



A Bibliography of Journal Articles and Other Sources Describing the Value of Managing Student Health in the School Setting

New topics: Value of youth engagement, school-based oral health programs; the effect of economic disadvantage on health as related to student health

Introduction

It makes intuitive sense that healthy children are better prepared to learn and succeed in school and beyond. This is one of the primary motivations for placing health centers in schools. The Colorado Association for School-Based Health Care (CASBHC) often receives requests for evidence, or even “proof,” that school-based health centers (SBHCs) are impacting students’ health and academic behaviors such as achievement, attendance, and graduation rate, or are narrowing the “achievement gap.”

There are very few articles devoted to investigating the effectiveness or impact of school-based health centers, specifically, on student outcomes. There are a number of articles, however, which discuss the impact of student health on academic outcomes. Acknowledging the efforts of SBHCs will improve student health, it is reasonable to include articles in this annotated bibliography which discuss the influence of health on academics. For this reason, in CASBHC’s communications, we are learning to use the phrase, “managing student health in the school setting” when discussing evidence of the impact of SBHCs.

This bibliography contains a set of juried journal articles and other publications which discuss the value of managing student health in the school setting. These articles discuss the relationships between the health status, school behavior and school performance of students. They also report positive effects of school-based health centers on the quality and cost of care. Of course, each of these studies has limitations, but taken together as a body of research, there is clear evidence healthy students are better prepared to learn and school-based health centers help to keep students healthy.

One of the original purposes of this compilation was to find the “proof” for SBHCs’ impact on student achievement. What was found was that evidence for this is extremely elusive. During the search for articles, however, evidence emerged that managing student health improved attendance and graduation rates. It was learned that by intentionally focusing on specific health concerns, such as asthma or obesity, real outcomes could be realized in students’ lives. It was discovered that managing student health in schools made economic sense to taxpayers and improved the health of the community outside of the school.

The organization of this annotated bibliography groups articles by topic. Some articles provide information which may be relevant to more than one topic. For example, an article on the impact of asthma management on school attendance will appear in two separate sections, asthma and attendance.

Sections included in this edition are:

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The Effect of Managing Student Health on Achievement

The following articles point out that healthy behavior helps to set the stage for academic success. As noted above, the link between student health or the work of a school-based health center and student achievement is complicated with many confounding variables. CASBHC recommends one choose his words very carefully in discussions on this topic.

1. **Walker, S.C., Kerns, S.E.U., Lyon, A.R., Bruns, E.J., Cosgrove, T.J. Impact of School-Based Health Center Use on Academic Outcomes. Journal of Adolescent Health. (2009) In press, abstract available online only as of 9/25/09.**

Abstract accessed online 9/25/09 at: [http://www.jahonline.org/article/S1054-139X\(09\)00264-X/abstract](http://www.jahonline.org/article/S1054-139X(09)00264-X/abstract)

Acknowledging a paucity of research literature on SBHC use and academic outcomes, the authors sought to correlate SBHC use with improved attendance and grade point average along with a decrease in discipline referrals. The article describes a longitudinal study conducted over 5 semesters comparing the academic achievement of 2,306 ninth grade SBHC users and non-users in Seattle high schools. It was found that SBHC users showed a significant increase in attendance over non users. The grade point average for SBHC users showed a more rapid increase over time compared to non-users. In addition, those students accessing mental health services in the SBHC had significantly lower grade point averages at the start of the study and showed the steepest increase over time. SBHC usage did not appear to have an impact on discipline issues.

2. **Centers for Disease Control and Prevention. Healthy Youth! Student Health and Academic Achievement. Accessed online 10/18/2008 at: www.cdc.gov/healthyyouth/health_and_academics/index.htm**

The following text is from the CDC's web page identified above and is well referenced:

The academic success of America's youth is strongly linked with their health. Health-related factors such as hunger, physical and emotional abuse, and chronic illness can lead to poor school performance. Health-risk behaviors such as substance use, violence, and physical inactivity are consistently linked to academic failure, and often affect students' school attendance, grades, test scores, and ability to pay attention in class.

In turn, academic success is an excellent indicator for the overall well-being of youth and a primary predictor and determinant of adult health outcomes. Leading national education organizations recognize the close relationship between health and education, as well as the need to embed health into the educational environment for all students.

Promoting academic achievement is one of the four fundamental outcomes of modern school health programs. Scientific reviews have documented that school health programs can have positive impacts on educational outcomes, as well as on health risk behaviors and health outcomes. Programs that are primarily designed to improve academic performance are increasingly being recognized as important public health interventions.

3. **Sigfúsdóttir, I.D., Kristjánsson, A.L., Allegrante, J.P. Health behaviour and academic achievement in Icelandic school children. Health Education Research (2007); 22:70-80.**

Abstract accessed online 10/17/2008 at: <http://her.oxfordjournals.org/cgi/content/abstract/22/1/70>

When considering the cultural, racial, or socio-economic diversity in U.S. schools, Icelandic children are probably not too similar to most students in many American schools hosting a SBHC. This report is included, however, for several reasons. The study is a cross-sectional survey of almost 6,000 Icelandic students. Using a large and relatively homogeneous cohort increases the validity of the results and conclusions of such a study and is therefore useful when it confirms the findings of similar American studies on a more heterogeneous population. Also, CASBHC assumes that similar health behaviors in any set of students may have broadly similar academic outcomes.

The authors of *Health behaviour and academic achievement in Icelandic school children* report that body mass index (BMI), diet and physical activity explained almost a quarter of the variance in academic achievement. They also report that variance increases to over 25% when depressed mood and self-esteem are added to the model. The researchers controlled for gender, parental education, family structure and absenteeism. In their conclusion, they admit these are not hugely convincing results but do point out that the results are consistent with other findings and lament the complexity of connecting health and achievement.

4. **US Department of Health and Human Services and Centers for Disease Control and Prevention. National Youth Risk Behavior Survey. Accessed online 10/18/2008 at:**
http://www.cdc.gov/healthyyouth/health_and_academics/pdf/health_risk_behaviors.pdf

The following text is from the CDC's Health Kids! web page:

The Youth Risk Behavior Surveillance System (YRBSS) monitors behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States. Through the national Youth Risk Behavior Survey, CDC monitors student health-risk behaviors and the extent to which these behaviors are associated with academic achievement.

Data from the 2003 National Youth Risk Behavior Survey (YRBS) show a negative association between health-risk behaviors and academic achievement among high school students after controlling for sex, race/ethnicity, and grade level. This means that students with higher grades are less likely to engage in health-risk behaviors than their classmates with lower grades, and students who do not engage in health-risk behaviors receive higher grades than their classmates who do engage in health-risk behaviors. These associations do not prove causation. Further research is needed to determine whether low grades lead to health-risk behaviors, health-risk behaviors lead to low grades, or some other factors lead to both of these problems.

5. **Taras, H., Potts-Datema, W. Obesity and Student Performance at School. *Journal of School Health* (2005); 75: 291-5.**

Full text article accessed online through Denver Public Library's Research Resource Database, Gale PowerSource.

Authors report on their review of peer-reviewed journal articles describing studies of school-aged children (ages 5-18) published during the years 1994 through 2004. The articles related to the effect of weight on student performance in terms of attendance, achievement or cognitive ability. Only ten articles were cited and were arranged by the authors into a table describing source, research design, and outcomes related to school performance. All ten articles described some type of poor school performance related to obesity. Though not shown to be a causal factor, obesity seemed to be a predictor of lowered years of education and grade point average, placement in special education or remedial classes, IQ, or an increased likelihood of grade retention.

The Effect of Managing Student Health on School Attendance and Graduation

The following articles discuss the impact of managing student health on school attendance and graduation rates. Not all of the articles give the information you may wish to see. For example, the first article says the SBHC studied had no effect on absenteeism, but did improve promotion and graduation rates in SBHC users. Other articles show a large impact on attendance, so you may need to be careful in how these articles are used. These two factors, attendance and graduation rate, are both reported on the School Accountability Reports, which state law requires be published for every public school. For this reason, schools are very interested in anything that may improve their ratings in either category.

1. **McCord M.T., Klein J.D., Foy J.M., Fothergill K. School-Based Clinic Use and School Performance. *Journal of Adolescent Health* (1993); 14: 91-8.**

Abstract accessed online 10/17/2008 at: www.ncbi.nlm.nih.gov/pubmed/8476879

This paper describes a study that focused specifically on the effect of using a SBHC on absenteeism, suspension, promotion to the next grade level and graduation. The study examined 322 students in a single alternative high school. Overall, the attendance rate was 56%, suspension rate 24%, and only 26% were promoted to the next grade or graduated. Actual SBHC users (49% of the student body) were just as likely to be absent or suspended, but were more likely to be promoted or graduate than non-SBHC users. This was especially true for African-American males.

2. **Bureau of Primary Health Care. School-Based Clinics that Work. Washington, DC: U.S. Department of Health and Human Services, Health Resources and Services Administration; 1994.**

Full text accessed online 10/17/2008 at:

http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/13/ef/52.pdf

School-Based Clinics that Work is a lengthy report on the characteristics of successful SBHCs. For the most part, success is defined in this paper as a well-run and long-lasting SBHC that has high numbers of students accessing care with only passing mention of the students' health or academic outcomes. The paper does report, however, that school attendance improves, drop-out rates decline and some SBHCs reported a decline in teen pregnancies.

3. **Webber M.P., Carpiniello K.E., Oruwariye T., Lo Y., Burton W.B., Appel D.K. Burden of Asthma in Inner-City Elementary Schoolchildren. *Archives of Pediatric and Adolescent Medicine* (2003); 157: 125-129.**

Abstract accessed online 10/17/2008 at: <http://archpedi.ama-assn.org/cgi/content/full/157/2/125>

Burden of Asthma in Inner-City Elementary Schoolchildren describes a study which sought to find if access to school-based clinics actually effect outcomes for students. Outcomes were defined as hospitalizations, emergency room visits, and absenteeism. Nine hundred and forty nine students known to have asthma and who attended one of six elementary schools in The Bronx, NY, were tracked in this study. Four of the schools had SBHCs, two did not. Data were compiled by surveying parents and by tracking school attendance records. Prevalence of asthma was 19.9% and parents reported that 46.2% of these children had been in the emergency room in the previous 12 months and 12.6% had been hospitalized. It was found that emergency room usage was no different between the two groups of schools, but the rate of hospitalization was higher in students attending a school without a SBHC. In addition, access to a SBHC decreased absenteeism by 3 days.

4. **The National Conference of State Legislatures. Benefits of School-Based Health Centers. Accessed online 10/16/2008 at www.ncsl.org/programs/health/schlitthandout.htm**

The National Conference of State Legislatures has compiled this brief listing of reasons why SBHCs are a good thing. The reasons include: SBHCs reduce inappropriate emergency room use among regular users of school-based health centers; SBHCs lead to a reduction in Medicaid expenditures related to inpatient, drug and emergency department use; SBHCs attract harder-to-reach populations and they do a better job at getting them crucial services such as mental health care and high-risk behavior screens; SBHCs significantly increase health care access for students; SBHCs lead to a reduction in hospitalization and an increase in use of peak flow meters, inhalers, and improved school attendance among inner-city school children; they lead to decreased absenteeism and tardiness by students using SBHC counseling services; students who reported depression and past suicide attempts, were obese, or are sexually active were significantly more willing to use the clinic; and students who used SBHC counseling service were less likely to be referred for discipline. Each of the reasons presented are supported in a bibliography of peer-reviewed journals.

5. **Liao, O, Morphew, T, Galant, SP. The Breathmobile: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children. *Journal of School Health* (2006); 76: 313-9**

Abstract accessed online 10/15/2008 at: www.ncbi.nlm.nih.gov/pubmed/16918862

While not describing the result of students accessing a SBHC, *The Breathmobile: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children*, does speak to the value of providing high-quality medical care in schools. The "Breathmobile" is a program sponsored by the Children's Hospital of Orange County which focuses on addressing asthma in inner-city children. The Breathmobile program is a school-based program which includes a mobile clinic and a pediatric asthma specialist. The paper describes how the program improved daily anti-inflammatory medication usage and decreased annual emergency room usage, hospitalizations, and school absenteeism.

6. **Diette, G.B., Markson, L., Skinner, E.A., Nguyen, T.T.H., Algatt-Bergstrom, P., Wu, A.W. Nocturnal Asthma in Children Affects School Attendance, School Performance, and Parents' Work Attendance. *Archives of Pediatric and Adolescent medicine* (2000); 154: 923-8.**

Full text article accessed online 10/16/2008 at: <http://archpedi.ama-assn.org/cgi/reprint/154/9/923.pdf>

Nocturnal Asthma in Children Affects School Attendance, School Performance, and Parents' Work Attendance does not address the value of SBHCs in managing asthma directly. Rather, it uses nocturnal asthma as a sign of less than optimal asthma control and examines the relationship between nocturnal awakenings and daytime functioning in terms of school absenteeism, academic achievement as well as parental work absenteeism. The authors did a cross-sectional survey during the winter of 1997-8, interviewing the parents of 438 children with asthma ages 5-17. The survey determined number of missed days of school and work and how often the children's education suffered due to asthma in the four weeks prior. In the 40% of children who had experienced nocturnal awakenings due to asthma chances of school and work absenteeism increased. The authors report the children's education suffer as well.

7. **Centers for Disease Control and Prevention. Healthy Youth! Student Health and Academic Achievement. Accessed online 10/18/2008 at: www.cdc.gov/healthyyouth/health_and_academics/index.htm**

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8. **Sigfúsdóttir, I.D., Kristjánsson, A.L., Allegrante, J.P. Health behaviour and academic achievement in Icelandic school children. *Health Education Research* (2007); 22:70-80.**

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9. **Davis, M.M., King, J.C., Moag, L., Cummings, G., Magder, L.S. Countywide School-Based Influenza Immunization: Direct and Indirect Impact on Student Absenteeism. *Pediatrics* (2008); 122: 260-5.**

Full text article accessed online 10/16/2008 by linking through:
<http://pediatrics.aappublications.org/cgi/content/abstract/122/1/e260>

Countywide School-Based Influenza Immunization: Direct and Indirect Impact on Student Absenteeism uses weekly absentee records for the 2005-06 school year following an influenza vaccination program carried out in all public elementary schools in Carroll County, Maryland, during the fall of 2005. These absentee records were compared with years 2002-05 absentee records

for all Carroll County schools and years 2001-2006 absentee records from neighboring Frederick County schools. It was found that the county-wide vaccination program was associated with reduced absenteeism at the elementary and high school levels during a flu outbreak. The authors of the study state that school-based programs are an efficient method of delivering vaccine and probably offer protection to the unvaccinated community outside of the schools.

10. **Telljohann, S.K., Dake, J.A., Price, J.H. Effect of Full-Time versus Part-Time School Nurses on Attendance of Elementary Students with Asthma. *Journal of School Nursing* (2004); 20: 331-4.**

Abstract accessed online 10/16/2008 at: <http://www.ncbi.nlm.nih.gov/pubmed/15560730>

Like the previous articles, *Effect of Full-Time versus Part-Time School Nurses on Attendance of Elementary Students with Asthma* does not speak of SBHCs. It does, however, compare absenteeism in elementary school children when they attend schools staffed with either a full-time (5 days per week) school nurse or a part-time (2 days per week) school nurse. It was found that students with asthma who are either poor or African American had a lower rate of absenteeism (23% fewer days) if they attended a school with a full-time school nurse than their counterparts in a school with a part-time school nurse.

11. **Geier, A.B., McLaughlin, J., Kumanyika, S., Shults, J., Foster, G., Womble, L., Borradaile, K., Nachmani, J., Sherman, S., The Relationship Between Relative Weight and School Attendance Among Elementary School Children. *Obesity* (2007); 15: 2157-61.**

Full text article accessed online 10/15/2008 at: <http://www.nature.com/oby/journal/v15/n8/full/oby2007256a.html>

Studying 1069 fourth through sixth grade students, the authors of *The Relationship Between Relative Weight and School Attendance Among Elementary School Children* compared school absenteeism between different weight classes of students while controlling for age, gender, race and socioeconomic status. Students were grouped according to relative weight categories as described by the Institute of Medicine: underweight, normal-weight, overweight, and obese. After following attendance records for one year, it was found that overweight children were absent on average 20 percent more than their normal-weight peers. The authors state that student BMI is as significant a predictor of absenteeism as age, gender, race, or socioeconomic status.

12. **Barnet, B., Arroyo, C., Devoe, M., Duggan, A.K. Reduced School Dropout Rates Among Adolescent Mothers Receiving School-Based Prenatal Care. *Archives of Pediatric Adolescent Medicine* (2004); 158: 262 - 268.**

Full text article accessed online 8/21/09 at: <http://archpedi.ama-assn.org/cgi/reprint/158/3/262?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=sbhc&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>

Researchers investigated the relationship between school-based prenatal services and attendance and dropout rates using a retrospective cohort study. Three years of records regarding the drop-out rates of adolescents aged 18 years and under were compared between those receiving pre-natal care in a school-based setting against those receiving prenatal care outside of the school. The 431 students studied had a history of high absenteeism and low grades. Those students receiving school-based care were found to be absent an average of 12 fewer days and had half the drop-out rate of those receiving nonschool-based prenatal care. The authors concluded, "...findings underscore the importance of funding and evaluating school-based health centers and other interventions that may ameliorate negative outcomes among childbearing adolescents.

Managing Student Health Makes Economic Sense

In the world of public schools, conversations inevitably come around to the topic of funding. Many of the articles cited in this bibliography can serve as rationale for the continued funding of managing student health. This section focuses specifically on the economic value of healthy students.

1. **Adams, K.E., Johnson, V. An elementary school-based health clinic: can it reduce Medicaid costs? *Pediatrics*. (2000); 105: 780-788.**

Full text article accessed online 10/17/2008 at: <http://pediatrics.aappublications.org/cgi/content/full/105/4/780>

An elementary school-based health clinic: can it reduce Medicaid costs? describes a study which examined the effect of a SBHC in a single elementary school on health care costs paid by Medicaid. Researchers looked at Medicaid claims data for children ages 4-12 years who attended Whitefoord Elementary School before and after the start up of a SBHC. They also considered Medicaid claims for children of a similar demographic in a comparison school district. In all, three groups of children were examined; those at the comparison school, those at Whitefoord who used the SBHC regularly and those at Whitefoord who used the SBHC only sporadically.

It was found that there was no difference in Medicaid payments for children at Whitefoord and the comparison school before the opening of the SBHC in 1994. However, by 1995 there were significantly less emergency room visits by Whitefoord children than by comparison children. Whitefoord students also had higher Early Periodic Screening Diagnosis and Treatment (EPSDT) preventive care expenses. By 1996, the students from Whitefoord Elementary had significantly lower inpatient, nonemergency department transportation, drug, and emergency department Medicaid expenses.

The authors state, "...the results strongly suggest that the operation of a SBHC can have effects on the child's use of services and health care expenses. Given that these clinics serve all those who come for care and many of these are low-income children, these savings are likely to accrue to the Medicaid program of the state. As states continue to implement Medicaid-managed care for their child populations, they will need to consider the ability of SBHCs to participate in and receive Medicaid revenues through health maintenance organization networks."

2. **Wang, L.Y., Burstein, Gale R., Cohen, D. A. An economic evaluation of a school-based sexually transmitted disease screening program. *Sexually Transmitted Diseases.* (2002); 29: 737-45.**

Full text article accessed online 10/31/08 at: <http://www.stdjournal.com/pt/re/std/fulltext.00007435-200212000-00001.htm;jsessionid=JLzL9j1TDDbPJDzN2W0pnRvVMDZKrfLJrFM6Q0TLDQpxJG2h179X!-975242908!181195629!8091!-1>

To evaluate the cost effectiveness of replacing nonschool-based screening with a school-based screening program, the authors constructed a decision-analysis model to assess the expected costs and cases of pelvic inflammatory disease (PID) due to gonorrhea and Chlamydia with and without a screening program. The authors determined the school-based screening program prevented 38 cases of PID in 8 New Orleans high schools at a savings of \$1,524 per case (a total savings of \$57,912). The authors concluded the screening program was both cost effective and cost saving. In addition, they felt this type of program could be replicated and would be a cost effective use of public funds while reducing the sexually-transmitted disease burden in adolescents.

3. **Wang L.Y., Yang Q., Lowry R., Wechsler H. Economic analysis of a school-based obesity prevention program. *Obesity Research.* (2003); 11: 1313-24.**

Full text article was accessed on line 10/31/08 at: <http://www.nature.com/oby/journal/v11/n11/full/oby2003178a.html>

The authors describe an economic evaluation of an interdisciplinary weight management program called, "Planet Health" at the middle school level. The study assessed the cost effectiveness of the program and the cost benefit to society in terms of "quality-adjusted life years." While only a small percentage of girls were affected (1.9%) overall and boys seemed unaffected by the program, the cost per student per year was only \$14 (\$33,677 total cost) and the net savings to society was determined to be \$7,313.

4. **The National Conference of State Legislatures. Benefits of School-Based Health Centers. Accessed online 10/16/2008 at <http://www.ncsl.org/programs/health/schlitthandout.htm>**

The National Conference of State Legislatures has compiled this brief listing of reasons why SBHCs are a good thing. The reasons include: SBHCs reduce inappropriate emergency room use among regular users of school-based health centers; SBHCs lead to a reduction in Medicaid expenditures related to inpatient, drug and emergency department use; SBHCs attract harder-to-reach populations and they do a better job at getting them crucial services such as mental health care and high-risk behavior screens; SBHCs significantly increase health care access for students; SBHCs lead to a reduction in hospitalization and an increase in use of peak flow meters, inhalers, and improved school attendance among inner-city school children; they lead to decreased absenteeism and tardiness by students using SBHC counseling services; students who reported depression and past suicide attempts, were obese, or are sexually active were significantly more willing to use the clinic; and students who used

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Burden of Asthma in Inner-City Elementary Schoolchildren describes a study which sought to find whether access to school-based clinics actually effect outcomes for students. Outcomes were defined as hospitalizations, emergency room visits, and absenteeism. Nine hundred and forty nine students known to have asthma and who attended one of six elementary schools in The Bronx, NY, were tracked in this study. Four of the schools had SBHCs, two did not. Data were compiled by surveying parents and by tracking school attendance records. Prevalence of asthma was 19.9% and parents reported that 46.2% of these children had been in the emergency room in the previous 12 months and 12.6% had been hospitalized. It was found that emergency room usage was no different between the two groups of schools, but the rate of hospitalization was higher in students attending a school without a SBHC. In addition, access to a SBHC decreased absenteeism by 3 days.

6. **Trotter, C.L., Edmunds, W.J. Modeling cost effectiveness of meningococcal serogroup C conjugate vaccination campaign in England and Wales. British Medical Journal (2002); 324: 809.**

Full text article accessed online 10/16/2008 at <http://www.bmj.com/cgi/content/full/324/7341/809>

The study, *Modeling cost effectiveness of meningococcal serogroup C conjugate vaccination campaign in England and Wales*, describes several vaccination programs, including a school-based program, and analyzes the effectiveness of each program in terms of lives saved, cost of implementation of the vaccination programs, and the economic benefits to society from the lives saved. The conclusion most relevant to this bibliography is that the vaccination program described in this paper was seen as the most cost-effective means of vaccinating school-aged children (ages 5-17). The authors also noted that for a vaccination program for this disease to be cost-effective, the disease should be prevalent at a certain base level in the population.

7. **Liao, O., Morpew, T., Galant, S.P. The Breathmobile: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children. Journal of School Health (2006); 76: 313-9**

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While not describing the result of students accessing a SBHC, *The Breathmobile: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children*, does speak to the value of providing high-quality medical care in schools. The "Breathmobile" is a program sponsored by the Children's Hospital of Orange County which focuses on addressing asthma in inner-city children. The Breathmobile program is a school-based program which includes a mobile clinic and a pediatric asthma specialist. The paper describes how the program improved daily anti-inflammatory medication usage and decreased annual emergency room usage, hospitalizations, and school absenteeism.

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Promoting academic achievement is one of the four fundamental outcomes of modern school health programs. Scientific reviews have documented that school health programs can have positive impacts on educational outcomes, as well as on

health risk behaviors and health outcomes. Programs that are primarily designed to improve academic performance are increasingly being recognized as important public health interventions.

9. Guo, J.J., Jang, R., Keller, K.N., McCracken, A.L., Pan, W., Cluxton, R. J. Impact of school-based health centers on children with asthma. *Journal of Adolescent Health* (2005); 37: 266-274.

Full text article accessed online 9/23/2009 at: <http://www.jahonline.org/article/PIIS1054139X04002332/fulltext>

A study conducted in the Cincinnati area sought to find the effect of SBHC usage by children with asthma on emergency room use and hospitalization. Data from 4 school districts with SBHCs were compared to data from two comparable school districts without SBHC. It was found that the risk of hospitalization and emergency department visits for children with asthma decreased significantly with school-based health center program. The authors estimated the potential cost savings for hospitalization was \$970 per child.

10. Kaplan, D.W. , Brindis, C.D., Phibbs, S.L., Melinkovich, P., Naylor, K., Ahlstrand, K. A Comparison Study of an Elementary School-Based Health Center: Effects on Health Care Access and Use. *Archives of Pediatric Adolescent Medicine* (1999); 153: 235-243.

Abstract accessed online 9/23/2009 at: <http://www.ncbi.nlm.nih.gov/pubmed/10086399>

The authors sought to determine the effects of an elementary SBHC on access to and the use of physical and mental health services by children aged 4 to 13 years. They conducted a retrospective cohort analysis of parent surveys from an elementary school which housed a SBHC and a comparison of urban elementary school. After controlling for confounding variables, such as insurance status, it was found that there was a significant decrease in emergency department use for underserved minority children with access to a SBHC compared to those without access to a SBHC. In addition, they found that these children also had a greater likelihood of having had an annual dental examination. The abstract did not report on the mental health outcomes for these children.

11. Kaplan, D.W., Calonge, B.N., Guernsey, B.P., Hanrahan, M.B. Managed Care and School-Based Health Centers: Use of Health Services. *Archives of Pediatric Adolescent Medicine* (1998); 152: 25-33.

Abstract accessed online 9/23/2009 at: <http://www.ncbi.nlm.nih.gov/pubmed/9452704>

This article describes a comparison of 240 adolescents who are enrolled in managed care and have access to a SBHC with 116 adolescents enrolled in managed care, but without access to a SBHC. The authors wished to investigate the use of physical and mental health services by these two groups of students. The study utilized a retrospective cohort study which matched age, sex and socioeconomic status for the students examined. Adolescents with access to a SBHC had fewer after hours emergent or urgent care visits compared to adolescents without access to a SBHC and ten times more likely to make a mental health or substance abuse visit. They also had significantly fewer visits for after hours care. The authors concluded that SBHCs have a "synergistic" effect on student health and were especially effective on improving student access to and treatment for mental health and substance abuse counseling.

12. Santelli, J., Kouzis, A., Newcomer, S. School-based health centers and adolescent use of primary care and hospital care. *Journal of Adolescent Health* (1996); 19: 267-275.

Abstract accessed online 9/23/2009 at: <http://www.ncbi.nlm.nih.gov/pubmed/8897104>

Because there had been little known of the impact of SBHCs' primary care services on the use of emergency rooms and hospitals at the time of this study, the authors conducted a self-reported survey of 3,258 students in grades six through twelve from nine Baltimore schools with SBHCs and four schools without SBHCs. They learned that chronic conditions and emergency room use was commonly reported from both groups, but was lower in the group with access to SBHCs. Students in schools with school-based health centers were also more likely to report seeing social workers and counselors than those in the non-SBHC group.

The Impact of Providing Behavioral Health Services in the School Setting

Providing behavioral health care to children and adolescents is a critical piece of the integrated and comprehensive care provided by school-based health centers. The papers included in this section provide evidence that behavioral health services can improve such academic outcomes as students' grade point averages and school attendance. The papers also find students with access to a SBHC are more likely to follow through on mental health referrals, more likely to seek substance abuse counseling, and more likely to visit with social workers and counselors. In addition to these benefits, several papers describe how behavioral health services provided in school-based health centers are uniquely positioned to reach poor, minority, and immigrant children who have been traumatized by exposure to violence or separation from one or both parents.

1. **Walker, S.C., Kerns, S.E.U., Lyon, A.R., Bruns, E.J., Cosgrove, T.J. Impact of School-Based Health Center Use on Academic Outcomes. Journal of Adolescent Health. (2009) In press, available online only as of 9/25/09.**

Abstract accessed online 9/25/09 at: [http://www.jahonline.org/article/S1054-139X\(09\)00264-X/abstract](http://www.jahonline.org/article/S1054-139X(09)00264-X/abstract)

Acknowledging a paucity of research literature on SBHC use and academic outcomes, the authors sought to correlate SBHC use with improved attendance and grade point average along with a decrease in discipline referrals. The article describes a longitudinal study conducted over 5 semesters comparing the academic achievement of 2,306 ninth grade SBHC users and non-users in Seattle high schools. It was found that SBHC users showed a significant increase in attendance over non users. The grade point average for SBHC users showed a more rapid increase over time compared to non-users. In addition, those students accessing mental health services in the SBHC had significantly lower grade point averages at the start of the study and showed the steepest increase over time. SBHC usage did not appear to have an impact on discipline issues.

2. **DeSocio, J., and Hootman, J. Children's Mental Health and School Success. Journal of School Nursing. (2004); 20: 189-196.**

Abstract accessed online 9/30/09 at: <http://jsn.sagepub.com/cgi/content/abstract/20/4/189>

The author's review of the literature shows a confluence of problems associated with school performance and mental health. Early indications of emerging mental health issues include inconsistent attendance and poor academic functioning. The authors consider the role of the school nurse in early identification and resolution of student health problems, especially as related to mental health.

3. **Mason, M.J. School-based health clinics and the role of mental health services: A review of the literature. Journal of Health and Social Policy. (1998); 10: 1-13.**

Abstract accessed online 10/23/09 at: <http://www.ncbi.nlm.nih.gov/pubmed/10181031>

This article provides a historical prospective of the school-based health center and its role in expanding access to mental health and substance abuse services. It also discusses traditional difficulties with SBHCs' relationship with managed care organizations and challenges SBHCs face in developing sustainable funding streams. In spite of the pointing out several serious challenges facing SBHC sustainability, the author is supportive of SBHCs, especially in promoting mental health services, and describes research protocols for developing a body of evidence to show effectiveness to funders and the medical community.

4. **Brown, M.B., Bolen, L.M. The school-based health center as a resource for prevention and health promotion. Psychology in Schools. (2007); 45: 28-38.**

Abstract accessed online 9/30/09 at: <http://www3.interscience.wiley.com/journal/117357222/abstract>

This article describes the growing role of SBHCs in prevention and health promotion as they become more prevalent in schools. Research on health outcomes due to SBHC services is reviewed. It is noted that SBHCs improve access to comprehensive physical and mental health services for children and adolescents. The article encourages school psychologists to partner with the SBHC to broaden their impact throughout the student body.

5. U.S. Department of Health and Human Services. Report of the Surgeon General's Conference on Children's Mental Health: A National Action Agenda. (2000).

The full report accessed online 8/19/09 at: www.surgeongeneral.gov/topics/cmh/cmhreport.pdf.

The report states, "...the nation is facing a public health crisis in mental health for children and adolescents." In response, the report provides eight goals, each with specific actions to achieve each of the goals. Goal Five addresses infrastructure and urges that integrated care be encouraged for improved treatment coordination and referrals. The report states that 10% of the nation's youth are in need of mental health services, yet only 20% of those youth in need actually receive services. In addition, there is no unified infrastructure for serving this population. Goal Six speaks to access and states that services should be available where children and adolescents congregate, specifically citing schools as a potential source for mental health treatment. Dr Velma LaPoint, one of the discussants at the conference advocated for school-based treatment facilities while one of the panels examined the effectiveness of community treatment sites, including school-based sites. The panel found youth with severe emotional or behavioral disorders responded better with community-based treatment over institutional or office-based treatment.

6. HGSE News: Harvard Graduate School of Education. 85% of Immigrant Children Experience Separations During Migration. (2001).

Press release accessed online 8/19/09 at: <http://gseweb.harvard.edu/news/features/suarez06292001.html>.

This is a press release from the Harvard Graduate School of Education and reports on findings of the Harvard Immigration Project as described at the plenary session of the American Family Therapy Academy in June of 2001. Nowhere in this report are SBHCs mentioned. This press release is included here because of the potential impact these findings could have on schools. Schools with SBHCs providing mental health services would no doubt be uniquely positioned to provide needed care to the children described in the press release.

The press release says that 85% of immigrant children arriving in the U.S. have experienced some degree of separation from one or both parents during immigration. Thirty-five percent of these children have endured a separation from their fathers lasting at least five years. Children arriving in the U.S. without any family separation were less likely to report depressive symptoms than children of families who experienced separation. Because 20% of the children growing up in the U.S. are in immigrant households, this is significant information for SBHCs.

7. Stein, B.D., Jaycox, L.H., Kataoka, S.H., et al. A Mental Health Intervention for Schoolchildren Exposed to Violence: A Randomized Controlled Trial. Journal of the American Medical Association. (2003); 290: 603-611.

Full text article accessed on line on 8/20/09 at: <http://jama.ama-assn.org/cgi/content/full/290/5/603>.

The authors describe a study of the effectiveness of a school-based psychological intervention for reducing symptoms of post traumatic stress syndrome in middle school children who witnessed acts of violence. It was not reported whether the intervention took place in a SBHC. The children were assessed before and after the intervention for clinical signs of PTSD, depression, parent-reported psychosocial dysfunction and teacher-reported classroom problems. Students either participated in 10 standardized cognitive-behavioral therapy early intervention sessions or in wait-listed delayed interventions. Both types of sessions were conducted by trained school mental health clinicians. Those students randomly assigned to the early intervention group fared better than the delayed treatment group in terms of a reduced number of indicators of PTSD, depression and psychosocial dysfunction when assessed three months after treatment. When the students' classroom teachers were asked to assess their behavior subjectively, both groups were rated equally.

The authors noted that poor and minority children were at the greatest risk for exposure to violence, and therefore the psychological trauma associated with violence, while being the least likely group to receive care. They went on to say that schools have always been the de facto providers of mental health care through school counselors, social workers and

psychologists, but the services provided by school-based health centers are an increasingly available option for students. The authors concluded that effective treatments for these disorders can be provided by trained clinicians in the school setting.

8. Center for School Mental Health Assistance. Outcomes of Expanded Mental Health Programs. (2003).

Full report accessed online 8/21/09 at: <http://www.schoolmentalhealth.org/Resources/ESMH/ESMHoutcomes.pdf>

Acknowledging that school-based mental health programs receive 96% of those referred, whereas only 13% of those referred to community-based mental health services follow through with counseling, this report describes the outcomes of expanded school mental health programs in four states (Maryland, Ohio, Oregon and Texas). Outcomes reported included the number of contacts; improved academic achievement (described as either fewer course failures or higher grade point average); positive impacts on attendance, truancy, and discipline referrals; and improved emotional outcomes, such as decreased levels of depression and emotional distress. The report lists links to several online resources.

9. Kaplan, D.W., Brindis, C., Naylor, K.E., Phibbs, S.L., Ahlstrand, K.R., and Melinkovich, P. Elementary School-based Health Center Use. *Pediatrics* (1998); 101: 12.

Full text article accessed online 8/21/09 at: <http://pediatrics.aappublications.org/cgi/content/full/101/6/e12>

Researchers conducted a retrospective analysis of services provided for almost 600 Hispanic students at an elementary school-based health center. They looked both physical and mental primary health care utilization by the students. They found that 2,443 visits were made to the SBHC by 591 students, averaging 4 visits per student. Two thirds of these visits were for physical health related issues and one third was for mental health related issues. They concluded that providing comprehensive and culturally-sensitive care resulted in a high level of SBHC utilization for both physical and mental health related issues by a traditionally underserved population.

10. Anglin, T.M., Naylor, K.E., Kaplan, D.W. Comprehensive School-based Health Care: High School Students' Use of Medical, Mental Health, and Substance Abuse Services. *Pediatrics* (1996); 97: 318-330.

Brief article over view accessed online 8/21/09 at: <http://pediatrics.aappublications.org/cgi/content/abstract/97/3/318>

Researchers investigated adolescents' use of physical, mental and substance abuse services available through SBHCs and compared these data with students in traditional school settings by means of a retrospective analysis of computer-stored standardized data during a 4 year period. They studied 3,818 students who had access to three high school SBHCs. It was found that the students made 27,886 visits to the three SBHCs. These students represented only 63% of the students enrolled in the SBHC and were most likely to be Hispanic and female. SBHC users made up about 42% of the total school population and there were no significant demographic differences between SBHC users and the general school population. The vast majority of students (94%) used the SBHC for physical health visits; 25% met with mental health providers; and, 8% sought help from substance abuse counselors. An average of 1.4 diagnoses were made per visit with the most common major diagnostic category being emotional problems (29%), followed by health supervision (13%), respiratory or reproductive health problems (11% each), and finally, substance abuse (8%). The investigators concluded that students with access to a SBHC had a higher rate of visits for health and medical care than students without access to a SBHC. The proportion of use of mental health and substance abuse services by students utilizing the SBHCs were found to be equivalent to national estimates of their prevalence. In addition, students using medical, mental health and probably substance abuse services in the SBHCs seemed to do so at a higher rate than their peers without access to a SBHC.

11. Kaplan, D.W., Calonge, B.N., Guernsey, B.P., Hanrahan, M.B. Managed Care and School-Based Health Centers: Use of Health Services. *Archives of Pediatric Adolescent Medicine* (1998); 152: 25-33.

Abstract accessed online 9/23/2009 at: <http://www.ncbi.nlm.nih.gov/pubmed/9452704>

This article describes a comparison of 240 adolescents who are enrolled in managed care and have access to a SBHC with 116 adolescents enrolled in managed care, but without access to a SBHC. The authors wished to investigate the use of physical and mental health services by these two groups of students. The study utilized a retrospective cohort study which matched age, sex and socioeconomic status for the students examined. Adolescents with access to a SBHC had fewer after hours emergent or urgent care visits compared to adolescents without access to a SBHC and were ten times more likely to make a mental health or substance abuse visit. They also had significantly fewer visits for after hours care. The authors concluded that SBHCs have a

“synergistic” effect on student health and were especially effective on improving student access to and treatment for mental health and substance abuse counseling.

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Abstract accessed online 9/23/2009 at: <http://www.ncbi.nlm.nih.gov/pubmed/8897104>

Because there had been little known of the impact of SBHCs’ primary care services on the use of emergency rooms and hospitals at the time of this study, the authors conducted a self-reported survey of 3,258 students in grades six through twelve from nine Baltimore schools with SBHCs and four schools without SBHCs. They learned that chronic conditions and emergency room use was commonly reported from both groups, but was lower in the group with access to SBHCs. Students in schools with school-based health centers were also more likely to report seeing social workers and counselors than those in the non-SBHC group.

The Impact of Providing Reproductive Health Services in the School Setting

Providing reproductive health services to adolescents is an essential piece of the integrated and comprehensive care provided by school-based health centers. The articles in this section provide evidence that supplying contraceptives, offering reproductive health education and counseling often benefits adolescents as well as the greater community by reducing unintended pregnancy, STI prevalence, and dropout rate due to pregnancy while not contributing to earlier initial intercourse or increased levels of sexual activity. Several of the articles included in this section indicate the majority of parents tend to support the reproductive health services provided by SBHCs housed in their child’s school.

1. Dryfoos, J.G. School-Based Health Clinics: Three Years of Experience. *Family Planning Perspectives* (1988); 20: 193-200.

Abstract accessed online 9/24/09 at: http://www.find-health-articles.com/rec_pub_3072216-school-based-health-clinics-three-years-experience.htm

At the time of this study, there were only 138 comprehensive SBHCs in the U.S. The author reports that the SBHCs varied widely in their funding sources, ranges of clinical services offered, operational structures and operating costs. All of the SBHCs, however, offered family planning counseling but only 10-25% of the visits were for family planning services. It is important to point out that a portion of those SBHCs receiving state funding were prohibited from using funds for contraceptive supplies or abortion referrals. The abstract concludes by stating that no study had found an increase in the rate of sexual activity by students who utilized SBHC programs and that there were indications those students who were sexually active and used SBHC services were more likely to use contraceptives.

2. Kirby, D., Waszak, C., Ziegler, J. Six school-based clinics: Their reproductive health services and impact on sexual behavior. *Family Planning Perspectives* (1991); 23: 6-16.

Abstract accessed online 9/24/09 at: <http://www.popline.org/docs/0914/065264.html>

The article describes an evaluation conducted in 6 SBHCs with reproductive health services offered as a minor portion of the suite of program offerings. All of the SBHCs served low-income youth and the students attending the schools hosting 5 of the 6 SBHCs were predominately African-American. Data collected from these 6 sites were compared with data collected from 4 sites with similar demographics but without SBHCs. In addition, 2 of the schools hosting SBHCs had data collected both before the SBHC opened and again two years after it had opened. The data indicated that the presence of the SBHCs neither hastened the onset of sexual activity among the adolescents utilizing SBHCs’ services nor did they increase the frequency of sexual activity. Contraceptive availability by itself did not significantly increase contraceptive use by students. Community priorities and

educational programs in conjunction with contraception availability did impact student choices, however. None of the SBHCs studied seemed to have a statistically significant impact on school-wide pregnancy rates.

3. **Tiezzi, L., Lipshutz, J., Wroblewski, N., et al. Pregnancy prevention among urban adolescents younger than 15: Results of the 'In Your Face' Program. Family Planning Perspectives (1997); 29: 173-176, 197.**

Full text article accessed online 9/24/09 at: <http://www.guttmacher.org/pubs/journals/2917397.pdf>

The article describes the implementation and results of a program operated through SBHCs, called "In Your Face," which was developed using commonly accepted standards of quality public health and clinical practice. Risk factor information was collected from students attending four New York City junior high schools. The information was then used to identify those in need of program services. Staff invited these students to participate in the "In Your Face" program which was essentially intensive case management and continuity of care. Participating students were referred to a family planning clinic for contraception. Follow-through on the contraception referral rose from 11% before program implementation to 76% three years after the program's implementation. In addition, pregnancy rates decreased 34% by the fourth year of the program.

4. **Ricketts, S.A., Guernsey, B.P. School-Based Health Centers and the Decline in Black Teen Fertility During the 1990s in Denver, Colorado. American Journal of Public Health. (2006); 96: 1588-92.**

Full text article accessed online 8/21/09 at: <http://www.ajph.org/cgi/content/full/96/9/1588>

Investigators compared the fertility rates over time of African-American high school students attending a school hosting a SBHC with similar students attending a high school with no SBHC. It was found that birth rates declined in both populations studied, but a significantly greater decline was found in those students attending a high school with a SBHC. The researchers concluded that the rapid and significant decline in teen fertility rates was likely due to the intensive efforts of the SBHC to identify, intervene, and follow-up with students engaging in behaviors that place them at risk for unintended pregnancies.

5. **Wang, L.Y., Burstein, G.R., Cohen, D.A. An economic evaluation of a school-based sexually transmitted disease screening program. Sexually Transmitted Diseases. (2002); 29: 737-45.**

Full text article accessed online 10/31/08 at: <http://www.stdjournal.com/pt/re/std/fulltext.00007435-200212000-00001.htm;jsessionid=JLzL9j1TDDbPJDzN2W0pnRvVMDZKrfLJrFM6Q0TLDQpxJG2h179X!-975242908!181195629!8091!-1>

To evaluate the cost effectiveness of replacing nonschool-based screening with a school-based screening program, the authors constructed a decision-analysis model to assess the expected costs and cases of pelvic inflammatory disease (PID) due to gonorrhea and Chlamydia with and without a screening program. The authors determined the school-based screening program prevented 38 cases of PID in 8 New Orleans high schools at a savings of \$1,524 per case (a total savings of \$57,912). The authors concluded the screening program was both cost effective and cost saving. In addition, they felt this type of program could be replicated and would be a cost effective use of public funds while reducing the sexually-transmitted disease burden in adolescents.

6. **Zabin, L.S., Hirsch, M.B., Smith, E.A., et al. Evaluation of a pregnancy prevention program for urban teenagers. Family Planning Perspectives (1986); 18: 119-126.**

Abstract accessed online 9/24/09 at: <http://www.poline.org/docs/0728/048462.html>

This article does not describe a SBHC offering reproductive health services, contraception or pregnancy counseling. Rather the authors report on a pregnancy prevention program carried out in two Baltimore schools: a junior high school and a senior high school. Outcomes were examined against comparable junior and senior high schools in the same city. The program was designed and administered by staff from the Johns Hopkins School of Medicine's Department of Gynecology and Obstetrics. Students from the test schools were provided with sex and contraceptive education, individual and group counseling, and medical and contraceptive services over a period of almost 3 school years while the control schools received no such services. Data were collected by means of a survey to determine students' sexual knowledge, attitudes and behavior. The proportion of sexually active students in the program schools who attended a clinic rose at all grade levels for both male and female students. At the baseline survey, pill use was found to increase with age. After exposure to the program, the percentage using the pill increased among all grade levels. Use of no contraceptive method at last intercourse was reduced to extremely low levels after

exposure to the program. After 20 months of exposure to the program, the conception rate fell by 22.5%. The program led to decreases in the pregnancy rates of 9th-12th grade students.

- 7. Barnet, .B, Arroyo, C., Devoe, .M, Duggan, A.K. Reduced school dropout rates among adolescent mothers receiving school-based prenatal care. Archives of Pediatric Adolescent Medicine (2004); 158: 262-8.**

Full text article accessed online 9/25/09 at: <http://archpedi.ama-assn.org/cgi/reprint/158/3/262>

The authors acknowledge that pregnancy increases school dropout rates and dropping out of school increases the chances of persistent social and economic disadvantages. To examine the impact of utilizing SBHC for prenatal care on absenteeism and dropout rates, a retrospective cohort study was performed using school and medical records of 431 adolescents 18 years of age and younger and who attended an alternative junior and senior high school in Baltimore, MD. It was found that both absenteeism and dropout rates decreased for those students who used the SBHC for prenatal care. The authors state that the "findings underscore the importance of funding and evaluating school-based health centers and other interventions that may ameliorate negative outcomes among childbearing adolescents."

- 8. Santelli, J., Alexander, M., Farmer, M., et al. Bringing parents into school clinics: Parent attitudes toward school clinics and contraception. Journal of Adolescent Health (1992); 13: 269-274.**

Abstract accessed online 9/25/09 at: <http://www.ncbi.nlm.nih.gov/pubmed/1610841>

The article describes parental attitudes toward Baltimore SBHCs dispensing contraceptives. Prior to a policy change which would allow contraceptives to be dispensed in SBHCs, 2,622 parents were surveyed through telephone interviews. Parental attitude toward contraception was context-specific: 63% endorsed and 27-30% opposed prescribing and dispensing. If a boy (or girl) was already engaging in sex, 76% (or 75%) of the parents supported and 14% (or 17%) opposed the provision of birth control pills or condoms. With parental permission, 93% supported contraception and only 3% were opposed. No differences were seen by age, race, gender, or grade of student. Following the positive parental responses, contraception distribution was initiated and parental and community support remained high.

- 9. Bearss, N., Santelli, J., Papa, P. A pilot program of contraceptive continuation in six school-based clinics. Journal of Adolescent Health (1995); 17: 178-83.**

Abstract accessed online 9/25/09 at: <http://www.popline.org/docs/1111/108372.html>

Authors describe a contraception continuation pilot program offering reproductive health assessment and counseling in a Baltimore SBHC over a seven month period. Initially, 143 females were enrolled in the pilot. A monthly contraceptive calendar was developed to collect data on contraceptive use, pregnancy and STD risk, sexual behavior, and parental support for contraceptive use. In addition a physical assessment was provided to assess the presence of STDs or pregnancy. Oral contraceptive use and abstinence both increased over the course of the program, though condom use remained at about 30%. Program dropout was high, almost 10% (13) of the participants became pregnant, and 35% were diagnosed with one or more STIs. In spite of these setbacks, the authors concluded that monthly follow-ups can improve contraception use.

- 10. Klein, D., Handwerker, L., Sesselberg, T.S., Sutter, E., Flanagan, E., Gawronski, B. Measuring Quality of Adolescent Preventive Services of Health Plan Enrollees and School-Based Health Center Users. Journal of Adolescent Health (2007); 41: 153-160.**

Abstract accessed online 9/28/09 at: [http://www.jahonline.org/article/S1054-139X\(07\)00177-2/abstract](http://www.jahonline.org/article/S1054-139X(07)00177-2/abstract)

The authors sought to find whether the quality of care was better for adolescents enrolled in a community-based managed care plan (either commercially insured or Medicaid insured) and also received some care at their SBHC. The Young Adult Health Care Survey (YAHCS) was given to 374 adolescents to determine their degree of risk behaviors, provision of preventive health services, counseling and quality of care. It was discovered that SBHC users were more likely to be told that their discussion with a provider was confidential, more likely to receive screening/counseling on STIs, HIV/AIDS, condom use, and birth control; whereas, the commercially insured adolescent were least likely to report having had a discussion on sexual health issues. In addition, SBHC users had the highest mean quality measure scores for screening/counseling on pregnancy/STIs, diet, exercise,

and helpfulness of counseling provided as measured by the YAHCS. Medicaid-insured adolescents received the lowest scores on four of the seven measures.

11. Coyne-Beasley, T., Ford, C.A., Waller, M.W., Adimora, A.A., Resnick, M.D. Sexually active students' willingness to use school-based health centers for reproductive health care services in North Carolina. *Ambulatory Pediatrics* (2003); 3: 196-202.

Abstract accessed online 9/28/09 at: <http://linkinghub.elsevier.com/retrieve/pii/S1530156705602341>

Because of limited access to reproductive health services in North Carolina SBHCs, the investigators sought to find whether sexually active students would seek these services, should they be available. The authors conducted a cross-sectional survey of 949 sexually experienced students in 2 middle schools and 5 high schools. Most students (52%) reported inconsistent contraception usage; 18% of the females reported having been pregnant, 75% had used the SBHC; and 58% said they would use the SBHC services for information to protect against pregnancy or STI infection, pregnancy testing (51%), or birth control (48%), if available. The authors conclude the lack of reproductive health services in these SBHCs "represents a missed opportunity to provide health care to adolescents who are at substantial risk of pregnancy and STIs"

12. Edwards, L.E., Steinman, M.E, Arnold, K.A., Hakanson, E.Y. Adolescent pregnancy prevention services in high school clinics. *Family Planning Perspectives* (1980); 12: 6-7, 11-14.

Abstract accessed online 9/28/09 at: <http://www.popline.org/docs/0366/800170.html>

Article describes the early history of the St. Paul (MN) Maternal and Infant Care Project (MIC) from when the project opened a SBHC in a junior-senior high school in 1973 through 1979. The authors report that the SBHC experienced wide use of its services, high rates of contraception continuation, a decline of the students' fertility by 56%, and a decline in the dropout rate following delivery of a child from 45% to 10% in the first three years after opening. The authors ascribe these successes to personalized service, confidentiality, accessibility, and the provision of integrated educational, social and medical services.

13. Galavotti, C., Lovick, S. School-based clinic use and other factors affecting adolescent contraceptive behavior. *Journal of Adolescent Health Care* (1989); 10: 506-512.

Abstract accessed online 9/28/09 at <http://www.popline.org/docs/0863/059988.html>

This article reports on a survey of SBHC usage, risk-taking behaviors, contraceptive usage and prevention behaviors taken by 260 inner-city adolescents in a Dallas high school. It was found that SBHC usage, increased number of welfare benefits by household, and older age at first intercourse were all significant positive predictors of more frequent contraceptive use by adolescents. The authors conclude these results indicate social welfare programs may be showing some success in encouraging sexually active adolescent to use contraceptives and use them more consistently.

14. Short, M.B., Rupp, R., Stanberry, L.R., Rosenthal, S.L. Parental Acceptance of Adolescent Vaccines within School-Based Health Centres. *Herpes* (2005); 12: 23-27.

Full text article accessed 9/28/09 at: [http://www.ihmf.org/journal/download/121Short\(23\)vol12123.pdf](http://www.ihmf.org/journal/download/121Short(23)vol12123.pdf)

Although this paper was partially funded by GlaxoSmithKline Biologicals; was published by the International Herpes Management Forum (www.ihmf.org), which appears to have strong ties to the pharmaceutical industry; and, the research upon which this paper is based appears to be focused on finding the best strategy for a future vaccination campaign, some of the information can be of value to those sharing CASBHC's interests. The article describes the results of a parent survey asking about the hypothetical availability of vaccines for genital herpes virus and meningococcal disease under differing circumstances. The majority of those surveyed felt that SBHCs delivered high quality care and supported SBHCs offering vaccines in general, though the majority felt parental consent for any vaccines at the time of SBHC enrollment was important. In addition, the parents supported their child receiving the hypothetical genital herpes vaccine in the SBHC with and without their knowledge.

The Impact of Obesity on Students' Academic Performance

In 2008, Colorado was found to be the leanest state in the nation. At the same time The Colorado Health Foundation reported obesity is on the rise in Colorado. Whether Colorado is lean or not has absolutely no impact on a child who is obese. The following set of articles describes the impact of obesity on students. The second and fourth articles are particularly disturbing in their descriptions of the impact of untreated childhood obesity.

1. Geier, A.B., McLaughlin, J., Kumanyika, S., Shults, J., Foster, G., Womble, L., Borradaile, K., Nachmani, J., Sherman, S. **The Relationship Between Relative Weight and School Attendance Among Elementary School Children**. *Obesity* (2007) 15, 2157–61.

Full text article accessed online 10/15/2008 at: <http://www.nature.com/oby/journal/v15/n8/full/oby2007256a.html>

Studying 1069 fourth through sixth grade students, the authors of *The Relationship Between Relative Weight and School Attendance Among Elementary School Children* compared school absenteeism between different weight classes of students while controlling for age, gender, race and socioeconomic status. Students were grouped according to relative weight categories as described by the Institute of Medicine: underweight, normal-weight, overweight, and obese. After following attendance records for one year, it was found that overweight children were absent on average 20 percent more than their normal-weight peers. The authors state that student BMI is as significant a predictor of absenteeism as age, gender, race, or socioeconomic status.

2. Taras, H., Potts-Datema, W. **Obesity and Student Performance at School**. *Journal of School Health* (2005); 75: 291-5.

Full text article accessed online through Denver Public Library's Research Resource Database, Gale PowerSource.

Authors report on their review of peer-reviewed journal articles describing studies of school-aged children (ages 5-18) published during the years 1994 through 2004. The articles related to the effect of weight on student performance in terms of attendance, achievement or cognitive ability. Only ten articles were cited and were arranged by the authors into a table describing source, research design, and outcomes related to school performance. All ten articles described some type of poor school performance related to obesity. Though not shown to be a causal factor, obesity seemed to be a predictor of lowered years of education and grade point average, placement in special education or remedial classes, IQ, or an increased likelihood of grade retention.

3. Wang, L.Y., Yang, Q., Lowry, R., Wechsler, H. **Economic analysis of a school-based obesity prevention program**. *Obesity Research*. (2003); 11: 1313-24.

Full text article was accessed on line 10/31/08 at: <http://www.nature.com/oby/journal/v11/n11/full/oby2003178a.html>

The authors describe an economic evaluation of an interdisciplinary weight management program called, "Planet Health" at the middle school level. The study assessed the cost effectiveness of the program and the cost benefit to society in terms of "quality-adjusted life years." While only a small percentage of girls were affected (1.9%) overall and boys seemed unaffected by the program, the cost per student per year was only \$14 (\$33,677 total cost) and the net savings to society was determined to be \$7,313.

4. Tavaris, E.M., Sobol, A.M., Hannon, C., Finklestein, D., Wiecha, J., Gortmaker, S.L., **Youths' Perceptions of Overweight-related Prevention Counseling at a Primary Care Visit**. *Obesity* (2007) 15, 831–6.

Abstract accessed online 12/2/08 at: <http://www.nature.com/oby/journal/v15/n4/abs/oby2007594a.html>

The authors surveyed 324 youth, ages 10-18 to find how they perceived receiving weight-related advice from their primary care physician. They reported receiving specific over-weight prevention advice only infrequently during routine primary care visits. After controlling for age, race/ethnicity, gender, weight status and mother's highest education, it was found that those youth whose mother lacked education beyond high school were significantly more likely to not have received weight-related advice. This article is included as a reminder to all of us that prejudices can creep in from the most unexpected places.

5. Wang, F., Vengeler, P.J. **Self-esteem and cognitive development in the era of the childhood obesity epidemic.** *Obesity Reviews* (2008) 9, 615-23.

Full text article accessed on line 8/20/09 at: <http://www3.interscience.wiley.com/cgi-bin/fulltext/120835488/PDFSTART>

Researchers sought to investigate relationships between body weight, self-esteem (often used as an indicator of mental well-being), and school performance in children. They studied 4,945 children aged 10 and 11 years. Students' height, weight, self-reports of self-esteem, diet quality and physical activity were linked to the results of a standardized literacy test. As others has reported before them, the researchers found that excess weight negatively effects self-esteem and physical activity positively effects self-esteem. New findings included that high quality diet positively effects self-esteem, while sedentary activities negatively effects self-esteem. Taken together, healthy diets and an active life improve both mental and physical health. Obesity, however, did not seem to independently effect school performance. Those factors which lead to obesity, poor diet and a sedentary life style were found to negatively impact both self-esteem and school performance.

The Value of the Active Management of Asthma in Schools

The sequence of the following articles describing the impact of asthma on children's educational experience loosely develops a story. The first article tells us that unmanaged asthma impacts school attendance and "education suffers" (but we don't know how). In the second article we hear again that asthma impacts school attendance but there is no clear correlation between asthma and academic achievement (i.e., measurable learning, aka grades). Then in the third article we see that a "hit and run" style of an asthma awareness (or asthma education) program has no real effect on children. In the fourth article of the series, we see that having a full-time school nurse will decrease asthma-related absenteeism more than the presence of a part-time school nurse. There is even better news in the fifth article: the active engagement of a pediatric asthma specialist makes a real and measurable difference in school absenteeism and asthma morbidity. In the sixth article outcomes are compared between three sets of schools; each with a different degree of asthma management. The first set of two schools has no SBHC, the second set of two schools has SBHCs but no specific asthma-intervention program, and the third set of two schools has both SBHCs and an asthma-intervention program. The two schools with both an active asthma management focus and a SBHC showed better student outcomes than either of the other two models studied. In the seventh article, it appears data were used from the same study as the preceding article; however, the data were examined in terms of hospitalization and attendance. It was discovered that access to a SBHC decreased hospitalization due to asthma while increasing attendance.

Although it may be tempting, there is no way to make comparisons about student outcomes reported in one paper with those reported in another paper. For example, it cannot be determined from these reports if the impact of a full-time school nurse on student asthma management was greater or lesser than the impact of the pediatric asthma specialist visiting in the Breathmobile. What can be seen in this sequence of reports is the greater the presence, the better the outcome: a full-time school nurse is better for students than a part-time school nurse; having a SBHC is better than no SBHC and having a SBHC that focuses on asthma is better for asthmatic students than a SBHC that does not aggressively pursue student asthma.

1. Diette, G.B., Markson, L., Skinner, E.A., Nguyen, T.T.H., Algatt-Bergstrom, P., Wu, A.W. **Nocturnal Asthma in Children Affects School Attendance, School Performance, and Parents' Work Attendance.** *Archives of Pediatric and Adolescent medicine* (2000); 154: 923-8.

Full text article accessed online 10/16/2008 at <http://archpedi.ama-assn.org/cgi/reprint/154/9/923.pdf>

Nocturnal Asthma in Children Affects School Attendance, School Performance, and Parents' Work Attendance does not address the value of SBHCs in managing asthma directly. Rather, it uses nocturnal asthma as a sign of less than optimal asthma control and examines the relationship between nocturnal awakenings and daytime functioning in terms of school absenteeism, academic achievement as well as parental work absenteeism. The authors did a cross-sectional survey during the winter of 1997-8, interviewing the parents of 438 children with asthma ages 5-17. The survey determined number of missed days of school and work and how often the children's education suffered due to asthma in the four weeks prior. In the 40% of children who had experienced nocturnal awakenings due to asthma, chances of school and work absenteeism increased. In addition, their education suffered as well.

2. Taras, H., Potts-Datema, W. **Childhood asthma and student performance at school.** *Journal of School Health* (2005); 75: 296-313.

Full text article accessed online through Denver Public Library's Research Resource Database, Gale PowerSource.

Authors report on a review of peer-reviewed journal articles describing studies of school-aged children (ages 5-18) published during the years 1989 through 2004. The articles related to the effect of asthma on student performance in terms of attendance and achievement. Sixty six articles were reviewed in terms of asthma and attendance and virtually all showed an inverse relationship between asthma and school attendance, though the degree of severity of the asthma and the reason for the absence were unknown. Approximately 2/3 of the studies showed no correlation between asthma and achievement or ability. There was a report of a decrease in reading readiness scores among kindergarteners with asthma. The authors reported interrupted sleep due to asthma as a reason for decreased achievement, rather than the severity of the asthma.

3. **Gerald, L.B., Redden, D., Wittich, A.R., Hains, C., Turner-Henson, A., Hemstreet, M.P., Feinstein, R., Erwin, S., Bailey, W.C. Outcomes for a Comprehensive School-Based Asthma Management Program. Journal of School Health (2006); 76: 291-296.**

Abstract accessed online 10/16/2008 at: <http://www3.interscience.wiley.com/journal/118733352/abstract>

Outcomes for a Comprehensive School-Based Asthma Management Program is an evaluation of a comprehensive school-based asthma management program. Fifty four elementary schools in a largely African-American, inner-city school district were randomly split into two groups. One of the groups participated in an immediate intervention program and the other half participated in a delay-intervention program. The intervention had three components: one for faculty/staff, one for students with asthma, and one for peers without asthma. The component for students with asthma included a personalized asthma-management action plan, medications and peak-flow meters.

No significant differences were seen in school absences, grade point average, emergency room visits, or hospitalizations between the immediate and delayed intervention groups. Also, there were no differences found between the intervention and control groups regarding morbidity outcomes.

4. **Telljohann, S.K., Dake, J.A., Price, J.H. Effect of Full-Time versus Part-Time School Nurses on Attendance of Elementary Students with Asthma. Journal of School Nursing (2004); 20: 331-4.**

Abstract accessed online 10/16/2008 at: <http://www.ncbi.nlm.nih.gov/pubmed/15560730>

Like the previous articles, *Effect of Full-Time versus Part-Time School Nurses on Attendance of Elementary Students with Asthma* does not speak of SBHCs. It does, however, compare absenteeism in elementary school children when they attend schools staffed with either a full-time (5 days per week) school nurse or a part-time (2 days per week) school nurse. It was found that students with asthma who are either poor or African American had a lower rate of absenteeism (23% fewer days) if they attended a school with a full-time school nurse than their counterparts in a school with a part-time school nurse.

5. **Liao, O., Morphew, T, Galant, S.P. The Breathmobile: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children. Journal of School Health (2006) 76: 313-9**

Abstract accessed online 10/15/2008 at <http://www.ncbi.nlm.nih.gov/pubmed/16918862>

While not describing the result of students accessing a SBHC, *The Breathmobile: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children*, does speak to the value of providing high-quality medical care in schools. The "Breathmobile" is a program sponsored by the Children's Hospital of Orange County which focuses on addressing asthma in inner-city children. The Breathmobile program is a school-based program which includes a mobile clinic and a pediatric asthma specialist. The paper describes how the program improved daily anti-inflammatory medication usage and decreased annual emergency room usage, hospitalizations, and school absenteeism.

6. **Webber, M.P., Hoxie, A.E., Odlum, M., Oruwariye, T., Lo, Y., Appel, D. Impact of Asthma Intervention in Two Elementary School-Based Health Centers in the Bronx, New York City. Pediatric Pulmonology (2005); 40: 487-93.**

Abstract accessed online 10/16/2008 at: <http://www3.interscience.wiley.com/journal/112098020/abstract>

Children with asthma had been identified in six schools prior to the asthma-intervention program's initiation. At that time it was found that the asthma prevalence was 20% and the emergency room usage was 46%. Once the asthma-intervention

program was started, parents were interviewed every 6 months for three years and asked about their children's health services usage in the 6 months prior. It was found that in the two schools having both a SBHC and the asthma-intervention program, children were less likely to have sought medical services or visited an emergency room for asthma in the previous 6 months compared to either of the other two sets of schools. In the words of the authors, "our findings support the effectiveness of aggressive school-based asthma services provided by SBHCs to reduce asthma morbidity and complement community health services."

7. **Webber, M.P., Carpiniello, K.E., Oruwariye T., Lo, Y., Burton, W.B., Appel, D.K. Burden of Asthma in Inner-City Elementary Schoolchildren. Archives of Pediatric and Adolescent Medicine (2003); 157: 125-129.**

Abstract accessed online 10/17/2008 at: <http://archpedi.ama-assn.org/cgi/content/full/157/2/125>

Burden of Asthma in Inner-City Elementary Schoolchildren describes a study which sought to find whether access to school-based clinics actually effect outcomes for students. Outcomes were defined as hospitalizations, emergency room visits, and absenteeism. Nine hundred and forty nine students known to have asthma and who attended one of six elementary schools in The Bronx, NY, were tracked in this study. Four of the schools had SBHCs, two did not. Data were compiled by surveying parents and by tracking school attendance records. Prevalence of asthma was 19.9% and parents reported that 46.2% of these children had been in the emergency room in the previous 12 months and 12.6% had been hospitalized. It was found that emergency room usage was no different between the two groups of schools, but the rate of hospitalization was higher in students attending a school without a SBHC. In addition, access to a SBHC decreased absenteeism by 3 days.

8. **Guo, J.J., Jang, R., Keller, K.N., McCracken, A.L., Pan, W., Cluxton, R.J. Impact of school-based health centers on children with asthma. Journal of Adolescent Health (2005); 37, 266-274.**

Full text article accessed online 9/23/2009 at: <http://www.jahonline.org/article/PIIS1054139X04002332/fulltext>

A study conducted in the Cincinnati area sought to find the effect of SBHC usage by children with asthma on emergency room use and hospitalization. Data from 4 school districts with SBHCs were compared to data from two comparable school districts without SBHC. It was found that the risk of hospitalization and emergency department visits for children with asthma decreased significantly with school-based health center program. The authors estimated the potential cost savings for hospitalization was \$970 per child.

The Value of Vaccinations in the School Setting

The first four of the following articles develops a case that, first, a school-based flu vaccination program can decrease school absenteeism; second, school-based flu vaccinations extend protection to others not in school; third, an epidemiologically-based school flu vaccination program benefits society in terms of financial cost and outbreak containment; and finally, it may be possible to generalize these findings because, as shown in the fourth article, a slightly different vaccination regimen for a very dissimilar disease carried out in a foreign country found advantages in both cost savings and disease control (findings from the previous papers) while employing a very different benefit analysis scheme. The fifth paper describes the value of SBHCs in providing vaccinations to uninsured students and those students enrolled in Medicaid. The final paper reported here may not be a juried article, which may cast doubt on its legitimacy. The point of the article seemed of value and so it was included.

1. **King, J.C., Stoddard, J.J., Gaglani, M.J., Moore, K.A., Magder, L., McClure, E., Rubin, J.D., Englund, J.A., Neuzil, K. Effectiveness of School-Based Influenza Vaccine. New England Journal of Medicine (2006) 355: 2523-32.**

Full text article accessed online 10/15/2008 at <http://content.nejm.org/cgi/content/abstract/355/24/2523>

Effectiveness of School-Based Influenza Vaccine describes a study of 11 clusters of demographically similar schools in 4 different states. Within each cluster, one school (designated as an "intervention school") is assigned to participate in a flu vaccination program and one or two schools (control schools) from the same cluster are identified but do not participate in the vaccination program. During a week predicted to be a time of peak influenza activity in each of the states, parents from each of the schools

are surveyed. It was found that *families* in which children participated in the vaccination program had significantly fewer flu-like symptoms and outcomes during the week of the survey.

2. **Davis, M.M., King, J.C., Moag, L., Cummings, G., Magder, L.S. Countywide School-Based Influenza Immunization: Direct and Indirect Impact on Student Absenteeism. *Pediatrics* (2008) 122: 260-5.**

Full text article accessed online 10/16/2008 by linking through:
<http://pediatrics.aappublications.org/cgi/content/abstract/122/1/e260>

Countywide School-Based Influenza Immunization: Direct and Indirect Impact on Student Absenteeism uses weekly absentee records for the 2005-06 school year following an influenza vaccination program carried out in all public elementary schools in Carroll County, Maryland, during the fall of 2005. These absentee records were compared with years 2002-05 absentee records for all Carroll County schools and years 2001-2006 absentee records from neighboring Frederick County schools. It was found that the county-wide vaccination program was associated with reduced absenteeism at the elementary and high school levels during a flu outbreak. The authors of the study state that school-based programs are an efficient method of delivering vaccine and probably offer protection to the unvaccinated community outside of the schools.

3. **Schmier, J., Li, S., King, J.C., Nichol, K., Mahadevia, P.J. Benefits and Costs of Immunizing Children Against Influenza At School: An Economic Analysis Based On A Large-Cluster Controlled Clinical Trial. *Health Affairs* (2008) 27: 96-104.**

Abstract accessed online 10/15/2008 at <http://content.healthaffairs.org/cgi/content/abstract/27/2/w96>

Prior to the CDC's change to recommending flu vaccinations to all children aged 5-18, *Benefits and Costs of Immunizing Children Against Influenza At School: An Economic Analysis Based On A Large-Cluster Controlled Clinical Trial* urged that vaccinating school children rather than just high-risk individuals would be an effective supplement in controlling flu outbreaks. The paper goes on to show that school-based immunization programs are also an economic benefit to society.

4. **Trotter, C.L., Edmunds, W.J. Modeling cost effectiveness of meningococcal serogroup C conjugate vaccination campaign in England and Wales. *British Medical Journal* (2002) 324: 809.**

Full text article accessed online 10/16/2008 at <http://www.bmj.com/cgi/content/full/324/7341/809>

The study, *Modeling cost effectiveness of meningococcal serogroup C conjugate vaccination campaign in England and Wales*, describes several vaccination programs, including a school-based program, and analyzes the effectiveness of each program in terms of lives saved, cost of implementation of the vaccination programs, and the economic benefits to society from the lives saved. The conclusion most relevant to this bibliography is that the vaccination program described in this paper was seen as the most cost-effective means of vaccinating school-aged children (ages 5-17). The authors also noted that for a vaccination program for this disease to be cost-effective, the disease should be prevalent at a certain base level in the population.

5. **Daley, M.F., Curtis, C.R., Pyrzanowski, J., Barrow, J., Benton, K., Abrams, L., Federico, S., Juszczak, L., Melinkovich, P., Crane, L.A., Kempe, A. Adolescent Immunization Delivery in School-Based Health Centers: A National Survey. *Journal of Adolescent Health* (2009); 45: 445-52.**

Abstract accessed online 10.26/09 at: [http://www.jahonline.org/article/S1054-139X\(09\)00137-2/abstract](http://www.jahonline.org/article/S1054-139X(09)00137-2/abstract)

The article describes a randomized national survey of 521 SBHCs for the purpose of determining adolescent vaccination practices and perceived barriers to vaccination. Most of the SBHCs (84%) reported offering vaccines, 96% vaccinated students enrolled in Medicaid and 98% vaccinated uninsured students. Only 39% of the SBHCs reported billing private insurance, 69% used an electronic database to track vaccinations and 83% sent reminders to students or parents if immunizations were due. Difficulty in billing private insurance was reported to be the greatest barrier for SBHCs which did not offer vaccines. The authors concluded that "SBHCs appear to be an important vaccination resource, particularly for low income and uninsured adolescents who may have more limited access to vaccination elsewhere."

6. **Short, M.B., Rupp, R., Stanberry, L.R., Rosenthal, S.L. Parental Acceptance of Adolescent Vaccines within School-Based Health Centres. *Herpes* (2005); 12: 23-27.**

Full text article accessed 9/28/09 at: [http://www.ihmf.org/journal/download/121Short\(23\)vol12123.pdf](http://www.ihmf.org/journal/download/121Short(23)vol12123.pdf)

Although this paper was partially funded by GlaxoSmithKline Biologicals; was published by the International Herpes Management Forum (www.ihmf.org), which appears to have strong ties to the pharmaceutical industry; and, the research upon which this paper is based appears to be focused on finding the best strategy for a future vaccination campaign, some of the information can be of value to those sharing CASBHC's interests. The article describes the results of a parent survey asking about the hypothetical availability of vaccines for genital herpes virus and meningococcal disease under differing circumstances. The majority of those surveyed felt that SBHCs delivered high quality care and supported SBHCs offering vaccines in general, though the majority felt parental consent for any vaccines at the time of SBHC enrollment was important. In addition, the parents supported their child receiving the hypothetical genital herpes vaccine in the SBHC with and without their knowledge.

Suggestions Regarding the Collection of Data in the SBHC

As noted earlier, there is not a lot of information specifically on the impact of SBHCs on student academic outcomes. Collecting quality information about your own SBHC serves several purposes. Good records collected over a period of years can be used to support writing grants and in reports to your local school board, or parent and community groups. This type of information can strengthen your local SBHC's standing in your school district or community. In addition, good information can also be useful when shared with other school districts, SBHCs, or CASBHC. Qualitative and quantitative data can be used to persuade others of the value of beginning a SBHC, expanding a program, or lobbying for better laws or regulations, or improving funding.

1. **Geierstanger, S.P., Amaral, G., Mansour, M., Walters, S.R. School-Based Health Centers and Academic Performance: Research, Challenges, and Recommendations. *Journal of School Health* (2004) 74: 347-43**

Abstract accessed online 10/18/2008 at:

http://eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=EJ696749&ERICExtSearch_SearchType_0=no&accno=EJ696749

This paper does not address the effect of SBHCs on academic achievement. Rather, it describes how studies have been conducted that attempt to connect the two. It goes on to offer advice on how SBHC service providers (and others) should respond to pressure to document effect of SBHC on academic performance

2. **National Assembly on School-Based Health Care. School-Based Health Centers and Academic Performance: What is the Intersection? Meeting Proceedings (2005).**

Full text report accessed on line 10/18/2008 at: http://www.nasbhc.org/atf/cf/%7BCD9949F2-2761-42FB-BC7A-CEE165C701D9%7D/PUB_Academic_Outcomes.pdf

School-Based Health Centers and Academic Performance: What is the Intersection? reports on a 2004 meeting, sponsored by NABHC, which brought together 23 experts in education and health to examine the relationship between SBHCs and academic achievement. The paper also offers suggestions on ways those associated with SBHCs might inform others about the impact of SBHCs on the educational experience.

3. **Mathias K. Youth-specific primary health care – access, utilisation and health outcomes. NZHTA Report (2002); 5(1)**

Full text report accessed online 8/25/09 at: <http://nzhta.chmeds.ac.nz/publications/youth.pdf>

This publication was commissioned by the New Zealand Ministry of Health. It provides a critical assessment of the scientific literature to determine the effectiveness of youth-specific primary health care. The main objective of the study was to determine the impact of youth-specific health programs on access, utilization, physical and mental health outcomes and emergency room usage. The project also wished to determine what types of health programs increased access and utilization. Studies of American school-based health care programs made up a significant portion of the studies reviewed.

While twenty three studies were used in compiling this study, the author was dismayed at the general lack of rigor in many of the studies describing outcomes of SBHCs. She cites funding for program, rather than evaluation of outcomes; unique

populations being served by SBHCs; and the fact that political and religious objections to providing reproductive health care in schools all conspire to confound the pursuit of valid data from SBHCs.

The Impact of Student Health on their Education and Health in General Terms

The references which follow are a diverse assortment of articles which did not always fit nicely into the above categories (though some were used there) but seemed to be of interest and value.

1. **Grossman, J.B., Vang, Z.M. The Case for School-Based Integration of Services: Changing the Ways Students, Families and Communities Engage with their Schools. 2009. Public/Private Ventures' GroundWork series**

Full text article accessed online 8/25/09 at: http://www.ppv.org/ppv/publications/assets/267_publication.pdf

Authors argue for the integration of health, social and extra-curricular educational services being co-located in the school. The authors use findings from research to develop an argument for "complementary learning," a model in which low income and minority students access a variety of opportunities at their school which would otherwise be unavailable to them or difficult to access. Their research has led them to believe the co-location of these services creates a synergy which improves students' connection with school; improves attendance, academic achievement and behavior; increases the family's involvement in their children's' education; and, increases participation in services for both youth and their families through improving access. School-based health centers are a centerpiece of the model they describe.

2. **Mathias K. Youth-specific primary health care – access, utilisation and health outcomes. NZHTA Report (2002); 5(1)**

Full text report accessed online 8/25/09 at: <http://nzhta.chmeds.ac.nz/publications/youth.pdf>

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A total of twenty three studies were reviewed. Seven of the studies looked at SBHC utilization. All seven studies reported a greater utilization of health resources by those with SBHC access compared to those without such access. Several of the studies found those who most benefitted were socio-economically disadvantaged, female and considered at-risk. Increased utilization by minority students showed mixed results and increased access was seen in rural settings over urban settings. It must be noted that increased access does not refer to the miles to the nearest source of health care. Rather it refers to the "ease of use" or the approachability of health service. This could mean distance, cost, cultural appropriateness, perceptions around confidentiality, or hours of service. The author states that evidence clearly shows improved access and utilization for youth in SBHCs.

Five studies compared emergency room usage for those with and without SBHC access. Three studies showed a decreased emergency room usage by students with access to SBHCs while two studies showed little difference. The author claimed the three studies showing a decrease in emergency room use were more robust than the two studies with mixed results.

Four studies were described which address health outcomes for students using youth-specific programs. All of these studies were described as "poor to moderate in quality." They all evaluated aspects of reproductive health. The author felt there was insufficient information to make claims regarding improved health outcomes due to these programs.

The author concluded by stating youth desire youth-specific health programs and they will use these programs when they are available. There is a need, however, to monitor the health outcomes of such programs. The author also cautioned researchers to be careful in the design of their studies to ensure valid data is collected.

3. **The Center for Health and Health Care in Schools. School-Based Health Centers: A Select Bibliography. Updated September 2008**

Accessed online 10/18/2008 at: <http://www.healthinschools.org/Publications-and-Resources/Publications/Bibliographies/School-Based-Health-Centers-Bibliography.aspx#reproductive>

The Center for Health and Health Care in Schools has posted on their website this extensive bibliography. The bibliography provides both general background as well as publications that address the specific topics relevant to SBHCs. These topics include access to care, clinical services, financing, reproductive health care, research and evaluation, school-based dental services, school-based health centers/school partnerships, and staffing and training.

4. **Silberberg, M. Cantor, J.C. Making the Case for School-Based Health: Where Do We Stand? *Journal of Health, Policy and Law.* (2008) 33: 3-37.**

Full text article accessed online 8/25/09 at: <http://jhppl.dukejournals.org/cgi/reprint/33/1/3>

While the authors support the school-based health care movement, they provide several well researched and thought out cautions. They believe overly enthusiastic support for SBHCs is leading to poorly designed and maintained health centers. They urge those involved with SBHCs to be more attentive to local needs and resources as well as being more strategic in their planning. The authors develop the argument that three things must be considered before starting a new SBHC. First, SBHCs must focus on delivering services that are appropriate for the specific needs of the target population it will be serving. Second, local resources must be evaluated and exploited to develop the most effective strategy for addressing the health needs of the target population. Finally, funding sources should match the work that needs to be done.

5. **The National Conference of State Legislatures. Benefits of School-Based Health Centers. Accessed online 10/16/2008 at <http://www.ncsl.org/programs/health/schlitthandout.htm>**

The National Conference of State Legislatures has compiled this brief listing of reasons why SBHCs are a good thing. The reasons include, SBHCs reduce inappropriate emergency room use among regular users of school-based health centers; SBHCs lead to a reduction in Medicaid expenditures related to inpatient, drug and emergency department use; SBHCs attract harder-to-reach populations and they do a better job at getting them crucial services such as mental health care and high-risk behavior screens; SBHCs cause a significant increase in health care access by students; SBHCs lead to a reduction in hospitalization and an increase in use of peak flow meters, inhalers, and improved school attendance among inner-city school children; they lead to a decreased absenteeism and tardiness by students using SBHC counseling services; students who reported depression and past suicide attempts, were obese, or are sexually active were significantly more willing to use the clinic; and students who used SBHC counseling service were less likely to be referred for discipline. Each of the reasons presented are supported in a bibliography of peer-reviewed journals

6. **Centers for Disease Control and Prevention. Healthy Youth! Student Health and Academic Achievement. Accessed online 10/18/2008 at: http://www.cdc.gov/healthyyouth/health_and_academics/index.htm**

The following text is from the CDC's web page identified above and is well referenced:

The academic success of America's youth is strongly linked with their health. Health-related factors such as hunger, physical and emotional abuse, and chronic illness can lead to poor school performance. Health-risk behaviors such as substance use, violence, and physical inactivity are consistently linked to academic failure, and often affect students' school attendance, grades, test scores, and ability to pay attention in class.

In turn, academic success is an excellent indicator for the overall well-being of youth and a primary predictor and determinant of adult health outcomes. Leading national education organizations recognize the close relationship between health and education, as well as the need to embed health into the educational environment for all students.

Promoting academic achievement is one of the four fundamental outcomes of modern school health programs. Scientific reviews have documented that school health programs can have positive impacts on educational outcomes, as well as on health risk behaviors and health outcomes. Programs that are primarily designed to improve academic performance are increasingly being recognized as important public health interventions.

7. **US Department of Health and Human Services and Centers for Disease Control and Prevention. National Youth Risk Behavior Survey. Accessed online 10/18/2008 at: http://www.cdc.gov/healthyyouth/health_and_academics/pdf/health_risk_behaviors.pdf**

The following text is from the CDC's Health Kids! web page:

The Youth Risk Behavior Surveillance System (YRBSS) monitors behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States. Through the national Youth Risk Behavior Survey, CDC monitors student health-risk behaviors and the extent to which these behaviors are associated with academic achievement.

Data from the 2003 National Youth Risk Behavior Survey (YRBS) show a negative association between health-risk behaviors and academic achievement among high school students after controlling for sex, race/ethnicity, and grade level. This means that students with higher grades are less likely to engage in health-risk behaviors than their classmates with lower grades, and students who do not engage in health-risk behaviors receive higher grades than their classmates who do engage in health-risk behaviors. These associations do not prove causation. Further research is needed to determine whether low grades lead to health-risk behaviors, health-risk behaviors lead to low grades, or some other factors lead to both of these problems.

8. **Murray, N.G., Low, B.J., Hollis, C., Cross, A.W., Davis, S.M. Coordinated School Health Programs and Academic Achievement: A Systematic Review of the Literature. *Journal of School Health* (2007); 77: 589-600.**

Full text article accessed online 10/14/2008 at:

http://www.cdc.gov/HealthyYouth/health_and_academics/pdf/CSHP_and_Academic_Achievement.pdf

Housed on the CDC's Healthy Kids! web page, this article addresses the effect of Coordinated School Health Programs with academic achievement. Like the findings of the NASBHC panel attempting to link SBHC's with academic achievement (see, [School-Based Health Centers and Academic Performance: What is the Intersection?](#) above) the literature is found to be sparse and inconclusive. The following is a statement from the abstract describing the strongest and weakest evidence from their review:

The strongest evidence from scientifically rigorous evaluations exists for a positive effect on some academic outcomes from school health programs for asthmatic children that incorporate health education and parental involvement. Strong evidence also exists for a lack of negative effects of physical education programs on academic outcomes. Limited evidence from scientifically rigorous evaluations support the effect of nutrition services, health services, and mental health programs, but no such evidence is found in the literature to support the effect of staff health promotion programs or school environment interventions on academic outcomes.

9. **Sigfúsdóttir, I.D., Kristjánsson, A.L., Allegrante, J.P. Health behaviour and academic achievement in Icelandic school children. *Health Education Research* (2007); 22:70-80.**

Abstract accessed online 10/17/2008 at: <http://her.oxfordjournals.org/cgi/content/abstract/22/1/70>

When considering the cultural, racial, or socio-economic diversity in U.S. schools, Icelandic children are probably not too similar to most students in many American schools hosting a SBHC. This report is included, however, for several reasons. The study is a cross-sectional survey of almost 6,000 Icelandic students. Using a large and relatively homogeneous cohort increases the validity of the results and conclusions of such a study and is therefore useful when it confirms the findings of similar American studies on a more heterogeneous population. Also, CASBHC assumes that similar health behaviors in any set of students may have broadly similar academic outcomes.

The authors of *Health behaviour and academic achievement in Icelandic school children* report that body mass index (BMI), diet and physical activity explained almost a quarter of the variance in academic achievement. They also report that variance increases to over 25% when depressed mood and self-esteem are added to the model. The researchers controlled for gender, parental education, family structure and absenteeism. In their conclusion, they admit these are not hugely convincing results but do point out that the results are consistent with other findings and lament the complexity of connecting health and achievement.

10. **National School Board Association. Beliefs and Policies of the National School Boards Association; amended March 28, 2008: Page 21. Accessed online 10/16/2008 at:**

<http://www.nsba.org/FunctionNav/AboutNSBA/NSBAGovernance/BeliefsandPolicies.aspx>

The following is a belief statement of NSBA:

5.5 Coordinated School Health Programs

NSBA encourages local school boards to recognize that health and learning are integrally linked and that schools are a critical link in community-wide efforts to promote life-long health and prevent health-risk behaviors. NSBA also encourages school boards to collaborate with community partners to maximize resources for achieving a coordinated school health program.

11. **Dively, J., Berg, K. In-school clinics help wellness, achievement. Illinois School Board Journal. 2007**

Full text article accessed online 10/15/2008 at:

https://www.iasb.com/printit.cfm?whichpage=www.iasb.com/journal/j091007_05.cfm

In-school clinics help wellness, achievement is an opinion piece with references. The article states that “closing the achievement gap requires three strategies: 1) raising the quality of instruction; 2) expanding the definition of schooling to include crucial out-of-school hours; and 3) implementing social and economic policies that will enable students to come to school ready to learn. Without including strategies two and three the influence of social class characteristics is probably so powerful that schools cannot overcome it, no matter how well-trained are their teachers and no matter how well-designed are their instructional programs and climates.” The authors go on to promote the usage of SBHCs as a means to achieve the objective of the third strategy.

12. **Adolescent Health Services: Missing Opportunities. Washington, D.C.: The National Academies Press, 2009.**

The Committee on Adolescent Health Care Services and Models of Care for Treatment, Prevention and Healthy Development was charged by the National Research Council and Institute of Medicine to study adolescent health services and develop research and policy recommendations which highlight critical health needs, promising service models and components of care that could strengthen and improve health services for adolescents.

The Committee found that most adolescents are thriving but may engage in risky behaviors, develop unhealthy habits, and experience mental and physical health conditions which can jeopardize their immediate health and contribute to poor health as an adult. They also found that health services are often highly fragmented, poorly coordinated and delivered in multiple public and private settings. These health services for adolescents are poorly equipped to meet the disease prevention and health promotion and behavioral health needs of all adolescents. Rather, care focuses on care for acute conditions or addressing specific issues such as contraception or substance abuse. In addition, many of the health professionals working with adolescents frequently lack the training or skills to interact appropriately or effectively with this age group.

This book provides guidance to administrators in public and private health care agencies, health care workers, guidance counselors, parents, school administrators, and policy makers on investing in, strengthening, and improving an integrated health system for adolescents.

13. **Kaplan, D.W., Brindis, C., Naylor, K.E., Phibbs, S.L., Ahlstrand, K.R., and Melinkovich, P. Elementary School-Based Health Center Use. PEDIATRICS (1998)101; 12.**

Full text article accessed online 8/21/09 at: <http://pediatrics.aappublications.org/cgi/content/full/101/6/e12>

Researchers conducted a retrospective analysis of services provided for almost 600 students, Hispanic, at an elementary school-based health center. They looked both physical and mental primary health care utilization by the students. They found that 2,443 visits were made to the SBHC by 591 students, averaging 4 visits per student. Two thirds of these visits were for physical health related issues and one third was for mental health related issues. They concluded that providing comprehensive and culturally-sensitive care resulted in a high level of SBHC utilization for both physical and mental health related issues by a traditionally underserved population.

14. **Kaplan, D.W., Brindis C.D., Phibbs, S.L., Melinkovich, P., Naylor, K., Ahlstrand, K. A Comparison Study of an Elementary School-Based Health Center: Effects on Health Care Access and Use. Archives of Pediatric Adolescent Medicine (1999) 153: 235-43.**

Full text article accessed online 8/21/09 at: <http://archpedi.ama-assn.org/cgi/reprint/153/3/235.pdf?ck=nck>

Researchers sought to determine the effect of SBHC on usage of and access to physical and mental health services by elementary school students by means of a retrospective cohort analysis of parent surveys. When measured against

comparison schools, children attending the elementary school with a SBHC had less difficulty receiving immunizations, physical examinations, and treatment for illness and injuries. In addition, access to a SBHC was negatively correlated to emergency department usage and a positively correlated to the chances of having had an annual dental examination and visit to a physician's office. Finally, respondents were more likely to be satisfied with their experiences with health services than those respondents who used mostly community clinics or hospital clinics. The investigators concluded that, regardless of insurance status and other confounding variables, children with access to a SBHC had better access to health care and a higher usage rate than those without, signifying that SBHCs are an effective component of health care delivery system for these children.

15. Pastore, D.R., Murray, P.J., Juszczak, L. School-Based Health Center: Position Paper of the Society for Adolescent Medicine. *Journal of Adolescent Medicine.* (2001) 29: 448-50.

Full text article accessed online 8/21/09 at: http://www.adolescenthealth.org/PositionPaper_School-based_health_center.pdf

The vast majority of this position paper of the Society for Adolescent Medicine provides documented data on the state of SBHCs in the U. S. (as of 2001). The last few lines of the papers state:

At this time SAM voices its unequivocal support of the comprehensive SBHC model with the following positions:

1. School-based health centers are a valuable asset in health promotion and prevention programming for teens.
2. School-based health centers provide essential access to mental health and substance use services for teens.
3. School-based health centers are valuable sites for learning about interventions that best support adolescents' healthy behaviors.
4. School-based health centers are well-situated to minimize financial and non-financial barriers to care for adolescents.
5. School-based health centers are well-situated to play a central role in addressing the treatment of sexually transmitted infections in teens. School-based health centers recognize the need to negotiate some of the specific issues of reproductive care on an individual school and community basis.
6. School-based health centers are a valuable training site for health professionals and can model interdisciplinary and multisystem collaboration.
7. School-based health centers provides a unique opportunity for research on adolescent health issues including the evaluation of outcomes related to health promotion and disease prevention as well as specific programmatic interventions.

16. Anglin, T.M., Naylor, K.E., Kaplan, D.W. Comprehensive School-Based Health Care: High School Students' Use of Medical, Mental Health, and Substance Abuse Services. *Pediatrics* (1996) 97: 318-330.

Brief article over view accessed online 8/21/09 at: <http://pediatrics.aappublications.org/cgi/content/abstract/97/3/318>

Researchers investigated adolescents' use of physical, mental and substance abuse services available through SBHCs and compared these data with students in traditional school settings by means of a retrospective analysis of computer-stored standardized data during a 4 year period. They studied 3,818 students who had access to three high school SBHCs. It was found that the students made 27,886 visits to the three SBHCs. These students represented only 63% of the students enrolled in the SBHC and were most likely to be Hispanic and female. SBHC users made up about 42% of the total school population there were no significant demographic differences between SBHC users and the general school population. The vast majority of students (94%) used the SBHC for physical health visits; 25% met with mental health providers; and, 8% sought help substance abuse counselors. An average of 1.4 diagnoses were made per visit with the most common major diagnostic category being emotional problems (29%), followed by health supervision (13%), respiratory or reproductive health problems (11% each), and finally, substance abuse (8%). The investigators concluded that students with access to a SBHC had a higher rate of visits for health and medical care than students without access to a SBHC. The proportion of use of mental health and substance abuse services by students utilizing the SBHCs were found to be equivalent to national estimates of their prevalence. In addition, students using medical, mental health and probably substance abuse services in the SBHCs seemed to do so at a higher rate than their peers without access to a SBHC.

17. Klein, J.D., Handwerker, L., Sesselberg, T.S., Sutter, E., Flanagan, E., Gawronski, B. Measuring Quality of Adolescent Preventive Services of Health Plan Enrollees and School-Based Health Center Users. *Journal of Adolescent Health* (2007); 41: 153-160.

Abstract accessed online 9/28/09 at: [http://www.jahonline.org/article/S1054-139X\(07\)00177-2/abstract](http://www.jahonline.org/article/S1054-139X(07)00177-2/abstract)

The authors sought to find whether the quality of care was better for adolescents enrolled in a community-based managed care plan (either commercially insured or Medicaid insured) and also received some care at their SBHC. The Young Adult Health Care Survey (YAHCS) was given to 374 adolescents to determine their degree of risk behaviors, provision of preventive health services, counseling and quality of care. It was discovered that SBHC users were more likely to be told their discussion with a provider was confidential, more likely to receive screening/counseling on STIs, HIV/AIDS, condom use, and birth control, whereas commercially insured adolescent were least likely to report having had a discussion on sexual health issues. In addition, SBHC users had the highest mean quality measure scores for screening/counseling on pregnancy/STIs, diet, exercise, and helpfulness of counseling provided as measured by the YAHCS. Medicaid-insured adolescents received the lowest scores on four of the seven measures.