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Perceptions of School Nutrition Standard Rollbacks by Child Nutrition Program
Directors in Mississippi

by
Payton Syndell Meadows

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford, MS
April 16, 2020

Approved by

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*In dedication of
My dad, who loved and supported me through my entire life. Without you I would not be who I
am today. I am forever grateful, love you!*

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ABSTRACT

PAYTON SYNDELL MEADOWS: Perceptions of School Nutrition Standard Rollbacks by Child Nutrition Program Directors in Mississippi

(Under the direction of Georgianna Mann)

The Healthy, Hunger-Free Kids Act of 2010 established national nutrition standards for school meals, these standards included mandates for whole grain serving requirements and sodium and flavored milk restrictions. In 2017, the U.S. Secretary of Agriculture relaxed the standards allowing schools to serve 1% flavored milk, half of grains offered as refined grains, and halted reduction of sodium standards. This study investigated perceptions of child nutrition program directors in Mississippi regarding these changes. An online survey was used to assess Mississippi child nutrition program directors' perceived barriers to implementation of the original standards and their perceptions of the recent changes on their meal programs. With the implementation of the Healthy, Hunger-Free Kids Act of 2010 most (70%) child nutrition program directors reported decreased revenue. Barriers that schools faced in implementing the original standards included children's food preferences, training, and availability of compliant foods through vendors. The most common response noted was children's food preferences as the biggest barrier to reaching sodium targets. Since the relaxation of federal school nutrition standards, child nutrition program directors noted increases in revenue and meal quality. Overall, the relaxed standards were viewed positively by child nutrition program directors.

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LIST OF ABBREVIATIONS

NSLP: National School Lunch Program

SNA: School Nutrition association

HHFKA: Healthy Hunger Free Kids Act of 2010

OVS: Offer vs. Serve

INTRODUCTION

The Child Nutrition Act of 1966 established nutrition standards for the meals served through the National School Lunch program (NSLP). Justification for this addition was based on the connection between proper nutrition, childhood development, and academic performance (Food and Nutrition Service, 2010). In 2008, an Institute of Medicine committee evaluated school lunches and deemed them unhealthy: saying that lunches lacked fruits and vegetables and contained excessive calories (Stallings et al., 2009). Bringing to the forefront the need to address school nutrition standards, therefore the Healthy, Hunger-Free Kids Act (HHFKA) (Healthy, Hunger-Free Kids Act, 2010) established nutrition standards that followed the guidelines set forth in the *Dietary Guidelines for Americans 2005* and Institute of Medicine suggestions (U.S. Department of Agriculture, 2012) (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2005). They reached these suggestions by reducing the sodium and fat in school meals while increasing the availability of whole grains, fat-free or low-fat milk, fruits, and vegetables and staying in the calorie requirements for children (U.S. Department of Agriculture, 2012). As a result of the HHFKA, nutrition standards were implemented for school meals by 2012 and by 2014 for all foods sold in school (Food and Nutrition Service, 2012). The School Nutrition Association (SNA) published their 2017 position paper encouraging congress to change the school nutrition standards based on the difficulties schools participating in the NSLP had in meeting them (School Nutrition Association, 2017). On May 1, 2017 Secretary of Agriculture Sonny Perdue announced that U.S. Department of Agriculture (USDA) would relax the current standards. The “USDA Commitment to School Meals” allowed schools participating in

the NSLP to serve 1% fat flavored milk as well as relaxed the sodium standards. Schools participating in the NSLP only need to meet the requirements in the previous sodium target one and not continue to the incremental targets for the sodium requirement. States will now be able to grant more waivers to schools facing difficulties serving all grains that are at least 51% whole grain, allowing them to waive that standard temporarily. Secretary Purdue hoped the increased flexibility would help to balance the nutrition of school meals with palatability and increased participation (U.S. Department of Agriculture, 2018). For many students on free or reduced price lunches, the school meals could be their primary source of nutrition. Mississippi has highest rate of students on free or reduced price lunch the school lunch topic is very significant in this state (National Center for Education Statistics, 2017).

The goal of this study was to examine child nutrition program directors' perceptions of the impact of the implementation of HHFKA standards. Child nutrition program directors are responsible for directing school meal programs, so their perceptions of nutrition standards provide insight into the challenges they face in meeting the standards in daily practice.

CHAPTER 1: LITERTURE REVIEW

School lunches are a prominent concern today as approximately 29.8 million students eat a school lunch each day (Food and Nutrition Service, 2020). Participation in federally-funded school meals is associated with a lower body mass index among low-income children and can also reduce chances for food insecurity (Food Research and Action Center, 2020). Research shows that students who participate in the school meal programs consume more milk, fruits, and vegetables during mealtimes and have better intake of certain nutrients, such as calcium and fiber, than nonparticipants (Clark, 2009). Children experiencing hunger are more likely to be hyperactive, absent, and tardy, in addition to having behavioral and attention problems more often than other children (Food Research and Action Center, 2020).

National School Lunch Program

In the 1930's, the rising number of impoverished children in the United States gained attention and this issue was brought to the public agenda leading to 15 states authorizing local school districts to provide meals for children in 1937 (Gunderson, 2014). In 1946, after seeing promising results from the school lunch efforts, the federal government began providing funding continuously for school lunches through the approval of the National School Lunch Act signed by Richard B. Russell (*Richard B. Russell National School Lunch Act*, 1946). This act has been amended many times, among the most notable being the 1968 amendment which did not allow requirements to come into conflict with accommodating special dietary needs (Gunderson, 2014) and the Healthy, Hunger-Free Kids Act of 2010 (HHFKA) (Food and Nutrition Service, 2013).

Establishment of the Nutrition Standards

The Child Nutrition Act of 1966 established nutrition standards for the meals served through the National School Lunch Program (NSLP) and established a non-profit school breakfast program. Justification for these two additions were based on the connection between proper nutrition and childhood development and academic performance (Child Nutrition Act of 1966). The Child Nutrition Act of 1966 was signed to extend and expand the National School Lunch Act to give the Secretary of Agriculture the means to implement nutrition standards for school lunches to safeguard the health of the nation's children (Child Nutrition Act of 1966). In 2008, an Institute of Medicine committee evaluated school lunches and deemed them unhealthy saying that lunches lacked fruits and vegetables and contained excessive calories, concluding a change in nutrition standards was warranted (Stallings et al., 2009).

Further nutrition standards were implemented with the USDA program to fight childhood obesity called "Let's Move", which was endorsed by First Lady Michelle Obama (*Let's Move!*, 2010). Through this initiative, a White House Task Force on Childhood Obesity was created and suggested firmer nutrition standards for school lunches. The HHS established nutrition standards that followed the guidelines set forth in the *Dietary Guidelines for Americans 2005* and Institute of Medicine suggestions by reducing the sodium and fat in school meals while increasing the availability of whole grains, fat-free or low-fat milk, fruits, and vegetables, all the while staying in the calorie requirements for children (U.S. Department of Agriculture, 2012). As a result of the HHS, nutrition standards were implemented for school meals by 2012 and by 2014 for all foods sold in school including snacks (Food and Nutrition Service, 2012). Schools

must offer fruits and vegetables at every meal and students are required to take at least one serving at each meal. The standards included the requirement that half of the grains served would be whole grain-rich (51% whole grain) upon immediate implementation of the rule and that all grains would be whole-grain rich two years post-implementation (Food and Nutrition Service, 2012). Schools were given calorie minimum and maximum standards and sodium targets to meet which are outlined in Table 1. Additionally, meals are not allowed to contain *trans*-fat and no less than 10% of calories can come from saturated fat (Food and Nutrition Service, 2012). For beverages, plain milk is allowed to be 1% however, all flavored milk must be fat-free. There is to be free, palatable, drinking water at meals, but this requirement can be carried out in a variety of forms such as water fountains or coolers accessible to the students (Food and Nutrition Service, 2012).

Table 1

*Lunch Meal Patterns for National School Meal Program according to the Healthy
Hunger Free Kids Act of 2010*

Lunch Meal Patterns			
Meal Pattern	Amount of Food Per Week		
Grades	1-5	6-8	9-12
Fruits (cups)	2.5	2.5	5
Vegetables (cups)	3.75	3.75	5
Dark Green	0.5	0.5	0.5
Red/Orange	0.75	0.75	1.25
Bean/Peas(Legumes)	0.5	0.5	0.5
Starchy	0.5	0.5	0.5
Other	0.5	0.5	0.5
Additional Vegetables to Reach Total	1	1	1.5
Grains (oz. eq.) 100% whole grain rich	8-9	8-10	10-12
Meats/Meat Alternatives (oz. eq.)	8-10	9-10	10-12
Fluid Milk: Fat free, non-flavored milk only, Plain non-flavored milk may be served as 1% fat			
Other Specifications: Daily Amount Based on the Average for a 5-Day Week			
Min-max Calories (kcal)	550-650	600-700	750-850
Saturated Fats (% of total calories)	<10	<10	<10
Sodium (mg) July 2014	≤1,230	≤1,360	≤1,420
July 2017	≤935	≤1,035	≤1,080
July 2022	≤640	≤710	≤740

Under HHFKA, a new Offer vs. Serve (OVS) policy was also implemented. OVS allows students to decline some of the options offered at lunch as an effort to reduce the amount of plate waste observed in school cafeterias (Food and Nutrition Service, 2012). At lunch, students are offered five meal components: meats/meat alternates, grains, fruit, vegetables, and fluid milk. Students are required to take only three of the five meal components however one of the three must be the fruit or vegetable serving (Long, 2013).

The HHFKA also increased training requirements for school food service professionals. Child nutrition program directors are now required to complete at least fifteen hours of additional training each year while all kitchen staff, who work over 20 hours a week, are required to have 8 hours of continuing education training each year (Food and Nutrition Service, 2013).

In 2015, the House of Representatives amended the HHFKA to include whole grain waivers for meeting the standards because of the difficulties some schools were having in meeting the standards (U.S. Department of Agriculture, 2017). Schools that receive waivers will be allowed to serve 50% of whole grains as whole grain rich instead of all grains as whole grain rich foods (U.S. Department of Agriculture, 2017). Schools with a net loss of revenue over six months can apply for a waiver to opt out of providing meals that adhere to the whole grain standards set forth in the HHFKA (U.S. Department of Agriculture, 2017).

Effects of Changes in Standards

The SNA is a nonprofit professional organization with a focus on school nutrition, having the purpose of advancing quality of school nutrition. The SNA often publishes

position statements on the state of school meals relying on the latest research in this area. In 2015 the SNA position paper addressed key concerns schools were having on meeting the HHFKA standards. They noted that schools should receive more funding, sodium targets should stop at target one, and whole grain requirements should revert back to only half of grains being served being whole grain (School Nutrition Association, 2015). These statements were made following research on plate waste and the effects of the standards and the SNA advocating for the changes in hopes that plate waste would decrease (School Nutrition Association, 2015). The effects of the changes in school nutrition standards quickly gained attention from the press, and consequences of the standards were soon published in popular media, including *Civil Eats* (Diaz, 2013).

Financial Concerns

Across literature, the reviews on the nutrition standards were mixed. Rural areas often had more difficulties meeting the standards while some urban areas could meet them with ease (Cornish et al., 2015). Some rural child nutrition program directors reported the implementation of the standards to be a great burden due to a multitude of factors, with the most prominent being financial limitations to pay staff, buy equipment, and training employees to cook healthier meals (School Nutrition Association, 2015).

While there were challenges for implementing the new meal standards there were also many positive aspects of the HHFKA nutrition standards reported. The USDA stated that students are eating more fruits and vegetables and a more nutrition-oriented school environment overall (U.S. Department of Agriculture, 2013).

Plate Waste

The effect of the HHFKA on plate waste is also mixed. In one study, plate waste was shown to vary by food group and the food groups that tend to be the most wasted were salad, vegetables, and fruit (Templeton et al., 2005). However, another study found that the results indicate significant fruit and vegetable waste within the NSLP after the implementation of the HHFKA of 2010 (Molaison, 2015). While other studies show that food waste levels were substantial both pre- and post-implementation, so the new guidelines implemented under the HHFKA of 2010 have positively affected nutrient consumption in school lunches while neither increasing or decreasing waste (Cohen et al., 2014).

Availability and Acceptability

In a 2017 position statement, the SNA stated that they support nutrition standards so students receive healthy meals. However, some standards have resulted in reduced student participation in lunch, higher costs, and increased food waste (School Nutrition Association, 2017). The 2017 position statement mentioned that decreased participation could come from a lack of appealing food being served in schools. As students do not like the new foods served, participation can decrease. Students often do not like the whole grain appearance of food, which is discernable as black flecks and often found in whole grain alternatives to popular local foods such as grits and tortillas (Merrigan, 2011). Additionally, research mentions the sodium requirements of HHFKA may make the new healthy foods served in schools bland and unappealing (Jeffries et al., 2015). Another study found that child nutrition program directors had difficulty finding foods that met the HHFKA nutrition standards that children liked, and they heard complaints

from children about the discontinuation of staples like peanut butter and jelly sandwiches (Weir, 2016).

Lack of Food Prep Equipment

Complying with HHFKA standards can mean learning a different way of preparing food and many schools simply may not have means to prepare this food well. About one-third of school food authorities surveyed said that their meal preparation equipment was inadequate for cooking to adhere to the standards implemented by the HHFKA, with the most common source of inadequacy being the lack of equipment necessary to meet the fruit and vegetable requirement such as steamers instead of fryers (Pew Charitable Trusts, 2016). Schools can apply for grants for food preparation equipment that help improve nutrition and quality of meals (Food and Nutrition Service, 2018). Without the support of these grants, which often school personnel may lack training to write, schools often lack funds to purchase new food preparation equipment they need to meet the HHFKA nutrition standards (Cornish et al., 2016). Schools applying for grants are also judged on accessibility to other resources and age of current food service equipment (Food and Nutrition Service, 2018).

Overcoming Barriers and Novel Approaches to Meet Standards

With costs rising and student participation decreasing, many schools are exploring creative ways to meet the standards of the HHFKA and appeal to students. Some school districts have even moved all food preparation to one central kitchen. This change was implemented to save money by cutting down on staff and having one set of large scale production equipment and better storage for fruits and vegetables (Cooper, 2016).

Additionally, a number of chefs have been trying to prepare more or different kinds of food from scratch in order to save money and provide better appeal to students.

The U.S. government increased funding to certain programs such as the Farm to School program to try to alleviate financial concerns voiced, identified, and brought forth by nutrition staff. One program whose funding was increased during this time was the Farm to School Network which was implemented to get healthy, whole food into schools and increase education opportunities for students (National Farm to School Network, 2020). The Farm to School program has been shown to positively encourage children to eat more fruits and vegetables. However, the program comes with many limitations such as the difficulty for farmers to produce fresh produce continuously throughout the school year in most areas of the United States (Merrigan, 2011).

Some schools began to outsource their lunch preparation to a private vendor after significant money loss, thus the vendor prepares and delivers foods that meet HHFKA standards but appeals to students better than the school's prepared food (Coz, 2015). From schools who did not already do so, 44% of schools began using pre-portioned condiments and 40% began using pre-portioned salad dressings to ensure HHFKA nutrition standards were met. Some schools began to purchase locally grown produce to meet the fruit and vegetable requirement through the Farm to School program (National Farm to School Network, 2020). Some schools have tried to increase menu options to entice students, and some schools have engaged students by creating a vote on what is served on the menu, creating student buy-in (Orange County Schools, n.d.).

Many schools increased training of employees to implement the new standards. The employees were trained on topics such as serving proper portion sizes, how to

encourage children to try new food, and cooking from scratch. Despite many of these potential solutions, many schools still faced barriers in meeting standards so the final rule to lessen the standards was implemented. Secretary of Agriculture Sonny Purdue said the students not eating the food because it is not appealing with the new standards defeats the purpose of the standards (U.S. Department of Agriculture, 2018).

Greater Flexibility in Standards

The SNA published their 2017 position paper encouraging Congress to change the school nutrition standards based on the difficulties in meeting them (School Nutrition Association, 2017). On May 1, 2017, Secretary of Agriculture Sonny Perdue announced that USDA would relax the current standards. The “USDA Commitment to School Meals” of May 2017 allowed schools to serve 1% fat flavored milk and relax the sodium standards. Schools are only mandated to meet the requirements in the previous target one and not continue to the next targets for sodium (Table 2). States will now be able to allow more schools facing difficulties in serving all grains that are at least 51% whole grain to waive that standard temporarily to serve at least 50% of grains as whole grains. Secretary Purdue hoped the increased flexibility would help to balance the nutrition of school meals with palatability and increase participation (U.S. Department of Agriculture, 2018).

Table 2*School Lunch Standards after the Increased Flexibility was Implemented in 2016*

Lunch Meal Patterns			
Meal Pattern	Amount of Food Per Week		
Grades	K-5	6-8	9-12
Fruits (cups)	2.5	2.5	5
Vegetables (cups)	3.75	3.75	5
Dark Green	0.5	0.5	0.5
Red/Orange	0.75	0.75	1.25
Bean/Peas (Legumes)	0.5	0.5	0.5
Starchy	0.5	0.5	0.5
Other	0.5	0.5	0.5
Additional Vegetables to Reach Total	1	1	1.5
Grains (oz. eq.) 50% whole grain rich	8-9	8-10	10-12
Meats/Meat Alternatives (oz. eq.)	8-10	9-10	10-12
Fluid Milk 1% Flavored Milk (<i>all flavored milk served was non-fat while plain milk was allowed as 1%</i>)*			
Other Specifications: Daily Amount Based on the Average for a 5-Day Week			
Min-mac Calories(kcal)	550-650	600-700	750-850
Saturated Fats(% of total calories)	<10	<10	<10
Sodium(mg)	≤1,230 (640)*	≤1,360 (710)*	≤1,430 (740)*

* Previous Standards based on the Healthy Hunger Free Kids Act-Actually target 3 standards that were targeted for implementation by 2022 if standards had not been relaxed.

Feedback on the Flexibility in Standards

There are differing opinions on the increased flexibility of standards. The American Public Health Association published an article that claimed the rollbacks of the school meal nutrition requirements harm child nutrition efforts (Haskins, 2017). The Healthy Schools Campaign, which is a national nonprofit organization that works to ensure that schools can provide students with healthy environments, suggests that the increased flexibility will most likely not change the school meals significantly (Healthy Schools Campaign, 2017). Schools will continue to serve healthy meals in ways that are beneficial to them but there will be more options of foods allowed to be served in areas that are troubling schools such as whole grains (Healthy Schools Campaign, 2017).

The relaxation of the standards raise concerns when it comes to children from food insecure households many of these students are receiving free or reduced price lunches and the school meals they are receiving could be their main or only source of nutrition (California Department of Education, 2018). In Greenville, Mississippi there is concern that the increased flexibility in standards could be causing children to receive fewer nutrients than with the full HHFKA standards (Lapan, 2017). Overall, 84 percent of low-income food-insecure households with school-age children accessed free or reduced-price lunches through the NSLP (Ralston & Coleman-Jensen, 2015).

Time to Eat

The time allowed for lunch has been a topic for consideration before the HHFKA nutrition standards were put into place and it is still an issue today. The HHFKA does not mandate a set time required for lunch. Often the time permitted for lunch is inadequate

and lacking in supervision (Pew Charitable Trusts, 2016). Some schools found that placing recess before lunch could decrease plate waste because students were hungrier when they arrived (California Department of Education, 2018). In order to increase participation by lowering lunch line wait time, many schools began serving pre-packaged grab-and-go meals (California Department of Education, 2018).

Mississippi Schools

School nutrition is particularly vital in Mississippi as 71.5% of students are eligible for free or reduced priced lunches, which is the nation's highest rate (National Center for Education Statistics, 2017). This increases the possibility that students will be receiving all or most of their nutrients from school lunches, increasing the need for nutritious and palatable food (Lapan, 2017). Mississippi also has the highest rate of diabetes prevalence, where improving eating and lifestyle choices of children can decrease the risk of type 2 diabetes (Mississippi State Department of Health, 2018). However, 95% of districts in Mississippi are in need of at least one piece of kitchen equipment to better prepare food to meet the new HHFKA nutrition standards. (Pew Charitable Trust, 2016b). The state also has legislation requiring at least 24 minutes to be provided for students to eat lunch, in an effort to allow enough time for food consumption after going through the lunch line (School Nutrition Association, 2015). Additionally Mississippi has a farm to school network to help get locally-grown nutrient-dense food in schools (Pew Charitable Trust, 2016a).

Child nutrition program directors are responsible for directing school meal programs, so their perceptions of nutrition standards provide insight into the challenges they face in meeting the HHFKA nutrition standards and their perception of the 2017

relaxation of nutritional standards. The goal of this study was to examine child nutrition program directors' perceptions of the impact of the implementation of HHFKA standards.

CHAPTER 2: METHODS

Survey Development

As they are key decision makers in school meal programs, Mississippi child nutrition program directors were surveyed about directors' perceptions of the HHFKA standards and of the recent changes on their foodservice programs using a 39 item online questionnaire. Development of the questionnaire was done prior to this study. This study is a part of a larger tri-state study in which this survey was distributed in two other states simultaneously.. The questionnaire was developed based on information and reported challenges found in the literature on the HHFKA nutrition standards and the topics of the introduced flexibilities in the implementation. The anonymous questionnaire included questions about the school's demographics and district characteristics as well as whether the schools were reaching the HHFKA standards of whole grain requirements, sodium targets, and milk requirements. A follow-up question of the biggest barrier in reaching each requirement was also asked. Questions about school nutrition directors' perceptions of financial effects of the school nutrition standards and the increase/decrease in food waste were also asked. The questions were mostly multiple choice, some contained an "Other" write in box, and the food waste questions were in net promoter score format so the change in waste could be selected on a scale of 0-10. At the end of the survey a link was presented to another survey where the participants could fill out their name and email separately so the incentive could be given without identifying information attached to the questionnaire. The University of Mississippi Internal Review Board (IRB) approved this study (#19x-047).

Recruitment and Participation

All child nutrition program directors were contacted first via email to invite them to participate. Each child nutrition director was emailed with the Qualtrics (Qualtrics, Provo, UT) survey attached as a link. An \$8 Amazon e-gift card incentive was given for completion of the survey. The child nutrition program directors who did not respond were emailed again then contacted via phone. The survey was emailed to every child nutrition director in the state, 173 in total, with a 21% response rate (N=37).

Data Analysis

A descriptive analysis was completed using Microsoft Excel 2019 (Microsoft Corporation, Redmond, WA). Raw files of the survey data were cycled through and incomplete surveys were deleted. Of the remaining surveys (N = XX) the answers were compared (how? By school, district?), and percentages were calculated to reveal school nutrition director's perceptions of the increased flexibility in the HHFKA standards.

CHAPTER 3: RESULTS

Participants

The majority of the child nutrition program directors' districts were in rural areas (n=26), with the next most common area being urban districts (7), and the remaining districts in suburban areas (4). The approximate number of students in being served in the districts were as follows: 20 districts enrolled 2,499 or less students, 16 districts enrolled 2,500-9,999 students, and districts with 10,000 or more was 1.

Table 3

Demographic Data of Child Nutrition Program Directors

Years Worked as a School Nutrition Director	
More than 10	19
5-10	8
1-5	9
Less than one year	1
Degree type	
Masters	10
Bachelors	27
Certificates	
SNA Certificate	17
Registered Dietician	5
School Nutrition Specialist	3
Other	4
None	13
Age	
<30	4
31-40	4
41-50	11
>50	18
Gender	
Male	3
Female	34

Barriers

The whole grain standards had a very high rate of exemptions applied for. Only one response indicated that the school did not apply for a whole grain exemption for the school year 2017-2018, therefore 97% of respondents needed a whole grain exemption for that school year. Reasons given by child nutrition program directors for requesting a whole grain exemption were children's food preferences (n=35), lack of vendor availability (n=16), and increase in food cost (n=5). No directors indicated that labor cost or lack of food preparation equipment as a barrier to meeting the whole grain standards. Responses from the open ended question included:

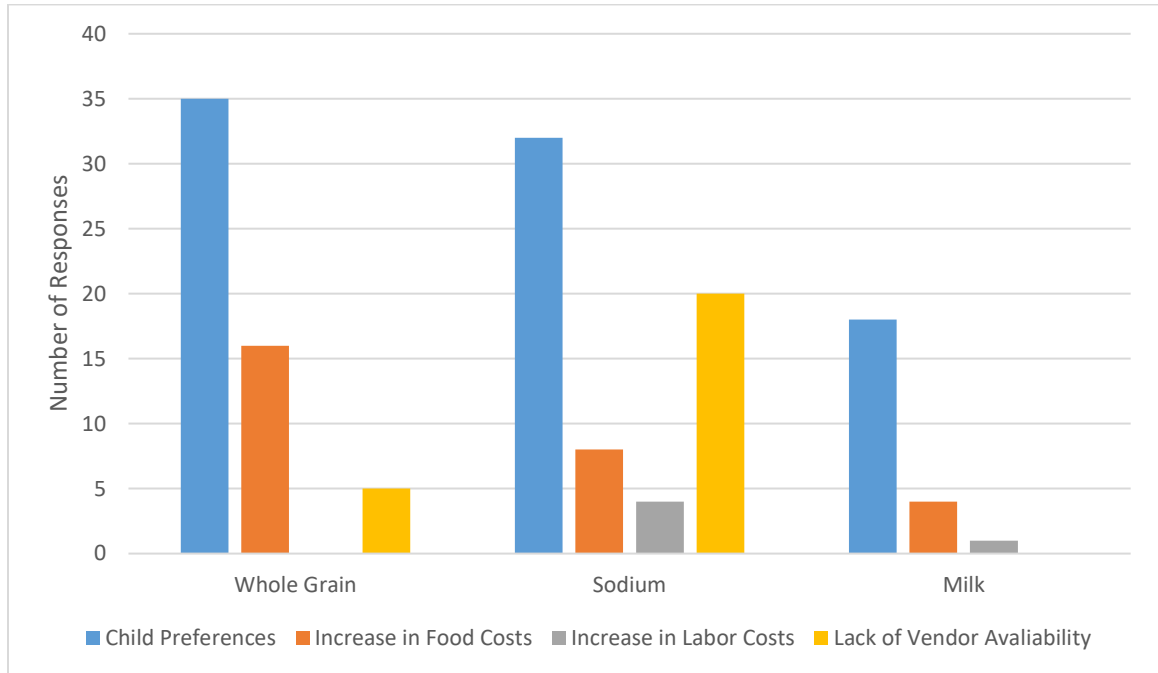
“lack of employee training on cooking”

”poor quality of whole grain items from vendors, food, waste, quality on some whole grain items”

One child nutrition director reported that their school was serving 100% whole grains, four reported to serve few (25%) whole grain, 15 reported serving mostly (75%) whole grains, while 17 reported serving some (50%) whole grain.

Figure 1

Barriers as Indicated by Child Nutrition Program Directors to Meeting The Healthy, Hunger Free Kids Act of 2010 Nutrition Standards



Most child nutrition program directors were meeting sodium target one (target data shown on Table 1), one child nutrition director’s school was meeting target two, and one child nutrition program director was not meeting either sodium target. When asked for the biggest challenges in meeting sodium target two child nutrition program directors said: children’s food preferences (n=32, 86%), lack of vendor availability (n=20, 54%), increase in food cost (n=8, 22%), and increase in labor cost (n=4, 11%). Again, lack of food prep equipment was not listed as a barrier to meeting sodium target 2. Answers written in the “other” box included:

“POOR TASTE and students do need sodium as active as they are. Also, it is VERY difficult to meet the weekly guidelines with menu planning as they are at Target 1.”

“Lack of participation and increase in labor costs trying to create more scratch recipes to improve palatability, variety of menu options would not be as varied, lack of recipe diversity to allow such a low sodium count.”

“difficulty meeting the calorie requirement and sodium requirement without more scratch cooking. Thus, increased labor cost. Or if pre-made increase food cost and availability issues.”

The USDA has begun the regulatory process for schools to serve 1% flavored (such as chocolate) milk through the school meals programs and 11 child nutrition program directors reported their school would not serve 1% milk but only fat-free milk. Eighteen directors (49%), reported no barriers to serving only fat-free milk while another 18 (49%) also selected children’s food preferences as the biggest barrier to serving only fat-free milk. Some listed an increase in food cost as a barrier (n=4, 11%), one selected increase in labor cost (n=1, 3%), no one selected lack of food prep equipment. Other responses to barriers to serving only fat-free milk included:

”students would consume more milk with the 1% flavored because of taste preferences”

“state purchasing program is in a current 2 year bid with the dairy and will remain fat-free until the bid is up.”

Food Waste

Participants were asked if they noticed any changes in the amount of food students leave uneaten as part of reimbursable school lunches after the implementation of the HHFKA nutrition standards. They selected a number ranging from 0-10 with 1 being very little food left uneaten, 10 being a lot more food left uneaten, and 5 being no change. The response averaged 7.9. One school nutrition director selected 5 for no change, one selected 4 towards the uneaten side, and then the rest of the 35 responses reported an increase in plate waste. Child nutrition program directors were then asked if they have noticed any changes in the amount of food waste in kitchens as part of the preparation of reimbursable school lunches after the implementation of the HHFKA nutrition standards. They selected a number ranging from 0-10 with 1 being very little food left uneaten, 10 being a lot more food left uneaten, and 5 being no change and the average number was 6.8. Lastly, the child nutrition program directors again selected a number ranging from 1-10 for food waste of individual food groups of fruit, vegetables, grains, meat/meat alternatives and entrees, as well as milk. The average number for plate waste seen of fruit was 6.5, vegetable waste also varied with selections of 0 and 10 with an average number of 7.0, and grains had an average answer of 6.7. Meat/meat alternatives and entrees saw an average food left uneaten of 5, so overall responses no change was seen, although numbers varied at the individual level.

Child nutrition program directors were next asked if they perceived that the relaxations of the HHFKA in 2017 would decrease the amount of food left uneaten. Again, they selected a number ranging from 0-10 with 1 being very little food left uneaten, 10 being a lot more food left uneaten, and 5 being no change. The average

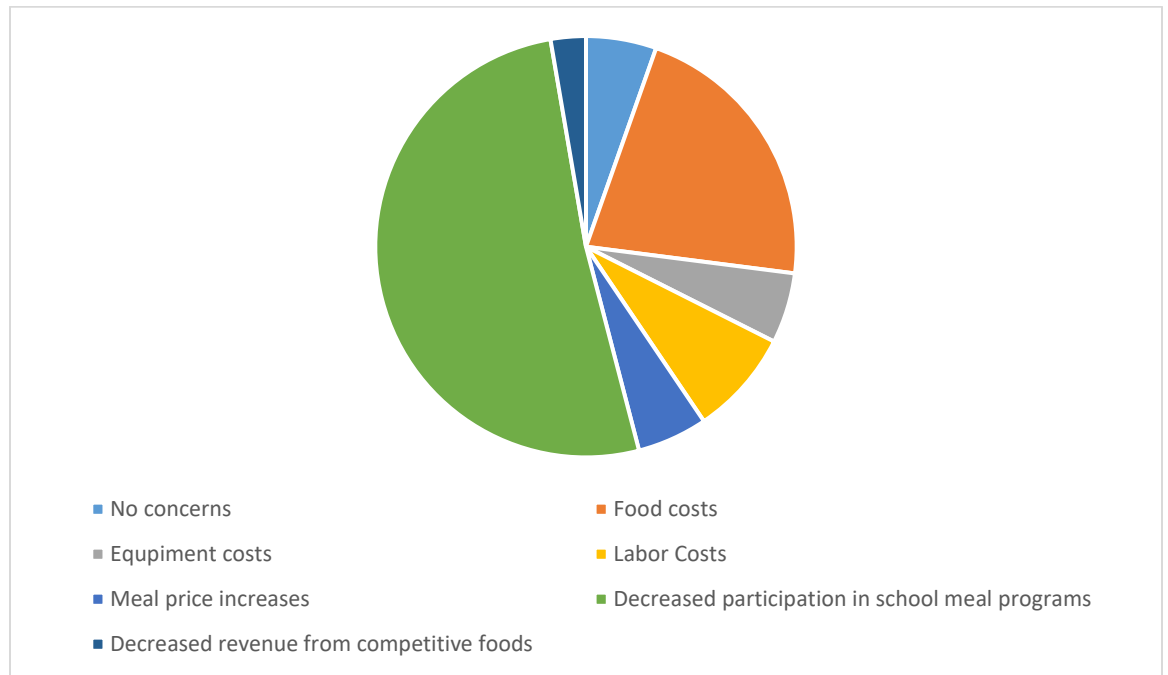
answer for whole grains was 5.0, sodium's average was 4.8, and milk had an average answer of 4.0.

Financial Concerns

When asked about changes in revenue from competitive foods and reimbursable school meals combined after the new nutrition standards of 2012, the majority of respondents said overall revenue decreased (n=26, 70%), while some say it stayed the same (n=8, 22%), and few said overall revenue increased (n=3, 8%).

Figure 2

Primary Concerns as Reported By Child Nutrition Program Directors in Mississippi Regarding the Financial Burdens of School Nutrition Standards (N=37)



When asked about the perceptions of the 2017 relaxations on school finances 32 child nutrition program directors selected positive, five selected neither positive or negative, and zero selected negative.

Changes Implemented Within Schools

Child nutrition program directors were asked to select all that applied from a list of changes to meal production or meal service their district made in order to implement the current meal requirements for lunch when this survey was administered after the 2017 relaxations (Table 3).

Table 3

Changes Implemented By Schools to Try to Meet School Nutrition Standards as Indicated By Child Nutrition Program Directors in Mississippi

Changes implemented	Number of child nutrition program directors	Percentage of total
Move to a central facility/commissary	0	0
Prepare more or different food from scratch	10	27%
Purchase more commercially prepared foods	10	27%
Use more pre-packaged or grab-and-go meals	6	16%
Use more pre-portioned condiments to control portion sizes	13	35%
Use more pre-portioned salad dressings to control portion sizes	12	32%
Use school gardens and/or locally grown produce to offer more fruits and vegetables	1	3%
Increase menu options	25	68%
Increase training of employees to implement new standards	19	51%

Child nutrition program directors were asked about if they had implemented strategies to increase the amount of time that students had to eat lunch. Twenty-one

responded that they have not made any changes in an attempt to increase time for lunch; two had increased the number of self-service food stations such as kiosks, carts, standalone salad bars, fresh fruit displays, and milk coolers; four had increased the number of serving lines/checkout stations, and 18 reported they had begun providing all required meal components on every serving line or food station in the required minimum amounts.

CHAPTER 4: DISCUSSION

The purpose of this study was to estimate the effects of the HHFKA nutrition standards and the 2017 relaxations in schools in Mississippi through the perspectives of child nutrition program directors. There were many barriers to meeting the standards of the HHFKA however, the ones most often reported was children's food preferences. Children not liking the food increases plate waste and can decrease participation in the NSLP which is consistent across literature (Jeffries et al., 2015) (Merrigan, 2011) (Weir, 2016). With this being the most cited barrier, the majority of the child nutrition program directors surveyed reported that their biggest concern was decreased participation in school meal programs. Additionally, 70% of respondents did see an overall decrease in revenue following the implementation of the HHFKA nutrition standards. The majority of directors (51%) reported increasing the training of employees to meet the new standards and having increased menu options (68%) both of which cost money for the schools.

Overall, there was more food waste seen in schools, food left uneaten by students and unserved in the kitchen. The food waste literature is inconsistent however the child nutrition program directors in this study reported an increase in plate waste. There was an average increase in reported food wasted in fruits, vegetables, grains, and milk in this study. One study on plate waste has shown that plate waste varies by food group; the food groups that tend to be the most wasted are salad, vegetables, and fruit (Templeton et al., 2005). While other studies show that food waste levels were substantial both pre- and post-implementation, so the new guidelines implemented under the HHFKA of 2010 have positively affected nutrient consumption in school lunches while neither increasing

or decreasing waste (Cohen et al., 2014). However, over all responses in our study show vegetables seemed to have the biggest increase in waste. Followed by vegetables, grains had the biggest increase in waste seen by child nutrition program directors in Mississippi. Fruits followed with an overall increase in waste. Meat/meat alternatives and entrees saw no overall increase or decrease in plate waste. However, when asked about how the perceived effects the relaxation of the HHFKA standards in 2017 had on the food groups waste the average answer from 0-10 over all responses was for whole grains was 5.0, sodium's average was 4.8, and milk had an average answer of 4.0.

When asked about barriers to reaching the HHFKA standards not one school nutrition director selected "lack of food prep equipment" which was surprising because of the literature behind difficulties of the HHFKA. This could be because *The Bower Foundation* provided grants to replace fryers with combination oven steamers in 124 schools (*The Bower Foundation*, 2020). Additionally, they gave 173 grants to allow schools to purchase sectionizers and slicers in order to prepare more healthy and appealing service lines (*The Bower Foundation*, 2020).

Mississippi lunchtime requirement is 24 minutes (Mississippi Healthy Students Act Senate Bill 2369 Nutrition Standards). Many child nutrition program directors (57%) had not tried increasing the time for lunch.

Overall, the child nutrition program directors positive views of the relaxation of standards because of the difficulties in meeting the original standards.

Limitations

A limitation to this study is the number of responses, 37, giving it a 21% response rate. Additionally, out of the 37 respondents, 27 were child nutrition program directors in

rural areas, only 6 from urban districts, and 4 from suburban districts. The rural areas could have more difficulty meeting standards than other locations because of what food is available or what the children are used to eating at home so it could skew data although it is characteristic of the state as there are many rural areas in Mississippi. This study is not generalizable.

Future Research

Future research should explore the differences between the schools struggling to meet standards and schools easily meeting standards. By looking at the differences in the schools a better plan of action to meet standards could possibly be determined. More in depth research would be useful, asking child nutrition program directors open ended interview questions where they can truly explain their thoughts versus a survey.

CONCLUSION

The NSLP HHFKA standards could improve child health through meal quality but it depends on how they are implemented. These standards, however, have caused concerns for child nutrition program directors. For many students on free or reduced price lunches the lunches provided at school could be their primary source of nutrition. With Mississippi having the highest rate of students on free or reduced price lunch the school lunch topic becomes even more significant (Lapan, 2017). Child nutrition program directors overall reported positive attitudes towards the relaxed standards. The implementation of the standards of the HHFKA caused a decrease in revenue for most schools in this study (70%) which supports the School Nutrition Association position statements (School Nutrition Association, 2018). Additionally, there were difficulties with children's food preferences, staff training, and food vendor's availability. These difficulties can be lessened through programs that help schools decrease the barriers in preparing healthy meals such as equipment grants with the USDA which provide money to purchase equipment that will aid in preparing healthy meals. Additionally, the School Nutrition Culinary Institute, founded in collaboration of the USDA and Institute of Child Nutrition, aims to provide training to enhance the skills of child nutrition program directors, chefs, cooks, and supervisors to help meet school nutrition standards (Nutrition, 2018). In light of these expressed difficulties meeting the original HHFKA standards, it is possible that the relaxation of school nutrition standards will have a positive impact on school food.

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APPENDICES

APPENDIX A: Recruitment Emails

Good afternoon,

I am Payton Meadows, a student at the University of Mississippi working on a research project with Dr. Georgianna Mann. We are conducting a research study on the perceptions of School Food

Service Administrators on the school meal rollbacks. I am emailing to ask if you would like to take about 20-30 minutes to complete a survey for this research project. Participation is completely voluntary, if completed you will receive an \$8 e-gift card.

If you are interested, please click on the link for the survey and additional information:

If you have any questions, please do not hesitate to contact me at psmeadow@go.olemiss.edu

Thank you for your time,

Payton Meadows

NSLP Rollbacks

Start of Block: Default Question Block

You are invited to participate in a research study that examines your opinions regarding recent (2017-2018) exemptions in the nutrition standards originally put in place by the Healthy, Hunger-Free Kids Act of 2010. This is part of a tri-state (Mississippi, North Carolina, and Virginia) study in which nutrition directors are asked to answer a brief questionnaire about their experiences and opinions about school meals. Your participation is completely voluntary and your responses are confidential. Should you wish to participate, you will be compensated for your time with a \$8 Amazon e-gift card. The survey should take approximately 20-30 minutes to complete and must be completed all at once. There are no known risks or discomforts associated with participating in this study. If you change your mind about participating, you can withdraw at any time by closing your web browser window. There are no personal benefits to participating in this study, but survey results will increase understanding of the impact of these exemptions, and will contribute to academic knowledge. The information may be published in a professional journal and/or presented at a professional meeting. If you are interested, please click on the link below and please be sure to fill out your contact information to receive the survey incentive. All information you provide is confidential. In an effort to protect the identity of school divisions, reports will not include any information that could identify them. This study was approved by the University of Mississippi (IRB Approval #19x-047). Please contact farrisar@appstate.edu, gmann@olemiss.edu, serrano@vt.edu/sbudowle@vt.edu if you have any questions. For questions about your human subject rights, you may contact the University of Mississippi Institutional Review Board at irb@olemiss.edu.

Yes, I am 18 years of age or older

No

Page Break

Thank you for agreeing to participate. The survey will ask you specific questions about the 2017-2018 exemptions to the nutrition standards for the National School Lunch Program described below: The USDA will allow states to grant exemptions to schools experiencing hardship in serving 100 percent of grain products as whole-grain rich for 2017-2018 school year. For the 2017-2018 through 2020 school years, schools will not be required to meet Sodium Target 2. Instead, schools that meet Sodium Target 1 will be considered compliant. The USDA will begin the regulatory process for schools to serve 1 percent flavored milk through the school meals programs. USDA will seek to publish an interim rule as soon as possible to effect the change in milk policy.

Page Break

First, please provide the following information about the schools in your district/division.

Thinking about all the schools in your school district/division, would you say the majority of your schools are... *Select one only*

- Located in urban areas
 - Located in suburban areas
 - Located in rural areas
 - Don't know
-

Please select the approximate number of students in your district/division:

- 2,499 or less
 - 2,500-9,999
 - 10,000 or more
-

Please select the approximate number of schools in your district/division:

Do **elementary schools** in your district/division use the “offer versus serve” option at lunch?

- All (100%)
 - Most (75%)
 - Some (50%)
 - Few (25%)
 - None
-

Do **middle schools** in your district/division use the “offer versus serve” option at lunch?

- All (100%)
 - Most (75%)
 - Some (50%)
 - Few (25%)
 - None
-

Page Break

Please provide the following information about current practices in your schools.

What is your **perception** of the 2017-2018 exemptions on whole-grains, sodium, and flavored milk for **nutritional quality of meals**?

- Positive
 - Negative
 - Neither positive or negative
-

What is your **perception** of the 2017-2018 exemptions on whole-grains, sodium, and flavored milk for **school finances**?

- Positive
 - Negative
 - Neither positive or negative
-

The USDA will allow states to grant an exemption to schools experiencing hardship in serving 100 percent of grain products as whole-grain rich for School Year 2017-2018. **Have you applied for a grain exemption** in the last year due to difficulty meeting the whole-grain requirement?

- Yes
 - No
-

If yes, what did you perceive to be the **biggest challenges** in serving 100 percent whole-grain products in your district/division? *Select all that apply.*

- Increase in food cost
- Increase in labor cost
- Children's food preferences
- Lack of whole grain availability with current vendor
- Lack of food preparation equipment
- Other (please describe):

Beginning in the 2016-17 school year, all grains served in lunches and breakfasts were required to be whole grain-rich. Given product availability, and your experience last year, what proportion of grains do you think you could currently serve as **whole grain-rich**? *Select one only.*

- All (100%)
 - Most (75%)
 - Some (50%)
 - Few (25%)
 - None
-

For School Years 2017-2018 through 2020, schools are not required to meet Sodium Target 2. Instead, schools that meet Sodium Target 1 are compliant. Which **Sodium Target** are schools in your district/division meeting for lunch?

- Target 1 (
 - Target 2 (
 - Neither
-

If Target 1, or neither, what do you perceive to be the biggest challenges in meeting Target 2 in your district/division? *Select all that apply.*

- Increase in food cost
 - Increase in labor cost
 - Children's food preferences
 - Lack of vendor availability
 - Lack of food preparation equipment
 - Other (please describe):

-

The USDA has begun the regulatory process for schools to serve 1-percent flavored (such as chocolate) milk through the school meals programs. Are you planning to serve **1-percent flavored milk** in your school district/division?

Yes

No

If yes, what challenges have you experienced in **not** serving 1-percent flavored milk in your district/division? *Select all that apply.*

- Increase in food cost
 - Increase in labor cost
 - Children's food preferences
 - No difficulties
 - Other (please describe):

-

Page Break

Please provide the following information on consumption/food waste in your schools.

Thinking back over the past three years, after the implementation of the 2012 nutrition standards, have you noticed any changes in **the amount of food students leave uneaten** as part of reimbursable school lunches?

- very little food uneaten 0
 - 1
 - 2
 - 3
 - 4
 - No change 5
 - 6
 - 7
 - 8
 - 9
 - a lot more food uneaten 10
-

Thinking back over the past three years, after the implementation of the 2012 nutrition standards, have you noticed any changes in the amount of food waste in kitchens as part of the preparation of reimbursable school lunches?

no additional food wasted 0

1

2

3

4

No change 5

6

7

8

9

a lot more food wasted 10

Thinking about each of the meal components offered at lunch, how has the amount of food students select but leave uneaten changed since the 2012 nutrition standards? For each food

category, please choose a number between 0 and 10 with 0 being 'no additional food wasted' and 10 being 'a lot more food wasted'.

	no additional food wasted 0	1	2	3	4	no change 5	6	7	8	9	a lot more food wasted 10
Fruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meat/meat alternatives and entrees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you perceive the 2017-2018 exemptions of whole-grains, sodium, and flavored milk standards will decrease the amount of food left uneaten? Choose a number between 0 and 10 with 0 being 'very little food uneaten' and 10 being 'most food uneaten'.

	very little food uneaten 0	1	2	3	4	no change 5	6	7	8	9	a lot more food uneaten 10
Whole Grains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sodium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flavored Milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Page Break

Please provide the following information about the financial effects of school lunch changes in your schools.

When you think about any change in revenue from **competitive foods and reimbursable school meals combined** after the new nutrition standards of 2012, would you say...*Select one only*

- Overall revenue increased
 - Overall revenue decreased
 - Overall revenue stayed the same
-

Some district/divisions report that they struggle to make revenue meet costs. Currently, what is your district/division's **greatest financial concern**, if any? *Select one only*

- Labor costs
- Food costs
- Equipment costs
- Decreased revenue from competitive foods
- Decreased student participation in school meal programs
- Meal price increases
- No concerns
- Don't know

Page Break

Please provide the following information about changes implemented at your schools.

Did your district/division make any of the following changes to meal production or meal service in order to implement the current meal requirements for lunch? *Select all that apply*

- Move to a central facility/commissary or production kitchen(s)
 - Prepare more or different food from scratch
 - Purchase more commercially prepared foods
 - Use more pre-packaged or grab-and-go meals
 - Use more pre-portioned condiments to control portion sizes
 - Use more pre-portioned salad dressings to control portion sizes
 - Use school gardens and/or locally grown produce to offer more fruits and vegetables
 - Increase menu options
 - Increase training of employees to implement new standards
-

Has your district/division used any of the following strategies to increase the amount of time students have to eat their lunch? *Select all that apply*

Have not tried to increase eating time for lunch

Increase the number of food stations available to students, such as kiosks, carts, standalone salad bars or other self-service stations, fresh fruit displays, and milk coolers

Increase the number of serving lines/checkout stations

Provide all required meal components on every serving line or food station in the required minimum amounts

Page Break

Please provide the following information about your original stance or current view of the school lunch changes.

What is your perception of **parents, teachers, and students' knowledge** concerning the Healthy, Hunger-Free Kids Act? *Choose a number between 0 and 10 with 0 being 'extremely knowledgeable' and 10 being 'extremely unknowledgeable'.*

- 0
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
 - 10
-

What, if any, **feedback have you received** from parents, teachers, or others in regard to the nutrition changes brought about by the Healthy, Hunger-Free Kids Act? *Choose a number between 0 and 10 with 0 being 'extremely negative' and 10 being 'extremely positive'.*

0

1

2

3

4

5

6

7

8

9

10



Page Break

Please provide the following information about your personal demographics.

How many years have you been working as a School Nutrition Director?

- Less than a year
 - 1-5 years
 - 5-10 years
 - More than 10 years
-

Select your level of education.

- Bachelor's Degree
 - Master's Degree
 - Doctoral Degree
-

Please select your college major.

- Home Economics
 - Business
 - Education
 - Nutrition/Dietetics
 - Other (please list): _____
-

Please select any certifications/specializations you may have (select all that apply).

- Registered Dietitian
 - School Nutrition Specialist
 - SNA Certificate
 - Other (please list): _____
-

What is your current age?

<30

31-40

41-50

>50

What is the gender you identify with?

Male

Female

Non-binary/third gender

Prefer to self-describe: _____

External link pops up with below to keep the survey anonymous

Thank you for your time. Please enter the email address where you would like your e-gift card sent.

End of Block: Default Question Block