Evaluation of Cost-Benefit and Health Disparity for School-Based Health Centers in Ohio

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Research Team
- Jeff J. Guo, PhD, Professor (P.I.)
- Kate Keller, MPA (SBHC coordinator)
- Wei Pan, PhD, Professor (statistician)
- Terrance Wade, PhD, Professor
- Mona Ho, MS (data analyst)
- Mark Caronna, MA (database manager)
- Many students & other colleagues (Ray Jang, Robert Guxton, etc.)
- Health Foundation of Greater Cincinnati (Ann McCracken, and Patricia O'Connor).
- Institute for the Study of Health (Dept Public Health Sciences).
- Study review panel members.
- UC Medical Center IRB approved.

Acknowledgment

Background & Framework of School-Based Health Centers

The Foundation supports initiatives that improve access to health care in the 20 counties that surround Cincinnati, Ohio.

School-Aged Children’s Healthcare Focus Area
- School-Based Health Centers Initiative
- Beginning in 1999, funded for 15 SBHCs with $10.5 million

Research Hypotheses

- Increased accessibility to primary care services with SBHCs would reduce the gaps of health care disparities over time by increasing needed primary care.
- By providing timely and essential primary care, the SBHC program would have a positive net social benefit to the population.

Data Preparations

Timely appropriate primary care
Better health for students
Lower need for costly medical care and service
Data Sources & Study Design

- A quasi-experimental time-series design.
- The study period is from 9/1/1997 to 8/31/2003 (3 years before and 3 years after SBHCs).
- Data sources:
  1) Ohio Medicaid enrollment and claims data from 9/1/1997 to 2/28/2003; it is due to HIPAA implementation in April 2003.
  2) School Enrollment/Absence data;
  3) SBHC encounter clinical data; and
  4) Survey data from parents and school administrative staffs.

Study Sample Selection and Matching/Merging Procedures

- School enrollment data were linked with the Ohio Medicaid claims/enrollment data, matching by sex, race, name, county code, and date of birth.
- Four school districts (6 schools in total). School-aged students from K to 12th grade. SBHC encounter data were retrieved from the Welligent® database.

Target Population
- School-aged Medicaid recipients

Four SBHCs
3,673 (1,607)*

Two Non-SBHC
1,383 (546)

MEASURES
- Trends of Medicaid expenses
- Cost Components
- Risk factors

*Numbers in parenthesis are students who have continuously enrolled in Medicaid and same schools.

Health Care Costs by Categories for Students (N=5056)

- Mental: 4.9%
- Outpatient/Office: 9.5%
- Hospital: 11.2%
- Physician: 24.7%
- Drug: 4.2%
- ER: 4.1%
- Dental: 14.2%
- EPSDT: 29.7%

Total Medicaid expenses for students were $29,851,889 from Sept 1997 to Feb 2003.

Study Population & Analysis

- All matched students (n=5,056) were selected for this time-series analysis;
- Using hierarchical linear modeling (HLM v.5.05), a repeated-measure was conducted.
  - HLM allows to control unbalanced observations with time-series quarterly data due to student attrition in different schools or different enrollment periods in the Medicaid program.

Major Findings (Health Disparity)

- African American students had lower health care disparities at the beginning of the SBHC program.
- The gap was closed after the implementation of the SBHC according to the growth curves displayed in following Tables and Figures.
Growth Trend of Quarterly Total Costs by Race (N=5056)

Racial Disparity: African-Americans with low costs at the initial point, then, overcame the difference with SBHC.

Growth Trend of Quarterly Total Costs by SBHC (N=5056)

With SBHC, more costs for mental health services.

Growth Trend of Quarterly Total Costs by Sex (N=5,056)

Total cost variation by sex

Growth Trend of Quarterly Total Costs by Age Groups (N=5056)

Age variation in total costs
Cost-Benefit Analysis for SBHCs

**Net Social Benefit = $Benefit - $Cost**

**COSTS**

- Healthcare Sector \( (C_1) \)
- Patient and Family \( (C_2) \)
- Other Sectors \( (C_3) \)

**CONSEQUENCES (benefits/effects)**

- Health status changed
- Willingness-to-pay \( (W) \)
- Other value created \( (V) \)
- Resources saved:
  - Healthcare sector \( (S_1) \)
  - Patient and family \( (S_2) \)
  - Other sectors \( (S_3) \)

Drummond, O’Brien, 1999. p.19

Sample & Population for CBA

- Four SBHC school/districts and two matched non-SBHC school/districts were studied.
- From 5,069 matched students, 2,153 students had continuous enrollment in schools and Medicaid program.
- From 2,153 students, we assessed costs and benefits based on some sub-cohorts:
  1. Students with asthma,
  2. Students with mental health illness,
  3. Students with dental care, etc.
- All students enrolled in those study schools were included for assessing costs and benefits of the SBHC program.

Cost Sector’s Measures

- Health care sector, such as SBHC operation costs (prescription drugs, medical equipment, physician and nurse hours, etc.) and what insurance companies would have paid for these encounters;
- Patient and family sectors, such as out-of-pocket expenses in traveling to get medical care, co-payments, and other expenditures.
- Other sectors, such as essential start-up funds, costs for school facility use, etc. (Data were surveyed from administrative staffs.)
- All costs are measured in 3 years.

Benefit Measures

1. Student’s health status changes
2. Other value created by the SBHC program (based on survey from administrative staffs)
3. Resources saved due to the SBHC program:
   - Health care savings (e.g., decreased hospitalizations, ER visits, and prescription drugs).
   - Patient and family savings (e.g., transportation, family productivity. Data were collected from parent survey), and
   - Other savings (school efficiency, community multiplier effect).
4. Unquantifiable benefits, such as healthy students having better quality of life, increased access to health care.
5. All benefits are measured in 3 years.
**Statistical Analyses**

- Based on data from students with continuous enrollment, repeated measures analysis of covariance (ANCOVA) was conducted to assess savings from major components of health care costs for students before and after the SBHC program.
- All costs were adjusted to US dollar value in 2002 using medical component of CPI.

**Subcohort #1: Students with Asthma**

- Asthmatic students with access to an SBHC had lower hospitalization and ED expenses than students without access to an SBHC.

**Numbers of Hospitalization and ED Visits for Children with Asthma in SBHC Schools (N=196) and Non-SBHC Schools (N=77)**

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<thead>
<tr>
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<th>SBHC</th>
<th>Non-SBHC</th>
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<tbody>
<tr>
<td>Hospitalization</td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td>ED Visits</td>
<td>Before</td>
<td>After</td>
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</tbody>
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- Hospitalization costs decreased 3-fold.
- Estimated Marginal Means of HOSPCOST
  - Hospitalization costs decreased $970 per student.

**Subcohort #2: Students with Mental Health**

- Mental health expenses increased for students with access to an SBHC, indicating increased access to services.

Major Finding (Benefit-Cost Analysis)

- Over a 3-years period, the School Based Health Center operations (3 urban & 1 rural SBHCs) generated a sizable net social benefit with estimations of:
  - Low-end estimation: $1.35 million
    - Cost $1,998,659
    - Benefit $3,350,746
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  - Benefit $3,350,746

Summary

- Administrative data is useful and critical for evaluation of the SBHC program.
- The net social benefits of the SBHCs was sizable over three years.
- African-American students received increasing health care with SBHC, and overcome the disparity.
- The hospitalization and ED visits decreased for students with Asthma.
- There is an increased access to mental health care with a seasonal pattern.
Limitations & Future Implications

- limited to school-age children in the Ohio Medicaid program; It might not be generalizable to other state populations.
- We are planning to conduct this study for the Northern Kentucky area.
- During the six-year study period, the natural history of disease epidemics among school-age children might vary along with maturation of students.