

# Research Review: School-based Health Interventions and Academic Achievement

September 2009



Julia Dilley, PhD MES

Healthy Students, Successful Students Partnership Committee



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### Author

Julia Dilley, PhD MES  
Senior Research Scientist/Epidemiologist

### Editors

Don Martin, Tara Wolff

### Graphic Designer

Vonda Witley

### Consultants/Reviewers

**Washington State Board of Health:** Treuman Katz, Chair  
Craig McLaughlin, Frankie Manning, Tara Wolff\*

**Washington State Office of Superintendent of Public Instruction:** Randy Dorn, Superintendent  
John-Paul Chaisson-Cardenás, Lesley Eicher, Dixie Grunenfelder, Mona Johnson, Erin Jones,  
Ken Kanikeberg, Martin Mueller, Robin Munson, Nathan Olson, Lisa Rakoz, Gayle Thronson\*,  
Greg Williamson\*

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\* Healthy Students, Successful Students Partnership Committee Members

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## 13 Health Risks Examined in This Report

From the Washington State  
Healthy Youth Survey

- Insufficient fruit and vegetable consumption
- Fewer than 8 hours of sleep at night
- Not eating breakfast
- Watching TV 3 or more hours on an average school day
- Depressed for at least 2 weeks in past year
- Insufficient exercise
- Feeling unsafe at school
- Alcohol use
- Drinking 2 or more soda pops per day
- Obesity
- Marijuana use
- Cigarette smoking
- Severe asthma



## Executive Summary

*Research Review: School-based Health Interventions and Academic Achievement* provides important new evidence that links students' health and academic performance. It identifies proven health interventions and practical resources that can positively affect both student health and academic achievement.

**Health and Education Are Linked.** For students in middle and high school, health risks and academic risks affect each other. Students who do poorly in school may have more health risks, which adversely affect their achievement and in turn contribute to health risks. Data from the Healthy Youth Survey in Washington State provide a new way of looking at the relationship between health risk and academic achievement. The report examines 13 key physical and mental health risk factors and analyzes the relationship between these specific health factors and the grades students report getting in school.

**Every Health Risk Can Affect Academic Success.** The more health risks students have, the less likely they will succeed in school or graduate on time. Each health risk that can be removed has the potential to positively influence academic behaviors. Improvement of even a single health factor may help improve academic achievement.

**Interventions Can Narrow Disparities.** Lack of equal chances for success—the result of poverty, discrimination, unequal access to services, and other factors—affects a person's health. These patterns of socioeconomic disparities are often the same for disparities in academic achievement. It may be unrealistic to expect to close the achievement gap for disadvantaged youth without addressing wellness, readiness to learn, and the conditions affecting the health of the community.

**Health Interventions Can Improve Learning and Health.** There are many proven interventions that have a positive impact on students' health and academic achievement. This report examines how delivering supportive health policies, instruction, and services comprehensively may be more effective than offering single health interventions. School leaders are offered six key ingredients for success that are supported by research and are consistent with the Coordinated School Health approach from the Centers for Disease Control and Prevention (CDC).

The findings of this report suggest that implementing proven school-based health interventions is an opportunity to improve students' academic achievement, well-being, and quality of life.

## Purpose of This Report

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What is the relationship between a student's health and academic achievement? Are they competing priorities? Or do healthy students really learn better?

This report summarizes what the research shows about academic achievement and health, so that administrators, teachers, school staff, and communities can make well-informed decisions about how to prioritize health interventions in their schools.

## Finding Common Ground for Health and Education

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Washington State school professionals work hard to provide students with knowledge and skills and to support their well-being. Their mission is to prepare Washington students to live, learn, and work as productive citizens in the 21st century. And like other systems across the nation, we find that not all students are able to succeed in school, and that certain groups of students are consistently less likely to have success than others. School leaders struggle with how best to support students given limited funding. Sacrificing class time and scarce resources for subjects that do not directly contribute to those scores may be perceived as risky or less of a priority.

Washington State's public health community also works hard to make our children's lives better. The mission of public health is to protect and improve the health of people in Washington State. Students spend a large portion of each day in school. This makes schools a natural place for delivering information to students about positive health choices and a natural partner in improving the public's health. There is increased pressure on schools to improve scores on reading, writing, and math performance tests, and increased evidence that unaddressed health barriers prevent improvement in test scores.

## Health and Education Are Linked

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A great deal of research is available to describe the relationship between educational attainment and health among adults. Because adults have for the most part completed their education, the attainment of education precedes their health status: we can safely say that more highly educated adults tend to be healthier. For this reason, public health advocates are giving increased attention to the social determinants of health for improving public health. The social determinants of health are the conditions in which people are born, grow, live, work, and age. These include income, education, and access to resources.

*Education and health are linked. Adults who are more educated tend to be healthier. For students, unhealthy behaviors and educational challenges may influence each other, or have common root causes.*

Youth are in the process of completing their education, and in some cases are also initiating unhealthy behaviors (such as experimenting with alcohol or tobacco). Do unhealthy behaviors decrease the ability of young people to succeed in school? Or do challenges in school influence young people to take up unhealthy behaviors? It may be that each influences the other; and that the relationship can work in either direction. Also, there seem to be underlying factors that influence both academic achievement and health, such as insufficient family income<sup>1,2</sup> or childhood trauma.<sup>3</sup>

Researchers have suggested that the relationship between health and achievement works in different ways. For example, Hawkins, Catalano, and Miller (1992) found that “low degree of commitment to school” and “academic failure/poor achievement” are associated with substance abuse.<sup>4</sup> Townsend, Flisher, and King (2007) specifically studied the direction of the relationship between health and achievement by looking at previously published studies. They reported that substance abuse (especially cigarette smoking and marijuana use) was associated with dropping out of high school even after adjustment for demographic differences, but that more research was needed to understand how the relationship worked.<sup>5</sup>

*Health is an excellent indicator for the academic success of students.*

## Healthy Students Learn Better

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Teachers and parents know that a student who arrives at school fed, rested, calm, and unworried is ready to learn. Research also supports the idea that healthy students learn better. In a recent longitudinal study, after accounting for family characteristics, adolescents with poorer general health were found to be less likely than healthier students to graduate from high school on time and attend college or post-secondary education.<sup>6</sup> California’s state education system published an extensive report linking academic achievement and health.<sup>7</sup> A study by researchers at the University of Washington found that Washington State schools with a lower prevalence of substance abuse also had higher scores on the Washington Assessment of Student Learning (WASL).<sup>8</sup> The Centers for Disease Control and Prevention (CDC) recognizes the impact of health on academic achievement, stating:

*CDC recognizes that the academic success of America’s youth is strongly linked with their health. In turn, academic success is an excellent indicator for the overall well-being of youth, and is a primary predictor and determinant of adult health outcomes.<sup>9</sup>*

This association between health and academic achievement can also be seen among our own Washington youth. To illustrate, we examined this relationship using data collected from Washington State students who took the Healthy Youth Survey. The survey takes place in classrooms and has



questions about a variety of health factors and academic indicators, such as what grades the student usually gets in school. We classified students as being at “academic risk” if they said they usually get Cs, Ds, or Fs in school. We chose this classification because students have a tendency to over-report their grade achievements—a student who actually earns “straight Cs” is still successful. We identified 13 key physical and mental health risk factors that were available in the Healthy Youth Survey and somewhat common among students (see Table 1). *Note:* The Healthy Youth Survey does not collect information on all health risks affecting students. When we conducted this review, the latest data available were from 2006. We reviewed both representative random samples and statewide data from unsampled schools.

Health Risks That May Influence Student Achievement	
Health Risk	Percent of 8th grade students with risk factor
<b>Substance Abuse</b> (any use in past 30 days)	
Cigarette smoking	6.1
Alcohol use	16.9
Marijuana use	7.3
<b>Chronic Health Conditions</b>	
Obesity (body mass index greater than 30)	10.4
Severe asthma (frequent symptoms that affect activities and sleep)	0.3
<b>Poor Nutrition</b>	
Not eating breakfast	33.9
Insufficient fruit and vegetable consumption (fewer than 5 per day)	70.6
Drinking 2 or more soda pops per day	15.8
<b>Insufficient Physical Activity</b>	
Insufficient exercise (vigorous or moderate activity)	17.6
Watching TV 3 or more hours on an average school day	31.2
<b>Poor Mental Health</b>	
Feeling unsafe at school	17.5
Depressed for at least 2 weeks in past year	23.5
<b>Sleep Deprivation</b>	
Fewer than 8 hours of sleep at night	42.8

**Table 1**

Source: Washington State Healthy Youth Survey, 2006, 8th grade students (Washington public schools—sample schools and volunteer schools combined)

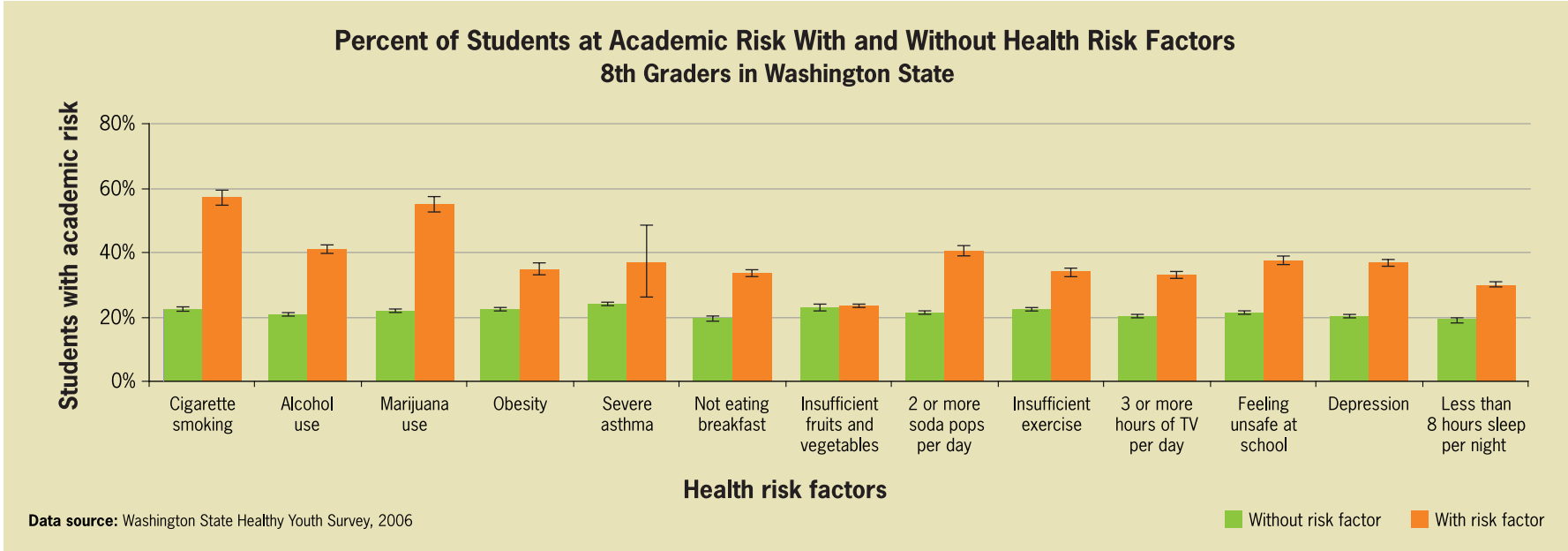
The percentage of 8th graders at academic risk was greater for students who reported having any of the 13 health risk factors, in comparison to students without the health risks (see Figure 1). For example, about 22 percent of nonsmoking students were at academic risk, but more than twice as many—57 percent—of students who smoke were at risk. About 20 percent of students who ate breakfast were at academic risk, but 34 percent of students who did *not* eat breakfast were at risk. For each specific risk factor, the difference in academic risk by health risk factor was statistically significant, including after adjusting for gender and socioeconomic status (throughout this report, socioeconomic status is measured by self-reported maternal education, which is a proxy for family income level).

**Figure 1**

Source: Washington State Healthy Youth Survey, 2006, 8th grade students (Washington public schools—sample schools and volunteer schools combined)

Figure shows 95 percent confidence interval, which is the probability that the interval shown covers the true value for all 8th graders in Washington State. Academic risk defined as students’ self-report of getting “mostly Cs, Ds, or Fs” in school.

We did not find other published research that looked at these health indicators as predictors for academic achievement. Most data analyses approach it from the other direction, looking at the academic outcome and exploring the association with a health risk. Both ways of presenting the relationship are valid. However, looking at health risk factors as the predictors may provide a more concrete means for educators and health advocates to discuss and focus attention on school health programs that help students succeed in school.



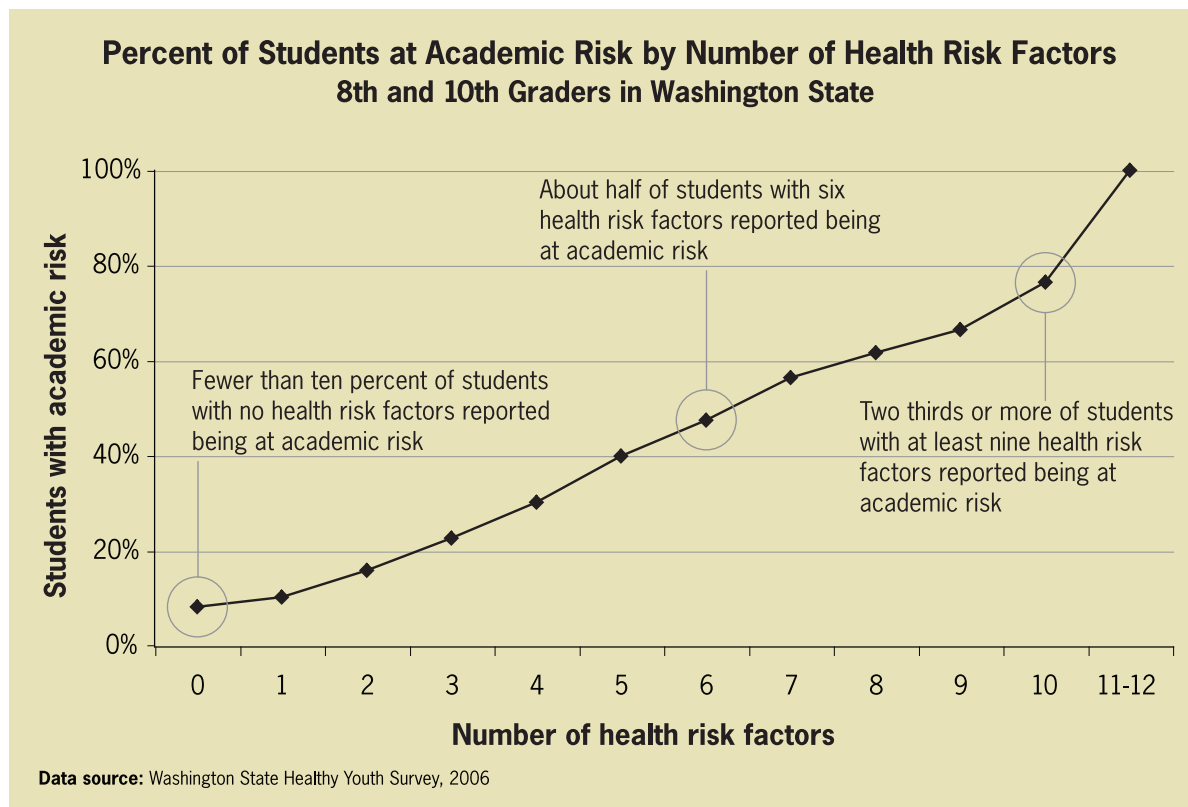


## Every Health Risk Can Make a Difference

We wanted to learn whether there is a point at which having more health risks did not continue to make a difference in academic risk. We combined the Washington State Healthy Youth Survey data for 8th and 10th graders, and created a “health risk score” for each student. One’s “score” is the total number of health risk factors from our list of 13. For example, a student who had insufficient sleep, insufficient exercise, and severe asthma, but had no other health risks received a score of 3.

We found that the more health risks students had, the more likely it was that they also were at academic risk. The rate of increase in academic risk was very consistent—each extra health risk added a similar difference, whether going from one to two risks or seven to eight risks (see Figure 2). Fewer than 10 percent of students with no health risk factors reported being at academic risk (having mostly Cs, Ds, or Fs). About half of students with six health risk factors, and two-thirds or more of students with at least nine health risk factors were at academic risk.

*The more health risks students have, the more likely they will be academically challenged. Improvement of even a single health risk factor may help.*



**Figure 2**

Source: Washington State Healthy Youth Survey, 2006, 8th and 10th grade students (Washington public schools—sample schools and volunteer schools combined)

This figure shows a dose-response effect—the relationship between how much an effect changes as you change the amount of the cause of that effect. Each health risk was associated with about a seven percent point increase in academic risk. Academic risk defined as students’ self-report of getting “mostly Cs, Ds, or Fs” in school.

Additionally, we combined all 13 health risks into a multiple logistic regression model, and also adjusted for age, gender, and socioeconomic status (based on maternal education). In this model each of the 13 health risk factors remained significantly associated with academic risk. In other words, if two students are the same in every other respect (both are in the same grade, both are overweight, both get insufficient sleep, but don't smoke, etc.), but only one of them drinks two or more sodas a day, the one who drinks the pop has greater odds of being at academic risk. On the positive side, this also suggests that each health risk that can be removed has the potential to positively influence academic behaviors.

*With slight variations, the patterns for disparities in academic risk are similar to patterns observed for disparities in health indicators.*

**Figure 3**

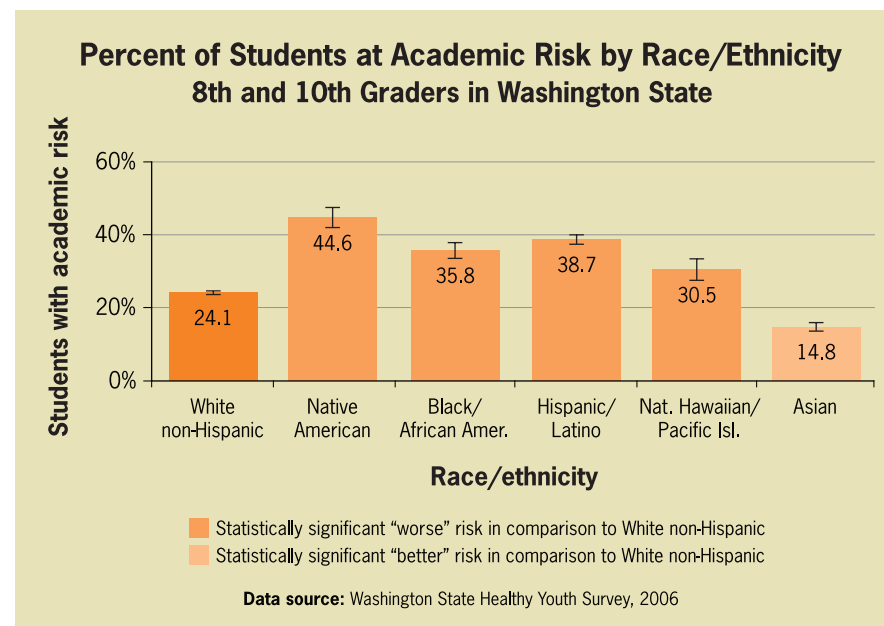
Source: Washington State Healthy Youth Survey, 2006, 8th and 10th grade students (Washington public schools—sample schools and volunteer schools combined)

Academic risk defined as students' self-report of getting "mostly Cs, Ds, or Fs" in school. Associations were significant after controlling for grade, maternal education and gender. Figure shows 95 percent confidence interval which is the probability that the interval shown covers the true value for all 8th and 10th graders in Washington State.

**Race and Poverty: Disparities in Health, Disparities in Education**

Health disparities are differences in disease, disability, and death between social groups. Groups who lack equal opportunity for economic or academic success often have less access to health information and services. In the United States and in Washington State we find poorer health outcomes for adults with less income and education in comparison to those with more, and for people of color in comparison to White non-Hispanics.<sup>10</sup>

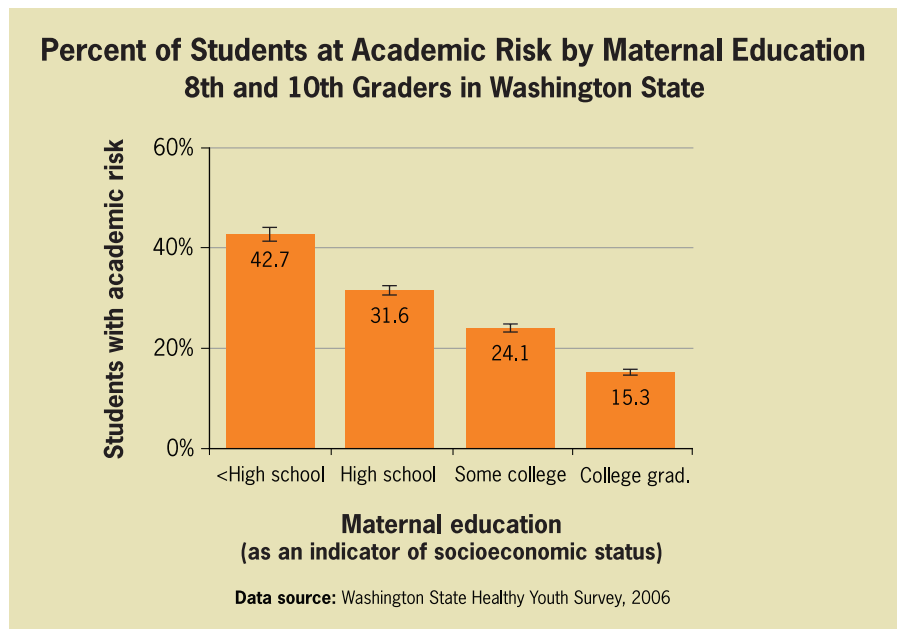
We can see the same patterns of inequity among youth in Washington's Healthy Youth Survey for both health and achievement indicators. For example, students who are Native American, Black,



Hispanic/Latino, and Native Hawaiian/Pacific Islander are all more likely to be at academic risk than White non-Hispanic and Asian students (see Figure 3). Also, using their mothers' highest level of education as an indicator of family socioeconomic status, students from families with less income are more likely to be at academic risk (see Figure 4).

In fact, except for Asian Americans, students of color in Washington are less likely to graduate from high school than White students. The dropout rate for Washington State high school students in 2005–06 was six percent for all students, but 11 percent for Native American students, 10 percent for Black/African American students, and nine percent for Latino students.<sup>11</sup> In 2005–2006, the on-time graduation rate for Washington’s White non-Hispanic students was 74 percent, but only 48 percent for Native American, 54 percent for Black/African American, and 58 percent for Latino students. We do not have graduation rates for students based on the socioeconomic status of the family, but based on reported academic risk by maternal education in our Healthy Youth Survey data (see Figure 4) we assume that graduation rates would also be lower for students from poorer families.

One limitation of race categories is that they don’t capture many differences between communities. For example, the commonly used race category “Asian and Pacific Islander” is a data collection grouping that is convenient rather than logical. In fact, Asian and Pacific Islanders include people of diverse cultures and social conditions. At this writing, the Office of Superintendent of Public Instruction had not begun reporting graduation rates for Asians and Pacific Islanders separately. The relatively small rate of dropout (four percent) and high levels of on-time graduation (77 percent) reported for Asian/Pacific Islanders in comparison to other racial/ethnic groups may be misleading. In the Healthy Youth Survey we were able to examine data for these two groups separately (see Figure 3). We found that Asian students were significantly less likely to be at academic risk than White non-Hispanic students, but Pacific Islander students were significantly more likely to be at academic risk than White non-Hispanic students. Pacific Islander groups may have achievement disparities that are not apparent since they are combined with other, lower-risk Asian groups. Furthermore, there may be subpopulations within either Asian or Pacific Islander groups that have different levels of risk from the overall category. Similarly, students from Russian immigrant



**Figure 4**

Source: Washington State Healthy Youth Survey, 2006, 8th and 10th grade students (Washington public schools—sample schools and volunteer schools combined)

Academic risk defined as students’ self-report of getting “mostly Cs, Ds, or Fs” in school. Associations were significant after controlling for grade, maternal education, and gender. Statistically significant association between maternal education and academic risk at  $p < .05$ . Figure shows 95 percent confidence interval which is the probability that the interval shown covers the true value for all 8th and 10th graders in Washington State.

families could be struggling as a group, but they would be identified as White non-Hispanic, and any different risks they have would not be apparent when examining data by race/ethnicity that combines them with all other White non-Hispanics. Understanding the changing populations in a school system is important for exploring and revealing inequities otherwise obscured by the way data is collected and reported.

In addition to facing academic challenges, Washington's low-income students and students of color frequently have more health risks. With slight variations, the patterns for disparities in academic risk are similar to patterns observed for disparities in health indicators. Disparities in health may compound already existing disparities in academic achievement. One published national study estimated that up to one-quarter of the racial gap in school readiness is the result of greater health risks (e.g., asthma, lead poisoning, anemia, etc.).<sup>12</sup> Fiscella and Kitzman (2009) concluded that “addressing disparities in child achievement and education are key to reducing disparities in health across the life span” and that “achieving this goal will likely entail closing gaps in child school readiness through adequate investment in child health, early education and reductions in child poverty.”

A recent report on disparities in health and academic achievement among youth concluded that while the purpose of the No Child Left Behind Act of 2001 was to eliminate gaps in child achievement, little progress has been made.<sup>13</sup> School-based health interventions are an opportunity not only to improve the physical well-being of students, but also to increase their ability to learn and succeed in school. It may be unrealistic to expect to close the achievement gap without also addressing the gaps in wellness, readiness to learn, and conditions affecting the health of the community.

*There are many school-based health interventions that are well designed and proven to be effective, covering a range of health topics.*

## Schools Can Improve Student Health

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The good news is that many programs have been shown to improve student health indicators when implemented in a school setting. For example, the *Guide to Community Preventive Services*, which conducts rigorous reviews of health interventions, found strong evidence to recommend:<sup>14</sup>

- School-based programs to reduce youth violence
- Youth development behavioral interventions, coordinated with community service to reduce sexual risk behaviors in adolescents
- School-based instructional programs for reducing alcohol-impaired driving
- School-based or linked dental sealant delivery programs
- Enhanced school-based physical education
- Person-to-person interventions to improve caregivers' parenting skills.

The Community Guide requires a high threshold of evidence for recommending interventions. Other reputable programs and agencies use different screening criteria to endorse specific curricula for effective school health interventions. For a list of examples and Web sites, see page 27. Additionally, many school-based health interventions, for a wide variety of health outcomes, can be found in peer-reviewed publications. Searches of research databases yield thousands of specific school-based health intervention studies that have found positive effects on health.

## Health Programs Work Better When They Are Comprehensive

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Clearly, there are many possibilities for school-based health interventions. School staff and partners may gravitate toward classroom-based or individual-based health education because it is the traditional way to reach students at school. However, policies, procedures, and “environments” that promote healthy behaviors are also critical components for improving student health. These school- or district-wide approaches are universal because they touch all students and staff, are often less costly to implement, and reinforce more targeted interventions. In the following section both targeted and universal approaches will be discussed in more detail.

Programs that include more than one approach can create synergy, so that the end effect is greater than the sum of its parts.<sup>15</sup> Such comprehensive programs include multiple interventions that are both universal and targeted. In the well-researched field of tobacco control, for example, the Centers for Disease Control and Prevention recommends “applying a mix of educational, clinical, regulatory, economic, and social strategies.”<sup>16</sup>

Research in a few specific health areas supports the increased effectiveness of school-based interventions that are comprehensive. Key examples include:

- A recent study conducted in Philadelphia found that the incidence of obesity was cut in half for the 4th–6th grade students at randomly assigned intervention schools versus control schools. The intervention schools conducted an assessment, implemented nutrition education, strengthened nutrition policies, conducted a marketing campaign, and provided outreach to parents.<sup>17</sup>
- In Oregon, schools that fully implemented comprehensive school-based tobacco prevention programs (including multiple policy components, curriculum, parent involvement, community support, and cessation services for students) had greater reductions in student smoking over a one-year period, compared to schools that implemented some but not all components, and also compared to those schools implementing only a few or no components (in fact, low-implementing and non-implementing schools performed the same).<sup>18</sup>

*Single interventions work, but health programs that combine policy, instruction, and services may be more effective.*

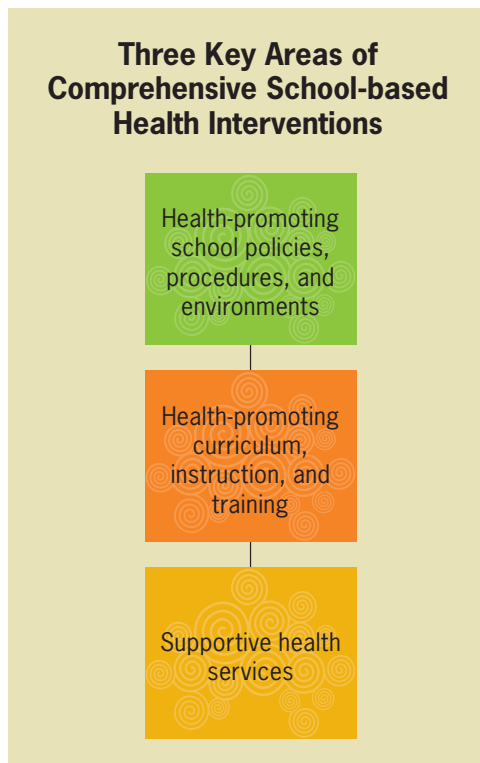
We can summarize comprehensive interventions in the school setting as addressing three key areas: 1) health-promoting policies, procedures, and environments; 2) health-promoting curriculum, instruction, and training; and 3) supportive health services. For the purpose of illustrating each of these areas, the examples below look at a comprehensive tobacco program, but they can apply to many other health issues.

**Health-promoting school policies, procedures, and environments** include rules that govern the school environment, the behavior of all people spending time in the school, and the physical features of the buildings and facilities. For example, schools can assure that campuses are completely tobacco-free by establishing zero-tolerance policies (i.e., no type of tobacco use allowed anywhere on school grounds or school events, by students, staff, or visitors, at anytime, including during non-school hours), having enforcement mechanisms, and posting signs clearly explaining the policies in the schools.

**Health-promoting curriculum, instruction, and training** cover a range of lessons and activities for students, but also include training opportunities for staff and teachers. For example, tobacco prevention curriculum is provided to students in required health classes, teachers get instruction on more targeted activities for students who are at higher risk, and staff are trained in how to involve families and community members in tobacco prevention efforts.

**Supportive health services** are targeted interventions or support for selected students, as well as provision of a broad range of services that can influence health. For example, school nurses and counselors refer students who currently smoke to cessation classes or other help for quitting.

Multi-component strategies surround students with visible, consistent, constant messages that reinforce making positive health choices. Taken together, health-promoting policies provide an environment for healthy ideas and behaviors, conveyed through instruction and supportive services that help students grow and thrive. All students are encouraged to make healthier behavior choices, and those who need extra help have access to that help. Healthy behaviors and improved health then translate into students learning better.





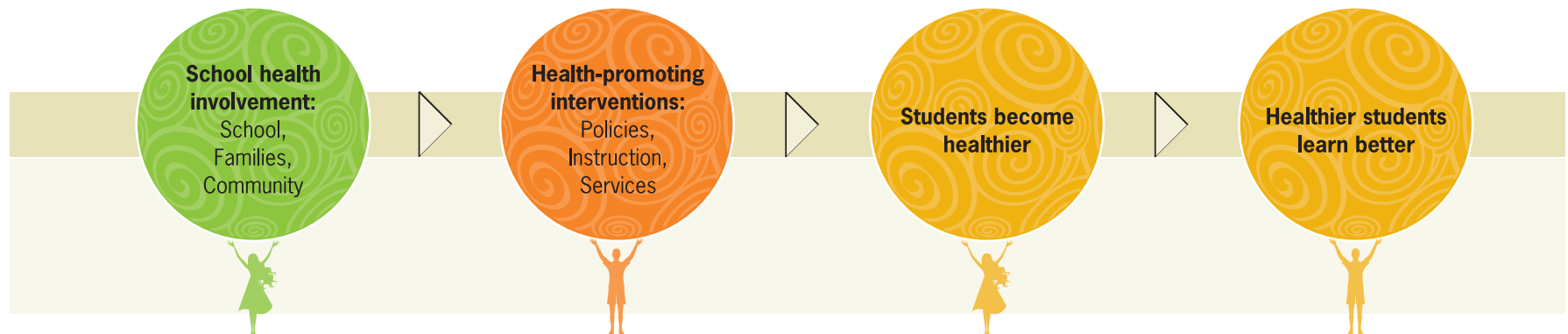
An analogy can be drawn between school health and worksite wellness. A substantial and growing body of research indicates that health promotion programs delivered through worksites are not only valuable for improving workers' health and quality of life, they are also a good investment for businesses. As with a worksite wellness program, school administrators, teachers, nurses, and food service managers use multi-component health promotion strategies that encourage students to improve their nutrition, become more physically active, stop smoking, manage stress, and use preventive medical services. Worksite wellness programs have been shown to decrease absenteeism, and to improve productivity (see <sup>19,20</sup>). The evidence that healthier worksites create healthier, more productive employees can be extended to suggest that healthier schools may create healthier, more successful students.

Simply providing health information to students is not as likely to result in healthier choices and behaviors as delivering more comprehensive interventions. For example, students receiving education on healthy food choices, who emerge from the classroom to be surrounded by options like soda, pizza, candy, and chips, may be less likely to eat healthy foods than when they have options for fresh fruits and vegetables. Similarly, the impact of tobacco prevention education may be lessened if smoking is tolerated just off campus. Additionally, enforcement of a tobacco-free campus is more powerful if smoking cessation services are readily available.

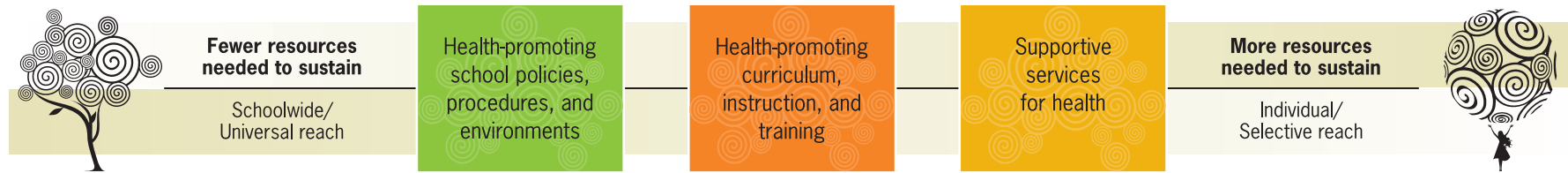
**Figure 5**

This figure illustrates the logic of a comprehensive school health strategy.

### Comprehensive School-based Health Interventions Improve Student Health and Learning



## The Relationship Between Resources and Reach in School-based Health Interventions



**Figure 6**

This figure illustrates the continuum of resources needed for universal and individual interventions.

*Policy interventions* (including changes in the school environment) can influence day-to-day norms of the school as a whole. These policy interventions may have a low individual impact, but high universal reach. For example, posting signs with health messages at school may not greatly change an individual student's risk, but they create an awareness of the expected behavior for everyone at the school. Other changes, such as restricting the availability of soda pop from vending machines during school hours, can have both a universal and meaningful individual impact. Some policy interventions also have the advantage of requiring fewer staff resources to sustain them once changes are made. Once signs are posted, or staff are assigned to routinely lock vending machines during the school day, these interventions require only minimal attention to continue.

In contrast, *supportive services* can have a high impact on individual students, but only for the *selected students* who need and use the services. These services usually require relatively more staff resources to sustain. For example, individual counseling programs for students at risk for substance abuse may effectively impact the behavior of individual students, but may not impact the prevalence of substance abuse at the school as a whole, because they only reach a small number of students.

Interventions involving *curriculum, instruction, and training* are somewhere in the middle of the range between universal and selective impact. Instruction is not usually offered to the whole school at once (universally) or to individual students (selectively), but rather to a classroom of students. It should be noted that instructional interventions can be undermined without supportive policy and environmental approaches. For example, if students are taught about the importance of exercise for good health, but then punished by having to run extra laps or do more pushups, they receive conflicting messages about the desirability of being active. It may not be reasonable to expect students to make long-term, healthy choices based on information they receive if health curriculum is delivered during a brief period of time, such as a single grade level. Additionally, constant cues in the environment are needed to reinforce and remind students about the messages learned in the classroom, and to assure that healthy choices are the easy choices.

Another challenge is delivering information targeted to specific population groups. When information is delivered without sensitivity to cultural values and norms, it can be less effective for groups of students who are in the minority. Communication failures of this nature can compound existing health disparities. Cultural competence may be especially important with regard to specific health topics. Because health beliefs and practices vary widely across cultures, information in a health curriculum can be perceived as contradictory to, or critical of, family and cultural norms. For example, a health-focused curriculum with a component for interacting with the family may be a positive and beneficial experience for most students. However, if the materials have not been translated or tested for different cultures (such as non-English-speaking families or new immigrant families), the activity may be ineffective or even stressful for others.

## Finding Health Interventions That Influenced Achievement

A recent and rigorously controlled review of school health interventions determined that implementation of nutrition, mental and physical health services programs were all associated with positive outcomes for achievement.<sup>21</sup> We reviewed additional published studies and prominent databases of “best practice” programs. Only studies or databases that demonstrated evidence of effectiveness for improving achievement-related indicators with health-focused interventions in schools were reviewed and included in this report.

We attempted to review any health intervention that had been implemented in a school setting, that focused on improving one or more of the 13 health indicators described on page 3, and that also reported improvement in academic achievement or a related measure (such as cognitive functioning, attendance, or other measures predictive of school success). We identified seven groups of effective school-based interventions showing a positive impact on both health-related factors and achievement-related factors. Each of these groupings represents multiple studies:

1) handwashing; 2) cognitive/social skills training; 3) parent/teacher communication skills training; 4) increased physical activity; 5) school breakfast programs; 6) chronic disease management training; and 7) school-based health centers.

There are many other successful or promising health interventions in the literature that were not considered because they did not include measures of academic achievement. Some examples of these promising interventions are noted in each section. We will examine the seven groups of interventions by how they fit into the key areas of policies, instruction, and services discussed earlier.

### Effective School-based Interventions for Health and Achievement

Published studies and prominent databases identified effective interventions in:

- Handwashing
- Cognitive/social skills training
- Parent/teacher communication skills training
- Increased physical activity
- School breakfast programs
- Chronic disease management training
- School-based health centers





### Other Promising Interventions

#### Classroom Air Quality

Prill, Blake, and Hales (2005) conducted a study of several thousand classrooms in Washington and Idaho public schools. Poor air quality (measured as carbon dioxide concentrations) was found in 43 percent of all classrooms, and 66 percent of “portable” classrooms.<sup>25</sup> A further study among a subset of the classrooms found that reduced outside air ventilation, indicated by elevated carbon dioxide concentrations, was associated with 10–20 percent increases in student absences.<sup>26</sup> Notably, this association with attendance was seen in the general student population, not only among students with asthma. This suggests that improving classroom ventilation and air quality may improve student health and reduce absences.

### Policy, Procedure, and Environmental Interventions

**Promote and Support Handwashing** (multiple reviews representing 27 studies in schools or comparable institutions)<sup>22–24</sup>

A substantial body of research exists to support use of good handwashing for the purpose of reducing infectious diseases and improving attendance in school. Some research indicated that hand sanitizers are an effective alternative to handwashing, and may be more easily managed than washing with soap in some schools, but hand sanitizers are not appropriate for significantly soiled hands. Antibacterial soaps do not provide any additional benefit over regular soaps. Appropriate facilities and enough time should be allowed to support washing with soap and water after using the toilet, touching animals, or playing outside. Students who have not left the classroom or engaged in activities that soiled their hands, should use sanitizers before a snack. Handwashing is an appropriate intervention for all students in all school settings.

Recently, a new strain of flu virus (H1N1 or “swine flu”) emerged, and reached pandemic levels. Health officials from around the state faced difficult decisions about school closures when students were identified with the virus. To prevent transmission of the virus, public health officials advised schools to encourage frequent handwashing by students and staff. Because of heightened attention to the threat of a serious viral illness, this advice was repeated frequently on TV, radio, and other media. Proper handwashing is one of the most effective things people can do to prevent the spread of any contagious illness, including seasonal flu and colds.

Challenges to supporting frequent handwashing include maintaining sinks with soap and towels, providing adequate time for students to wash appropriately, and supervision of students in restrooms or at handwashing stations. However, the payoff in time and resources is reduced student illness and absences from school.

## Curriculum, Instruction, and Training

Relative to other components, a great deal of research was published to describe interventions for training students, teachers, staff, and parents. This does not mean that training is the most effective or important component. Rather, curriculum and training components are the easiest to evaluate, have been studied most often, and have the greatest number of published studies. We should not conclude that these approaches alone will create the greatest impact on student health and academic achievement, but that they can be an effective component of an approach that also includes policies and services.

### **Cognitive and Social Skills Training** (20 studies<sup>27-46</sup>)

We identified a large number of specific curricula or programs that have been shown to improve a wide variety of student health behaviors through cognitive functioning and social skills training. These included programs that teach decision-making skills, conflict management, goal setting, and peer pressure resistance. Some of these skill-building trainings included segments for family involvement and community service. Content varied according to the health risks being addressed and also the age group of the intended audience. For example, the *Guide to Community Preventive Services* recommends school-based violence prevention programs that use cognitive skills training for students in the elementary and middle school age range. Training then shifts to social skills and development of behavioral skills<sup>47</sup> for students in middle to high school ages.

Some skills training programs are for high-risk students, while others are for all students. For example, the *Reconnecting Youth Program* is aimed at high school students at risk for drug use, aggressive behavior, and suicide. The program involves a partnership between staff, peers, and parents. It has been effective in curbing progression of alcohol and other drugs, decreasing anxiety, improving grades, and increasing credits earned per semester. Middle and high school students participating in *Project SUCCESS*, on the other hand, are not selected by any special criteria. This goal setting and mentoring project has decreased students' smoking rates and lifetime use of marijuana, and increased participation in school activities. This program was offered to all students, so the results are in comparison to students in comparable schools without such a program.





## Other Promising Interventions

### Staff Health Promotion

The Coordinated School Health approach (see page 18) includes teacher and staff health promotion as one of its eight recommended components. We did not find evidence to associate staff health promotion with students' academic achievement indicators. However, numerous studies have demonstrated that employees who have poor health, or who have family members in poor health, are more likely to miss work or to have trouble concentrating at work.<sup>61</sup> Wellness programs for school staff have been shown to increase healthy behaviors among staff and to decrease absences from school among staff in comparison to a control group.<sup>62</sup> Healthy staff—or staff making healthy changes in their lives—can be role models for students. Wellness programs for school staff may increase their support for broader school health efforts. Teachers who miss fewer days of work due to illness, and who have increased ability to concentrate on the job, may be able to provide higher quality instruction for students. Future studies may provide more information about the effectiveness of staff wellness programs for influencing student health (and/or related achievement measures).

As we reviewed the research, we noticed that many skills training programs did not clearly specify whether they had evaluated students of color. Some programs clearly involved populations that were largely White non-Hispanic, such as the *Personal Growth* program, which was tested in Seattle high schools. While some programs were aimed at students of color, they may not translate well to the needs of students in other Washington communities. For example, the *SAFE Children* program was tested among African-American students in Chicago's inner city.

### Parent/Teacher Communication Skills (7 studies<sup>48–54</sup>)

Providing training to teachers and parents that builds skills for communication and conflict management with students also showed promise for preventing negative health behaviors. These approaches can be effective for promoting health<sup>53</sup> for adolescents and for students and families with low socioeconomic status. Trainings can be offered to all families, or targeted to families of at-risk students or those experiencing stress (for example, divorce or other trauma). Programs have been tested for all age groups, although many focus on middle school students.

*Strengthening Families* is an example of a skills training program designed to help parents and students learn to communicate more effectively with one another. It is frequently implemented in partnership between school and community organizations. Students in this program had decreased substance abuse and higher academic performance six years after participation in the program compared to a control group.

### Increased Physical Education (PE) or Physical Activity Breaks (multiple reviews<sup>56–59</sup>)

A small number of interventions to increase physical activity in classrooms (through extended physical education classes or physical activity breaks) showed that students either performed better or the same as control groups, despite their having less classroom instruction time. Incorporating more activity into the school day, such as vigorous walking, may be an especially inexpensive intervention. *Project SPARK* introduced 30 minutes of moderate activity, three times per week, throughout the school year in randomly selected elementary schools. Students in *Project SPARK* increased their activity level and also improved standardized reading scores.

New research is emerging to explain how increased physical activity can improve learning. Physical activity increases circulation and blood flow, which may improve brain function. Exercise also decreases stress and may improve a student's ability to focus in class.<sup>60</sup>



## Supportive Services

### School Breakfast Programs (2 studies<sup>63-64</sup>)

Provision of school breakfast programs to all students or to low-income students has a positive academic influence. In early studies conducted in Massachusetts, low-income students who were offered free breakfast at school not only improved their nutrition, but also had improved standardized achievement test scores and decreased absences and tardiness. In Baltimore and Philadelphia elementary and middle schools, participating students given free breakfast had improved nutrition, reduced depression and anxiety, improved attendance, and higher math grades. Although the research was conducted with elementary and middle school-aged students, breakfast programs can also be effective for older students. Many Washington schools offer breakfast programs for students.

### Training for Management of Chronic Disease (2 studies<sup>65-66</sup>)

Two studies showed that intensive training and supportive systems for students with asthma improved their self-management of the condition and their school attendance. These two programs also included training for staff or peers to help protect the student with asthma, and links to a health care provider. In one study conducted in New York, participating elementary school students had decreased asthma episodes (attacks), and improved grades in math, science, and verbal expression. These interventions may be costly to implement, but they may have a great academic benefit to those students with asthma, and reduce the potential for life-threatening asthma episodes. Similar programs have been implemented in Washington through the School Nurse Corps. These programs help students with chronic diseases, such as asthma, diabetes, or other serious conditions, learn to control their symptoms and protect themselves from environmental triggers. This is achieved by developing an asthma control plan, for example, and training school health staff.

### School-based Health Centers (7 studies<sup>67-73</sup>)

School-based health centers for mental health, counseling, physical health, or a combination of these services, were shown to improve academic outcomes in high schools. The Seattle School District has offered a variety of services through school-based health centers for more than 20 years.<sup>74</sup> About 75 percent of students who use the centers say that they are receiving services that they otherwise would not get. Their services include asthma care, immunizations, family planning, and mental health counseling.



## Other Promising Interventions

### Dental Health Services

Some studies of dental health have reported that acute dental health issues cause students to miss school,<sup>75</sup> and that disparities in dental health contribute to higher absenteeism among low-income and Native American children.<sup>76,77</sup> School-based sealant interventions have been shown to reduce the risk of dental decay. Although a direct relationship has not been shown, we can infer that services, such as sealants, improve dental health, and would also protect against absences related to dental health issues.

## Key Ingredients for Success

We have made the case for school health interventions by illustrating associations between health and academic achievement that exist for Washington students, and showing how specific school health interventions can improve achievement-related measures. We have provided evidence that the interventions we found in the research literature might be even more effective as part of a comprehensive approach that includes supportive policies, instruction, and services. After careful review of the research, we conclude that school health interventions are an appropriate priority for Washington schools. But the remaining question is: How can Washington schools best implement school health interventions that move the needle for both health and academic success?

Without resources and support, schools across Washington will not be able to make comprehensive changes. An article published recently in the *Journal of School Health* identified the need to support school health as one important step that states can take to improve student achievement. The article's authors indicated that states should “provide the means to engage each community in providing necessary support for its students and school staff.”<sup>78</sup>

Coordinated school health is a planning and evaluation model that integrates policies, instruction, and services. It draws on community involvement and helps to refocus the work of existing health-related school committees and committed staff. Coordinated school health models have not been studied to measure their effect on both health and achievement using rigorous, controlled research methods. But a recent study from Delaware public schools showed that when spending resources on school health there was no negative impact on students' academic indicators—in fact, school-level achievement targets were improved.<sup>79</sup>

As an introduction to describing coordinated school health, the Centers for Disease Control and Prevention (CDC) notes on their Web site:

*Schools by themselves cannot—and should not be expected to—solve the nation's most serious health and social problems. Families, health care workers, the media, religious organizations, community organizations that serve youth, and young people themselves also must be systematically involved. However, schools could provide a critical facility in which many agencies might work together to maintain the well-being of young people.*<sup>80</sup>

### Coordinated School Health

Integrated, school-based programs and services designed to promote physical, emotional, and educational development of students. The model, developed by the CDC, includes eight interactive components:

- Health Education
- Physical Education
- Health Services
- Nutrition Services
- Counseling and Psychological Services
- Healthy School Environment
- Health Promotion for Staff
- Family/Community Involvement



The steps outlined below are being used in several schools in Washington as a means of organizing school health interventions. These steps are consistent with the coordinated school health model.

### **What can school leaders do?**

A recent research article identified key ingredients observed in the United States, Canada, and Europe for successfully implementing school health initiatives.<sup>81</sup> The key ingredients can be conceptualized as follows:

1. Convene a school health advisory committee and designate school coordinators
2. Conduct an assessment and review data
3. Develop and implement a plan
4. Evaluate results and continuously improve
5. Create policies that support school health
6. Identify sufficient resources to succeed

#### **1. Convene a school health advisory committee and designate school coordinators**

Student health and wellness is affected by a variety of people within the school and the larger community, including school nurses, physical education teachers, food service coordinators, health educators, administrators, students, parents, community leaders, and others. By gathering together a diverse team or advisory group to make a plan, school leaders can make the best use of resources available in the school system. As some researchers have noted “the effectiveness of this approach lies not in the success of the components taken in isolation, but rather in well-orchestrated, coherent strategies.”<sup>82</sup> Using the coordinated school health approach, these interested individuals come together to form a cohesive picture of local needs. A school health advisory committee can operate at the school or district level. The committee’s role is to identify concerns, set priorities, design recommended solutions, and identify opportunities for support in the community. Washington State law RCW 28A.210.365 sets a goal of having school health advisory committees in all K–12 districts by 2010.

Leadership is essential for the committee to function well and sustain its efforts. Experts in coordinated school health in Washington recommend designating a champion within each school who is committed to improving student health and wellness. A variety of individuals can serve in this essential role as long as they receive the support of the school administration. A coordinator at the district level should have a keen interest in student health and achievement, a willingness to devote time to the issue, organizational skills, and an awareness of the community’s needs.





## 2. Conduct an assessment and review data

A coordinated approach relies on connecting student, school, and community health data with academic achievement data. Findings of the assessment provide a foundation for making informed decisions about school health and planning for sustainable, effective improvement. There are a variety of tools available to begin this process, including the CDC’s School Health Index, and others from organizations such as the Alliance for a Healthier Generation and the Whole Child Initiative of the Association for Supervision and Curriculum Development. These tools make it possible to evaluate a school’s programs, practices, and policies, and learn where there are successes and challenges.

The Healthy Youth Survey is conducted in the fall of even numbered years. When there is adequate participation in the survey, a variety of local reports are made available. Schools can also look at the academic achievement information available in an online School Report Card from the Office of Superintendent of Public Instruction.

## 3. Develop and implement a plan

Once the advisory committee has completed an assessment and identified the main area(s) of focus, they can discuss whether *every* student is healthy and ready to learn, and what barriers exist that influence students’ health. Setting goals for health improvement in a School Improvement Plan (SIP) is one way of making sure the school and district are prioritizing students’ health needs. Plans should clearly delineate interventions, activities, roles and responsibilities, support and materials needed. Each school in Washington is required by the State Board of Education to have a SIP that addresses academic achievement goals. These plans can also—but are not required to—include measures to address barriers to academic achievement, such as school health.

The eight interrelated components of coordinated school health can provide a conceptual framework for creating a plan that is comprehensive: Health Education, Physical Education, Health Services, Nutrition Services, Counseling and Psychological Services, Healthy School Environment, Health Promotion for Staff, and Community/Family Involvement.

The advisory committee can examine specific interventions and consider whether the intervention will affect students equally. For example, are curricula culturally competent? Has information about new school policies been delivered to parents in a meaningful way? Are opportunities for students and families made welcoming for a variety of cultures?

#### 4. Evaluate results and continuously improve

The school health advisory committee should routinely review the progress of specific interventions, and identify areas for improvement and opportunities for expansion. In addition to making sure that implementation plans are successfully carried out, the advisory committee can use a variety of tools to conduct evaluations. Health goals in the School Improvement Plan can provide an ongoing measure of progress. Healthy Youth Survey data can also be used to measure against a variety of health indicators.

It can be helpful to review the initial assessment after a year or two and revisit planning assumptions and decisions.

#### 5. Create policies that support school health

Schools and districts should regularly review and create policies to provide environments and rules that send constant messages supporting healthy behaviors. Policies provide the authorizing environment for schools to take on school health initiatives. Strong support from decision makers can be the foundation upon which a successful program is built.

A recent report from the Centers for Disease Control and Prevention (CDC) described the role of policies in supporting school health, and provided some examples of state policies to support school health initiatives.<sup>83</sup> An appendix to this report summarizes CDC-identified policies that states can implement to support school health programs, organized using the coordinated school health model.

#### 6. Identify sufficient resources to succeed

The remaining ingredient for success identified by research is the availability of sufficient resources to make change. School health committees may not have access to large financial resources for programs, but there are many existing tools and a wealth of experience in Washington to support these efforts. In supplementary materials for this report we have documented resources that are available to anyone planning or implementing school health efforts.

The Washington State Department of Health and the Washington State Office of Superintendent of Public Instruction receive ongoing support from the CDC to share information, provide professional development and technical assistance related to all areas of the coordinated school health approach. Working with a variety of partners across the state, these agencies support Educational Service Districts, school districts and K-12 schools statewide, in addition to other partners such as local health departments and nonprofit community organizations.

#### Key Ingredients for Success

- Convene a school health advisory committee and designate school coordinators
- Conduct an assessment and review data
- Develop and implement a plan
- Evaluate results and continuously improve
- Create policies that support school health
- Identify sufficient resources to succeed







## Conclusion

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In summary, we have reviewed available evidence describing associations between measures of health and academic achievement. We found a strong relationship between health factors and academic factors among Washington State students, including those who face socioeconomic disparities.

Published studies describe a range of effective health interventions addressing school-based policies, instruction, and services, and provide examples of specific interventions that positively influence both health and academic achievement. When well-designed health interventions are offered in a comprehensive way, not only through curriculum, but also reinforced by cues in the school environment and through supportive services, they may be more effective than when they stand alone. The research literature supports employing several key ingredients for implementing health interventions that are consistent with a coordinated approach.

At the beginning of this review, we asked the question: Do healthy students really learn better? Putting it another way: Is it reasonable to expect that school-based health interventions can improve academic achievement? Taken together, the information provided in this report suggests that the answer to both questions is “yes.”

We arrive at this conclusion using a set of criteria<sup>84</sup> developed by public health researchers to assess whether one thing causes another—in other words, to test “causality.” Using information from this report, we can answer this series of questions about the relationship between health and achievement:

**Are there consistent, strong associations between health and achievement?** Yes, data from Washington show that there are consistent and strong associations between a number of health factors and achievement.

**Is there a “dose-response” effect between health and achievement?** Yes, data from Washington show a clear relationship between increasing numbers of health risks and increasing academic risk.

**Is the association consistent, replicated by different researchers and under different conditions?** Yes, the data from Washington are similar to national data findings. Additionally, we saw that these associations were consistently present for youth across racial/ethnic and socioeconomic groups.



**Do health risks precede achievement risks?** We do not have longitudinal information to tell us whether the health risks discussed in this report precede achievement risk. In some cases, we may see a synergistic relationship; potentially, challenges in school may lead to unhealthy choices which compound school challenges. In the case of some health risks, if they do not entirely precede academic risk they may still contribute to academic risk. In this report we provided examples of studies where health interventions produced results that also improved achievement measures. These studies suggest that health risks do precede achievement risks, or that health interventions address some common underlying condition that benefits both health and achievement outcomes.

**Is the association plausible?** Yes. Almost anyone who has worked with youth can validate that students who feel unwell, tired, or distracted cannot learn as successfully. The same student who comes to school fed, rested, calm, and unworried is ready to learn and will be able to achieve much more.

**Are there similar associations for other exposures and outcomes?** Yes, in this report we compared school health to worksite health initiatives, which have been shown to improve workers' health and productivity.

## Recommendation

Taken together, the findings in this report suggest that implementing proven health interventions in Washington schools is an opportunity to improve both academic achievement and quality of life for students. Schools and partners should feel confident that the coordinated school health model, local expertise, existing state policies, and available health data can be mobilized to help Washington's students be healthy and learn better.



## References

- 1 Robert Wood Johnson Foundation, Commission to Build a Healthier America. October 2008. *America's Health Starts with Healthy Children: How Do States Compare?* [www.commissiononhealth.org/Documents/ChildrensHealth\\_Chartbook.pdf](http://www.commissiononhealth.org/Documents/ChildrensHealth_Chartbook.pdf) (accessed May 1, 2009).
- 2 Rouse, C.E. and L. Barrow. 2006. U.S. elementary and secondary schools: equalizing opportunity or replicating the status quo? *Future Child* 16(2):99–123.
- 3 Cole, S.F., J.G. O'Brien, M.G. Gadd, J. Ristuccia, D.L. Wallace and M. Gregory. 2005. *Helping Traumatized Children Learn: Supportive school environments for children traumatized by family violence*. Boston, MA: Massachusetts Advocates for Children. (Library of Congress Control Number 2005933604).
- 4 Hawkins, J.D., R.F. Catalano and J.Y. Miller. 1992. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychological Bulletin* 112(1):64–105.
- 5 Townsend, L., A.J. Flisher and G. King. 2007. A systematic review of the relationship between high school dropout and substance abuse. *Clinical Child and Family Psychology* 10(4):295–317.
- 6 Haas, S.A. and N.E. Fosse. 2008. Health and the educational attainment of adolescents: evidence from the NLSY97. *J Health Soc Behav.* 49(2):178–92.
- 7 California Department of Education. 2005. *Getting Results: Developing Safe and Healthy Kids Update 5: Student Health, Supportive Schools, and Academic Success*. [www.gettingresults.org/](http://www.gettingresults.org/) (accessed 2009).
- 8 Arthur, M.W., E.C. Brown and J.S. Briney. July 2006. *Multilevel Examination of the Relationships Between Risk/Protective Factors and Academic Test Scores*. Social Development Research Group, School of Social Work, University of Washington. [www1.dshs.wa.gov/pdf/hrsa/dasa/ResearchReports/MERRPFATS0706.pdf](http://www1.dshs.wa.gov/pdf/hrsa/dasa/ResearchReports/MERRPFATS0706.pdf) (accessed April 7, 2009).
- 9 Centers for Disease Control and Prevention. *Healthy Youth! Student Health and Academic Achievement*. [www.cdc.gov/healthyyouth/health\\_and\\_academics/index.htm](http://www.cdc.gov/healthyyouth/health_and_academics/index.htm) (accessed March 12, 2009).
- 10 Washington State Department of Health. December 2007. *The Health of Washington State 2007 — The Context of Health*. Olympia, WA. [www.doh.wa.gov/HWS/Context2007.shtm](http://www.doh.wa.gov/HWS/Context2007.shtm) (accessed May 1, 2009).
- 11 Washington State Office of Superintendent of Public Instruction. 2008. *Graduation and Dropout Statistics for Washington's Counties, Districts and Schools, School Year 2005–06*. Olympia, WA. [www.k12.wa.us/DataAdmin/pubdocs/GradDropout/05-06/2005-06GradDropoutStatistics.pdf](http://www.k12.wa.us/DataAdmin/pubdocs/GradDropout/05-06/2005-06GradDropoutStatistics.pdf) (accessed April 7, 2009).
- 12 Currie, J. 2005. Health Disparities and Gaps in School Readiness. *The Future of Children*. 15(1):117–138.
- 13 Fiscella, K. and H. Kitzman. 2009. Disparities in academic achievement and health: the intersection of child education and health policy. *Pediatrics* 123:1073–80.
- 14 Centers for Disease Control and Prevention. January 2005. *The Guide to Community Preventive Services: What Works to Promote Health?* [www.thecommunityguide.org/index.html](http://www.thecommunityguide.org/index.html) (accessed May 5, 2009).
- 15 Centers for Disease Control and Prevention. *The Social-Ecological Model: A Framework for Prevention*. [www.cdc.gov/ncipc/dvp/Social-Ecological-Model\\_DVP.htm](http://www.cdc.gov/ncipc/dvp/Social-Ecological-Model_DVP.htm) (accessed May 7, 2009).
- 16 Centers for Disease Control and Prevention. October 2007. *Best Practices for Comprehensive Tobacco Control Programs*. [www.cdc.gov/tobacco/tobacco\\_control\\_programs/stateandcommunity/best\\_practices/](http://www.cdc.gov/tobacco/tobacco_control_programs/stateandcommunity/best_practices/) (accessed May 7, 2009).
- 17 Foster G.D., S. Sherman, K.E. Borradaile, K.M. Grundy, S.S. VanderVeur, J. Nachmani, A. Karpyn, S. Kumanyika and J. Shults. 2008. A policy-based school intervention to prevention overweight and obesity. *Pediatrics* 121:e794–802.
- 18 Centers for Disease Control and Prevention. 2001. Effectiveness of school-based programs as a component of a statewide tobacco control initiative: Oregon, 1999–2000. *MMWR* 50(31):663–6.
- 19 Harris, J.R., P.A. Lichiello and P.A. Hannon. 2009. Workplace health promotion in Washington State. *Prev Chronic Dis* 6(1). [www.cdc.gov/pcd/issues/2009/jan/07\\_0276.htm](http://www.cdc.gov/pcd/issues/2009/jan/07_0276.htm).
- 20 Goetzel, R.Z. and R.J. Ozminkowski. 2008. The health and cost benefits of work site health-promotion programs. *Annu Rev Public Health* 29:303–23.
- 21 Murray, N.G., B.J. Low, C. Hollis, A.W. Cross and S.M. Davis. 2007. Coordinated school health programs and academic achievement: a systematic review of the literature. *Journal of School Health* 77(9):589–600.
- 22 Aiello, A.E., R.M. Coulborn, V. Perez and E.L. Larson. 2008. Effect of hand hygiene on infectious disease risk in the community setting: a meta-analysis. *American Journal of Public Health*. 98:1372–1381.
- 23 Ejemot, R.I., J.E. Ehiri, M.M. Meremikwu and J.A. Critchley. 2008. Hand washing for preventing diarrhea. *Cochrane Database of Systematic Reviews*. Issue 1, Article No: CD004265.
- 24 Meadows, E. and N. LeSaux. 2004. A systematic review of the effectiveness of antimicrobial rinse-free hand sanitizers for prevention of illness-related absenteeism in elementary school children. *BMC Public Health*. 4(50).
- 25 Prill, R., D. Blake and D. Hales. 2005. *School Indoor Air Quality Assessment and Program Implementation*. Washington State University and Northwest Air Pollution Authority. [www.energy.wsu.edu/projects/building/iaq.cfm](http://www.energy.wsu.edu/projects/building/iaq.cfm) (accessed May 1, 2009).

- 26 Shendell, D.G., R. Prill, W.J. Fisk, M.G. Apte, D. Blakc and D. Faulkner. 2004. Associations between classroom CO2 concentrations and student attendance in Washington and Idaho. *Indoor Air* 14:333–341.
- 27 Elias, M.J., M.A. Gara, T.F. Schuyler, L.R. Branden-Muller and M.A. Sayette. 1991. The promotion of social competence: longitudinal study of a preventive school-based program. *Am J Orthopsychiatry* 61(3):409–17.
- 28 Eggert, L.L., E.A. Thompson, J.R. Gerting, L.J. Nicholas and G.B. Dicker. 1994. Preventing adolescent drug abuse and high school dropout through an intensive school-base. *Am J Health Promotion* 8(3):202–15.
- 29 The National Campaign to Prevent Teen and Unplanned Pregnancy. *Teen Outreach Program (TOP)*. [www.thenationalcampaign.org/EA2007/desc/top.aspx](http://www.thenationalcampaign.org/EA2007/desc/top.aspx) (accessed 2009).
- 30 Temple University, Center for Intergenerational Learning. *Across Ages*. [www.acrossages.org](http://www.acrossages.org) (accessed 2009).
- 31 Tanglewood Research, Inc. *All Stars*. [www.allstarsprevention.com](http://www.allstarsprevention.com) (accessed 2009).
- 32 Developmental Studies Center. *Caring School Community Program*. [www.devstu.org/csc/videos/index.shtml](http://www.devstu.org/csc/videos/index.shtml) (accessed 2009).
- 33 University of Utah, Eunice Kennedy Shriver National Center for Community of Caring. *Community of Caring*. [www.communityofcaring.org/about/index.html](http://www.communityofcaring.org/about/index.html) (accessed 2009).
- 34 University of Alabama. *Coping Power Program*. [www.copingpower.com](http://www.copingpower.com) (accessed 2009).
- 35 University of Minnesota. *Early Risers Skills for Success*. [www.psychiatry.umn.edu/psychiatry/research/earlyrisers/home.html](http://www.psychiatry.umn.edu/psychiatry/research/earlyrisers/home.html) (accessed 2009).
- 36 Fairfax-Falls Church Community Services Board, Fairfax County Virginia. *Leadership and Resiliency Program*. <http://casat.unr.edu/bestpractices/view.php?program=53> (accessed 2009).
- 37 Lions Clubs International Foundation. *Lions Quest Skills for Adolescence*. [www.lions-quest.org](http://www.lions-quest.org) (accessed 2009).
- 38 University of Illinois at Chicago, Families and Communities Research Group. *SAFE Children*. [www.psych.uic.edu/fcrg/safe.html](http://www.psych.uic.edu/fcrg/safe.html) (accessed 2009).
- 39 University of Washington, Seattle Social Development Project. *Skills, Opportunity and Recognition (SOAR) and Raising Healthy Children*. <http://depts.washington.edu/ssdp/intervention.shtml> (accessed 2009).
- 40 Positive Action, Inc. *Positive Action*. [www.positiveaction.net](http://www.positiveaction.net) (accessed 2009).
- 41 Children's Institute. *Primary Project*. [www.childrensinstitute.net/programs/primaryProject/](http://www.childrensinstitute.net/programs/primaryProject/) (accessed 2009).
- 42 ACHIEVE Inc., Building Strong Schools to Strengthen Student Outcomes Project. *Project ACHIEVE*. [www.projectachieve.info/](http://www.projectachieve.info/) (accessed 2009).
- 43 Channing Bete Company, Inc. *Promoting Alternative Thinking Strategies (PATHS)*. [www.channing-bete.com/paths](http://www.channing-bete.com/paths) (accessed 2009).
- 44 Reconnecting Youth Company. *Reconnecting Youth*. [www.reconnectingyouth.com/](http://www.reconnectingyouth.com/) (accessed 2009).
- 45 Prevention Opportunities, LLC. *Responding in Peaceful and Positive Ways (RiPP)*. [www.preventionopportunities.com/programs\\_ripp.html](http://www.preventionopportunities.com/programs_ripp.html) (accessed 2009).
- 46 Student Assistance Services Corporation. *Project SUCCESS*. [www.sascorp.org](http://www.sascorp.org) (accessed 2009).
- 47 Centers for Disease Control and Prevention, National Center for Health Marketing. *The Community Guide — School-based Programs to Prevent Violence*. [www.thecommunityguide.org/violence/schoolbasedprograms.html](http://www.thecommunityguide.org/violence/schoolbasedprograms.html) (accessed 2009).
- 48 Family Therapy Training Institute of Miami. *Brief Strategic Family Therapy*. [www.fttim.com/about-bsft/what-is-bsft.html](http://www.fttim.com/about-bsft/what-is-bsft.html) (accessed 2009).
- 49 Columbia University, National Center on Addiction and Substance Abuse. *CASASTART*. <http://casastart.org/default.aspx> (accessed 2009).
- 50 Channing Bete Company, Inc. *Guiding Good Choices*. [www.channing-bete.com/prevention-programs/guiding-good-choices/](http://www.channing-bete.com/prevention-programs/guiding-good-choices/) (accessed 2009).
- 51 Incredible Years. *The Incredible Years*. [www.incredibleyears.com/](http://www.incredibleyears.com/) (accessed 2009).
- 52 National Registry of Evidence-based Programs and Practices, Substance Abuse and Mental Health Services Administration (SAMHSA). *New Beginnings*. [www.nrepp.samhsa.gov/programfulldetails.asp?PROGRAM\\_ID=98](http://www.nrepp.samhsa.gov/programfulldetails.asp?PROGRAM_ID=98) (accessed 2009).
- 53 National Registry of Evidence-based Programs and Practices, Substance Abuse and Mental Health Services Administration (SAMHSA). *Parenting Through Change*. [www.nrepp.samhsa.gov/programfulldetails.asp?PROGRAM\\_ID=83](http://www.nrepp.samhsa.gov/programfulldetails.asp?PROGRAM_ID=83) (accessed 2009).
- 54 Iowa State University, University Extension. *Strengthening Families*. [www.extension.iastate.edu/sfp](http://www.extension.iastate.edu/sfp) (accessed 2009).
- 55 Centers for Disease Control and Prevention, National Center for Health Marketing. *The Community Guide — Adolescent Health*. [www.thecommunityguide.org/adolescenthealth/index.html](http://www.thecommunityguide.org/adolescenthealth/index.html) (accessed 2009).
- 56 Sallis, J.F., T.L. McKenzie, B. Kolody, M. Lewis, S. Marshall and P. Rosengard. 1999. Effects of health-related physical education on academic achievement: Project SPARK. *Research Quarterly for Exercise and Sport* 70(2):127–34.
- 57 Dwyer T., L. Blizzard and K. Dean. 1996. Physical activity and performance in children. *Nutrition Reviews* 54(4Pt2):S27–31.
- 58 Trudeau, F. and R.J. Shephard. 2008. Physical education, school physical activity, school sports and academic performance. *Int J Behav Nutr Phys Act.* 5(10).

- 59 Hillman, C.H., M.B. Pontifex, L.B. Raine, D.M. Castelli, E.E. Hall and A.F. Kramer. 2009. The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. *Neuroscience*. 159:1044-54.
- 60 Robert Wood Johnson Foundation, Active Living Research. Fall 2007. *Active Education: Physical Education, Physical Activity and Academic Performance*. [www.activelivingresearch.org/alr/alr/files/Active\\_Ed.pdf](http://www.activelivingresearch.org/alr/alr/files/Active_Ed.pdf) (accessed August 16, 2009).
- 61 Davis, K., S.R. Collins, M.M. Doty, A. Ho and A.L. Holmgren. August 2005. *Health and Productivity Among U.S. Workers*. The Commonwealth Fund. [www.commonwealthfund.org/usr\\_doc/856\\_Davis\\_hlt\\_productivity\\_USworkers.pdf](http://www.commonwealthfund.org/usr_doc/856_Davis_hlt_productivity_USworkers.pdf) (accessed May 1, 2009).
- 62 Blair, S.N., L. Tritsch and S. Kutsch. 1987. Worksite health promotion for school faculty and staff. *J Sch Health* 57(10):469-473.
- 63 Meyers, A.F., A.E. Sampson, M. Weitzman, B. Rogers and H. Kayne. 1989. School breakfast program and school performance. *AJDC* 143:1234-39.
- 64 Murphy, J.M., M.E. Pagano, J. Nachmani, P. Sperling, S. Kane and R.E. Kleinman. 1998. The relationship of school breakfast to psychosocial and academic functioning: cross-sectional and longitudinal observations in an inner-city school sample. *Arch Pediatr Adolesc Med* 152(9):899-907.
- 65 Evans, D., N.M. Clark, C.H. Feldman, et al. 1987. A school health education program for children with asthma aged 8-11 years. *Health Education Q* 14(3):267-79.
- 66 Clark, N.M., R. Brown, C.L. Joseph, E.W. Anderson, M. Liu and M.A. Valerio. 2004. Effects of a comprehensive school-based asthma program on symptoms, parent management, grades, and absenteeism. *Chest* 125(5):1674-79.
- 67 McCord, M.T., J.D. Klein, J.M. Foy and K. Fothergill. 1993. School-based clinic use and school performance. *J Adolesc Health* 14(2):91-8.
- 68 Gall, G., M.E. Pagano, M.S. Desmond, J.M. Perrin and J.M. Murphy. 2000. Utility of psychosocial screening at a school-based health center. *J Sch Health* 70(7):292-8.
- 69 Geierstanger, S.P., G. Amaral, M. Mansour and S.R. Walters. 2004. School-based health centers and academic performance: research, challenges, and recommendations. *J Sch Health*. 74(9):347-352.
- 70 Kisker, E.E. and R.S. Brown. 1996. Do school-based health centers improve adolescents' access to health care, health status, and risk-taking behavior? *J Adolesc Health*. 18:335-43.
- 71 Jacob, S. and A. Coustasse. 2008. School-based mental health: a de facto mental health system for children. *J Hospital Mark Pub Rel* 18(2):197-211.
- 72 Jennings, J., G. Pearson and M. Harris. 2000. Implementing and maintaining school-based mental health services in a large, urban school district. *J Sch Health*. 70(5):201-5.
- 73 Geierstanger, S.P. and G. Amaral. 2005. *School-based Health Centers and Academic Performance: What is the Intersection?* April 2004 Meeting Proceedings. Washington, DC: National Assembly on School-Based Health Care. [ww2.nasbhc.org/RoadMap/Public/PUB\\_Academic\\_Outcomes.pdf](http://ww2.nasbhc.org/RoadMap/Public/PUB_Academic_Outcomes.pdf) (accessed August 14, 2009).
- 74 Barkan, S., R. Pfohman and M. Bolan. 2009. *Evaluation of School-Based Health Center Clinic and School Nurse Services in Seattle, Washington, September 2000-December 2003*. Seattle, WA: Public Health-Seattle & King County. [www.kingcounty.gov/healthservices/health/child/~~/media/health/publichealth/documents/yhs/nurse\\_services.ashx](http://www.kingcounty.gov/healthservices/health/child/~~/media/health/publichealth/documents/yhs/nurse_services.ashx) (accessed August 17, 2009).
- 75 Gift, H.C. 1997. Oral health outcomes research: Challenges and opportunities. In *Measuring Oral Health and Quality of Life*, ed. G.D. Slade, 25-46. Chapel Hill, NC: Department of Dental Ecology, University of North Carolina.
- 76 Adams, P.F. and M.A. Marano. 1995. Current estimates from the National Health Interview Survey, 1994. *Vital and Health Statistics: Series 10* (Data from the National Health Survey; no. 193). Hyattsville, MD: U.S. Department of Health and Human Services, National Center for Health Statistics.
- 77 Chen, M., R.M. Andersen, D.E. Barmes, M.H. Leclercq and C.S. Lyttle. 1997. *Comparing Oral Health Care Systems: A Second International Collaborative Study*. Geneva, Switzerland: World Health Organization.
- 78 Kolbe, L.J. 2005. A framework for school health programs in the 21<sup>st</sup> century. *Journal of School Health* 75(6):226-8.
- 79 Rosas, S., J. Case and L. Tholstrup. 2009. A retrospective examination of the relationship between implementation quality of the coordinated school health program model and school-level academic indicators over time. *Journal of School Health*. 79:108-115.
- 80 Centers for Disease Control and Prevention. *Healthy Youth! Student Health and Academic Achievement*. [www.cdc.gov/healthyyouth/health\\_and\\_academics/index.htm](http://www.cdc.gov/healthyyouth/health_and_academics/index.htm) (accessed 2009).
- 81 Deschesnes, M., C. Martin and A.J. Hill. 2003. Comprehensive approaches to school health promotion: how to achieve broader implementation? *Health Promotion* 18(4):387-96.
- 82 Allensworth, D.D. and L.J. Kolbe. 1987. The comprehensive school health program: exploring an expanded concept. *Journal of School Health*. 57:409-12.
- 83 Centers for Disease Control and Prevention. 2008. A CDC review of school laws and policies concerning child and adolescent health. *Journal of School Health* 78(2):69-127. [www.cdc.gov/HealthyYouth/policy\\_law/index.htm](http://www.cdc.gov/HealthyYouth/policy_law/index.htm) (accessed August 17, 2008).
- 84 Adapted from Mausner, J.S. and S. Kramer. 1985. *Epidemiology: An Introductory Text*, 2nd ed. Philadelphia: W.B. Saunders Company.



## Appendices and Other Resources

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### Appendices Available Online

From **Coordinated School Health in Washington State**: [www.HealthySchoolsWA.org](http://www.HealthySchoolsWA.org)  
Resources cover maintaining a strong advisory group, implementing a coordinated school health approach, planning for the whole child, continuous quality improvement, and policies and the political environment.

### Other Resources

- Coordinated School Health Program, Centers for Disease Control and Prevention: <http://cdc.gov/HealthyYouth/CSHP>
- National Registry of Evidence-based Programs and Practices (NREPP), designated by U.S. Department of Health and Human Services, Substance Abuse & Mental Health Services Administration (SAMHSA): <http://nrepp.samhsa.gov>
- National Center for Mental Health Promotion and Youth Violence Prevention: [www.promoteprevent.org/resources/briefs/evidence-based%20programs.html](http://www.promoteprevent.org/resources/briefs/evidence-based%20programs.html)
- Education Resources Information Center (ERIC), U.S. Department of Education: [www.eric.ed.gov/](http://www.eric.ed.gov/)
- Promising Practices Network (PPN), RAND Corporation: [www.promisingpractices.net](http://www.promisingpractices.net)
- The California Department of Education: [www.cde.ca.gov/ls/he/at/sbplist.asp](http://www.cde.ca.gov/ls/he/at/sbplist.asp)
- The Rocky Mountain Center for Health Promotion and Education (RCM): [www.rmc.org/K12/k12tools.html](http://www.rmc.org/K12/k12tools.html)
- National Campaign to Prevent Teen and Unplanned Pregnancy: [www.thenationalcampaign.org/EA2007/desc/top.aspx](http://www.thenationalcampaign.org/EA2007/desc/top.aspx)

### For More Information

- Julia Dilley, 360-705-1358, [julia.dilley@state.or.us](mailto:julia.dilley@state.or.us)  
Program Design and Evaluation Services  
Multnomah County Health and Oregon Public Health Division
- **Washington State Board of Health**: [www.sboh.wa.gov/](http://www.sboh.wa.gov/)  
Contact: Tara Wolff, 360-236-4101, [Tara.Wolff@doh.wa.gov](mailto:Tara.Wolff@doh.wa.gov)
- **Washington State Office of Superintendent of Public Instruction**: [www.k12.wa.us/](http://www.k12.wa.us/)  
Contact: Greg Williamson, 360-725-6251, [Greg.Williamson@k12.wa.us](mailto:Greg.Williamson@k12.wa.us)
- **Washington State Department of Health**: [www.doh.wa.gov/](http://www.doh.wa.gov/)  
Contact: Adam Fletcher, 360-236-3740, [Adam.Fletcher@doh.wa.gov](mailto:Adam.Fletcher@doh.wa.gov)
- **Washington State Healthy Youth Survey**: <https://fortress.wa.gov/doh/hys/>



## What Agency Leaders Are Saying About Research Review: School-based Health Interventions and Academic Achievement

This report advances and reflects the current literature. It validates the connection between students' health and academic achievement. It also highlights the importance of eliminating health disparities. For schools to succeed, they must focus on more than providing excellent instruction. Educators need to focus on the needs of the whole child to help them reach their full potential. — **Frankie Manning, Washington State Board of Health and Governor's Interagency Council on Health Disparities**

Teachers, staff, and principals have known all along that kids who are healthy learn better. Now this study proves it, down to how many cans of pop they drink, how much sleep they get, or how safe they feel at school. Now we can say confidently, if we tackle even just a few of these health issues, our children will do better in school. — **Randy Dorn, Washington Superintendent of Public Instruction**

For years many have believed that education is key to living a healthy, productive life. This new report confirms that. When kids get enough sleep, eat a balanced diet, and have limited stress, they're healthier and do better in school. This is groundbreaking information that will help us make Washington a healthier place to live. — **Mary C. Selecky, Washington Secretary of Health**

