Research tells us that school nutrition programs can be an effective tool to help children reach their full academic potential. Healthy and well-nourished children are more likely to attend class, be ready to learn, stay engaged, and perform well in school. School nutrition is linked to multiple indicators of academic success.
Summary of the Research Linking School Nutrition to Improved Literacy and Math Scores:

- Breakfast consumption has a positive impact on student literacy, independent of income level or parental education.\(^1\)

- The School Breakfast Program has a positive effect on academic performance, with the clearest effects upon mathematics among undernourished children.\(^1\)

- Research has found that children from food-insecure families perform worse in math as well as reading and achieve fewer educational gains than their peers over the course of the school year.\(^2,3\) School nutrition programs can decrease a child’s risk for food insecurity.\(^4,5\)

Summary of the Research Linking School Nutrition to Improved Cognitive Function:

- Most children and adolescents do not consume enough water.\(^6\) Research shows that even mild dehydration can lead to significant impairments in cognitive function.\(^7,8\) Water supplementation has been shown to improve students’ classroom focus and academic performance.\(^9,10\)

- According to experimental studies, students who eat breakfast have improved cognitive performance. They also have better visual perception and spatial memory ability. Results on short-term memory tests are higher for students who eat a nutritious breakfast than those who do not eat breakfast.\(^11\)

- After controlling for a number of factors related to children’s outcomes, food insecurity negatively affects children’s development and cognitive function. Even temporary exposure to food insecurity is related to lower cognitive development outcomes.\(^12\) Participating in the school nutrition programs can decrease a child’s risk for food insecurity.\(^4,5\)
### Summary of the Research Linking School Nutrition to Improved School Connectedness:

- Research has demonstrated a strong relationship between school connectedness and educational outcomes, including school attendance; staying in school longer; and higher grades and classroom test scores.\(^{13,14,15,16,17}\) The school cafeteria, school gardens, and school food are vital components of a student’s school experience. Students spend much of their time at school, and may eat as many as 2 out of 3 meals per day at school.

- Allowing students and their parents to use the school building and property outside of school hours for health promotion programs, such as utilizing school cafeterias as summer feeding sites, can increase student’s and parent’s feelings of being part of the school community.\(^{18}\)

- Schools that have higher rates of participation in extracurricular activities during or after school tend to have higher levels of school connectedness.\(^{19}\) Promoting healthy choices and behavior is considered a key aspect of quality expanded learning programs.\(^{20}\)

### Summary of the Research Linking School Nutrition to Improved School Attendance:

- School breakfast programs have been shown to improve attendance and reduce absenteeism. On average, school breakfast reduces absenteeism by 1.5 days per child.\(^{21}\)

- Children who are overweight or obese are more likely to be absent from school.\(^{22,23,24,25}\) Participating in the school nutrition programs can decrease a child’s risk for obesity.\(^{26,27,28}\)

- Food-insecure children and teenagers have been shown to miss school more frequently, and are more likely to repeat a grade than food-secure children.\(^{29}\) Food-insecure children are also more likely to get headaches, stomachaches, and colds,
and to have chronic illnesses.\textsuperscript{30} Participating in the school nutrition programs can decrease a child’s risk for food insecurity.\textsuperscript{4,5}

<table>
<thead>
<tr>
<th>Grades and Performance on Standardized Tests</th>
<th>Summary of the Research Linking School Nutrition to Improved Grades and Performance on Standardized Tests:</th>
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<tbody>
<tr>
<td>• In a California Department of Education survey of students in grades 7, 9 and 11, schools with a higher percentage of pupils eating breakfast had significantly higher Academic Performance Index (API) scores.\textsuperscript{31}</td>
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<tr>
<td>• Participation in the School Breakfast Program is associated with significant improvements in standardized test scores and grades among low-income elementary school children.\textsuperscript{32,33,31,1,34,35}</td>
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<tr>
<td>• Multiple studies have demonstrated a link between inadequate dietary intake and at least one or more of the following: lower grades, lower standardized test scores, or increased likelihood of grade level retention.\textsuperscript{33} The school nutrition programs are linked to healthier dietary intakes among participating students.\textsuperscript{36}</td>
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<th>Aggressive Behavior</th>
<th>Summary of the Research Linking School Nutrition to Reduced Aggressive Behavior:</th>
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<tbody>
<tr>
<td>• Food-insecure children are more likely to have difficulty getting along with their peers.\textsuperscript{29} Food insecurity increases the likelihood a child will experience developmental risk and behavior problems, primarily aggression, anxiety, depression, attention deficit disorder, hyperactivity and inattention.\textsuperscript{37,38,39} Children who become food insecure are more likely to have worse behavioral outcomes in first grade, including externalizing behaviors, self-control, and interpersonal skills.\textsuperscript{40} Participating in the school nutrition programs can decrease a child’s risk for food insecurity.\textsuperscript{4,5}</td>
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<tr>
<td>• A study of a pilot classroom breakfast program in six Maryland school districts found that more than 80 percent of teachers and administrators said that</td>
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</table>
implementing breakfast in the classroom improved student behavior.\textsuperscript{49}

- Universal free school breakfast programs have been shown to improve teachers’ assessments of student’s behavior, focus and well-being.\textsuperscript{35}

### Summary of the Research Linking School Nutrition to Reduced Discipline Problems:

- Children from families that report multiple experiences of food insecurity and hunger are more likely to be delinquent and show behavioral, emotional and academic problems on a standardized measure of psychosocial dysfunction than children from the same low-income communities that are not food insufficient.\textsuperscript{1} Participating in the school nutrition programs can decrease a child’s risk for food insecurity.\textsuperscript{4,5}

- Children who eat breakfast also are sick less often, have fewer problems associated with hunger, such as dizziness, lethargy, and stomachaches, and do significantly better than their non-breakfasted peers in terms of cooperation, discipline, and interpersonal behaviors.\textsuperscript{41}

### Summary of the Research Linking School Nutrition to Decreased Risk for Obesity and Diabetes:

- Participating in the school nutrition programs can decrease a child’s risk for obesity.\textsuperscript{26,27,28}

- School meal participants are less likely to drink sugar-sweetened beverages and more likely to drink nutritious milk.\textsuperscript{42} Children who eat school meals consume less added sugar and more fruit than children who eat a quick breakfast outside of school. Consuming less added sugar may also prevent childhood obesity and type 2 diabetes.\textsuperscript{43}

- Breakfast consumption can increase the feeling of fullness throughout the morning. Compared to students who do not eat breakfast, those who eat a
breakfast rich in protein, like school breakfast, consume fewer calories at lunch.\textsuperscript{44} Eating breakfast more frequently may help control appetite and blood sugar, which has important implications for the risk of obesity and diabetes.\textsuperscript{45}

<table>
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<tr>
<th>Hunger</th>
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<tbody>
<tr>
<td>Summary of the Research Linking School Nutrition Programs to Reduced Hunger:</td>
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<tr>
<td>• Participating in the school nutrition programs can decrease a child’s risk for food insecurity. \textsuperscript{4,5,21}</td>
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<th>Tardiness</th>
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<tr>
<td>Summary of the Research Linking School Nutrition to Reduced Tardiness:</td>
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<tr>
<td>• An analysis of the USDA’s School Breakfast Program found that it significantly improves school performance and reduces absenteeism and tardiness, all while improving children’s diets overall.\textsuperscript{46,21,49,47}</td>
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<th>Suspensions</th>
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<tr>
<td>Summary of the Research Linking School Nutrition to Reduced Suspensions:</td>
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<tr>
<td>• Food-insecure teenagers also have an increased likelihood of being suspended from school.\textsuperscript{48} Participating in the school nutrition programs can decrease a child’s risk for food insecurity.\textsuperscript{4,5}</td>
</tr>
<tr>
<td>• A study of the pilot classroom breakfast program in six Maryland school districts found that disciplinary suspensions decreased at their schools.\textsuperscript{49}</td>
</tr>
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</table>
Literature Cited


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