

# IMPACT OF SCHOOL BREAKFAST ON CHILDREN'S HEALTH AND LEARNING

**An Analysis of the Scientific Research**



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***Commissioned by the Sodexo Foundation***



Raising awareness of the issues of hunger, poverty and their impact on the American people through scholarly research and public debate is a primary goal for the Sodexo Foundation. Part of Sodexo's commitment to improving the quality of life, this study is the third in a series sponsored by the Sodexo Foundation and conducted by the Center on Poverty and Hunger.

The Sodexo Foundation ([www.SodexoFoundation.org](http://www.SodexoFoundation.org)) is the charitable arm of Sodexo, Inc. ([www.sodexoUSA.com](http://www.sodexoUSA.com)) and is committed to being a driving and creative force that contributes to a hunger-free nation. The Sodexo Foundation has made more than \$11 million in grants to fight hunger and its root causes since its inception in 1999.

The Sodexo Foundation supports innovative programs to help children and families in the United States who are battling problems such as poverty, unemployment, lack of education and food insecurity. Programs that the Foundation supports range from nutrition programs for children to job training for adults and affordable housing for families.

## Foreword

These days, the face of hunger could easily be a familiar one – that of neighbors, professional colleagues, even friends and family members. It is a fact that in virtually every U.S. community there are people who are impoverished and in need, whether they are the working poor, the elderly, or families with children. Hunger threatens 35 million of our fellow American citizens. Ten million of those are children struggling to learn and succeed in school while dealing with the impact of under-nutrition on their brain and ability to learn.

The mission of the Sodexo Foundation is to be a driving and creative force that contributes to a hunger-free nation. It is for this reason that we commissioned this analysis of the scientific literature about the impact of under-nutrition on children. We wish to bring to the forefront of public and legislative awareness the issues related to hunger and learning, with a goal of finding a solution that maximizes the potential for American schoolchildren.

While people may differ on various policy proposals, all would agree that our nation's children deserve to have the best opportunities to learn and thrive in order to become productive and positive contributors to our society. This research clearly says that proper nutrition is key to learning and thriving. It has long been held that breakfast is the most important meal of the day.

We believe better access to school nutrition programs will make a significant difference in the quality of life for America's children.

Stephen J. Brady  
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## Introduction

The scholarly research findings summarized in this document provide our nation with a comprehensive picture of the exceptional value of the school breakfast program. For this reason, Dr. Beardslee, Dr. Prothrow-Stith and I are grateful to the Sodexo Foundation for commissioning this analysis and, in doing so, giving policymakers and the public an objective basis by which to understand the importance of this federally funded program that now operates in a majority of school districts in the nation.

These new findings come on the heels of related research over the past twenty years into the relationship between inadequate nutrition and a variety of adverse developmental outcomes in children. Youngsters from homes without sufficient food have a poorer overall health status than do children from similar backgrounds who have enough to eat. Children who experience hunger get sick more often, are more likely to have ear infections, experience iron deficiency anemia and get hospitalized more frequently. They miss more days of school and are far less likely to be able to learn when they do attend classes. When children fail to get sufficient dietary energy, particularly in the mornings, their cognitive capacity is impaired: their brains do not have sufficient fuel for attention, concentration and learning. This interactive relationship between sufficient nourishment and brain function also extends to the emotional and behavioral health of children. Youngsters who do not get enough to eat have poorer mental health; they are more likely to be withdrawn and inattentive. They also exhibit more disruptive behaviors and disciplinary disorders, require more counseling and other mental health services, and are more likely to need other special educational services.

There exists no “safe” level of inadequate nutrition for healthy, growing children. Even nutritional deficiencies of a relatively short duration – a missed breakfast, an inadequate lunch – impair children’s ability to function and learn. When children attend school inadequately nourished, their bodies conserve the limited food energy that is available. Energy is first reserved for critical organ functions. If sufficient energy remains, it then is allocated for growth. The last priority is for social activity and learning. As a result, undernourished children become more apathetic and have impaired cognitive capacity.

Letting school children go hungry means that the nation’s investments in public education are jeopardized by childhood under-nutrition. Not only are hungry children robbed of their natural potential, but their condition leads to lost knowledge, brainpower and overall productivity for the nation. And the longer and more severe the experience of hunger among our youth, the greater the loss and the greater the cost to our country. Through concerted federal and state action to fully utilize the nation’s school breakfast program, our country could take a dramatic step toward ending hunger in a relatively brief time. Ten million additional low-income children are eligible for it-- and they await the leadership to make it available so they can concentrate and learn with their peers.

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## Executive Summary

The body of evidence, drawn from more than 100 published research articles, provides the scientific basis for concluding that the School Breakfast Program (SBP) is highly effective in terms of providing children with a stronger basis to learn in school, eat more nutritious diets, and lead more healthy lives both emotionally and physically. Participation in the SBP is also economically desirable for our nation, the research shows.

While no single study necessarily provides a uniquely definitive assessment of the SBP's benefits, and while some studies occasionally reach differing conclusions, the combined and quite consistent message of this body of research is that **servicing breakfast to those schoolchildren who don't get it elsewhere significantly improves their cognitive or mental abilities, enabling them to be more alert, pay better attention, and to do better in terms of reading, math and other standardized test scores.** Children who eat breakfast also are sick less often, have fewer problems associated with hunger, such as dizziness, lethargy, stomachaches and earaches, and do significantly better than their non-breakfasted peers in terms of cooperation, discipline and inter-personal behaviors.

Protecting the ten million low-income children who are eligible for the SBP, but who do not receive it, is a goal that the nation can achieve. Funding is not an impediment since Congress provides reimbursement to local school districts who offer the program. Moreover, facilities and equipment pose no hurdles since virtually all school districts in the nation already offer the National School Lunch Program. **Achieving more participation by schools in the SBP is the key challenge.**

Full utilization of the SBP in U.S. school districts also increases cost efficiency. **When schools do not provide breakfast to children, the loss of return on educational investment becomes a hidden tax paid by the local district and community.** Some states, for example, lose tens of millions of dollars a year in federal funding by not fully utilizing the SBP. Altogether, states lose an estimated half a billion dollars annually in school breakfast funding from Congress.

A second hidden tax that is paid when schools do not provide children with a school breakfast comes in the form of poorer educational outcomes. America pays an estimated \$90 billion annually when some of its people go hungry; money that comes in the form of more illness, lethargy, lost productivity, and poorer educational outcomes on the part of children. \*Of this amount, nearly \$10 billion represents the costs of poorer education-related outcomes such as greater absenteeism and more grade retention related to hunger. More than \$65 billion of the \$90 billion total is paid for poorer health and psychosocial dysfunction, a significant proportion of it for conditions among children from households that do not get enough to eat.

The researchers conclude that the scientific evidence indicates that full participation by all U.S. school districts in the federally funded SBP would be a win for children and a win for the nation.

\* Brown JL, Shepard D, Martin T, Orwat J, "The Economic Cost of Domestic Hunger: Estimated Annual Burden to the United States," 2007, available through [www.SodexoFoundation.org](http://www.SodexoFoundation.org).

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## Research Analysis: Impact of the U.S. School Breakfast Program

Over the past two decades, and particularly recently, a number of scientific studies assessing the value and operations of school breakfast programs have been published (see References section). The majority of these studies pertain to the federally-funded School Breakfast Program operating in public schools in the United States. Interestingly however, a number of breakfast-related studies have been done outside the U.S. providing an interesting cross-cultural comparison (see Papamandjaris, Niemeyer). These studies include countries such as Great Britain, Sweden, Ireland, Wales, Vietnam, Guatemala, Peru and Jamaica.

Among the studies conducted in the U.S., the majority are peer-reviewed and have been published in refereed professional journals. Still other studies have been commissioned or conducted by state agencies such as departments of education or health. And a number of school breakfast studies have been conducted by local school districts, state advocacy organizations, national groups and the federal government. Because of the plethora of recent research in this field, and particularly the need to set rigorous standards by which to evaluate research and its scientific value, we set specific criteria for inclusion. The studies cited in this publication are:

- Scholarly in nature and related directly or indirectly to the federal School Breakfast Program,
- Peer reviewed and/or conducted under university auspices,
- Published in a refereed journal or by a university or federal agency, and
- U.S.-based or have significance for the U.S. School Breakfast Program.

Based on these standards, we draw upon more than one hundred relatively recent studies to discern the research implications. What, we might ask, are the effects of the School Breakfast Program on participating low-income children? Understanding what science now knows about the relationship of adequate nutrition to child health, mental functioning and overall development (see Alaimo, Brown, Brown/Pollitt, Cueto, Strupp, Wachs), what protections or benefits does the School Breakfast Program provide to children who are otherwise at risk of poor developmental outcomes?

To be sure, all studies that have been done are not similar in method or even outcome. Occasionally some find no significant differences in outcomes while others do. This is one of the qualities of the scientific enterprise. But what is most significant is that the research in this field overwhelmingly establishes that participating in the School Breakfast Program bestows clear benefits on children who receive it. Drawing upon current scientific literature described above, this report highlights such findings in three broad areas: cognitive and educational benefits; health benefits; and behavioral and psychosocial benefits.

## 1. Cognitive and Educational Benefits

Beginning twenty or more years ago, and continuing today, scholarly research has established that the School Breakfast Program significantly improves the cognitive abilities and learning capacities of children. Matched controlled studies, for example, indicate that low-income children who receive school breakfasts do significantly better on a variety of indicators than low-income peers who go without breakfasts. Significantly, the better outcomes associated with school breakfast include both educational preparedness (attendance, energy, alertness, memory) and educational outcome measures (math scores, grades, reading ability).

### Improved attendance and less tardiness

- School administrators in Minnesota reported significant improvements in school attendance as the result of instituting a breakfast program over a two-year period (Begalle)
- The Department of Agriculture notes that several studies found less tardiness and improved attendance rate among children who are served breakfast in school (Kennedy)
- Lawrence, Massachusetts schools found that the initiation of a School Breakfast Program led to significantly improved school attendance rates and a decline in tardiness (Meyers)
- A study of schools in both Philadelphia and Baltimore found a significant drop in tardiness and absences among children who were fed in school (Murphy)
- The International Symposium on Breakfast and Performance (1995) found that the existing research literature indicates that “breakfast consumption improves school attendance” (Pollitt)
- A review of existing breakfast studies in several nations, including the U.S., found that school breakfasts have a positive effect on school attendance (Cueto)

### Concentration, alertness, energy

- Testing the potential value of a “universal free” School Breakfast Program at six pilot schools, researchers found better concentration and patterns of alertness among children who were fed (Begalle)
- Teachers reported that at the end of a three-year test, children who were in a pilot feeding program had more energy and better attention than did children not participating in the program (Redden)
- Children provided complex carbohydrate cereals such as those provided in the breakfast program had better mental performance throughout the morning (Wesnes)

### Overall academic performance

- A USDA review of existing literature noted that studies find better academic performance on a variety of measures (see sections below) on the part of children who receive school breakfast as compared to those who do not (Kennedy)
- In a study of 97 inner-city children both before and after initiation of a School Breakfast Program, Kleinman, et. al. found that nutritional enhancements resulting from breakfast led to “significant improvements in student academic performance” (Kleinman)

#### Comprehension, learning, memory

- The consumption of breakfast on the part of children improves overall blood glucose levels which, in turn, lead to improvements in both comprehension and memory as discerned on a variety of measures (Benton)
- Brain function is sensitive to short-term variations in the availability of nutrients, suggesting that one of the benefits of school feeding programs is to enable children to “improve their educational status” (Pollitt)
- Breakfast consumption provides a short-term benefit in improving selected learning skills, particularly memory (Cueto)

#### Math, reading and standardized test scores

- A two-week randomized trial in five elementary schools found that food supplementation shortly before taking a test “notably improves” test scores (Vaisman)
- Controlling for other factors, children who received a school breakfast did better on standardized tests (Comprehensive Test of Basic Skills) than did children who did not participate in the breakfast program (Meyers)
- In Minnesota, children who received a school breakfast exhibited general improvements in math and reading scores (Begalle)
- A study of public school students in two states found that youngsters participating in the breakfast program had “significantly greater increases in their math grades” (Murphy)

## 2. Health-Related Benefits

For many years teachers and school nurses often report keeping a supply of crackers or other snacks on hand for children who cannot function well after coming to school without enough to eat. This practice has a sound biological basis. Dietary energy (glycogen) is stored in the liver and, because children have small livers, they need to eat more frequently than do adults in order to have an adequate energy supply for mental and physical functions. When a child misses even one meal, let alone experiences chronic food shortages, impairments occur whether they be lethargy and inattention, tiredness and distraction, or actual physical symptoms such as stomachaches and headaches. The research shows that feeding children breakfast in school helps to prevent these adverse outcomes.

### Better overall diet

- USDA researchers have found that students consuming breakfast, both school breakfast and at home, have a significantly higher score on the Department's Healthy Eating Index. Among children in low-income households, those who received a school breakfast have "a statistically significant higher HEI score" (Basiotis)
- Nutritional consumption scores for low-income children eating school breakfast, as opposed to those who did not receive a meal, were more than twice as high for fruits consumed, and exactly twice as high for milk consumption (Basiotis)
- Pooled data from a variety of studies and assembled by UC Davis researcher, Ernesto Pollitt, indicate that "breakfast consumption improves school attendance and enhances the quality of the students' diets" (Pollitt)

### Better eating habits

- The School Breakfast Program has been shown to build better eating habits among children, particularly insofar as reducing the percentage of calories consumed from fat (Bhattacharya)
- Breakfast participation also reduces the likelihood of serum micronutrient deficiencies in vitamin C, vitamin E and folate, and increases the likelihood that children will receive recommended intakes of potassium and iron (Bhattacharya)

### Improved nutritional status

- A research summary of studies in various countries, including the U.S. conducted by Cueto found school meals contributing to improvements in nutritional status, including growth measures such as height and weight gain among poor children (Cueto)
- Nutritionally at-risk children in the U.S. exhibited improvements in nutritional intake as a result of participating in the School Breakfast Program (Kleinman)

### Reduced illnesses

- Numerous studies have reported reductions in childhood illnesses such as headaches and stomachaches, known to associate with hunger. When Minnesota instituted a

universal free breakfast program, researchers found significant decreases in complaints of stomachaches and headaches (Begalle)

### **3. Behavioral and Psychosocial Benefits**

In addition to mental processing (readiness to learn) and physical health, research has established yet a third benefit of the School Breakfast Program. Students who participate have been found to have fewer discipline problems, manifest less aggression and violence, and show significant improvements in social behavior and general psychosocial functioning. This body of research corresponds to reports of teachers and other school officials who note that when children enter their classrooms having had breakfast, their classes run more smoothly, behavior is better and inter-personal dynamics are calmer.

#### Psychosocial well-being

- In a sample of inner-city schools in two states, Murphy, et. al. found that as participation in the School Breakfast Program increased, both child and teacher ratings of specific psychosocial problems significantly decreased (Murphy)
- A group of Harvard-led researchers found that when inner-city children received school breakfast they exhibited “significant improvements in psychosocial functioning” (Kleinman)

#### Discipline and social behavior

- Researchers tracking the Minnesota universal free breakfast program found that participation correlated with benefits in social behaviors on several indices (Begalle)
- This research also found a corresponding decrease in discipline problems directly corresponding to participation in the breakfast program (Begalle)

#### Aggression and suspensions

- The federal Centers for Disease Control and Prevention found “strong evidence” that school-based programs, including school breakfast, “decrease rates of violence and aggressive behavior among school-aged children (CDC)
- In a national study, food insufficient children (those reporting that they often did not get enough to eat) were more likely than their other low-income peers to have been suspended from school and have had difficulty getting along with other children (Alaimo)

#### 4. Underutilization of the School Breakfast Program

While the highly significant effect of this relationship is now borne out by a strong body of scholarly research, the importance of feeding children so they will be able to learn is something long known:

*“This is expensive stupidity . . . trying to educate children with half starved bodies.”*  
*U.S. Surgeon General, 1917*

**While educators, parents and policymakers generally agree that children need breakfast in order to learn, function and grow, the nation still has a ways to go to insure that all needy and at-risk children receive a daily school breakfast.** While nearly 100,000 individual schools across the country offer a school lunch, more than 15,000 of them still do not make breakfast available to children who are in need. In some states, only 50-60% of the schools serving students lunch also provide them with a breakfast to start the day.

##### Current school breakfast coverage rates

The gap between the number of low-income children receiving a school breakfast and the number getting a school lunch is significant. During the school year ending June, 2007, for example, nearly 18 million children received a free or reduced-price school lunch. During the same year, however, just over 8 million of these eligible, needy students also received a school breakfast. This means that fewer than half of all needy children who get lunch at school also get breakfast to prepare them for learning.

While some students or parents elect for the child not to eat at school, low breakfast coverage rates correspond highly with whether a school system offers the federally-funded meals to their students, and how the programs are operated and promoted. This factor is borne out by the differences in the coverage of low-income children across states. States that cover at least 55-60% of eligible low-income children include New Mexico, South Carolina, West Virginia and Oklahoma. States that cover fewer than 35% of their needy children include Illinois, New Hampshire, Utah and Alaska. Across all states, more than 10 million low-income students who are eligible for a school breakfast do not receive its benefits, often because local school officials do not elect to offer their children this federally-funded program. To address this problem, about 30 states have adopted legislation that either requires local school districts to offer the federally-funded School Breakfast Program to all students, or to do so when certain circumstances occur.

##### “Universal Free” school breakfasts

Another way to insure that more eligible children receive the benefits of a school breakfast is to offer the meals free of charge to all students irrespective of household income. Many students eligible for free or low-cost meals elect not to participate even if their school district offers a breakfast program because they do not want to be stigmatized as being poor. To address this issue, about six states now enable local school districts to offer breakfast to all children in their schools free of charge (universal free). The universal breakfast program enables all children to eat a morning meal in their classroom. Participation rates typically go up significantly in such districts, sometimes by more than 50% over starting rates, because all children are able to eat; none are stigmatized as low-income by participating.

A related benefit of the universal free breakfast program is that school districts are relieved of the burden of checking the eligibility of each student for a free, reduced-price or full-pay meal.

The lessened paperwork and handling of financial forms, as well as reports to state and federal government agencies, saves local school officials much of the burden of administering the breakfast program.

## Conclusion

The body of evidence, drawn from more than 100 published research articles, provides the scientific basis for concluding that the federal School Breakfast Program is highly effective in terms of providing children with a stronger basis to learn in school, eat more nutritious diets, and lead more healthy lives both emotionally and physically.

While no single study necessarily provides a uniquely definitive assessment of the program's benefits, and while some studies occasionally reach differing conclusions, the combined and quite consistent message of this body of research is that serving children breakfast at school significantly improves their cognitive or mental abilities, enabling them to be more alert, pay better attention, and to do better in terms of reading, math and other standardized test scores. Children getting breakfast at school also are sick less often, have fewer problems associated with hunger, such as dizziness, lethargy, stomachaches and ear aches, and do significantly better than their peers who do not get a school breakfast in terms of cooperation, discipline and inter-personal behaviors.

Protecting the 10 million low-income children who are eligible for the School Breakfast Program, but who do not receive it, is a goal that the nation can achieve. Funding is not an impediment since Congress provides reimbursement to local school districts who offer the program. Moreover, facilities and equipment pose no hurdles since virtually all school districts in the nation already offer the National School Lunch Program. Overcoming local indifference to establishing the program is the key challenge.

One of the more cost-efficient things the nation can do to reduce hunger among children and to better their health and educational success, is to fully utilize the School Breakfast Program in districts across the country. When schools do not provide breakfast to children, the loss of return on educational investment becomes a hidden tax paid by the local district and community. Some states, for example, lose tens of millions of dollars a year in federal funding by not fully utilizing the School Breakfast Program. Altogether, states lose an estimated half a billion dollars annually in school breakfast funding from Congress.

A second hidden tax that is paid when schools do not provide children with a school breakfast comes in the form of poorer educational outcomes. America pays an estimated \$90 billion annually when some of its people go hungry, money that comes in the form of more illness, lethargy, lost productivity and poorer educational outcomes on the part of children. \*Of this amount, nearly \$10 billion represents the costs of poorer education-related outcomes such as greater absenteeism and more grade retention related to hunger. More than \$65 billion of the \$90 billion total is paid for poorer health and psychosocial dysfunction, a significant proportion of it for conditions among children from households that do not get enough to eat.

In short, failure to fully utilize the federally-funded School Breakfast Program has substantial costs, costs that greatly reduce the return on educational investment in communities and states across the nation. Moreover, longer-term costs also are borne by young children who arrive at school unable to fully participate in the educational process due to lack of adequate nutrition. **Full utilization of the School Breakfast Program represents a key way to protect these children and to get a better return on educational investments as well.** The existing scientific evidence indicates that doing so would be a win for children and a win for the nation.

\* Brown JL, Shepard D, Martin T, Orwat J, "The Economic Cost of Domestic Hunger: Estimated Annual Burden to the United States," 2007, available through [www.SodexoFoundation.org](http://www.SodexoFoundation.org).

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