



YEAR THREE

Report



Assessing the Impact of the
Mississippi Healthy Students Act





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EXECUTIVE SUMMARY

This report summarizes the results of several studies comprising Year Three of an evaluation project assessing the impact of the Mississippi Healthy Students Act on childhood obesity. The evaluation measures trends in childhood obesity rates and assesses the implementation of school health initiatives mandated by the Act. Because parents and the home environment can have a major influence on children's health, the project also includes a parent survey to examine changes occurring in the home and family.

CHILDHOOD OBESITY TRENDS

Mississippi has reached an important turning point in its attempts to address high rates of childhood obesity. Data from the 2011 Child and Youth Prevalence of Obesity Study (CAYPOS) demonstrate a statistically significant decline in the combined prevalence of overweight and obesity in elementary students, a major shift in direction after decades of steady increases. The percentage of children in all grades classified as either overweight or obese has also declined since 2005, but not to a statistically significant extent as it has for elementary age students. This positive change, however, has not occurred uniformly for all children, as racial disparities appear to be increasing. The 2011 CAYPOS documents a statistically significant drop in the combined prevalence of overweight and obesity for white students, but not for black students.

This leveling off in overweight and obesity among public school students is likely due to many factors. Because of the influence of both the school and home environments, changes in both have been assessed.

IMPLEMENTATION OF SCHOOL HEALTH INITIATIVES

The school environment has seen major transformations since the passage of the Healthy Students Act in 2007. The most dramatic changes occurred soon after the enactment of the law, as documented in the Year One Report. The percentage of schools with at least 75 percent of students receiving health education, for instance, doubled between 2006 and 2008. Evidence of schools making tremendous improvements in the nutritional quality of foods was confirmed by data from surveys conducted by the Centers for Disease Control and Prevention, who in 2009 recognized Mississippi as making some of the greatest strides among all surveyed states in removing unhealthy foods from its schools.¹

Some continued improvements in several areas related to nutrition, physical education, and health education are noted in this report:

- Serving of whole grain foods on a daily basis
- Removal of fryers
- Serving a variety of fruits weekly
- Reduction in fat content in milk
- Conducting annual self-assessments

There are many areas, however, where progress has either stalled or regressed:

- Nutrition education provided to at least 75 percent of students in the school
- Consistency in serving fresh fruits and vegetables on a daily basis
- Membership of school health councils meeting state requirements
- Training of school food service personnel
- Promotion of school meal programs to families and staff
- Physical education provided to at least 75 percent of students in the school
- Students spending at least 75 percent of physical education time being physically active
- Health education being taught by certified teachers

CHANGES IN THE HOME ENVIRONMENT

Changes in the home environment do not appear to be contributing to reductions in childhood obesity, based upon results from surveys of the parents of public school students. As found in Year Two, parents reported that they intend to improve nutrition and physical activity within their households. However, when specific questions were asked about eating patterns and physical activity, parents reported few improvements. More than three-quarters of parents told surveyors that they were trying to change to healthier eating patterns. But when asked about specific foods and beverages served to the family, results showed the amount of vegetables consumed declined while soda consumption increased, both to a statistically significant degree.

PARENT PERCEPTIONS

In addition, as noted in previous reports, parents do not appear to recognize obesity in their children. When public school parents were asked for their child's height and weight so that researchers could calculate the child's body mass index (BMI), the percentage of children found to be overweight or obese did not differ much from the CAYPOS data. However, when asked to describe the weight status of their child, there was a considerable discrepancy between the parents' perception and reality. Although CAYPOS documented that 41 percent of public school children in Mississippi are either overweight or obese, only 15 percent of parents labeled their child overweight or obese.

Year Three surveys of parents reveal some subtle shifts in attitudes and opinions as well. The percentage of parents expressing the opinion that the role of the school in preventing childhood obesity is either very important or somewhat important has dropped from 94 percent in 2009 to 90 percent in 2011. As noted in previous reports, one of the components of coordinated school health that continues to show low implementation levels is family and community involvement. This finding may offer some insight into the lack of awareness of parents regarding aspects of the Healthy Students Act. Only one in five parents, for example, knew if their child's school had a school health council.

OTHER KEY FINDINGS

Few schools meet all state requirements for the composition of their school health council. The membership of the councils is dominated by principals and teachers. Fewer than half of the councils included representation from school food service staff or health care professionals. Fewer than 15 percent of school health councils included superintendents or school board members.

Although the Act has been in effect since the 2007-2008 school year, only 16 percent of school district superintendents reported that their district had fully implemented all components of the law. Surveys of State Board of Health and State Board of Education members provide some insight into the reasons behind the slowdown in implementation. Board members' comments refer to the obstacles that the agencies face in the current climate of budget restraints and cutbacks.

CONCLUSIONS

Full implementation of the Act requires resources that are in short supply. The State Department of Education has provided considerable technical assistance to schools to help integrate health education and physical activity into the academic curriculum, but components such as family and community involvement or fully functional school health councils take staff time to be effective.

While it appears that positive outcomes have resulted from the changes mandated by the Healthy Students Act, it is clear that further work is necessary to ensure that health improvements are realized by all students and to counteract decades of negative trends. Mississippi is at a turning point and cannot afford to relax its commitment to childhood obesity prevention and coordinated school health.



INTRODUCTION

Mississippi has consistently been ranked among the top states with the highest rates of children who are overweight or obese. Because of the significant consequences of obesity, including, but not limited to, higher risk of heart disease, high blood pressure, type 2 diabetes, stroke, and depression, this situation is of great concern.

In an effort to prevent a further rise in the state's childhood obesity rates, the Mississippi Legislature in 2007 passed the Mississippi Healthy Students Act. The Act represents the core of an effort to improve nutrition, increase physical activity, and develop health education programs in public schools. Focusing on the school, where children spend much of their time as they form lifelong habits, the Healthy Students Act also includes provisions for parental and community involvement through school health councils.

In 2008, the Robert Wood Johnson Foundation (RWJF) awarded the Center for Mississippi Health Policy (the Center) a five-year grant to assess the impact of the Healthy Students Act on childhood obesity in the state. The Center directs the evaluation project in collaboration with three Mississippi universities: The University of Southern Mississippi, Mississippi State University, and the University of Mississippi. The Center uses the RWJF grant in conjunction with funding from The Bower Foundation to provide for a comprehensive evaluation of the effectiveness of state policies aimed at preventing childhood obesity.

This document summarizes the key findings from the third year of the evaluation project. Copies of the Year One, Year Two, and Year Three reports as well as each of the individual studies are available on the Center's web site at www.mshealthpolicy.com.

The National Survey of Children's Health and the Centers for Disease Control and Prevention's Youth Risk Behavior Survey (YRBS) have ranked Mississippi as having one of the highest rates of childhood obesity of all states.

The Child and Youth Prevalence of Obesity Survey (CAYPOS), conducted biennially by The University of Southern Mississippi, monitors the prevalence of obesity among public school children in Mississippi using height and weight measurements collected by school nurses. CAYPOS data provide further documentation of the high rates of obesity among Mississippi's youth.

Unlike CAYPOS, YRBS monitors the prevalence of obesity in youth nationwide through a school-based questionnaire completed by students. The survey is conducted by the Centers for Disease Control and Prevention (CDC) in collaboration with state and local education and health agencies. Data from at least two states, Mississippi and North Carolina, showed that middle school students who completed the questionnaire consistently underestimated their weight compared to actual measurements, leading the CDC to eliminate questions about height and weight from the middle school YRBS. The questions remain on the high school YRBS because of a higher correlation between students' self-reported data and actual measurements.

POLICIES RELATED TO THE HEALTHY STUDENTS ACT

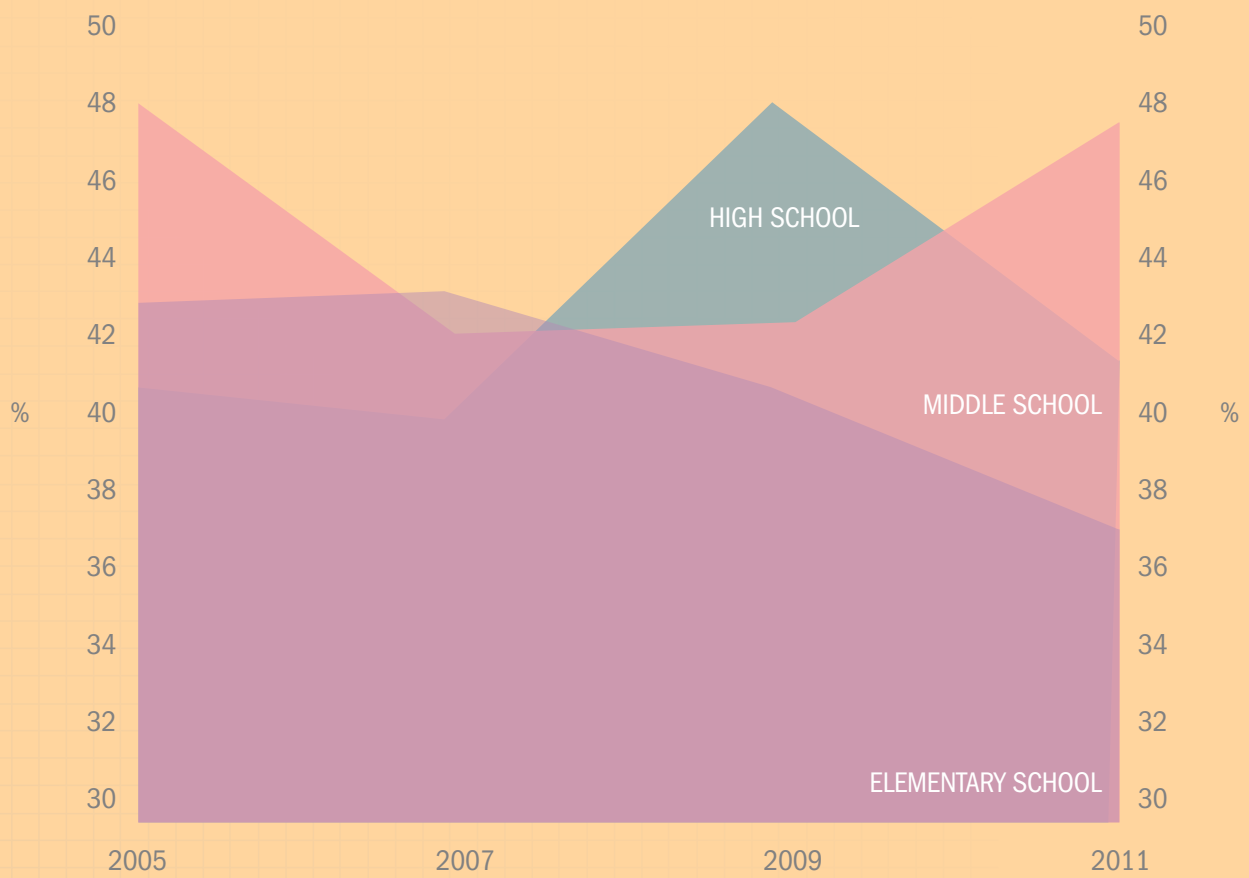
- 2006** The Mississippi Legislature instructed the State Board of Education to develop a wellness curriculum and outline rules and regulations to be followed by school districts in implementing the curriculum. The legislature also mandated that the board define what products could be sold in vending machines on school campuses and when they could be sold.
- 2007** The State Board of Education began a two-year phase-in of newly developed rules and regulations defining the products that may be sold in vending machines on school campuses.
- The Mississippi Legislature enacted the Mississippi Healthy Students Act to address the state's high rates of childhood obesity by improving nutrition, physical activity, and health education in public schools. The Act's provisions:
- Mandate minimum requirements for health education and physical education;
 - Require local school wellness plans to promote increased physical activity, healthy eating habits, and abstinence from tobacco and illegal drugs;
 - Require a physical activity coordinator at the State Department of Education;
 - Make local school health councils mandatory rather than optional;
 - Direct the State Board of Education to adopt regulations that address healthy food and beverage choices, marketing of healthy food choices to students and staff, healthy food preparation, food preparation ingredients and products, minimum and maximum time allotments for lunch and breakfast periods, the availability of extra food items during lunch and breakfast periods, and methods to increase participation in the Child Nutrition School Breakfast and Lunch Programs; and
 - Specify the appointment of a committee to advise the State Board of Education in developing these regulations.
- 2008** The State Board of Education adopted regulations defining nutrition standards along with physical education and health education requirements. All regulations were in effect as of the 2008-2009 school year.
- 2010** The Mississippi Legislature enacted HB 1078, which provides financial incentives to public schools that successfully participate in the HealthierUS School Challenge, and HB 1079, which requires comprehensive training for school food service personnel.
- The State Board of Education made several regulatory changes to be effective in the 2010-2011 school year:
- Clarified requirements for serving dark green and orange vegetables;
 - Required schools to submit a three-year plan to eliminate fried foods;
 - Increased whole grain products to at least one serving three days a week; and
 - Reduced milk fat content to 1%.

The Office of Healthy Schools in the State Department of Education has been working closely with local schools to implement the new policies through its coordinated school health program. Visit www.healthyschoolsms.org for more information.



identifying the trends

Students classified obese or overweight by grade



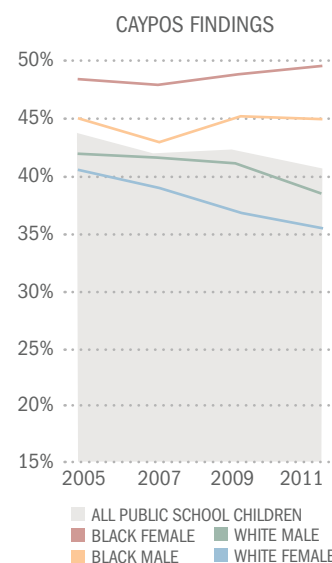
Childhood Obesity: Mississippi at a Turning Point

After decades of steady increases, data from the Child and Youth Prevalence of Obesity Study (CAYPOS), included in the Year Two Report and now the Year Three Report, indicate that the prevalence of overweight and obesity among public school students has leveled off since 2005. This positive change, however, has not occurred uniformly for all children, as racial disparities are increasing.

In 2011, the combined prevalence of overweight and obesity for all public school students was 40.9 percent, compared to 42.4 percent in 2009, 42.1 percent in 2007 and 43.9 percent in 2005. Statistically significant declines in overweight and obesity were found among white students and elementary school students from 2005 to 2011. The combined rates for white students dropped from 40.6 percent in 2005 to 34.8 percent in 2011. The combined rates in elementary school students dropped from 43.0 percent in 2005 to 37.3 percent in 2011. In 2011, the prevalence of overweight and obesity was significantly lower among white students than black students and significantly lower among white female students than black female students in all three grade categories.

Despite some success in lowering childhood obesity rates, parents, as noted in previous reports, still do not appear to recognize obesity in their children. When public school parents were asked for their child's height and weight so that researchers could calculate the child's body mass index (BMI), the percentage of children found to be overweight or obese did not differ much from the CAYPOS data. However, when asked to describe the weight status of their child, there was, as was the case in Year Two, a considerable discrepancy between the parents' perception and reality.

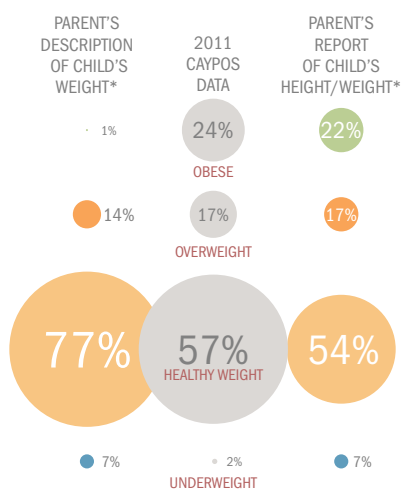
CAYPOS documented that 41 percent of public school children in Mississippi were either overweight or obese in 2011. Using the height and weight data provided by parents to calculate a BMI, researchers found that 39 percent of children would fit into one of the two categories. But only 15 percent of parents labeled their child overweight or obese. Although



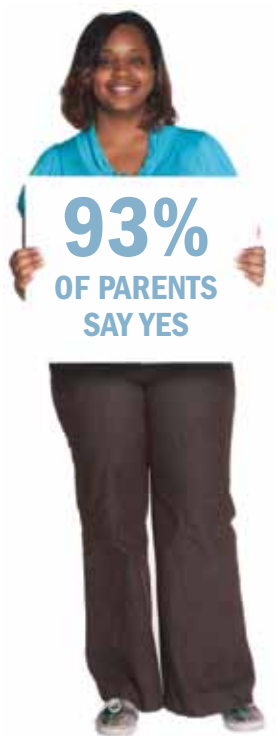
Data from the Child and Youth Prevalence of Obesity Study (CAYPOS) show that although the overweight and obesity rate of all public school children has leveled off since 2005, the racial disparities are increasing. Rates for all children are still high and need reduction.

For children and teens, Body Mass Index (BMI) is calculated from the child's weight and height and is age- and sex-specific (known as BMI-for-age). The BMI number is plotted on the CDC BMI-for-age growth charts to obtain a percentile ranking which determines the BMI-for-age weight status category:

UNDERWEIGHT
< 5th percentile
HEALTHY WEIGHT
5th percentile to < 85th percentile
OVERWEIGHT
85th percentile to < 95th percentile
OBESE
≥ 95th percentile



*Source: Parent Survey 2010



State laws now require schools to offer only healthy foods to children and to increase physical education. Asked if they support this, 93% percent of parents are still supportive.

95 percent of parents reported that their child had a regular healthcare provider, only 13 percent had been advised that the child was overweight. Twice as many black parents (18%) as white parents (9%) reported that their child's doctor had told them their child "weighed too much," a statistically significant difference.

Parents were highly supportive of the implementation of the Healthy Students Act. Ninety-three percent of parents supported state laws that require schools to offer only healthy foods to children and to increase physical education, and 96 percent agreed that schools should require physical education for all students. Although support remained at high levels, it was not as high as noted in the previous reports, and the decline is statistically significant.

While 89.5 percent of parents thought that the role of the school in childhood obesity prevention is either "very important" or "somewhat important," the percentage of parents who thought the role of the school is "very important" fell from 64.9 percent in Year Two to 58.3 percent in Year Three. There was, however, a corresponding increase in the percentage of parents who answered "somewhat important," from 26.8 percent to 31.2 percent.

School district superintendents and school board members were surveyed for the Year One Report, Year Two Report, and now the Year Three Report, regarding implementation of the Healthy Students Act. Approximately half of superintendents rated their district's degree of implementation at 75 percent in Year Three, with little change from Year One. Only 16 percent of superintendents thought their district had fully implemented the requirements of the Act.

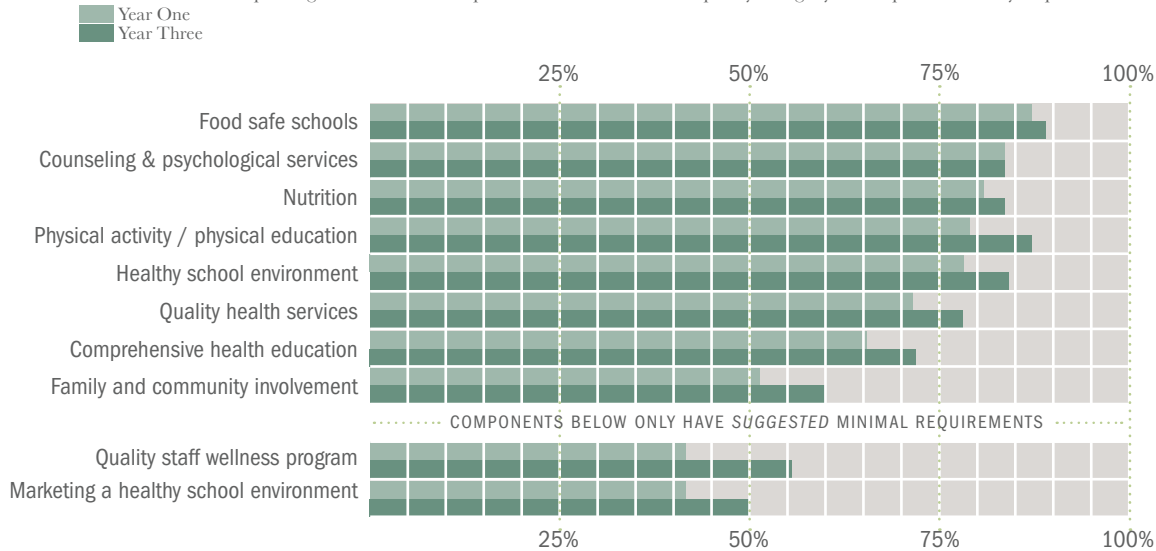
More than a quarter of school board members were unsure about the degree of Healthy Students Act implementation in their district for Year Three. Another 22 percent of school board members said their district had fully implemented the Act, a lower percentage than in Years One or Two.

WELLNESS POLICY IMPLEMENTATION CONTINUES AT SLOWER PACE

The Year One Report documented significant progress made by schools toward implementing the wellness policies required by federal and state laws, including the Mississippi Healthy Students Act. The 2010 Survey of Principals, documented in this year's report, found continued progress in many areas, but at a slower pace, indicating schools are struggling to reach full implementation.

Ninety-seven percent of principals reported partial or full implementation of a school wellness policy in 2010. By comparison, 96 percent reported full implementation in 2008

Percent of schools reporting that minimum requirements for the wellness policy category are in place and fully implemented



and 78 percent did so in 2006, both documented in the Year One Report. The percentage of principals reporting that their school had established a school health council increased slightly, from 84 percent in 2008 to 91 percent in 2010.

The Healthy Students Act requires that every school establish a school health council. Each council is to conduct an annual self-assessment, meet at least three times per year, and report annually to the school board. In this year's report, 88 percent of principals said their school had conducted the required self-assessment, with 87 percent of councils meeting three times per year and 77 percent of councils submitting an annual report to the school board. All these rates were higher than those reported in Year Two, although still well below optimal levels.

The success of school wellness policy implementation is analyzed in several separate categories. The categories with the highest percentages of full implementation were "food safe schools," "physical activity," and "nutrition." The lowest full implementation percentages reported by principals were in the categories of "marketing a healthy environment" and "staff wellness programs," both of which are recommended, but not required, wellness policy components.

The rate of full implementation in most categories was highest in middle schools. Elementary schools reported higher rates of full implementation for physical activity and counseling and psychological services. High schools showed higher rates of full implementation for health education than middle and elementary schools.

Ranking of local school wellness policy categories with the highest occurrence of full implementation

ELEMENTARY SCHOOLS

Physical Activity / Physical Education	91.4%
Counseling and Psychological Services	88.2%
Food Safe Schools	82.9%
Healthy School Environment	77.1%
Quality Health Services	73.5%
Nutrition	71.4%
Family and Community Involvement	65.7%
Comprehensive Health Education	62.9%
Quality Staff Wellness Program	24.3%
Marketing a Healthy Environment	52.9%

MIDDLE SCHOOLS

Food Safe Schools	90.0%
Physical Activity / Physical Education	90.0%
Nutrition	90.0%
Counseling and Psychological Services	85.0%
Healthy School Environment	82.1%
Quality Health Services	80.0%
Family and Community Involvement	67.5%
Comprehensive Health Education	62.5%
Quality Staff Wellness Program	64.1%
Marketing a Healthy Environment	57.5%

HIGH SCHOOLS

Food Safe Schools	89.8%
Nutrition	85.7%
Comprehensive Health Education	79.6%
Physical Activity / Physical Education	73.5%
Healthy School Environment	70.6%
Counseling and Psychological Services	69.4%
Quality Health Services	69.4%
Family and Community Involvement	51.0%
Quality Staff Wellness Program	55.1%
Marketing a Healthy Environment	55.1%

School Health Councils Widely Established; Participation Must Improve

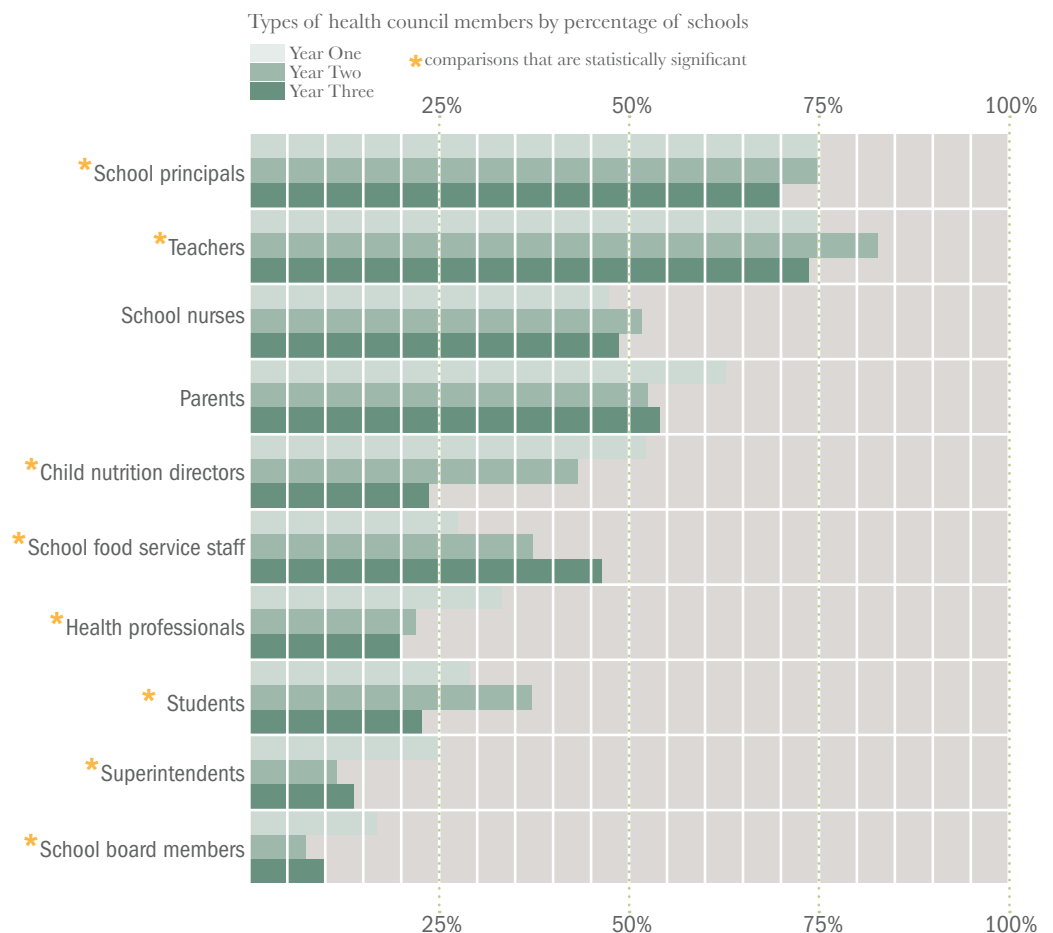
The law* requires each local school board to appoint the members of each school health council, which at a minimum must include at least one person from each of the following groups:

- Parents not employed by the school district
- Director of local school food services
- Public school teachers
- Public school administrators
- District students
- Health care professionals
- The business community
- Law enforcement
- Senior citizens
- Clergy
- Non-profit health organizations
- Faith-based organizations

*Section 37-13-134(8)(c)
of the Mississippi Code of 1972, Annotated

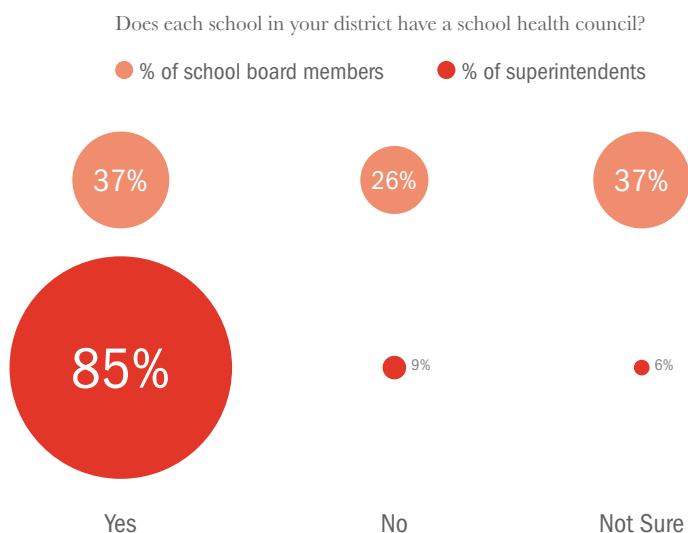
The Mississippi Healthy Students Act requires the establishment of a school health council in every school.

Researchers visiting a representative sample of public schools documented that while 92 percent of schools had a wellness committee or school health council, only 18 percent included representation from administration, faculty, staff, students, and parents. Almost three-quarters of school health councils included representation from teachers and principals. Parents, school nurses, and school food service staff served on about half of the councils. Fewer than 15 percent of the groups included superintendents and school board members. The percentages of health councils including school principals, teachers, school nurses, students, and health professionals have all fallen since Year Two. But the percentage of councils with parents increased, as did the percentage of councils with school food service staff, the latter exceeding 40 percent for the first time.



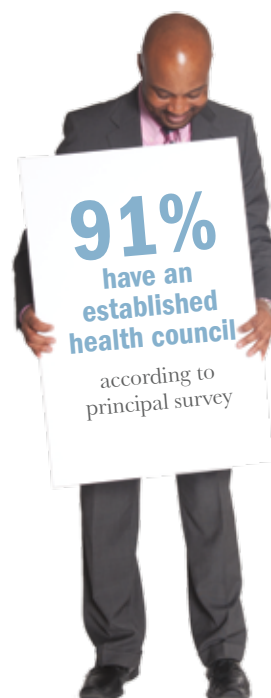
Confirming the results of the researchers visiting the schools, 9 percent of principals reported that their school did not have a school health council. Of the 91 percent who confirmed the establishment of a council, 68 percent stated that the functions of the council had been fully implemented in their school, with 87 percent agreeing that the council met three times each year and 77 percent confirming that the council submitted a yearly report to the school board.

Like principals, 9 percent of school superintendents reported the absence of school health councils, although another 6 percent were not sure. School board members, however, were less aware of the groups: 37 percent agreed that each school in their district had a school health council, while 26 percent said they did not exist, and 37 percent were not sure.



When asked if their child's school had a health committee, council, or task force, only one in five (21.5%) parents answered "yes." More than one-third (36.5%) said "no," and 41.9 percent were not sure. Of the parents who were aware school health councils existed, about half had attended a meeting.

Overall these results, combined with the fact that there has not been an improvement in the percentage of schools with a health council meeting all state requirements since last year's report, indicate a continuing need to improve participation by all groups and to ensure involvement by all those required by the Healthy Students Act.



Healthier Foods Available; Nutrition Education Stagnates

Extra food items are defined as foods that may be purchased with a reimbursable school breakfast or lunch. Ninety-eight percent of schools limit these items to individually-packaged foods that do not exceed 200 calories, and limit additional meal servings to the size of a normal meal portion.

Competitive foods are defined as food items available to students through vending machines, student stores, snack bars, fundraisers, events, and parties. Sale of these items is prohibited on school campuses for one hour before the start of any meal period.

According to parents, more than three-quarters of children eat school lunches, while approximately 16 percent take their lunch to school. Almost 90 percent of parents reported their child eats breakfast, and a third of these children eat that meal at home rather than at school.

The Healthy Students Act, along with rules and regulations issued by the State Board of Education, strengthened Mississippi's school nutrition policies. The Year One Report noted significant improvements in school nutrition following the implementation of these policies, and progress appears to be continuing in such areas as serving fresh fruits daily, serving raw vegetables daily, and serving whole grain foods daily.

Following the Year One Report, which showed a very low percentage of schools serving whole grain foods at optimal levels, the State Board of Education increased requirements related to whole grain foods. Since this action, the percentage of schools serving whole grain foods on a daily basis has increased from 22 percent among schools surveyed for the Year One Report to 32 percent for Year Two and to 36 percent for Year Three. The percentage of schools that have eliminated fryers increased from 26 percent in Year One to more than 34 percent in Year Three. Schools also showed overwhelming success complying with new milk standards that allow only non-fat or 1% milk to be served, with 98 percent of schools reporting compliance. The percentages of principals reporting that their schools serve raw vegetables and fruits daily have also increased during each period. The percentages of schools serving at least three different fruits and five different vegetables weekly have remained high.



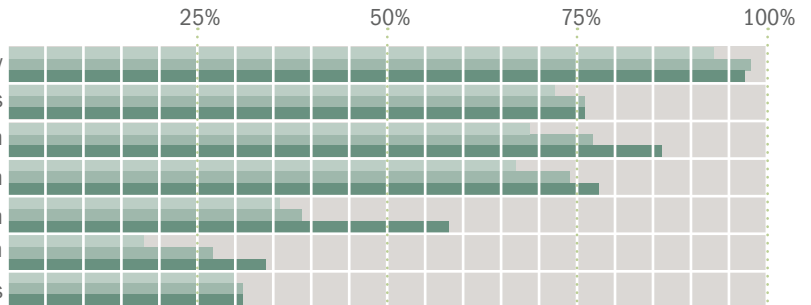
Percentage of schools in compliance with nutrition policy

Year One
Year Two
Year Three

* comparisons that are statistically significant

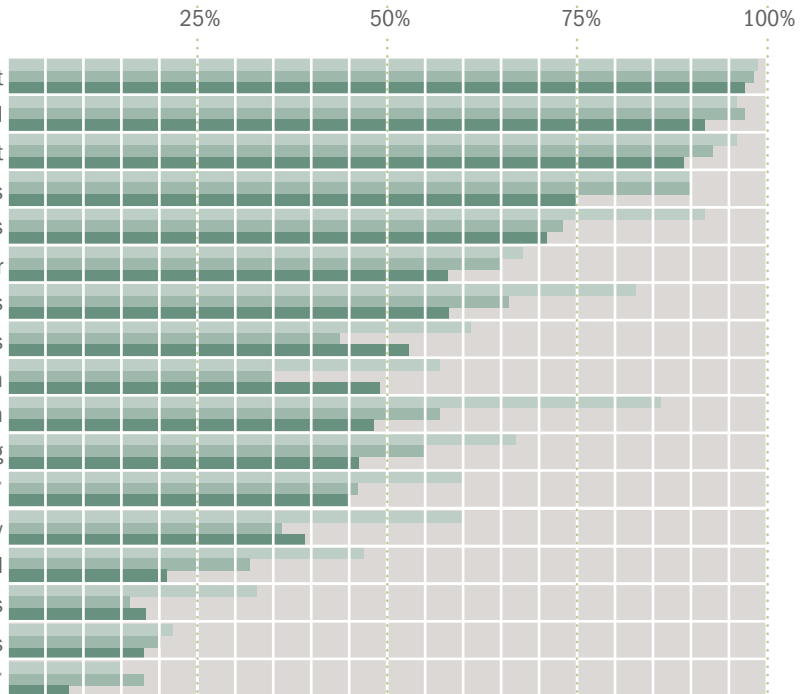
Components that show statistically significant trends of increase in compliance rates:

- * Served a minimum of 3 different fruits weekly
- * At least 1 whole grain product in lunch and breakfast items
- * Served at least 1 fresh fruit at any time on day of observation
- * Served 100% fruit and vegetable juice during lunch
- * Observed serving of at least 1 whole grain product at at least 1 lunch
- * Eliminated fryers in their operation
- * Served fresh vegetables at all observed lunches



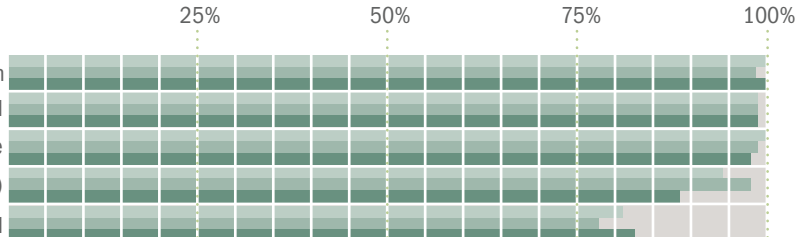
Components that showed statistically significant trends of decrease in compliance rates:

- * Valid operation permit
- * Have established a school health council
- * Gave students adequate time to eat
- * Used valid training materials
- * Served no fried extra food items
- * At least 1 working steamer
- * CNP manager attended 1 training within 12 months
- * Long-range plan to reduce fried foods
- * Partnerships to promote family nutrition
- * Wellness policy includes a food safety program
- * Had at least 1 kitchen staff attending training
- * Long-range plan to replace fryers*
- * Served at least 1 fresh fruit or vegetable at lunch every day
- * Limited number of extra sale items purchased with a reimbursable meal
- * Plan to promote lunch and breakfast meals
- * Health council that met standard requirements
- * Served dark green and/or orange vegetables or fruits 3x week for 4 weeks**



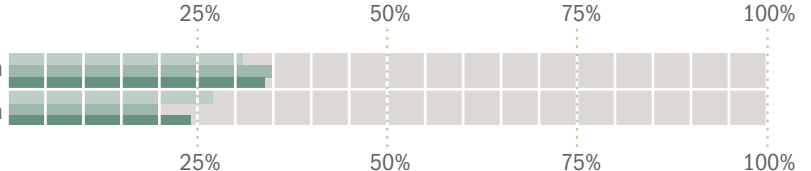
Components that showed no statistically significant change, but compliance rates remained high:

- Complied with existing NSLP/SBP meal pattern
- Showed a decrease or no change in fried food items served
- Served milk with allowed fat percentage
- Fully compliant with extra food sales (caloric content)
- Reported no competitive food sales within 1 hour of meal



Components that showed no statistically significant change, but compliance rates remained low:

- At least 1 working Combi-Oven
- Nutrient analyses for trans fats in breakfast and lunch



*Plan not needed for those who have eliminated fryers
**Lacks a uniform definition for what comprises dark green or orange vegetables or fruit

How many of
your students are
receiving nutrition
education?



reported by principals

In addition to the operational areas showing declines, as noted in the chart on page 17, there has also been a steep decline in the percentage of schools reported by principals where at least 75 percent of students receive nutrition education, a component of health education. After doubling between the Year One Report and the Year Two Report, the percentage dropped among those surveyed for Year Three.

The report also found a significant shift in the responses of parents regarding their support for the types of foods and beverages that should be offered. The percentage of parents who said schools should offer only healthy items like low-fat and low-sugar snacks fell from 50 percent in Year One to 45 percent in Year Three, while at the same time the percentage of parents who said schools should not have vending machines increased from 21 percent in Year One to 25 percent in Year Three.

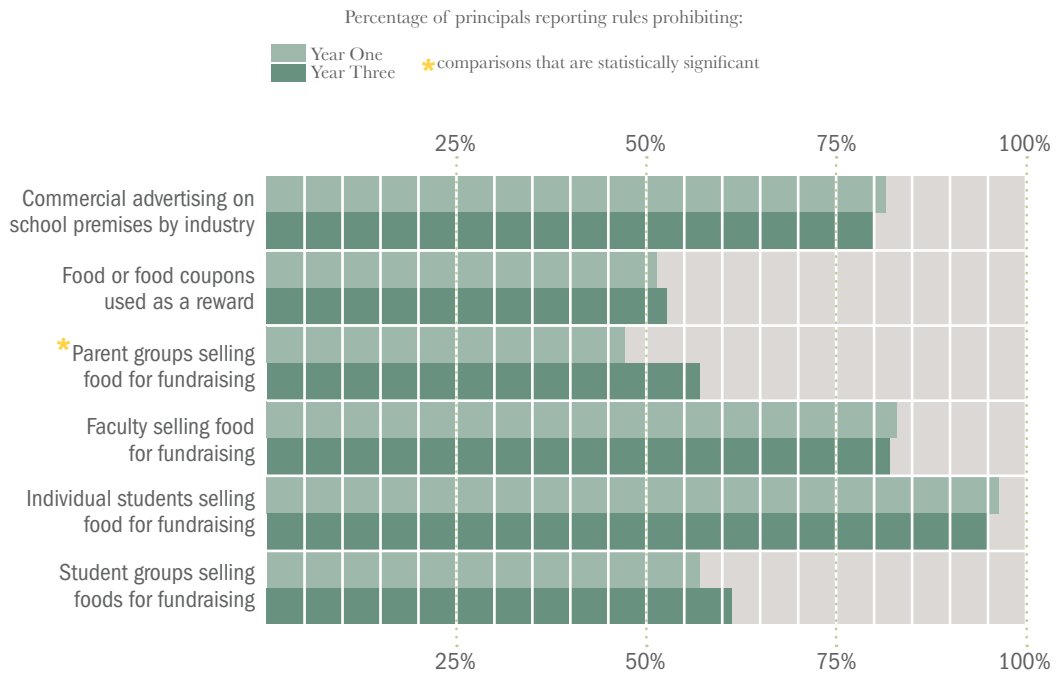
A growing percentage of parents said both healthy and less healthy snacks and drinks should be provided.

MORE SCHOOLS PROHIBITING FOOD AS A REWARD OR FUNDRAISING TOOL

More than 80 percent of principals report that their schools have policies prohibiting individual student sales of food for fundraising, faculty selling food for fundraising, and commercial advertising on school premises. More than half of principals indicate that their schools prohibit student groups from selling food for fundraising, parent groups from selling food for fundraising, and teachers from using food or food coupons as a reward.

PRINCIPALS' REPORTS CONFIRMED BY OBSERVED DATA

Observational studies by researchers that visited a random sample of public schools statewide confirm the reports of school principals. The data show, for example, that the percentage of schools serving at least three different fruits weekly has remained well over 90 percent, in line with the numbers reported in the principals' survey. Similar increases were observed in the percentages of schools serving whole grain foods, and a high percentage of schools was observed following enacted policies against foods that compete with established meals, including those from vending machines and fundraisers, confirming the principals' reports.



Health Education Progress Stalls

The goal of health education in schools is to provide students with accurate information on relevant health topics appropriate for their grade level. With a general focus on allowing students to gain an understanding of the growth and development of the human body and how their current and future health is related to their behavior, health education aims specifically at educating them on the topics of physical activity, healthy eating habits, preventing illness, and avoiding drugs and tobacco. By increasing the requirements for health education, the Healthy Students Act helps ensure that more Mississippi children are well-educated about the behavioral choices that impact their health and well-being and that of their families.

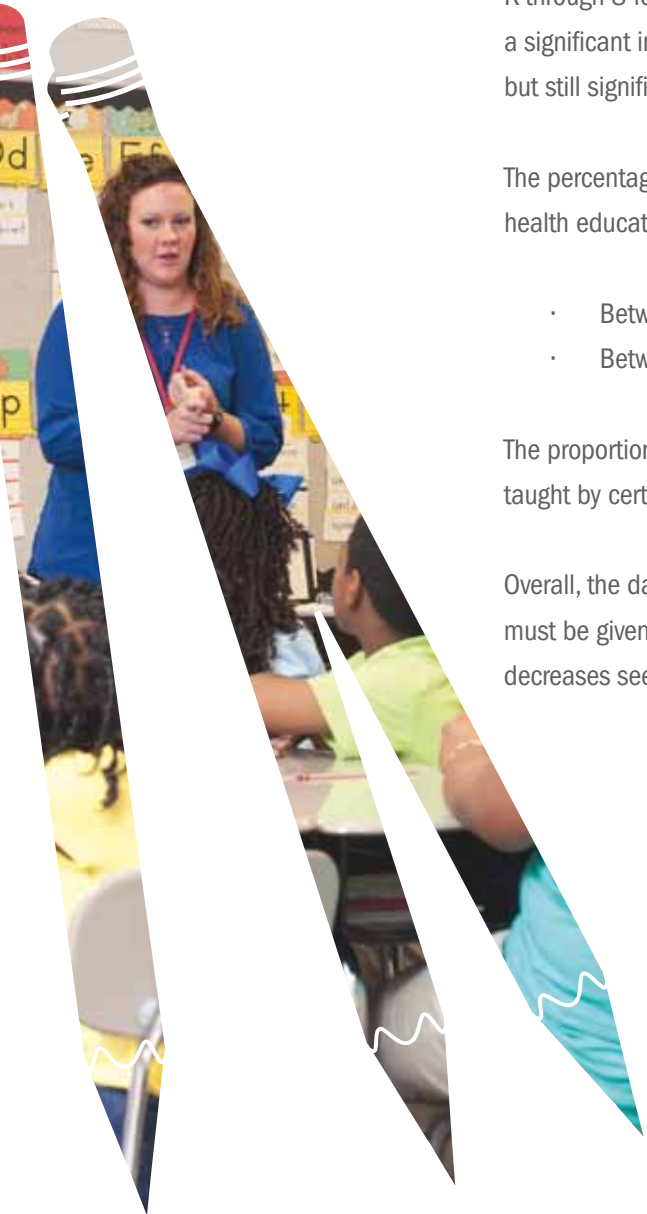
The Healthy Students Act mandates 45 minutes of health education per week in grades K through 8 followed by one semester during high school. In 2008 school principals reported a significant increase in the amount of health education being taught, followed by a small but still significant drop in 2010.

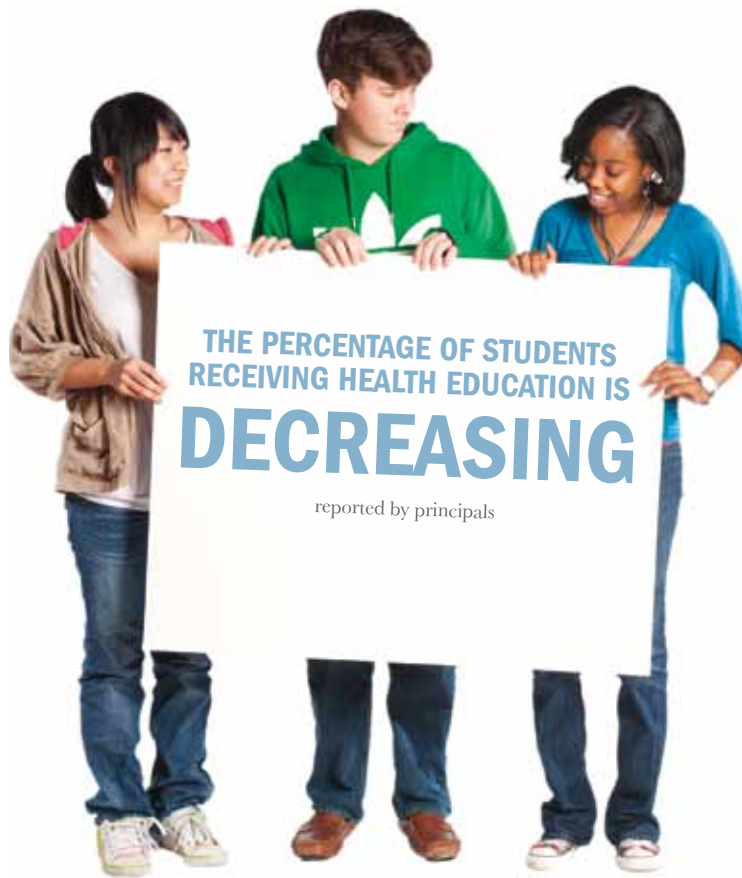
The percentage of schools where at least 75 percent of students were receiving health education has changed significantly since the Healthy Student Act took effect:

- Between 2006 and 2008, the percentage increased from 38 percent to 76 percent
- Between 2008 and 2010, the percentage fell from 76 percent to 67 percent

The proportion of schools reporting that at least 75 percent of health education was being taught by certified teachers dropped in 2010 to 48 percent, down from 54 percent in 2008.

Overall, the data still show significant improvement since 2006, but careful attention must be given to school policies on health education to avoid a continuation of the decreases seen in 2010.





Who is teaching health education?

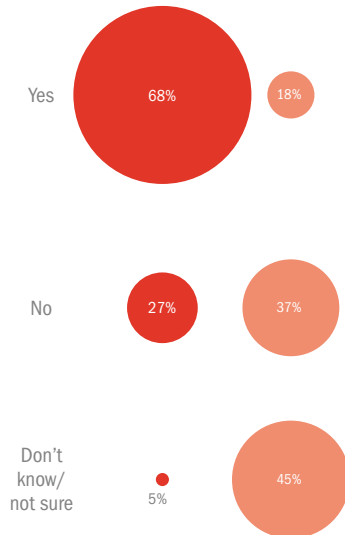


More Schools Fully Implement Physical Activity & Physical Education Programs

Does your school conduct fitness testing?

● % of superintendents

● % of school board members



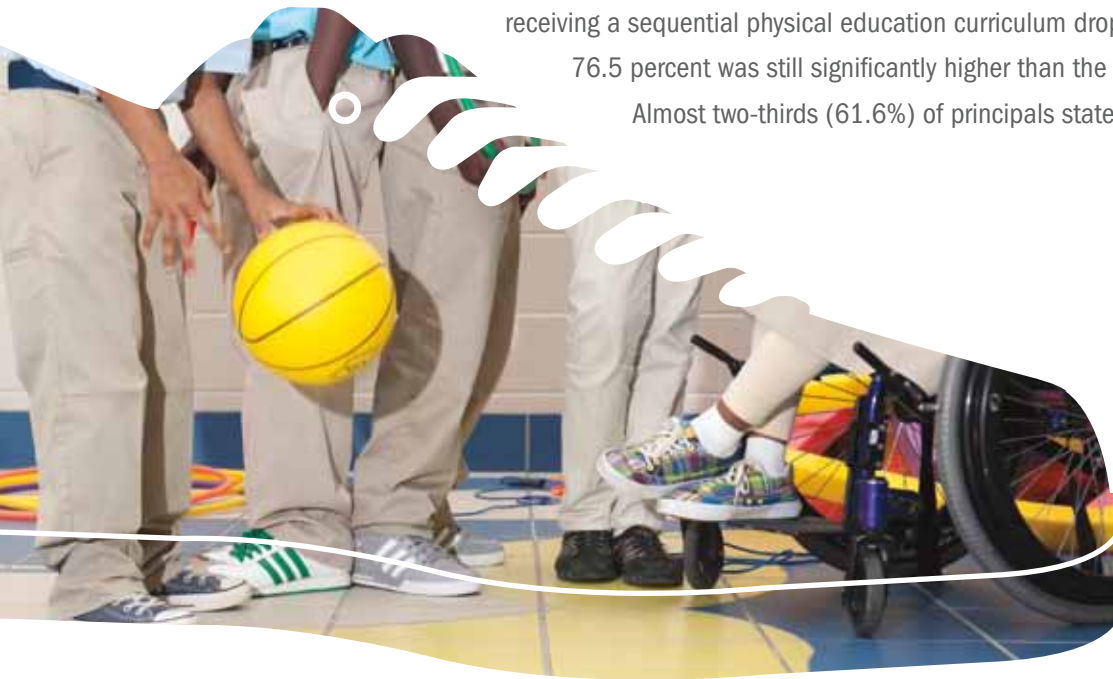
Research outlined in the Year Two Report documented the close association between the fitness levels of Mississippi students and their test scores in both math and language arts.² Students achieving more fitness zones scored higher on academic tests and missed fewer days of school.

As part of the Committed to Move project, students in grades 3-8 were assessed using Fitnessgram, a physical fitness test battery developed by the Cooper Institute. Fitnessgram consists of six tests:

1. Pacer test for measuring aerobic capacity
2. Curl-up test for assessing abdominal strength and endurance
3. 90-degree push-up for gauging upper-body strength and endurance
4. Trunk lift for measuring back extensor strength and flexibility
5. Backsaver sit-and-reach for review of hamstring flexibility
6. Skinfold assessment for determining body composition (Mississippi chose to use Body Mass Index screening rather than the skinfold assessment.)

The Healthy Students Act requires 150 minutes of physical education a week for elementary and middle schools and one-half Carnegie unit—approximately one semester—in high school. In 2010, 86.5 percent of surveyed public school principals reported full implementation of the minimum requirements for physical education and physical activity. This rate was up from 79.1 percent in 2008. The percentage of schools with at least 75 percent of students receiving a sequential physical education curriculum dropped slightly from 2008, but at 76.5 percent was still significantly higher than the 57.1 percent reported in 2006.

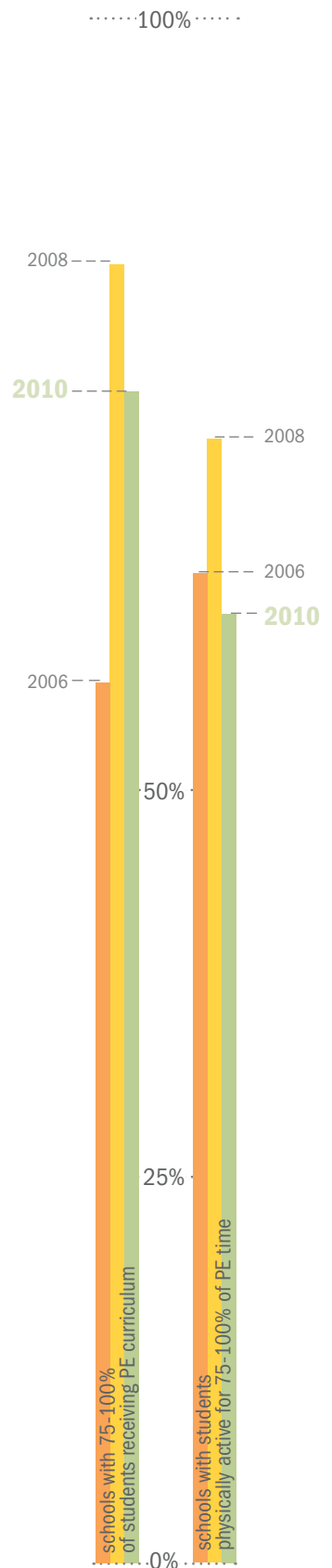
Almost two-thirds (61.6%) of principals stated that students spend at least

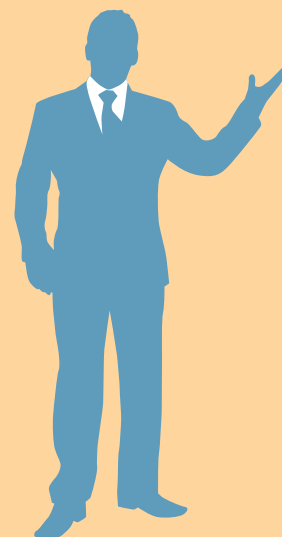
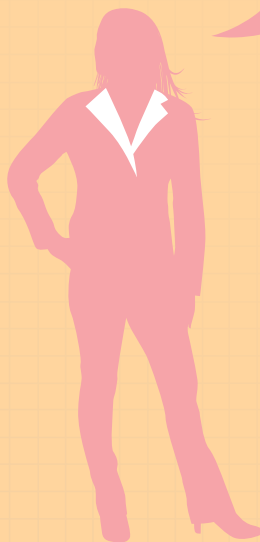
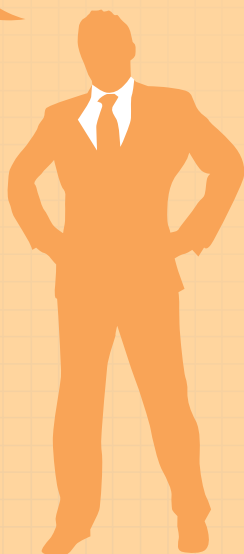
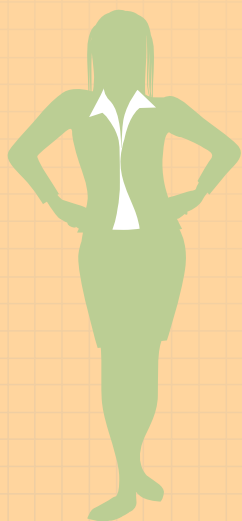
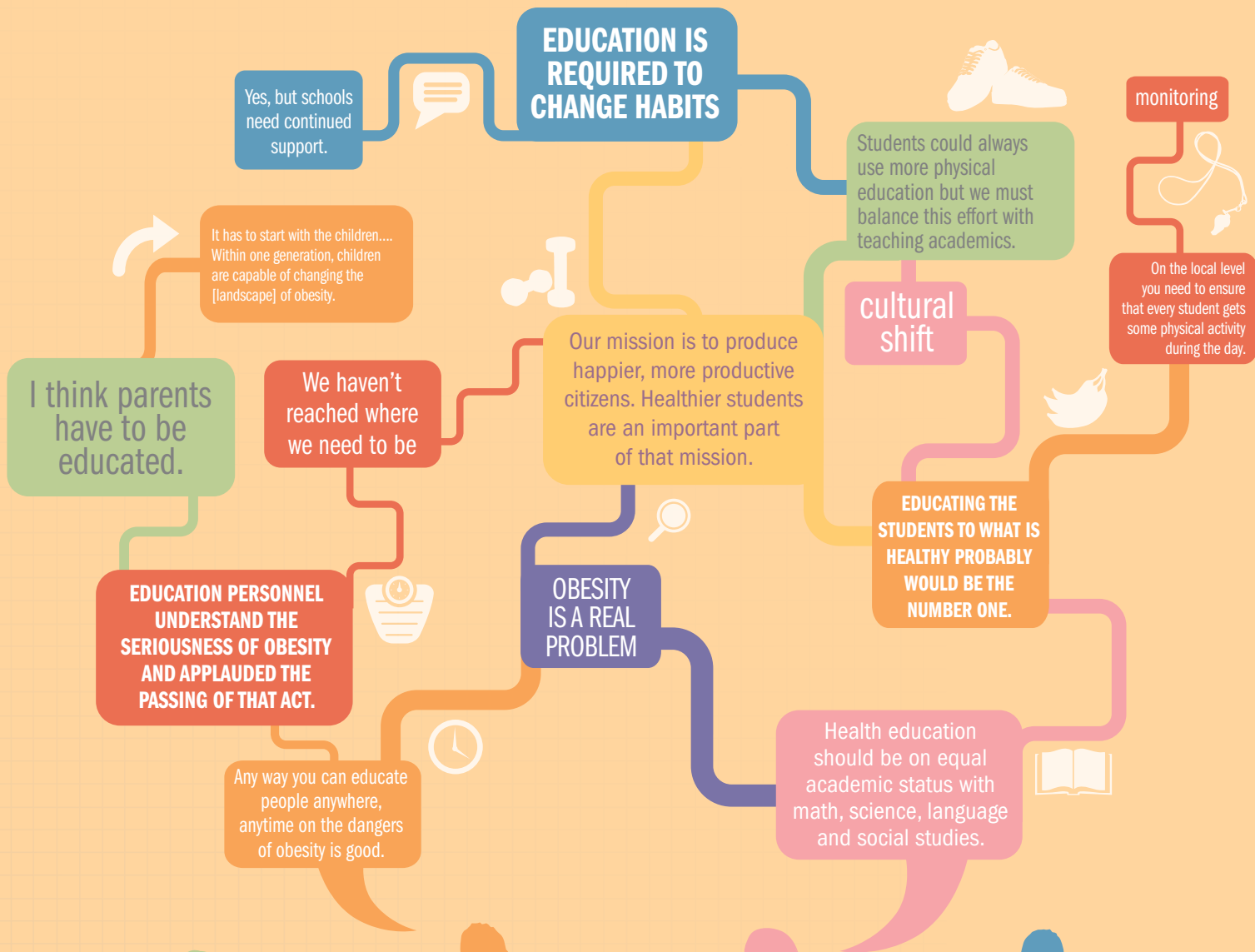


75 percent of physical education time being physically active, a decline from 73.8 percent in 2008. Nearly one-third (31.6%) of principals reported that students spend at least 180 minutes per week in physical education, up from 27.1 percent in 2008.

The Healthy Students Act requires schools to conduct fitness testing on students in the fifth grade and again in high school during the semester that the student takes physical education. School superintendents and school board members were asked whether the schools in their district conducted fitness testing. More than two-thirds of superintendents (68%), but less than a fifth (18%) of school board members answered affirmatively, while almost half (45%) of school board members said they did not know.

Change in physical activity between 2006 and 2010 as reported by the principal





Policy-Makers & State Officials

MISSISSIPPI STATE BOARD OF EDUCATION

Six members of the State Board of Education participated in the Year Three evaluation survey. All of them said they were “somewhat familiar” with the Mississippi Healthy Students Act. They did not express a consensus in ranking the three components of the Act. Three members said they believed increasing health education to be the most important component of the Act; two members said improving school nutrition was most important; one member was most strongly focused on improving physical education requirements. The three components of the Healthy Students Act are closely related to one another, perhaps resulting in difficulty prioritizing them. One board member highlighted the components’ close relationship: “I would probably say they are just about all three equal but health education. Educating the students to what is healthy probably would be the number one [place to start]. I would think that both are equally important but I would lead with the physical or nutritional side.”

All six respondents said that preventing childhood obesity is either important or very important for Mississippi. Unanimous recognition that childhood obesity is a significant problem in the state indicates that Board of Education members recognize both short and long term consequences at the individual and societal levels. Respondents rated current state policies designed to address childhood obesity as adequate to moderately effective, an acknowledgment that policies can still be improved.

Board members were asked how the Act was perceived by individuals with whom they interact. One Board member mentioned hearing only positive responses, while another said: “I think it would be appropriate to say that the education personnel understand the seriousness of obesity and applauded the passing of that Act.”

The Mississippi Board of Education is comprised of nine members appointed across various branches of government, including four at-large representatives, a teacher representative, an administrator-at-large representative, and one representative from each of the state’s three Supreme Court districts.

The Mississippi State Board of Health includes 11 members appointed by the governor for staggered six-year terms. The current board members include five physicians and two nurses, as well as representation from the academic and business communities.

Mississippi has six public health officers supervising a total of nine public health districts in a single, statewide public health system.

Board members were asked how the success of the Healthy Students Act should be measured. While their responses varied, all six members focused on determining the percentage of children who are obese and then following these children to determine if obesity rates decline over time. Five of six Board of Education members favored collecting information on children's height and weight to determine their body mass index (BMI). Board members also support conducting fitness tests of children in certain grades and sending both the fitness test results and information concerning their BMI home to parents. This support suggests that board members consider parents key stakeholders in their children's health and see value in providing parents with important children's health information.

The Board members were asked if the state of Mississippi has done enough to strengthen school policies. Responses ranged from “Yes, for now,” to “Yes, but schools need continued support,” to “Not sure,” and “Don't know.” One respondent said: “The state can only require so much, but on the local level you need to ensure that every student gets some physical activity during the day.” This response highlights the distinction between minimum requirements at the state level and how those requirements are implemented at the local level. All respondents said they believed it is important for schools to promote healthy lifestyles for students, faculty and staff, and that because students pay attention to faculty and staff behaviors and habits, it is important for them to set a positive example.

Board members were realistic about the time limitations affecting implementation. One respondent noted that “Students could always use more [physical] education but we must balance this effort with teaching academics. We have just so many minutes in each day.” They were also asked to what extent they believe schools in the state are implementing the minimum requirements of Coordinated School Health programs. Half (3) of the respondents said they believe schools in the state are doing an average job, two stated schools were doing better than adequate, and one respondent did not have an opinion.

Four out of six Board members stated they believe local government funds should be used to build and maintain places in the community where people can exercise. This finding suggests that a majority of respondents recognize the relationship between exercise and good health as a community issue. Respondents were then asked if schools should make facilities such as gym tracks, ball fields, and playgrounds available to community members after school hours. Five respondents indicated this would be a good idea, with one stating: “Where appropriate, yes. It cannot interfere with student activities but if there is available time, yes.” These responses indicate support for collaboration between schools and the communities

in which they are located, commonly referred to as “joint use agreements.” Making school gym tracks, ball fields and playgrounds available to community members could foster an important collaborative approach to healthy lifestyles and encourage partnerships between schools and local communities.

Respondents identified a broad array of other key groups as having a stake in decreasing childhood obesity in Mississippi. One Board member said the primary responsibility lies with parents, followed by daycare centers, youth recreation groups, restaurants and restaurant associations, and the health department. Another identified the state medical association as a primary stakeholder. In general, respondents understood obesity as a structural issue affecting a significant portion of the state’s population. They suggested it is a problem that presents many opportunities for local and state level involvement. Two respondents see the YMCA, churches, and other faith-based organizations as potentially playing a key role, given their involvement in activities for young people.

Board members reported that they access several key institutions for information regarding childhood obesity. These institutions include the State Department of Education, State Board of Health, Office of Healthy Schools, and the Department of Health and the Department of Human Services. Members identified several primary obstacles facing schools attempting to meet the requirements outlined in the Healthy Students Act, including: an emphasis on academics, time and money, traditional attitudes, cafeteria equipment, and getting buy-in on the importance of these requirements from administration, faculty, and parents. Although it was not explicitly stated, respondents seem to recognize that reducing childhood obesity will require coordinated efforts by school districts, community organizations and parents.

Overall, respondents recognized an association between implementing Coordinated School Health Programs in school districts and the academic performance of students. Additionally, respondents reported it is “moderately important” to “very important” to provide staff wellness programs. Respondents perceived the effectiveness of School Health Councils to promote healthy behavior as ranging from average to above average. “Education is required to change habits,” one respondent said. Another said, “I think parents have to be educated...obesity is a real problem.... Any way you can educate people anywhere, anytime on the dangers of obesity is good.” These responses indicate an awareness that obesity is symptomatic of the larger structural issues associated with poverty. As one respondent stated in conclusion: “Our mission is to produce happier, more productive citizens. Healthier students are an important part of that mission.”

MISSISSIPPI STATE BOARD OF HEALTH

Five of the 11 members of the State Board of Health participated in the Year Three evaluation of the Mississippi Healthy Students Act. Three of five respondents reported they are very familiar with the requirements of the Act and two reported being somewhat familiar. A majority of Board of Health members reported improving school nutrition as the most important component of the Act. Increasing health education came next, and increasing physical education was ranked last. Respondents unanimously reported the prevention of childhood obesity as an issue of paramount importance for the State of Mississippi. Four of five members believe the state is doing an adequate job of effectively addressing the problems associated with childhood obesity. One respondent reported state policies are less than adequate.

When queried about reactions to the Act by individuals and health department personnel with whom the board member interacts, one respondent said, “Well, it’s been positive and I think the people I’ve interacted with see it as a real need.” Other board members reported they had received little feedback or were not in regular contact with teachers or other administrative personnel. These comments indicate responses to the Act are related to the degree of contact a specific board member has with individuals familiar with it.

Board of Health members expressed varying opinions on how to measure the success of the Act. Like their counterparts on the Board of Education, several board members supported measuring body mass index and conducting fitness tests in order to determine decreases in obesity rates. Another board member added: “We can also measure the success of [the Healthy Students Act of 2007] by what [foods] we are serving our children.”

All board members reported that they see the State Department of Health playing a central role in obesity prevention. “The State Department of Education and the Department of Health are working together and trying to establish collaboration because we see a definite link,” one board member said. “I am just hoping there will be either some legislation or something in the way of the budget that can help facilitate...what we can do together.” This quote refers to a joint committee formed by both boards to promote dialogue between the two on school health issues. The quote highlights both the importance of collaborative work between agencies and the obstacles that agencies face in today’s climate of budget restraints and cutbacks.

When respondents were asked if they see a role for the local and/or district health department in promoting the Healthy Students Act, all participants said “yes,” with one adding that “All healthcare is ultimately local.” Another said: “Yes. I definitely see a role and the Communication Department [staff members] with the

Department of Health have pledged their support of this initiative. I think local health departments can do some things on the local level that we probably can't do on the state level because [local departments] are closer to the students. There should be a buy-in from all of the stakeholders to really make this a success." This comment clearly demonstrates recognition by Board of Health members that obesity prevention and reduction strategies require collaboration at the local and state levels.

Three out of five respondents reported they do not believe the state has done enough to strengthen school policies on nutrition, health education, or physical exercise. One participant said the state has done an adequate job and recommends "staying on course." As for health education, this respondent said: "Health education should be on equal academic status with math, science, language and social studies. It should be comprehensive and sequential." And another board member said: "I'm not sure the local schools are addressing this [nutrition, health education, and physical exercise]; maybe it's put on the back burner due to all the other concerns." This respondent highlighted the importance of teaching good eating habits from an early age, "thus eradicating obesity." These comments indicate that Board of Health members believe policies can be strengthened. They also indicate recognition that addressing childhood obesity is as important as academic achievement and has long-term benefits to both individuals and the prosperity of the state.

Board of Health members were more divided than Board of Education members on the issue of whether or not government funds should be spent to build and maintain places in local communities where people can exercise. Three of five respondents did not support the use of government funds, one indicated support, and one was unsure. "I think it's very, very important and I think there should be legislation for walking trails but I'm not real sure whether I think government funds should be used to promote exercising," one respondent said, emphasizing their opinion that exercise is a personal choice, adding that "Government funds should only be given as matching funds from the community."

Respondents were asked to share their insights on childhood obesity legislation. As indicated by the following quote, respondents see educating children at an early age as key to reducing and preventing obesity: "It has to start with the children.... Within one generation, children are capable of changing the [landscape] of obesity." This respondent mentioned certain local programs because through them "you're getting children to become aware of nutrition....The answer lies with the children."

DISTRICT HEALTH OFFICERS

When asked how familiar they were with the requirements of the Mississippi Healthy Students Act, four of Mississippi's six District Health Officers said they were "somewhat familiar" with the Act, one said "very familiar," and one respondent abstained. And when asked to rank the importance of Act components, half the District Health Officers reported improving school nutrition was the most important component of the Act. One respondent said: "We haven't reached where we need to be. We're still taking out [fryers] in some of the schools. [But] now we'll have an expanded health education as a result of this legislation." Less optimistic, one District Health Officer sees the problem as one of competing interests: "There is one program I know about that is very good but the rest of them, they want to do something but they're so distracted by this No Child Left Behind [program] that they don't know what to do."

District Health Officers reported generally positive reactions to the Healthy Students Act from individuals and health department personnel with whom they interact. Other District Health Officers indicated those with whom they interact express support for the Healthy Students Act but may not be actively involved with the programs it funds. As one respondent put it: "The school nurses are very positive. County [public health] nurses are positive but not directly involved. They're generally supportive of the concept but not fully engaged in the implementation." But according to another, health department personnel and other individuals "don't know anything about the Act." These responses suggest there are varying degrees of involvement by public healthcare professionals in the implementation and administration of programs designed to improve the health of Mississippi's school children. This gap in knowledge among public healthcare professionals may indicate an opportunity to incorporate information about the Act into in-service training programs or annual state meetings of healthcare professionals.

District Health Officers provided comprehensive ideas on how best to measure the success of the Healthy Students Act. Four out of six officers stated the need for "evidence-based" data that can be used to monitor and assess the effectiveness of programs designed to address childhood obesity. Among their answers: "I think we just have to bite the bullet and get parental consent... do a physical assessment each year of the student population...you might want to do a sample so [we] could follow some kids longitudinally." While collecting height and weight data to calculate body mass index levels provides a snapshot of student health, these data could be enhanced by incorporating an assessment of physical fitness levels and by monitoring students periodically throughout their educational careers. Other respondents suggested annual assessments to note changes, such as additional playgrounds and physical education teachers or the replacement of fryers with

ovens. One respondent suggested making unannounced inspections periodically at schools: “Check the amount of food that goes in the garbage and what kids are eating—monitor what’s left over at the end of the day...”

Respondents voiced a broad range of ideas about policies to bolster the Act’s effectiveness, including a policy that would require parents to become involved with parent/school child health reviews. Another suggestion included eliminating food as rewards. Still another respondent said that kids should have “at least an hour a day of physical activity and nutrition education” so that children could take that knowledge home to their parents. When asked if they envision district and county health offices playing a role in obesity prevention, respondents answered with a resounding “yes.” One respondent said: “The short answer is yes. The long answer is it depends on the individual health officer...It’s going to take a special kind of person to get involved in this.” Researchers were interested in how District Health Officers perceive the role of district and county offices in promoting the Healthy Students Act. Four out of five respondents stated local offices do have an important role to play, but respondents reported variation in the level of involvement of district and county staff. “[Involvement] ranges depending on the size of the health department and staff we have at that [particular] health department,” one respondent said, though other answers ranged from “pretty active” involvement to “really limited involvement” and “no specific involvement” at all.

Health Officers say they rely upon multiple resources to stay up-to-date on childhood obesity in Mississippi. The diversity represented in responses to this question indicates that District Health Officers are interested and committed to being well-informed.

Finally, District Health Officers were asked if there was additional information they wanted to share regarding their experiences and knowledge about childhood obesity legislation. One recommended summarizing the Healthy Students Act and releasing it to the public, adding that members of the medical community “should be adopting schools—monitoring what the school is doing, being present, and being on their councils.” Another said that while schools play an important role, real change must come outside the classroom: “Although the healthy schools initiative is great, it’s going to take more than that—[it’s going to take] a cultural shift to have a huge impact.” These responses demonstrate the need to educate and inform the public about the Healthy Students Act, to integrate mentors into programs who can serve as role models, and to continue the development of extensive partnerships between school districts, foundations and businesses.



The Family & Community

As found in Year Two, parents reported that they intend to improve nutrition and physical activity within their households. However, when specific questions were asked about eating patterns and physical activity, parents reported few changes.

PARENTS ACKNOWLEDGE NEED FOR HEALTHIER EATING, BUT LITTLE ACTION TAKEN

More than three-quarters of parents (78%) told surveyors that they were trying to change to healthier eating patterns. But when asked about specific foods and beverages served to the family, the pattern revealed was not a healthy one. The amount of vegetables served per week has decreased each year. Surveys indicate sodas were served more often per week in Year Three than in Year One. Both changes in consumption of vegetables and sodas were statistically significant.

Compared to national averages, Mississippians consume low amounts of fruits and vegetables and very high amounts of sodas. One of the reasons for the low consumption of fruit and vegetables may be limited knowledge about the amounts needed to promote good health. When parents were asked how many servings of fruit and vegetables a person should eat each day for good health, only 20 percent responded with the correct answer of five or more. Parents were also asked if they faced obstacles purchasing fresh fruit or vegetables, and 89 percent said “no.” Of the 11 percent who answered affirmatively, most explained that cost was the primary obstacle.



*VEGETABLES SERVED

4.8

DAYS PER WEEK

*statistically significant decrease



*SODAS SERVED

3.5

DAYS PER WEEK

*statistically significant increase



PARENTS' REPORTS ON PHYSICAL ACTIVITY REMAIN MIXED

In Year Three, almost half (48.3%) of parents said that their family's level of physical activity had increased in the past year, but responses about specific activities reveal little change.

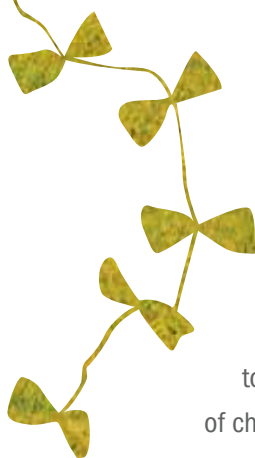
Parents told surveyors their children were physically active on average about two and one-half hours per day outside of school time. The most common reasons cited for children not being physically active at least 30 minutes every day outside of school hours were not enough time after school, involvement in other after school activities, lack of companions with whom their child could play, and their child's health.

Forty-three percent of parents reported public school facilities were available for the community to use outside of regular school hours, and more than half of parents said that they used them. The primary reasons provided for not using school facilities for physical activity were lack of time and transportation.

Over 70 percent of parents surveyed said there was a park nearby where their children could play, and 80 percent of these parents reported their children played there. The main reasons given for not using a park were lack of time, safety issues, and transportation.

The number of children walking or riding their bike to school continues to decline, from almost 10 percent in 2009 to 7 percent in 2011. By contrast, in 1969 approximately 42 percent of children walked or biked to school nationwide, while by 2001 this number had fallen to 13 percent.

A joint use agreement (or shared use agreement) is a formal agreement between a government entity—often a school, city or county—and another organization setting forth the terms and conditions for shared use of public property or facilities. It is used frequently to make school facilities available for sports and recreation activities outside of school hours.

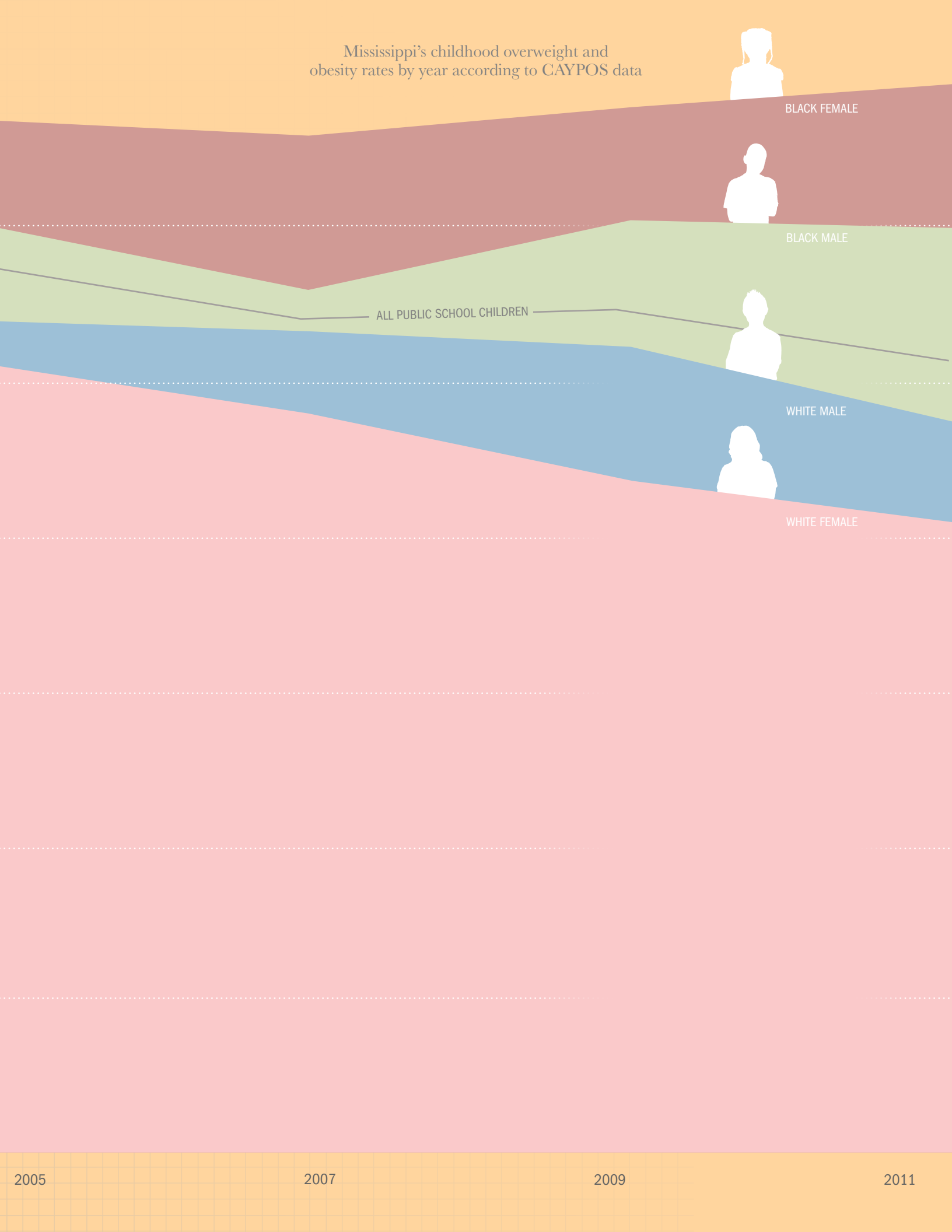




summarizing the findings



Mississippi's childhood overweight and obesity rates by year according to CAYPOS data



2005

2007

2009

2011

Summary of Findings & Discussion

This report summarizes the results of studies comprising Year Three of an evaluation project assessing the impact of the Mississippi's Healthy Students Act on childhood obesity. Findings from three years of data collection provide considerable information regarding trends in childhood obesity and changes occurring in the school and home environments that may contribute to those trends.

TRENDS IN PREVALENCE OF OVERWEIGHT AND OBESITY

The 2011 Child and Youth Prevalence of Obesity Survey (CAYPOS) offers both good and bad news. It documented a leveling off of obesity rates beginning in 2007, though changes were not statistically significant. In reviewing trends from 2005-2011, however, significant declines were found in certain student groups, especially the combined prevalence of overweight and obesity for elementary age children, which dropped from 43.0 percent in 2005 to 37.3 percent in 2011. Significant decreases were also seen in the combined prevalence of overweight and obesity for white students, but not for black students, and disparities between white and black students appear to be increasing.

HOME ENVIRONMENT

As in Year Two, parents reported that they intend to improve nutrition and physical activity within their households. However, when specific questions were asked about eating patterns and physical activity, parents reported few improvements. More than three-quarters of parents told surveyors that they were trying to change to healthier eating patterns. But when asked about specific foods and beverages served to the family, results showed the amount of vegetables served declined all three years, while soda consumption increased, and both changes were statistically significant.

PARENT PERCEPTIONS

Although the CAYPOS documents that approximately 41 percent of public school students were overweight or obese in 2011, only 15 percent of parents described their

child as overweight or obese. And though 95 percent of parents reported in Year Three that their child had a regular healthcare provider, only 13 percent had been advised by the provider that their child was overweight. Parent surveys reveal subtle shifts in opinions about school health. The percentage of parents who said that the role of the school in preventing childhood obesity is either very important or somewhat important dropped slightly from 94 percent in Year One to 90 percent in Year Three. As noted in previous reports, one component of coordinated school health that continues to show low implementation levels is family and community involvement. This finding may offer some insight into the lack of awareness of parents regarding specific aspects of the Healthy Students Act.

SCHOOL NUTRITION

Continued improvements were found in several areas related to nutrition, physical education, and health education. These include removing fryers, serving whole grain foods daily, serving a variety of fruits weekly, and a reduction in milk fat content. There are many measures, however, where progress has stalled or regressed, including providing nutrition education to at least 75 percent of students in the school, consistently serving fresh fruits and vegetables daily, training school food service personnel, and promoting school meal programs to families and staff. The improvements related to reducing the use of fryers, offering lower-fat milk, and increasing servings of whole grain foods directly follow stronger regulations set by the State Board of Education. In 2010, the Board clarified requirements for serving dark green and orange vegetables, required schools to submit a three-year plan to eliminate fried foods, increased requirements for whole grain products to at least one serving three days a week, and reduced maximum milk fat content to 1 percent.

Budget constraints likely influence those areas where schools have not made improvements, as many schools lack resources that would allow them to train school food service personnel or promote healthy foods to families and staff. That schools have performed well in terms of serving a variety of fruits and vegetables on a short-term basis, but poorly in doing so on a long-term basis, may also be attributable to lack of funding.

PHYSICAL EDUCATION AND HEALTH EDUCATION

The Year Two Report documented connections between students' fitness and academic performance, but few improvements were noted in the implementation of physical education in Year Three. Although 87 percent of principals reported full implementation of the minimum requirements for physical education and physical activity, two key measures showed reductions in the scope and intensity of physical education. "Physical education provided to at least 75 percent of students" dropped from 84 percent

to 77 percent of schools, and “students spending at least 75 percent of physical education time being physically active” dropped from 74 percent to 62 percent. Reductions occurred in the percentage of schools where at least 75 percent of students were receiving health education, and in the proportion of schools reporting that at least 75 percent of health education was being taught by certified teachers. These findings give further indication that the implementation of coordinated school health is stalling and in some cases regressing.

SCHOOL HEALTH COUNCILS

The Healthy Students Act requires each school to establish a school health council, which must conduct an annual health needs assessment, regularly report to the school board, and make recommendations for modifications to the school’s wellness policy. While 92 percent of schools have established a council, only 18 percent of schools meet all state requirements for its composition. The membership of the councils is dominated by principals and teachers. Fewer than half of the councils included representation from school food service staff or healthcare professionals, and fewer than 15 percent of school health councils included superintendents or school board members. The notable absence of this latter group may help explain the finding that only a little more than a third of school board members were aware of the these groups’ existence.

PERCEPTIONS OF POLICY-MAKERS

Interviews with members of the State Boards of Education and Health and with District Health Officers reveal continued strong support for childhood obesity prevention through implementation of the Healthy Students Act. At the same time, these policy-makers were realistic about resource constraints facing the schools and expressed an understanding that childhood obesity is symptomatic of broader community socioeconomic issues.

CONCLUSION

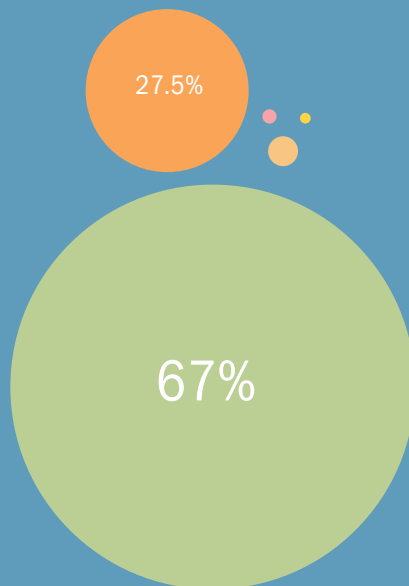
Schools seemed to have implemented the components of the Healthy Students Act that could be characterized as the “low hanging fruit.” Full implementation of the Act requires resources that are in short supply. The State Department of Education has provided considerable technical assistance to schools to help integrate health education and physical activity into the academic curriculum, but components such as family/ community involvement or fully functional school health councils take staff time to be effective. While it appears that positive outcomes have resulted from the changes mandated by the Healthy Students Act, it is clear that further work is necessary to ensure that health improvements are realized by all students and to counteract decades of negative trends. Mississippi is at a turning point and cannot afford to relax its commitment to childhood obesity prevention and coordinated school health.

Highlights from Year One

Question:

How important would you say is the role of the school in trying to prevent obesity?

PARENTS' RESPONSE



- very important
- somewhat important
- a little important
- not at all important
- don't know/not sure

The Year One Report presented results of initial data collection under this project. Overall, considerable progress was shown in implementing school wellness policies in response to the Mississippi Healthy Students Act. While most schools had formed local school wellness committees and school health councils, the need for more emphasis on the work of the councils, particularly in making required reports to school boards, was noted.

Middle schools led in implementing wellness policies, followed by high schools, then elementaries. Of 11 policy components, implementation was highest for food-safe schools, nutrition, and counseling/psychological/social services and lowest for staff wellness programs, healthy school environment marketing, and family/community involvement.

Statistically significant increases (2008 vs. 2006) were found in several nutrition policies:

- Percentage of schools with at least 75 percent of students receiving nutrition education (72.3% vs. 35.2%)
- Percentage serving at least three different fruits weekly (99.6% vs. 97.0%)
- Percentage serving whole grains (31.7% vs. 21.5%)

CDC surveys confirmed the improvements. In 2009, CDC recognized Mississippi as making the greatest strides of all surveyed states in removing unhealthy foods from its schools.

Also showing statistically significant increases were the percentages of schools reporting a physical education curriculum for at least 75 percent of students (84.2% vs. 57.1%), physical activity for at least 75 percent of physical education class time (73.8% vs. 64.1%), health education for at least 75 percent of students (75.9% vs. 38.4%), and at least 75 percent of health education taught by classroom teachers (61.1% vs. 38.2%).

Parents reported strong support for school policies requiring physical education and healthy eating but were not widely aware of specific changes at their child's school. Demonstrating keen understanding of the impact of childhood obesity on health and the economy, state and district policy-makers conveyed strong support for full implementation of the Healthy Students Act while recognizing the constraints schools face in fulfilling its requirements.

As statewide data suggested childhood obesity rates are leveling off, the gap between rates for white and nonwhite students showed a statistically significant increase for the first time.

Highlights from Year Two

The Year Two Report presented the results of continued data collected after the implementation of the Mississippi Healthy Schools Act. Results were generally positive, though mixed, with slow progress and regression in some areas that may have been a result of budget constraints and other challenges facing Mississippi's school districts.

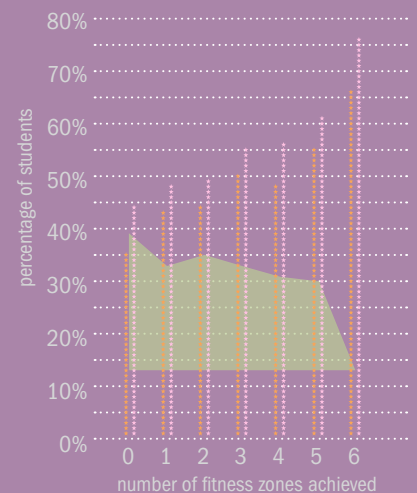
Schools offered less training for child nutrition program managers and food service staff in Year Two, and there were reductions in the promotion of healthy eating and family nutrition education. There was also a significant drop in the percentage of schools offering at least one fresh fruit or vegetable all five days of the week, to 36 percent. However, schools improved other categories related to nutrition, showing significant progress in reducing the amounts of fried foods served during school meals, an increase in the amount of whole grains served from 72% to 76%, and improved compliance with restrictions on the kinds of foods and drinks that can be offered in addition to school meals.




In the home environment, little change occurred, and some of the change that did occur was not positive. There was a statistically significant increase in the number of days on which parents served their families sodas, from 3.0 to 3.6. Year Two also showed that parents fail to recognize obesity in their own children, with only 14 percent saying they would describe their child as overweight and a mere 1 percent saying they would describe their child as obese. This trend may be exacerbated by a lack of accurate communication from healthcare providers about a child's weight status, with only 13 percent of parents reporting their child's healthcare provider had told them their child weighed too much. Parents did express the desire to receive more information from schools about their child's health, such as body mass index evaluations.

Particularly revealing in Year Two were findings about the connection between physical fitness and academic performance. Research included in the Year Two Report demonstrated a direct correlation between the fitness level of students and their test scores in math and language arts. There was also a correlation between low levels of fitness and absenteeism—students who were fit in more study areas missed fewer days of school.

School health councils were shown to be in place at most schools, but few parents were aware of their existence. Between Years One and Two there was a drop in the percentage of schools with parents on their councils. The percentage of superintendents reporting that each school in their district had a health council dropped, possibly a result of a similar fall in the percentage of schools with superintendents serving on their councils.

Impact of Fitness
on Academic Performance



-  % of students with an absentee record in excess of 8 days
-  % of high-achieving students in math
-  % of high-achieving students in language arts

Percentages of students with high achievement on the Mississippi Curriculum Test Version 2 (made up of language arts and math tests) increased with the number of fitness tests passed.

For example, 44% of the students who passed no fitness tests had high math achievement, compared to 76% of students who passed all six fitness tests. Likewise, only 35% of students who passed no fitness tests were high language arts achievers, compared to 66% of those who passed all fitness tests.

Project Director

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Methodology

All studies were approved by the respective university's Institutional Review Board.

PRINCIPAL SURVEY OF LOCAL SCHOOL WELLNESS POLICIES (USM)

This survey was conducted in 2006, prior to the Healthy Schools policy's enactment; for the purposes of this project, the survey was administered again in 2008 and 2010 and is scheduled to be repeated in 2012. As with the 2006 and 2008 surveys, all public school principals in the State of Mississippi were the target population for the survey. Due to the large number of topic areas and questions, the survey was designed in such a way that various components could be completed by different individuals (i.e. school foodservice manager or physical education instructor answered questions specific to their content area). However, the principal was ultimately responsible for assuring that the survey was completed and submitted.

The 2010 survey was identical to the 2008 survey, which was developed through input from several representatives of Mississippi Department of Education (MDE) Office of Healthy Schools, a review of recent state and federal legislation and scientific literature, and was set up to follow closely with the wording and format of the revised Local School Wellness Policy: Guide for Development. To ensure its validity, the 2010 survey was evaluated by content experts; however, no changes were recommended.

In October 2010, all principals and district superintendents were mailed a letter from the principal investigator and sent an e-mail from Dr. Tom Burnham, State Superintendent of Education encouraging their participation in the study. During the first week of November 2010, all principals and superintendents were sent an e-mail from the researchers. The e-mail explained the purpose

of the survey and provided a link to the online survey (created through QualtricsTM). By the first week of December, researchers were able to identify schools that had not completed the survey; yet, no data directly related to the schools could be identified. Those school principals were then contacted personally via phone to determine whether assistance would be needed in order for them to complete the survey. Data collection continued until January 2011.

For each of the 11 policy components, the total number (n) and percentages (%) of responses for each category were tabulated. Cross tabulations of school grade level to implementation were also conducted. The percentages reported and used for comparison to the 2006 and 2008 surveys are “valid percents” which exclude missing data. For survey items that were asked in 2006, 2008, and 2010, statistical significance of difference was determined through the Chi-square test for trend. Comparisons were considered significantly different if the p-value was less than 0.05.

COMMITTED TO MOVE EVALUATION (USM)

Fitness data were collected from 6,022 Mississippi public school children in grades 3-8. Once these student records were matched by the MDE with student records within the Mississippi Student Information System (MSIS), a data set consisting of 3,398 students was produced. From these, 351 matched records did not include associated academic scores and/or behavior performance information. Further, 55 records were duplicated. Hence the final analysis included 2,992 records.

Demographic information related to gender, race, grade level, and lunch status based on the 2007-2008 academic year was obtained through the MDE's Office of Management Information Systems. This information was merged with fitness scores, behavioral performance measures, and academic test scores to produce a comprehensive analysis for each student.

To objectively assess physical fitness status, researchers used the Fitnessgram, a physical fitness test battery developed by the Cooper Institute. This test battery is used in tandem with the Physical Best curriculum developed by the National Association for Sport and Physical Education (NASPE) as a guide for best practice for implementing health-related physical fitness in the K-12 physical education setting. The Fitnessgram test battery has six suggested tests

for the measurement of health-related fitness for children in grades 3-12: 1) the Pacer test for the measurement of aerobic capacity, 2) the curl-up test for the measurement of abdominal strength and endurance, 3) the 90 degree push up for measurement of upper-body strength and endurance, 4) the trunk lift for the measurement of back extensor strength and flexibility, 5) the backsaver sit-and-reach to measure hamstring flexibility, and 6) skinfold assessment for the measurement of body composition. An alternative to the skinfold assessment, as provided in the reference guide, is the BMI, which was chosen for this study to ensure that there were no infractions of Mississippi school district policies. Each student's BMI was further categorized into one of the four weight status categories based on the 2000 Centers for Disease Control and Prevention (CDC) BMI-for-age growth charts: underweight, healthy weight, overweight, or obese.

The Mississippi Curriculum Test, Version 2 (MCT2), which is administered annually to all Mississippi students in grades 3-8 in the areas of language arts and mathematics achievement, has four categories of achievement: minimal, basic, proficient, and advanced. For the purposes of this study, the levels were further grouped into two categories: low academic achievement for minimal and basic scores, and high academic achievement for proficient and advanced scores.

MDE collects data on each student's attendance and disciplinary incidents on each student in K-12. For this study, attendance was measured by the number of days students were absent and categorized into three groups: 0-3, 4-7, and 8 or more days missed during the academic year. For the purpose of this study, disciplinary incidents that resulted in students receiving either in-school suspensions or out-of-school suspensions were used for categorization into one of two groups: those students with at least one reported incident or those with no reported incidents.

Due to the sensitive nature of using and merging student records, a memorandum of understanding (MOU) regarding the protection of the data was established between MDE and Principal Investigator at The University of Southern Mississippi. All data were handled electronically and once merged, were password protected.

In November 2007, 25 elementary and middle schools from across the state of Mississippi received funding from The Bower Foundation as part of the

Health is Academic Quality Physical Education Program. The gender composition of these schools (52.4% male vs. 47.6% female) was similar to the rest of the state for gender (50.9% male vs. 49.1% female). The racial composition of the sample (52.3% white, 42.8% black, 4.9% other) was somewhat different than the rest of the state (46.4% white, 50.6% black, 3.0% other). As for economic status, the percentage of students who received free or reduced lunch in the study sample (63.7%) was comparable to the rest of the state.

As part of their funding, each school received the Physical Best Curriculum and the Fitnessgram software. In January 2008, all schools sent three representatives (a school administrator, a physical education teacher, and a school health champion selected by each school) to training sessions on the curriculum and software. Training on the Physical Best Curriculum was conducted by a certified NASPE trainer and training on the use of the Fitnessgram software was provided by a certified Physical Best/ Fitnessgram Instructor from the Cooper Institute. During the remaining months of the spring semester of 2008, 22 of the 25 schools were able to implement the curriculum in their PE classes, conduct the fitness tests, and collect, record, and submit their data through the Fitnessgram software. Test administration was handled by the physical education teachers at each school using the procedures taught at the Fitnessgram training and found in the Fitnessgram/Activitygram Test Administration Manual (2007).

The participating PE teacher input all demographic, biostatistical, and fitness data into the Fitnessgram software as instructed in the training sessions and then exported the data files directly from the software as either a comma delimited file or zip file for use in Excel®. All data files submitted by the schools were checked to determine if the required information was included in the submitted data. The researchers then created an Excel® Fitnessgram template from the exported data to confirm that necessary variables had been properly recorded and reported. Consequently, several schools were asked to resubmit data in the correct format and to make sure all required information was included. Each record included student name, date of birth, gender, grade level, and fitness test scores. Once the data submitted by the 22 schools were in the correct format with all of the required information, the fitness data were reformatted into interval data as an overall fitness score. The overall fitness score was

calculated based on Fitnessgram healthy fitness zones, which are criterion-referenced standards developed by Fitnessgram. These standards are considered to be the minimal level of performance on the test associated with good health or decreased risk. In the Fitnessgram software, students are given a score of “needs improvement” or “healthy fitness zone” based on whether the cutoff score is met. BMI, however, has a minimal and maximal score within which the student must fall to be considered in the healthy fitness zone. For this test, students’ BMI scores were categorized as too low, healthy fitness zone, or needs improvement. To appropriately score these measures, students’ tests had to fall within the given range based on age and gender. Student overall fitness scores ranged between zero and six as determined by the number of healthy fitness zones they attained on the test battery.

Once data were reformatted, all schools’ data were compiled into one file. This data file was submitted to the MDE’s Office of Management Information Systems. The fitness data from spring 2008 were merged with academic records within the Mississippi Student Information System. The data merged included race, free and reduced lunch status, academic achievement scores, and school behavioral factors.

SAS 9.2 (SAS Institute Inc, Cary, NC, USA, 2009) was used for all statistical analysis. Chi-square analyses were used to assess the statistical significance of observed differences in high academic achievement and unfavorable behaviors (i.e., absence and disciplinary incident) according to any selected characteristics. Multiple logistic regression models were used to identify factors associated with high academic achievement and unfavorable behavior. Adjusted odds ratio (aOR) and 95% confidence interval (CIs) were obtained in each subgroup relative to a referent group while controlling for students’ gender, race, grade, SES/lunch status, and physical fitness. An aOR was considered statistically significant if its 95% CI did not include one (1.0). Reported p-values are two-sided.

MISSISSIPPI SCHOOL NUTRITION ENVIRONMENT EVALUATION DATA SYSTEM (MS NEEDS) (UM)

Evaluation Design

An evaluation protocol was developed to assess the adoption of the Mississippi Healthy Students Act in the schools’ nutrition environment. The Act’s criteria were divided into “Policy Points” that were used to measure schools’ compliance with the Act. The evaluation was conducted through interviews,

observations, and the manual gathering of information for the food and beverage venues within each school's child nutrition program and school grounds.

The mission of MS NEEDS was to help organize and better understand through meaningful indicators:

- The implementation status of the Act throughout schools in Mississippi
- Ways the Act has impacted changes in the MS school nutrition environment
- Barriers/challenges and successes to implementation of the Act

Subjects & Sampling

A total of 156 schools, 52 per school level (elementary, middle, and high school), were randomly selected to participate in year 3 of this study. Of those, 150 agreed to participate (participation rate 96%), of which there are 5 multi-level schools: 1 elementary/middle school, 1 elementary/high school, and 5 middle/high schools. According to the simple random sampling design of the study, the elementary/middle school is used both in elementary school category and middle school category. Likewise the elementary/high school and middle/high schools are used in both respective school categories. This resulted in a final breakdown of 49 elementary schools, 50 middle schools, and 51 high schools for analyses.

Instruments

Interview Form—Each school's Child Nutrition Program (CNP) Manager provided information about nutrition-related policies adopted by the school and how those policies had been implemented to date. Verbal responses to both quantitative and open-ended qualitative questions, as well as data pulled from written documentation were recorded on the Interview Form. Written documentation provided by the CNP manager included the following: production records and lunch and breakfast menus from four full weeks in September, the school Wellness Policy, food safety policies, other school nutrition-related policy documents, and CNP staff training records. Most policy points of the Act were covered on the Interview Form.

Observation Form—Data about schools' implementation of the Act was collected on a single day through observation. Data recorded on the Observation Form primarily documented evidence of a school's compliance within the kitchen

and cafeteria settings as observed during the lunch periods. Example indicators include the following: the types of fruits, vegetables, and beverages served at lunches; whether whole grain and "0 trans-fat" foods were sold; if and how competitive foods were sold; evidence of CNP staff using written documentation for HACCP food safety plans; and ratings of the general atmosphere in terms of promoting healthier food options. Detailed information about specific food items sold were recorded on accompanying forms: the Reimbursable Meal, Vending, and Extra Food Items Foods forms. All of these forms were incorporated into the Observation protocol.

Reimbursable Meal Form—Data collectors documented the specific food and beverage items sold as part of the reimbursable lunch meal on the observation day. For each item they recorded a brief description, whether it was available only with the meal or if extra portions were for sale, whether the item was part of the original menu or was a substitution, and whether substitutions were reanalyzed for nutrients. In addition, if extra servings of the item were available after purchasing the meal, data collectors noted the price of the extra serving and its size in comparison to the portion served with the meal.

Extra Food Items Foods Form—Data were also collected on foods and beverages sold as extra food items during lunch periods. Data collectors recorded a description of each item, whether an item was available for sale without having purchased a meal, the item's price, and either the number of calories or enough information to determine caloric content at a later date.

Vending/School Store Form—A form was completed for each vending machine and/or school store in the school. First, data collectors documented general information about the machine or store itself including hours of operation, location, group responsible for the machine or store, and if a machine was in the faculty lounge, and whether or not students had access. Then item specific details were noted, such as manufacturer, product name, flavor, size, number of slots (vending machines only), and price.

Procedures for Data Collection

The evaluation tool was pilot tested for clarity and validity in a local elementary and high school (who were omitted from the study) resulting in some revisions. Data collection began in February 2009.

Ten consultants (data collectors) with nutrition and/or educational backgrounds were recruited to collect data in the schools using the MS NEEDS evaluation tool. Each of the data collectors were trained in two schools before evaluating a school on their own. The program coordinator was responsible for arranging school visits through communication with the CNP district director and the data collector assigned to the school. Once arrangements were made to visit the school, a document with all the requested written documentation was faxed or emailed to the CNP district director. The written documents were requested to be at the school when the data collector met with the CNP manager. Interviews were conducted between October 2010 and May of 2011. Upon arrival at the school, data collectors began the evaluation process by meeting with and interviewing the CNP manager. The interview took approximately 60-90 minutes. Once the interview was completed, data collectors used their time to gather data on the competitive food venues such as vending machines and/or school stores. The observation evaluation was conducted during the lunch periods to observe the reimbursable meal and extra food items item sales.

The evaluation took an estimated time of five to six hours. Upon completion of the evaluation, data collectors mailed or delivered the evaluation document to the program coordinator. Once the evaluation tool was received it was reviewed for quality assurance. Any missing data or data that was unclear was investigated by the program coordinator with assistance from the data collector who evaluated the school. Once data was reviewed and validated it was ready to be entered into the MS NEEDS database program.

Upon completion of data entry for all 150 participating schools, the data was forwarded to biostatistician collaborator for data analysis.

Analyses

Basic descriptive statistics are presented in this report. Proportions and frequencies are presented for all schools and by school level – elementary, middle, and high school. For variables that have missing values, valid percentages are reported. One-way analysis of variance (ANOVA) or Chi-Square test was used, as appropriate, to determine if any significant differences existed between school levels on the various outcomes.

SURVEY OF PUBLIC SCHOOL SUPERINTENDENTS (MSU)

This survey was conducted by the Wolfgang Frese Survey Research Laboratory of the Social Science Research Center (SSRC) at Mississippi State University. The population included 149 school superintendents. The data collection period spanned from late July to late August 2010. There were 104 superintendents who completed the survey for a response rate of 70 percent. Given that this was not a random sample, margin of error must not be calculated. The data from this survey represent a census with a minimal non-response rate.

SURVEY OF SCHOOL BOARD MEMBERS (MSU)

Researchers were given permission by Dr. Michael Waldrop, Executive Director of the Mississippi School Boards Association (MSBA), to distribute the surveys at their statewide meeting of school board members on February 23, 2010. Surveys were included in the packet of each individual school board member, with a cover letter to explain the purpose of the survey and provide a self-addressed envelope that individuals could use to insert the completed survey. A member of the research team was in attendance to answer any questions and to collect the surveys at the end of the meeting.

After collecting the surveys from the February 2010 meeting, the response rate was less than optimal and plans were made to send out surveys to each of the public school district offices, requesting that any school board members who had not had the opportunity to complete the survey be given the survey and a self-addressed, stamped envelope to return the completed survey to the SSRC research team. Again, the response rate was less than expected and written reminders were sent to school district offices in an attempt to increase the response rate. For a final appeal in 2010, two members of the research team attended the April 2010 Mississippi School Boards Association meeting and requested that any school board members who were in attendance, but had not completed the surveys, do so at this meeting. The final response rate was 33.94% for school board members (251/739). The multiple attempts resulted in an improvement over Year 1 (2009) response rate of 20.8%.

SURVEY OF PARENTS AND ADOLESCENTS (MSU)

Surveys were conducted by the Wolfgang Frese Survey Research Laboratory of the Social Science Research Center at Mississippi State University. The Mississippi Department of Education provided the telephone

numbers of all parents in the state of Mississippi who had at least one child enrolled in a public school during the 2010-2011 school year. From this database of approximately 491,540 telephone numbers, a random sample of 3,641 numbers was drawn. The data collection period spanned from early February, 2011 to early July of 2011.

As in Years 1 and 2, adolescents surveyed in Year Three were 14 years of age or older, and a parent had given permission for the survey to be conducted. In 2011, a total of 210 adolescents answered questions about nutrition standards and vending machines, physical education and physical activity, and health education and health knowledge, compared to 260 adolescents in 2010 and 150 adolescents in 2009. The sampling error for the total dataset (binomial response option with 50/50 split) is no larger than + or - 3.5% with a 95% confidence interval. Telephone numbers were dialed a maximum of eight times. There was a cooperation rate of 55.9%.

INTERVIEWS WITH STATE POLICY-MAKERS (MSU)

The 2011 interview guide was consistent with the interview guides used in 2010, and as in 2010 and 2009, these were developed in concert with staff from the Center for Mississippi Health Policy and the SSRC research team. The full interview guides are attached (see Appendix A). A mixed-method of telephone, written interviews via email, and face-to-face interviews were conducted from February 2011 through July 2011.

All telephone and face-to-face interviews were digitally recorded and were conducted by SSRC researchers. Key Mississippi policymakers, including members of the State Board of Education, State Board of Health and District Health Officers were asked about their perceptions and opinions regarding the Mississippi Healthy Students Act. Respondents were asked a series of open-ended questions concerning how the three major components (nutrition, health education, and physical education) should be prioritized, their views on the roles of various district offices as related to the Act, perceptions of support by local constituents, opinions regarding how well the components of the Act have been implemented, opinions regarding the need for additional policies to increase the health of Mississippi school children, and appropriate methods of measuring the success of the Act. Interviews were transcribed and then analyzed by associates affiliated with the SSRC. Researchers analyzed each transcript qualitatively

to identify patterns and their underlying meanings within each group of key stakeholder interviews. Qualitative research methods are particularly useful for obtaining information about issues that cannot be directly observed. Specifically, this method of analysis is particularly appropriate for identifying and understanding perspectives, opinions, and experiences in exploratory research. For this evaluation, researchers were interested in the ideas, feedback, and perspectives from an array of policymakers regarding the implementation of the Act.

The researchers noted key themes which emerged from the data. Themes were identified as a response topic that was mentioned by more than one respondent in the group, and mentioned on one or more question. Researchers also identified key quotes that reflected the themes identified in the analyses. The qualitative portions of each interview were organized by group and topic. Each respondent's ideas and opinions were then categorized by themes. Careful review of the interviews revealed areas of consistency with past reports (Year One and Year Two), as well as some changes. The data was then systematically arranged accordingly which enabled the researcher to discuss the findings in this report. The research noted key themes that emerged from the data.

The qualitative analysis component of this report includes analysis of interviews comprised of six Board of Education members, five State Board of Health members, and six District Health Officers. Each interview guide also had quantitative questions, and these responses were tabulated and when appropriate were compared to Year One and Year Two findings (2009 and 2010), respectively.

CHILDREN AND YOUTH PREVALENCE OF OBESITY SURVEY (CAYPOS) (USM)

Similar to the 2005, 2007, and 2009 CAYPOS, in the 2011 CAYPOS, the sampling frame consisted of 467,941 students in 892 public schools offering kindergarten or any combination of grades 1 through 12 in Mississippi. The sample design was a two-stage stratified probability design. The first stage included the random selection of 95 schools. A systematic sample of schools was drawn with probability proportional to the enrollment in grades K - 12 of each school. In the second stage of sampling, classes were randomly selected within the sampled schools. Classes were selected using equal probability systematic sampling. All eligible students

in the selected classes were asked to participate in the survey. The sample was designed to yield a self-weighting sample so that every eligible student had an equal chance of selection, thereby, improving the precision of the estimates.

As in each of the previous years, the weighting process was intended to develop sample weights so that the weighted sample estimates accurately represented the entire K-12 public school students in Mississippi. Every eligible student was assigned a base weight, which was equal to the inverse of the probability of selection for the student. Adjustments were made to the initial weights to remove bias from the estimates and reduce the variability of the estimates.

This CAYPOS (2011) was conducted in April 2011. As with all of the previous CAYPOS, once selected schools agreed to participate and classes were chosen, measuring equipment (i.e., digital scales and stadiometers) and passive consent forms were delivered to the schools. Each school designated a school nurse who was responsible for collecting data and had been trained on the use of equipment. Two or three days before data collection began, students in the selected classes were read a prepared paragraph containing information about the study. Each student was then given a passive parental consent form to take home to parents or guardians. If a parent did not want his or her child to participate in the study, the parent was instructed to indicate such on the form, sign it, and have the child return it to the teacher. Prior to the collection of height and weight, the nurse would check with the teacher to determine if any students returned a signed form. Students who returned a signed form did not participate in the study. There were neither consequences for nonparticipation nor rewards for participation.

As with all the previous CAYPOS, the protocol for making measurements required that the weight scale be placed on a hard, smooth surface; carpeted areas were not to be used. The scale was calibrated to zero before use and recalibrated after every 10th student. All students were weighed and measured in a location where the information gathered would be confidential.

As in the previous CAYPOS, nurses were sent an email with a link to a secure website developed and maintained by Qualtrics, Inc. to record and submit their data. These data were compiled in aggregate form by the Qualtrics software and made available

in excel format to the study authors for analysis. Body Mass Index (BMI) was computed for each responding student based on height (in meters) and weight (in kilograms). The height in feet and inches was first converted to meters. The weight in pounds was then converted to kilograms. BMI was calculated using the SAS program, gc-calculate-BIV.sas as follows: $BMI = \text{Weight (in kg)} / [\text{Height (in m)}]^2$. BMI values were checked to ensure that the results were biologically plausible, using the limits developed by the Centers for Disease Control and Prevention (CDC). BMI percentiles were computed using the SAS program, gc-calculate-BIV.sas.

SUDAAN 10.0 was used to calculate weighted estimates and standard errors, and Proc Crosstab procedure was used to compare prevalence of child overweight and obesity among different subgroups for the 2011 CAYPOS. The differences between summary statistics were considered statistically significant if the p-value from Chi-square test was less than 0.05. For comparisons of subgroups with more than two levels (e.g., obesity by gender and race, etc), differences between estimates were considered statistically significant if their associated 95% confidence intervals did not overlap. In addition, SUDAAN logistic regression procedure was used to investigate linearity of the longitudinal trends in overweight and obesity. Since elapsed time was the same between successive CAYPOS surveys, the logistic regression used orthogonal variables to model longitudinal trends while controlling for students' gender, race, and grade level. The linear coefficient (-3, -1, 1, 3) and quadratic coefficients (4, -4, -4, 4) were assigned over the years 2005, 2007, 2009, and 2011, respectively.

Endnotes

1 Centers for Disease Control and Prevention. (2009). Availability of less nutritious snack foods and beverages in secondary schools – selected states, 2002-2008. Morbidity and Mortality Weekly Report. October 9, 2009, 59(39);1102-1104

2 Blom LC, Alvarez J, Zhang L, & Kolbo J. (2011). Associations between fitness and academic and behavior performance among Mississippi public school students. ICHPER-SD Journal of Research 6(1)



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