 2.2%
IQR: -1.8%, 12.4%

SBHC Users vs. Non-Users

Favors Intervention

Relative Percent Change or Difference

†Adjusted results
§All data points collapsed to calculate one effect estimate for that study

33
Effects of SBHC on Sexual Activity

Author Year (outcome) (BL)

- Kiser 96 (% had sex in past month, 18.0%)
- Warren 03 (% ever had sex, 30.9%)
- Klein 07 (% ever had sex, 37.1%)
- Hutchinson 12 (% ever had sex, 48.9%)
- Kirby91§ (# times had sex past 4 wks, 2.6 times)
- Hutchinson 12† (% ever had sex, 74.3%)
- Kirby91§ (# times had sex past 4 wks, 3.3 times)

Before-after w/ Comparison  Before-after  Cross-sectional  5 studies

SBHC vs non-SBHC

Females and males

Females and males

Median: 19.6%

Range: 0.9% to 83.2%

SBHC users vs nonusers

Females only

Females

Mean: -3.6%

SBHC users vs Community users

Males only

Males

Mean: -8.5%

Favors Intervention

Relative Percent Change or Difference

§All data points collapsed to calculate one effect estimate
†Adjusted change
Effects of SBHC on Pregnancy Outcomes

Author Year (Outcome, BL)
- Ricketts06 (Births/100 AA girls, 160/1000)
- Kisker96 (% ever pregnant, 5.0%)
- Kirby93† (birthrate/1000 students)(22/1000)
- Kirby91§ (% pregnant, past yr, 14.0%)
- Edwards77 (fertility rate/1000 students)(80/1000)
- Kirby91§ (% caused pregnancy, past yr, 8.5%)

Female
- Before-after w/ Comparison
- Before-after
- Cross-sectional
- 5 studies

Median: -40.0%
IQL: -47.5%, 19.8%

Male

Favors Intervention

Relative Percent Change or Difference

§All data points collapsed to calculate one effect estimate
†Weighted for number of female students in school
Effects of School-Based Health Centers on Risk Behaviors: Alcohol Use

Author Year, (Baseline%)

Hutchinson12 (70.5%)
Kirby 91§†

Dallas, TX (41%)
Gary, IN (52%)
Jackson, MS (38%)
Quincy, FL (36%)
Kisker96 (36.0%)
Robinson03‡ (1.2 days)

Warren03
% beer, past 2mon (37.2%)
% liquor, past 2mon (36.7%)

Klein07
% drank past mon (29.1%)
% w ≥5 drinks in a row, past month (42.0%)

§All data points collapsed to calculate one effect estimate
†Calculated from % never drank
‡ # of days drank in past month

SBHC vs. Non-SBHC

SBHC Users vs. Non-Users

SBHC Users vs. Community Users

Favors Intervention

Relative Percent Change or Difference

Median: -14.8%
IQR: -19.8%, -9.5%
Effects of School-Based Health Centers on Risk Behaviors: Smoking

Author Year, (Baseline%)

Hutchinson 12 (6.6%)
Kirby 91§†
  Dallas, TX (8%)
  Gary, IN (21%)
  Jackson, MS (14%)
  Quincy, FL (6%)
  Kiser 96 (9%)
  Lewin 97(36.0%)
Robinson 03‡ (1.0 days)

Warren 03 (30.8%)
Klein 07 (14.3%)

SBHC vs. Non-SBHC

Before-after w/ Comparison  
Before-after  
Cross-sectional  
7 studies

Median: 21%
IQR: -24.1%, 32.4%

SBHC vs. Non-Users

SBHC Users vs. Community Users

Favors Intervention

Relative Percent Change or Difference

§All data points collapsed to calculate one effect estimate for that study
†Calculated from % never used
‡ # of days in past month used
Effects of School-Based Health Centers on Risk Behaviors: Substance Use

Author Year, (Baseline%)

Hutchinson12 (marijuana, 38.3%)
Kiser96† (5%)
Robinson03‡‡ (1.4 days)
Kirby 91§† (Illegal Drugs)
  Dallas, TX (10%)
  Quincy, FL (4%)

Warren 03 (marijuana, 19.7%)
Warren 03 (illegal drugs, 4%)

§All data points collapsed to calculate one effect estimate
†Calculated from % never used
‡‡ # of days in past month used

SBHC vs. Non-SBHC

Before-after w/ Comparison
Before-after
Cross-sectional
5 studies

SBHC Users vs. Non-Users

Favors Intervention

Relative Percent Change or Difference

Median: -27.2%
IQR: -48.2%, 13.6%
Effects of SBHC on Academic Outcomes:
High School Non-completion Rates

Author Year (Outcome, Baseline %)
Edwards 77 (postpartum dropout rate, 45%)
Kerns 11§ (Dropout, NR)
McCord 93 (dropout rate, 72.1%)
Barnett 04 (drop out rate pregnancy and post-pregnancy school yr, 19.5%)
Setzer 92 (drop out rate among pregnant students, 57.5%)

Pre-post SBHC implementation
SBHC users vs non-users
SBHC users vs Community users

Favors Intervention

Before-after w/ Comparison

6 studies

Relative Percent Change or Difference

Median: -29.1%
Range: -77.8%, -14.3%

§All data points collapsed to calculate one effect estimate
†Adjusted change
Additional Analyses:

Effects of SBHC Program Characteristics
Effect Modification (Secondary Research Question): Impact of Hours of Availability on Hospitalization and Emergency Department (ED) Use

Author Year (Metric, BL)

Guo05§ (avg # ED visit, NR)
Guo05§ (Hospitalization, NR)
Kirby91§-Dallas (avg # ED visit, 0.46)
Kirby91§-Gary (avg # ED visit, 0.44)
Kirby91§-Jackson (avg # ED visit, 0.38)
Kirby91§-Muskegon (avg # ED visit, 0.7)
Kirby91§-Quincy (avg # ED visit, 0.57)
Kirby91§-San Fran (avg # ED visit, 0.35)
Kisker96 (avg # ED visit, 0.49)
Webber03§ (% with ED visit, 44.4)
Webber03§ (Hospitalization)
Allison07 (% with ED visit, 33.8)
Juszczak03 (% with ED visit, NR)
Kaplan98 (% with ED visit, 55.5)
Santelli96§ (% with visit for asthma, 39)
Santelli96§ (Hospitalization, NR)

Regular School Hours

Extended Hours

Favors Intervention

Relative Percent Change or Difference

-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60

8 studies

Median: -5.2%

Median: -37.0%

§All data points collapsed to calculate one effect estimate
Effect Modification: Impact of Range of Services Offered on ED Visits

Author Year (Outcome, Baseline)

Lewin97 (% with ED visit, 36.0)
Hutchinson12 (% with ED visit, 35.1)
Kirby89/91 (avg # ED visit, 0.45)
Allison07 (% with ED visit, 33.8)
Kisler96 (avg # ED visit, 0.49)
Young01 (Avg # ED visit, 44.0)
Britto01 (% with ED visit, 29.7)
Gance-Cleveland05 (% with ED visit, 18.4)
Guo05 (avg # ED visit, NR)*
Juszcak03 (% with ED visit, NR)
Kaplan98 (% with ED visit, 55.5)
Santelli96 (% with ED visit, 39)
Silberberg08 (% with ED visit, 26.5)

1 service (Primary Care)

2 services
PC, R

3 services
PC, MH, R

4 services
PC, MH, R, S

Favors Intervention

Median: −25.1%
IQR: −12.5% to −34.1%

D: Dental services
ED: Emergency department
MH: Mental health services
R: Reproductive services
S: Social services

*: Asthmatic sample
Economic Evidence

For interventions found to be effective, the Community Guide systematically reviews economic evidence.

The only two available studies examined benefit: cost ratios from a societal perspective.

- One found benefits were 1.4 times costs.
- Another found that benefits were 3.1 times costs.
Overall Review Assessment

- Body of evidence: 44 studies
  - 31.8% greatest suitability of design; 50% fair quality

- Impact on recommended preventive services
  - Magnitude of effect meaningful? Yes
  - Consistent across the body of evidence? Yes

- Impact on morbidity
  - Asthma
    - Magnitude of effect meaningful? Yes
    - Consistent across the body of evidence? Yes
  - Physical Health
    - Magnitude of effect meaningful? No
    - Consistent across the body of evidence? Yes
  - Mental Health
    - Magnitude of effect meaningful? No
    - Consistent across the body of evidence? No

- Impact on misuse of medical care resources
  - Magnitude of effect meaningful? Yes
  - Consistent across the body of evidence? Yes
Overall Review Assessment

- Impact on source of regular health care services
  - Magnitude of effect meaningful?: Yes
  - Consistent across the body of evidence?: Yes
- Impact on reproductive health
  - Magnitude of effect meaningful?: No
  - Consistent across the body of evidence?: No
- Impact on other risk behaviors
  - Magnitude of effect meaningful?: Yes
  - Consistent across the body of evidence?: Unclear
- Impact on educational outcomes
  - Magnitude of effect meaningful?: Yes
  - Consistent across the body of evidence?: Yes
- Team assessment
  - Sufficient evidence of effectiveness
<table>
<thead>
<tr>
<th>Evidence of Effectiveness</th>
<th>Quality of Execution</th>
<th>Suitability Of Design</th>
<th>Number of Studies</th>
<th>Consistent</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRONG</strong></td>
<td>Good</td>
<td>Greatest</td>
<td>2 or more</td>
<td>Yes</td>
<td>Meaningful</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>Greatest or Moderate</td>
<td>5 or more</td>
<td>Yes</td>
<td>Meaningful</td>
</tr>
<tr>
<td></td>
<td>Good or Fair</td>
<td>Greatest</td>
<td>5 or more</td>
<td>Yes</td>
<td>Meaningful</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meet criteria for SUFFICIENT but not STRONG body of evidence</td>
<td></td>
<td>LARGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SUFFICIENT</strong></td>
<td>Good</td>
<td>Greatest</td>
<td>1</td>
<td>NA</td>
<td>Meaningful</td>
</tr>
<tr>
<td></td>
<td>Good or Fair</td>
<td>Greatest or Moderate</td>
<td>3 or more</td>
<td>Yes</td>
<td>Meaningful</td>
</tr>
<tr>
<td></td>
<td>Good or Fair</td>
<td>Greatest Moderate</td>
<td>5 or more</td>
<td>Yes</td>
<td>Meaningful</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Least</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meet criteria for STRONG body of evidence, but Task Force opts to downgrade conclusion to SUFFICIENT for one or more reasons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expert Opinion</strong></td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>Meaningful</td>
</tr>
<tr>
<td><strong>INSUFFICIENT (one or more)</strong></td>
<td>Inadequate designs or execution</td>
<td>Too Few</td>
<td>No</td>
<td>Small</td>
<td></td>
</tr>
</tbody>
</table>
Evidence Gaps

• Evaluate SBHC models in rural areas with low population density.
• Evaluate school-linked health centers and mobile units
• Assess threshold of community income/insurance coverage levels for utility of SBHCs.
• Evaluate effect of free vs. out of pocket costs on SBHC effectiveness.
• Evaluate means of increasing student enrollment in and utilization of SBHCs.
• Assess effects of ACA on SBHCs. Decreased need? Alternative funding mechanisms?
• Assess effect moderation of focused versus general programs on outcomes of focus.
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.
Most evidence derives from studies of SBHCs in low-income populations. As SBHCs are commonly implemented in low-income communities and communities with high proportions of racial and ethnic minority populations, many of whom are low-income, this source of student health care and health education may be a prominent means of advancing health equity.
Discussion
Sources and contacts


Community Guide School-Based Health Center Review Summary: [http://www.thecommunityguide.org/healthequity/education/schoolbasedhealthcenters.html](http://www.thecommunityguide.org/healthequity/education/schoolbasedhealthcenters.html)

Robert A. Hahn: rah1@cdc.gov