

INDICATORS OF SUCCESS IN PROVIDING WHOLE GRAINS IN SCHOOL MEALS: THE  
HEALTHIERUS SCHOOL CHALLENGE IN 2018

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## ABSTRACT

### INDICATORS OF SUCCESS IN PROVIDING WHOLE GRAINS IN SCHOOL MEALS: THE HEALTHIERUS SCHOOL CHALLENGE IN 2018

(April 2019)

In 2005, the Dietary Guidelines for Americans (DGA) emphasized that American children, adolescents, and adults should consume at least half of the grain servings as whole grains (3 servings daily).<sup>4</sup> Since many children are enrolled in public school, promoting whole grains in school meals may facilitate an increase in the consumption of whole grain foods.

This study was designed to determine the different methods HealthierUS School Challenge Gold rated schools use to incorporate whole grain food products in school meals.

Participants encountered many barriers while attempting to add whole grain food products to their menus, but have found ways to successfully incorporate whole grains into their school meals.

Since 2008 there has been an increase in schools that have achieved the HealthierUS School Challenge (HUSCC) Gold status. Although, the HUSCC ended July 2018, schools are still in a unique position to incorporate more nutritionally balanced food choices into their menus.

## DEDICATION

To my parents and best friend.

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## CHAPTER I

### INTRODUCTION

The National School Lunch Program (NSLP) is the second largest food and nutrition assistance program in the United States.<sup>1</sup> This federally funded program provided, on average, over 30 million low cost or free lunches per day during 2017, at a Federal cost of \$13.6 billion per year.<sup>2</sup> In 2017, 4.9 billion school lunches were served in the U.S. to 30 million students in nearly 100,000 schools and institutions.<sup>2,3</sup> Approximately 95 percent of public schools in the U.S. participate in the NSLP. The United States Department of Agriculture's (USDA) annual cost for the NSLP is \$13.6 billion with \$12.2 billion for reimbursements to schools and \$1.4 billion in commodity costs.<sup>2,3</sup> The School Breakfast Program (SBP) serves 14.6 million students each day in over 90,000 schools and institutions, costing the federal government \$4.2 billion per year.<sup>2,3</sup> The NSLP and SBP provides an efficient channel for translating national dietary guidelines into the lives of America's school children.

The *Dietary Guidelines for Americans* (DGA) is a joint project of the USDA and the United States Department of Health and Human Services (USDHHS). The DGA forms the basis for federal food programs in the United States.<sup>4</sup> In 2005, the DGA, for the first time placed a large emphasis on American children, adolescent, and adult consumption of at least half of grain servings daily as whole grains.<sup>4</sup> The remaining grain servings may be consumed as refined, enriched grains. This whole grain recommendation is still found in the current iteration of the DGA 2015-2020.<sup>4</sup> In 2009, the Institute of Medicine (IOM) released the report *School Meals: Building Blocks for Healthy Children*, recommending the USDA's Food and Nutrition Service (USDA-FNS) require school meals to meet the DGA.

Despite scientific evidence and national dietary policy recommendation, most American children, adolescents, and adults fall short of meeting the recommendations for whole grain consumption, and many Americans are exceeding the recommendations for refined grain intake.<sup>5</sup> For instance, the average American eats less than one whole grain serving a day and approximately 40% of Americans do not eat whole grains.<sup>7</sup> It is also well documented that American children favor consuming refined grains over whole grains.<sup>6,7</sup> Since so many U.S. children participate in the NSLP, promoting whole grains in school meals may facilitate an increase in consumption of these foods in school and ultimately at home.

### **Research Questions**

Based on the literature review, research questions were developed in order to perform a cross sectional test between 2008 and 2018. The following research questions were addressed:

- What are the primary ways HUSSC Gold or Gold of Distinction schools have been successful in providing whole grain foods their students consume on a regular basis in 2018?
- Using a cross sectional comparison, what are the most frequently served grain food products, methods used to incorporate whole grain food products into school meals, and any barriers encountered by food service professionals while trying to provide whole grain foods in their schools in 2008 vs. 2018?

## CHAPTER II

### REVIEW OF LITERATURE

In the United States, obesity has become a widespread epidemic and is becoming more prominent in children.<sup>8,9</sup> In 2016, approximately 1 in 5 school age children and adolescents (6-19 years old) in the United States were obese.<sup>8,9</sup> Children are increasing their caloric intake and not getting enough physical activity, which can lead to excess weight gain.<sup>9</sup> Children spend a substantial portion of their time in school, approximately 8 hours a day, and may consume up to half of their daily calories there.<sup>9</sup> Children's success in school and their health are interconnected and could be a key factor in the fight against childhood obesity.<sup>9</sup>

Many different sectors influence eating behaviors and physical activity in children including: family, healthcare providers, community organizations, social media, and schools.<sup>8</sup> While schools cannot solve the obesity epidemic on their own, they are able to make a large impact on the overall health and well-being of children.<sup>9,10</sup> Schools play a particularly important role because the majority of children are enrolled in school where physical activity and healthy eating can be promoted.<sup>10</sup>

Whole grains contain a variety of nutrients and bioactive substances that can positively impact health.<sup>11</sup> Research consistently demonstrates that whole grains play a role in weight management and have the ability to lower the risk of chronic diseases such as cardiovascular disease, diabetes, metabolic syndrome, and certain types of cancer.<sup>11</sup> There has been a large push by the DGA to encourage individuals to increase their whole grain intake.<sup>12</sup> Schools are also encouraging children to eat more whole grains.<sup>12</sup> The HealthierUS School Challenge seeks to encourage healthier school environments in order to improve the overall health of children across America.<sup>1</sup>

## **Obesity Statistics/Chronic Disease**

Obesity is complex and can stem from many different causes and contributing factors including but not limited to dietary patterns, physical activity, education, food marketing, and genetics.<sup>8</sup> In the United States, more than one third of adults struggle with obesity, with obesity being more common in women than men.<sup>8</sup> Obesity is a serious concern because it can lead to multiple chronic diseases including heart disease, stroke, type 2 diabetes, and certain types of cancers.<sup>5,8</sup> Other health consequences of obesity include high blood pressure, high LDL cholesterol, high levels of triglycerides, gallbladder disease, osteoarthritis, sleep apnea, body pains, and a low quality of life.<sup>8</sup>

Childhood obesity is a serious concern that is putting children at risk for poor health over their life span and decreased quality of life.<sup>8,15,16,17</sup> In the United States, approximately 12.7 million children and adolescents are struggling with obesity.<sup>8</sup> Approximately, 18.5% of children and adolescents aged 2-19 years old are obese.<sup>8</sup> Obesity rates are higher in Mexican American males, non-Hispanic black females, and American Indian youth.<sup>8,15</sup> Non-Hispanic white children from lower-income families are also more likely to be obese than non-Hispanic white children from higher income families.<sup>8</sup> Approximately, 61 percent of obese children and adolescents have an additional risk factor for cardiovascular disease, such as high blood pressure or high cholesterol.<sup>8</sup> These children are also at a higher risk for developing type 2 diabetes and certain types of cancers.<sup>8</sup> Furthermore, among children with type 2 diabetes, approximately 80% were obese.<sup>8,15,17</sup> Childhood obesity is also associated with social and psychological problems, which can have life-long implications on the child.<sup>8</sup> Additionally, children and adolescents who are overweight or obese have a higher chance of becoming overweight or obese adults.<sup>8</sup>

The incidence of childhood and adolescent obesity is a continuous problem in the United States that has been steadily rising.<sup>8,17</sup> The rise in obesity can be linked to physical inactivity, poor dietary patterns, and social environment.<sup>8</sup> Schools have the opportunity to impact a wide variety of children and adolescents because more than 95% of American children are enrolled in school.<sup>9</sup> Additionally, more than half of the students in the United States eat at least one of their daily meals at school and one out of ten students eat two of their daily meals at school.<sup>9</sup> Schools can provide an environment that encourages whole grain consumption, as well as more balanced and nutrient dense meals.<sup>9</sup> Targeting schools can serve as an effective intervention for implementing current national dietary policy, as well as, positively impacting childhood obesity.<sup>9</sup>

### **Dietary Guidelines for Americans**

The DGA are designed to help individuals eat a healthier diet and live a healthier lifestyle. The 2015 DGA have five major guidelines which include the following “a healthy eating pattern across the lifespan; focus on variety, nutrient density, and amount; limit calories from added sugars and saturated fats and reduce sodium intake; shift to healthier food and beverage choices; and support healthy eating patterns for all.”<sup>4</sup> The DGA discusses the associations between eating patterns and health. A healthy eating pattern consists of consuming higher intakes of vegetables, fruits, and whole grains and lower intakes of meats, sugar-sweetened foods/beverages, and refined grains.<sup>4</sup> Scientific evidence suggests higher intakes of vegetables, fruits, and whole grains may be associated with lower body weight and may reduce the risk of cardiovascular disease.<sup>4</sup>

The DGA recommends consuming at least half of daily grain (three out of six daily servings) intake as whole grains.<sup>4</sup> Whole grains contain the entire kernel, including the endosperm, bran, and germ.<sup>4</sup> Refined grains have been processed to remove the bran and germ,

which also removes dietary fiber, iron, magnesium, and phytonutrients.<sup>4</sup> The best way to meet the whole grain recommendations is to choose products that are 100 percent whole grain for at least half of all grains consumed.<sup>4</sup> Whole grains provide a good source of nutrients, such as dietary fiber, zinc, manganese, folate, iron, copper, magnesium, thiamin, niacin, vitamin B6, phosphorus, selenium, riboflavin, and vitamin A.<sup>4</sup> The average intake of whole grains in the United States is below recommended levels across all age groups, while the average intake of refined grains is above the recommended levels for most age groups. The average American eats less than one whole grain serving a day and approximately 40% of Americans do not eat whole grains<sup>4</sup>

The 2015 DGA encourages children and adolescents to maintain caloric balance in order to support normal growth and development to prevent excess weight gain.<sup>4</sup> It also recommends that children and adolescents who are overweight or obese should adjust their dietary patterns and increase their physical activity to maintain or reduce their rate of weight gain while linear growth occurs.<sup>4</sup> The DGA is the basis of the dietary recommendations used by the USDA's NSLP and SBP, which feed more than 30 million children each day.<sup>4</sup>

### **National School Lunch Program**

The NSLP is a federally assisted meal program which is found in public and non-profit private schools.<sup>1</sup> The purpose of the NSLP is to provide nutritionally balanced lunches to school-aged children for either a low or no-cost.<sup>1</sup> The program was founded under the Richard B. Russell National School Lunch Act, which was signed into law by President Harry Truman in 1946.<sup>1</sup> The first year the program was founded, 7.1 million participated. In 2017, 30 million children and adolescents participated.<sup>1</sup>

For each reimbursable meal participating school districts and independent schools serve they receive cash subsidies and specified foods from the USDA.<sup>1</sup> However, participating school districts and independent schools must serve lunches that meet Federal meal pattern requirements. Following the enactment of the Healthy Hunger-Free Kids Act (HHFKA) in 2010, Federal meal pattern requirements include a daily serving of fruit (1/2 cup to 1 cup), a daily serving of vegetables (3/4 cup to 1 cup), plus a weekly requirement for dark green, red or orange, beans or peas, starchy, and other vegetables (3/4 cup to 1 cup), daily minimum for meat or meat alternates (1 ounce equivalent), and at least half of the grains offered daily must be whole grain (1 serving = 1 oz equivalent).<sup>1</sup> In 2018, the Trump administration rolled back the Obama-era rules on school lunches.<sup>18</sup> Under these new rules, only half of the grain products on the schools weekly menus must be whole grain-rich.<sup>18</sup> Foods that meet the whole grain-rich criteria must contain 100 percent whole grain or at least 51 percent whole grain in a blend of whole grain flour and enriched flour.<sup>1</sup> Schools that are compliant with the federal meal pattern receive an extra six cents for each lunch administered.<sup>1</sup> For the USDA foods, each state selects the foods for their schools from a list which is purchased by the USDA.<sup>11</sup> In addition to cash subsidies and USDA foods, Food and Nutrition Services (FNS) provides training and technical assistance to school nutrition professionals.<sup>1</sup> This service enables nutrition professionals to prepare and serve nutritionally balanced lunches that appeal to children and meet the program meal requirements.<sup>1</sup>

Currently, children are determined eligible for free meals if they participate in particular Federal Assistance Programs, including the Supplemental Nutrition Assistance Program (SNAP), are homeless, migrant, runaway, or a foster child, are enrolled in a Head Start Program or other state-funded pre-kindergarten program, or come from a family with incomes that fall below 130

percent of the Federal poverty line (free lunch) or incomes between 130-185 percent of the Federal poverty line (reduced priced lunch).<sup>1</sup> Reduced price lunches must not be over 40 cents per child.<sup>1</sup>

### **School Breakfast Program**

The SBP is a federally assisted meal program found in public schools, non-profit private schools, and child care establishments.<sup>19</sup> In 1975, Congress made the SBP a permanent entitlement program.<sup>19</sup> Participation in the SBP has grown over the years reaching 14.6 million children in 2017.<sup>19</sup> Similar to the NSLP, school districts and independent schools must serve breakfast meals that are compliant with the federal nutrition requirements and offer free or reduced-price breakfasts to children that are eligible.<sup>1,19</sup> Federal nutrition requirements include a fruit serving (1 cup), and at least half the grains offered must be whole grains (1 serving = 1 ounce equivalent).<sup>19</sup> For each reimbursable breakfast that participating school districts and independent schools serve, they receive cash subsidies and specified foods from the USDA.<sup>19</sup> In addition to the traditional cafeteria based breakfast, schools are also able to implement breakfast in the classroom or a grab and go style breakfast.<sup>19</sup> Breakfast in the classroom involves serving breakfast to children while the teacher is taking attendance or giving morning announcements.<sup>19</sup> Grab and go breakfast involves serving children breakfast in a to go bag during a morning break or before school begins.<sup>19</sup> The eligibility requirements for the SBP are the same as the NSLP.<sup>1,19</sup>

### **Healthy, Hunger-Free Kids Act of 2010**

The Healthy, Hunger-Free Kids Act of 2010 (HHFKA) allows low income children increased access to healthy food and allows funding for federal school meal and child nutrition programs.<sup>20</sup> It improves nutrition and focuses on reducing childhood obesity by setting nutritional standards, providing additional funding to schools to meet the updated nutritional

requirements, helps communities establish local farm to school networks and school gardens, improves nutritional quality of commodity foods, expands drinking water access, sets basic standards for school wellness policies, promotes nutrition and wellness in child care establishments, and expands support for breastfeeding.<sup>20</sup> Before the Healthy, Hunger-Free Kids Act was implemented, findings on school meals were startling. Children ate few vegetables and fruits (consisting of mostly potatoes), excessive intake of refined grains, excessive sodium

**Table 1. Current Federal Nutrition Requirements for School Meals<sup>1,19</sup>**

	National School Lunch Program (NSLP)	School Breakfast Program (SBP)	Both NSLP and SBP
<b>Fruits</b>	A daily serving (½ cup to 1 cup)	1 cup serving	Students must select at least ½ cup of fruit or vegetable
<b>Vegetables</b>	A daily serving (¾ cup to 1 cup) plus a weekly requirement for dark green, red, orange, beans/peas, starchy, and other		Students must select at least ½ cup of fruit or vegetable
<b>Meat/Meat Alternates</b>	Daily minimum and weekly ranges (1 oz. equivalent)	Daily meat/meat alternate (1 oz. equivalent)	
<b>Dairy</b>			Fat-free (unflavored or flavored) and unflavored low-fat only

<b>Grains</b>	At least half of the grains offered must be whole grain (1 serving = 1 oz. equivalent)	At least half the grains offered must be whole grain (1 serving = 1 oz. equivalent)	By 2014, all grains should be whole grain-rich Daily minimum and weekly ranges
<b>Fat</b>			<i>Trans Fat:</i> limited to zero grams/serving <i>Saturated Fat:</i> limited to < 10% of calories
<b>Caloric Intake</b>			Calorie ranges with minimum and maximum levels

intake, excessive saturated fat intake, and children were eating more than 500 excess calories from added sugars and solid fats every day at school.<sup>20</sup> The HHFKA encouraged schools to follow the dietary guidelines and increased quantities of fruits and vegetables offered at all meals, increased variety of vegetables offered, increased servings of whole grains, reduced trans-fat, saturated fat, and sodium, serving low-fat and non-fat dairy products only, reduced portion sizes and established calorie ranges, and expanded access to drinking water.<sup>20</sup> One of the purposes of the HHFKA is to reduce childhood obesity and encourage healthier lifestyles.<sup>20</sup> This is done by directly impacting children through providing school meals and physical activity during school hours.<sup>20</sup>

## HealthierUS School Challenge

The goal of the HealthierUS School Challenge (HUSSC) is to promote healthier school environments to improve the health of children across America.<sup>21</sup> The HUSSC recognizes schools that go above and beyond federal nutrition requirements.<sup>21</sup> USDA-FNS recognizes schools that have made changes to improve the quality of food being served, provide students with nutrition education, and provide students with physical education/physical activity.<sup>21</sup> The HUSSC awards schools based on four levels bronze, silver, gold, and gold of distinction.<sup>21</sup> Schools must offer foods that ensure students can select a meal that meets all of the HUSSC criteria. These meals should highlight fruits, vegetables, whole grains, fat-free or low-fat milk and milk products, lean meats, poultry, fish, beans, eggs, and nuts.<sup>21</sup> These meals should also be low in trans-fat, saturated fat, cholesterol, sodium, and added sugars.<sup>21</sup> The number of times a food group must be served depends on the HUSSC level of achievement.<sup>21</sup> Table 2 and table 3 discuss the criteria for breakfast and lunch in further detail.

**Table 2. Breakfast Criteria for HUSSC Level of Achievement<sup>21</sup>**

Gold/Gold Award of Distinction	
<b>Fruits</b>	<ul style="list-style-type: none"> <li>• At least three different fruits must be offered each week on different days</li> <li>• Dried fruits cannot have added sweetener</li> <li>• Canned fruit must be packed in juice or light syrup</li> <li>• At least one fruit every week must be served fresh</li> </ul>
<b>Grains</b>	<p><i>Gold:</i></p> <ul style="list-style-type: none"> <li>• 70% of grains offered weekly are whole-grain rich</li> </ul> <p><i>Gold Award of Distinction</i></p> <ul style="list-style-type: none"> <li>• 100% of grains offered weekly are whole grain-rich</li> </ul>

**Table 3. Lunch Criteria for HUSSC Level of Achievement<sup>21</sup>**

Gold/Gold Award of Distinction	
<b>Vegetables</b>	<ul style="list-style-type: none"> <li>• Offer two additional ½ cup offerings weekly from any of three vegetable subgroups (dark green, red/orange, legumes)</li> </ul>
<b>Fruits</b>	<p><i>Gold:</i></p> <ul style="list-style-type: none"> <li>• Three fruits per week must be served fresh</li> </ul> <p><i>Gold Award of Distinction</i></p> <ul style="list-style-type: none"> <li>• Four fruits per week must be served fresh</li> </ul>
<b>Grains</b>	<ul style="list-style-type: none"> <li>• All grains offered must be whole grain-rich</li> </ul> <p><b>Whole Grain-Rich Variety:</b></p> <p><i>Gold:</i></p> <ul style="list-style-type: none"> <li>• At least three different types of whole grain-rich food offered during the week on different days</li> </ul> <p><i>Gold Award of Distinction</i></p> <ul style="list-style-type: none"> <li>• Same as Gold plus only 1 oz equivalent whole grain-rich offering per week may be a grain-based dessert in any serving line</li> </ul>

### **Whole Grain Consumption in Schools**

Research has shown that many US children prefer refined grain products over whole grain products.<sup>6,7</sup> Many children fall short of the whole grain recommendation while far exceeding the recommendation for refined grains.<sup>6,7</sup> School districts have faced many challenges and barriers while trying to incorporate whole grain products due to product acceptability among students.

## Benefits of Whole Grains

Whole grains contain a variety of nutrients and bioactive substances that can positively impact health.<sup>5,15,16,17</sup> Research consistently suggests that whole grains have the ability to lower the risk of chronic diseases such as cardiovascular disease, diabetes, metabolic syndrome, and certain types of cancer.<sup>5,15,16,17,18</sup> Whole grains may also play a role in weight management.<sup>5,19</sup> While there has been a push for individuals to increase whole grain intake many Americans fall short of meeting the recommendations by eating less than one daily serving.<sup>5</sup> However, many Americans are also exceeding the recommendations for refined grain intake.<sup>5</sup>

Cereals are the fruit or seed of plants that include wheat, rice, barley, corn, rye, oats, millet, sorghum, teff, and wild rice.<sup>4,7</sup> Whole grain products are derived using the whole seed or caryopsis during the manufacturing process.<sup>7</sup> The caryopsis is composed of three parts: the bran, the endosperm, and the germ.<sup>4,22,23,24</sup> The bran is the outer layer of the whole grain and is high in fiber, magnesium, B vitamins, and phytochemicals.<sup>4,22,23,24</sup> The middle layer is the endosperm consisting mostly of starch and protein and comprises the majority (75-80%) of the caryopsis.<sup>4,22,23</sup> The germ layer contains the embryo that germinates and grows into a plant. This layer contains tocopherols, thiamin, folic acid, magnesium, and other essential nutrients.<sup>4</sup>

The American Association of Cereal Chemists International (AACCI) state “Whole grains shall consist of the intact ground, cracked or flaked caryopsis, whose principal anatomical components—the starchy endosperm, germ, and bran—are present in the same relative proportions as they exist in the intact caryopsis.”<sup>26</sup> The FDA adopted this definition but added that at least 51% of the total weight of the product must be whole grain.<sup>26</sup> Refined grains go through a process that removes the bran and the germ layer leaving the starchy endosperm stripped of the majority of the nutrients contained in the intact caryopsis.<sup>26</sup> In the U.S., the

majority of whole grains consumed come from ready-to-eat cereals, yeast breads, hot cereals, popcorn, and crackers.<sup>26</sup>

Whole grains are a good source of B vitamins including thiamin, niacin, pantothenic acid, and biotin<sup>4,8,11</sup> Their bioavailability varies greatly in different whole grains. Typically, thiamin and pyridoxine have the greatest bioavailability.<sup>4,11</sup> These B vitamins play important roles as cofactors in the body.<sup>4,11</sup> Vitamin E is found in the germ layer of whole grains and acts as an antioxidant, preventing the oxidation of polyunsaturated lipids by free radicals.<sup>5,11</sup> Whole grains are also one of the richest dietary sources of magnesium.<sup>4,11</sup> Magnesium is a requirement for all phosphorylation processes in the body. Other minerals found in whole grains include iron, zinc, copper, and manganese, which play a role in regulatory and metabolic function in the body.<sup>4,8,11</sup> Whole grains also contain phytochemicals, which are non-nutrient bioactive compounds.<sup>12</sup>

### **Whole Grains and Cardiovascular Disease**

Whole grain consumption has been suggested to play a protective role in cardiovascular health.<sup>15,16,17</sup> Multiple epidemiological studies involving adults have investigated the association between whole grain intake and risk of coronary heart disease.<sup>15,16,17</sup> These studies found an increase in whole grain intake was inversely associated with risk of coronary heart disease.<sup>15</sup> Intake of whole grain bread and whole grain breakfast cereal were also found to contribute to a lowered risk of cardiovascular disease.<sup>15</sup>

Many cohort studies investigated the association between whole grain intake and risk of stroke.<sup>15</sup> Research found that there was a non-linear relationship between whole grain intake and the risk of stroke.<sup>15</sup> Risk of stroke was also not affected after whole grain intake reached 120-150 g/day.<sup>15</sup> It was concluded that there is no association between increased whole grain intake and risk of stroke.<sup>15</sup>

### **Whole Grains and Diabetes and Metabolic Syndrome**

Multiple epidemiological studies suggest that increasing whole grain intake can reduce the risk of type 2 diabetes.<sup>12</sup> The Women's Health Initiative found that increasing whole grain intake helped to reduce the risk of type 2 diabetes, while increasing refined grains increased the risk of type 2 diabetes.<sup>12</sup> The overall evidence-based research indicates the highest whole grain consumers consistently have a lower risk of developing type 2 diabetes.<sup>12</sup>

### **Whole Grains, Obesity, and Weight Management**

Whole grains are a rich source of both soluble and insoluble dietary fiber.<sup>13</sup> Dietary fiber has been shown to increase satiety.<sup>13</sup> Soluble dietary fiber can delay gastric emptying and slow intestinal transit, which can reduce the absorption rate of nutrients.<sup>13</sup> A reduction in the absorption rate of nutrients can increase the interaction between nutrients and the cells that release satiety hormones, ghrelin and leptin.<sup>13</sup> The dietary fiber in whole grains may help individuals feel full for a longer period of time due to its effects on bulking and viscosity.<sup>13</sup> Research from observational studies has shown that at least three servings or more of whole grains is associated with a lower body mass index (BMI), reduced weight gain, and reduced abdominal obesity.<sup>13</sup>

## CHAPTER III

### METHODS

#### **Institutional Review Board**

Protocols for this study were approved by the Texas Woman's University Institutional Review Board (IRB). Consent was procured from participating food service professionals prior to their participation in the survey. No names were associated with the data collected, and information gathered was kept confidential in a secured Excel document. A copy of the IRB approval letter for this study can be found in the appendix of this thesis.

#### **Sample and Recruitment**

School food service directors from schools listed on the USDA-FNS website in February and March 2018 as HUSSC Gold or Gold of Distinction schools were asked to participate in the survey. Contact information for each HUSSC Gold or Gold of Distinction school food service directors were found through each school district's Child Nutrition department online.

A database was created and contained the following information from recognized HUSSC Gold and Gold of Distinction Schools: state, school district name, school name, food service director name, food service director email, and food service director phone number. Food service directors were contacted through email to notify each individual about the importance of the survey. Email was also used as a method for food service directors to access the survey.

School food service professionals were recruited via email using the email addresses gathered from individual school district's websites to participate in the survey. The email invited food service directors and managers to participate and included a unique URL link to the web-based survey via SurveyMonkey. In order to open the survey a consent form appeared on the first page. Once a participant gave consent, they could access the survey questionnaire.

## Survey Instrument

The survey questions were created from the findings of an interview conducted with Sylvia Dunn in February 2008 at her office in Covington, LA.<sup>20</sup> At the time, Sylvia Dunn was the school food service director for St. Tammany Parish, LA, and had the distinction of achieving HUSSC Gold School status for all elementary schools in her school district. She successfully incorporated a daily serving of whole grains into all of her elementary schools during lunch. St. Tammany Parish elementary schools are still active in the HUSSC as Gold of Distinction in all of their elementary schools. The main focus of the interview was to answer the question “what are the indicators of success when incorporating whole grain foods into school meals?” Different methods used to successfully incorporate whole grain foods into school meals were identified from the interview with Mrs. Dunn.

The original survey was developed using the findings of the interview conducted with Mrs. Dunn and additional survey development resources, including: Don Dillman’s *Mail and Internet Surveys: The Tailored Design Method*<sup>21</sup> and Mildred L. Patten’s *Questionnaire Research: A Practical Guide*<sup>22</sup>. The final survey is made up of 30 multiple choice and open-ended questions focusing on identifying successful methods HUSSC Gold and Gold of Distinction Schools have used to incorporate whole grain foods into school meals. Two types of multiple-choice questions were used in this study: forced answer, where only one answer choice could be selected and the other allowing participants to check multiple answers for that particular question. For the original survey administered in 2008, three Texas food service directors provided input on the survey before it was finalized to confirm content, clarity and appropriate question length. The original survey created and deployed in 2008 was re-administered to schools awarded HealthierUS School Challenge Gold or Gold of Distinction in 2018.

### **Data Collection**

Data was collected using an online survey tool, SurveyMonkey, and was administered May 2018 – November 2018. To increase response rate, email reminders were sent every ten days to those individuals who had not completed the survey. During the first week of November, reminder phone calls were made to individuals who had not responded to the previous emails.

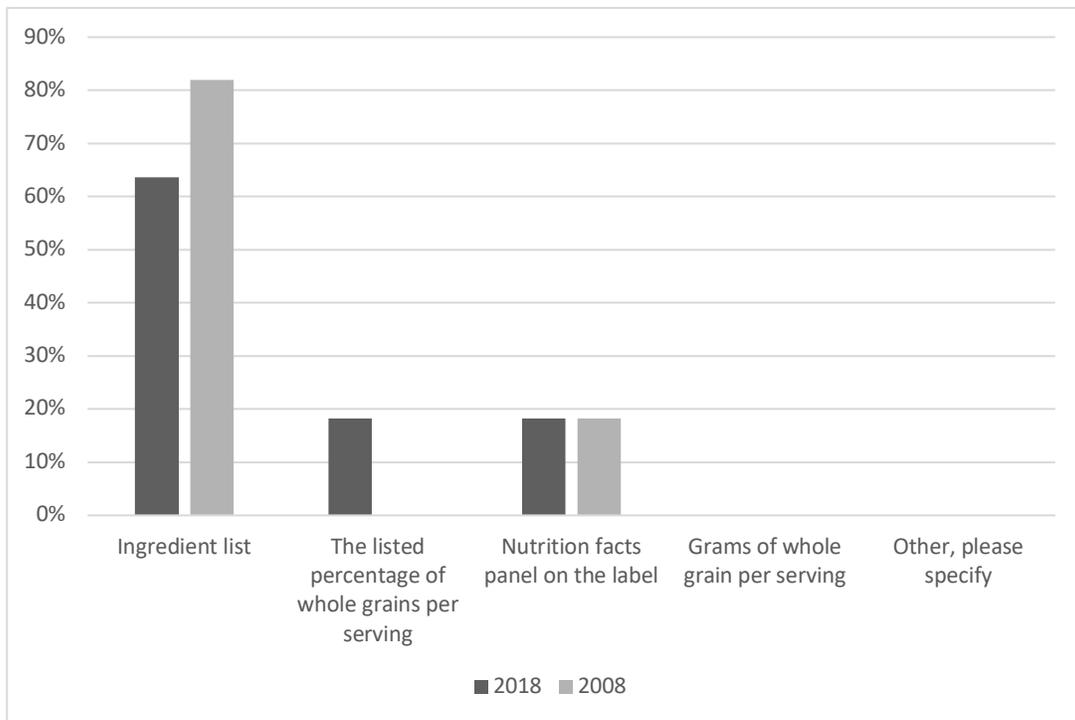
### **Data Analysis**

Following closure of the survey, all data were downloaded to Excel. Descriptive statistics including frequencies and percentages of responses were used to analyze the data. Findings from this 2018 study were compared to the findings of the 2008 survey. To compare surveys, descriptive statistics including percentages of responses to each question from 2008 and 2018 were used to develop bar graphs.

CHAPTER IV  
RESULTS

The following figures and tables represent responses gathered from the online survey used to determine the indicators of success in providing whole grains in school meals from 2018. Findings from this 2018 study are compared to the findings of the 2008 survey. There were 11 participating school districts in 2018 whereas there were 33 participating school districts in 2008. In 2018, there was an 18% response rate while in 2008 there was a 100% response rate. The following themes were used to organize and represent data for analysis: whole grain knowledge, whole grain foods, whole grain food items served, incorporation methods, barriers, educational/promotional tools, and USDA-FNS website information.

**Whole Grain Knowledge**



**Figure 1.** When looking at whole grain labels, what serves as the best indicator to you that the product is whole grain?

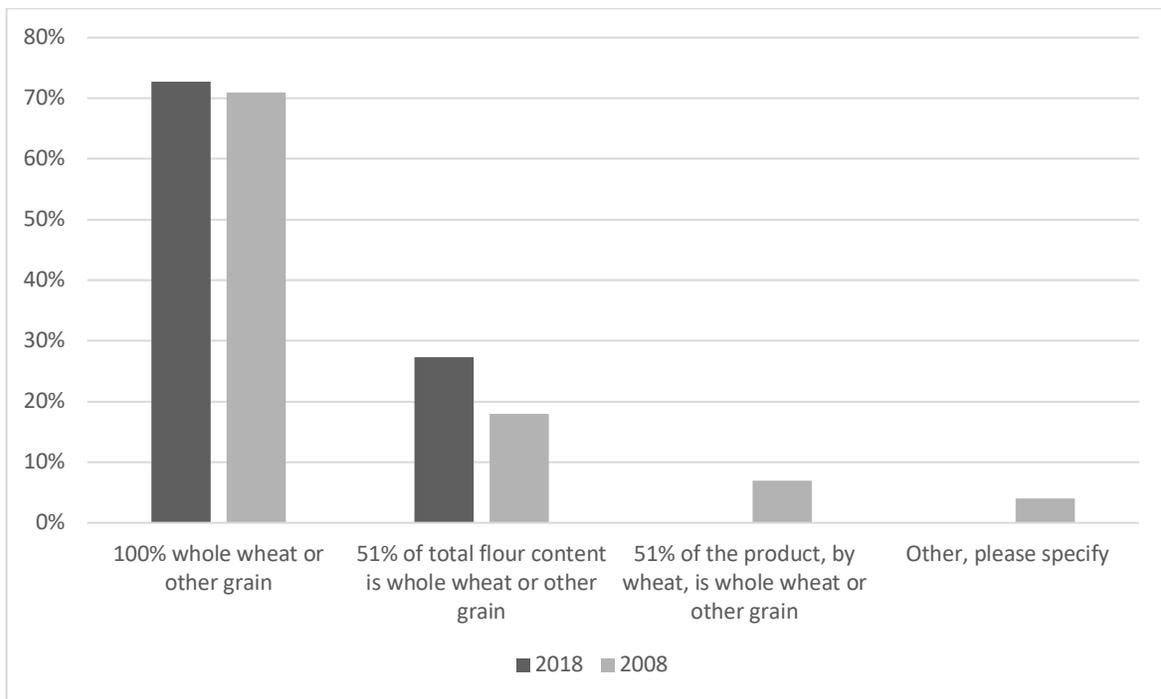
In both 2008 and 2018, the majority of participants found the ingredient list to be the best indicator that a product is whole grain (Figure 1). In 2018, 18% of participants also found the listed percentage of whole grains per serving to be an indicator that a product is whole grain while 0% of participants from 2008 did. Eighteen percent of participants in both 2018 and 2008 found the nutrition facts panel on the label to be a good indicator that a product is whole grain. Participants from 2008 and 2018 did not seem to use grams of whole grain per serving as an indicator that a product is whole grain.

**Table 4.** *How would you define the term "whole grain"?*

	<b>2018</b>	<b>2008</b>
<b>First/primary listed ingredient is "whole wheat"</b>	9%	31%
<b>A product that is 51% or more whole grain</b>	45%	23%
<b>Containing all 3 components: bran germ, endosperm</b>	27%	12%
<b>Not refined white flour, rice, and beans</b>	0%	12%
<b>Whole wheat flour</b>	9%	12%
<b>Outer covering not removed</b>	0%	8%
<b>Contains the entire grain seed</b>	0%	8%
<b>Not processed to take away the nutrient value of the grain</b>	0%	8%
<b>HealthierUS criteria</b>	9%	8%
<b>"Good source of whole grain"</b>	0%	4%
<b>100% whole wheat</b>	0%	4%
<b>50% or more grain in the product is whole wheat</b>	0%	4%

In both 2018 and 2008, a common theme that emerged from participant responses was that the food product ingredient label was used to determine if a product was whole grain (Table

4). First/primary listed ingredient is “whole wheat”, a product that is 51% or more whole grain, a product that is made from whole wheat flour, food labels such as “good source of whole grain”, and a product that fits the HealthierUS School Challenge criteria were considered product label identifiers. However, in 2008 the majority of participants (31%) used the first/primary ingredient as “whole wheat” to define the term “whole grain” while in 2018, 9% of participants used this term. In 2018, the majority of the participants (45%) used a product that is 51% or more whole grain to define the term “whole grain”. Twenty-seven percent of participants in 2018 and 12% of participants in 2008 defined the term “whole grain” as containing all three principle components of the cereal grain: bran, germ, and endosperm.

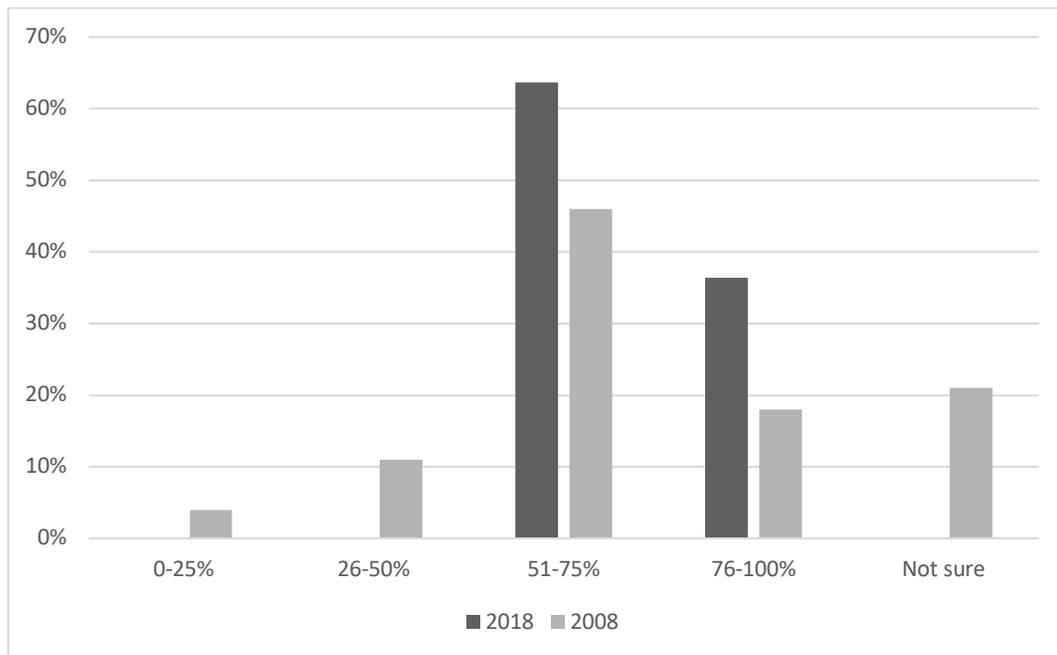


**Figure 2.** How do you interpret the phrase, "this is a 100% whole grain food"?

Participants of this survey were asked how they would interpret the phrase “this is a 100% whole grain food”. The majority of participants in both 2018 and 2008 indicated that a 100% whole grain food is comprised of 100% whole wheat or other grain (Figure 2). Twenty-

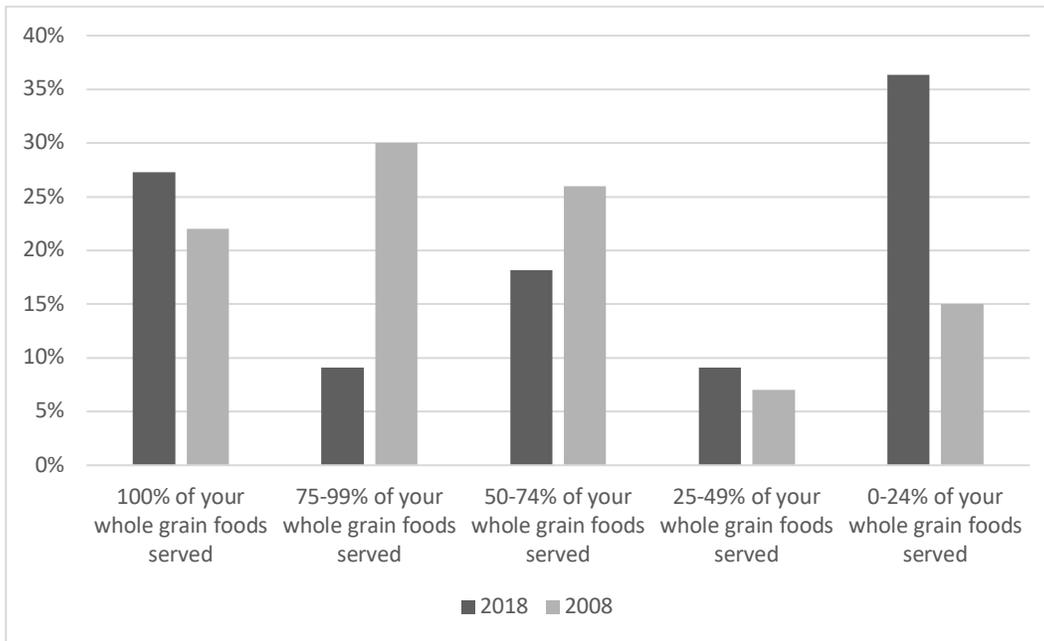
seven percent of participants in 2018 and 18% of participants in 2008 indicated that a 100% whole grain food is comprised of 51% of the total flour content is whole wheat or other grains. While, zero percent of participants in 2018 and 7% of participants in 2008 indicated that a 100% whole grain food is comprised of 51% of the product, by weight, as whole wheat or other grain.

### Whole Grain Foods



**Figure 3.** *What percent of whole grain is in the foods that you currently serve in your schools?*

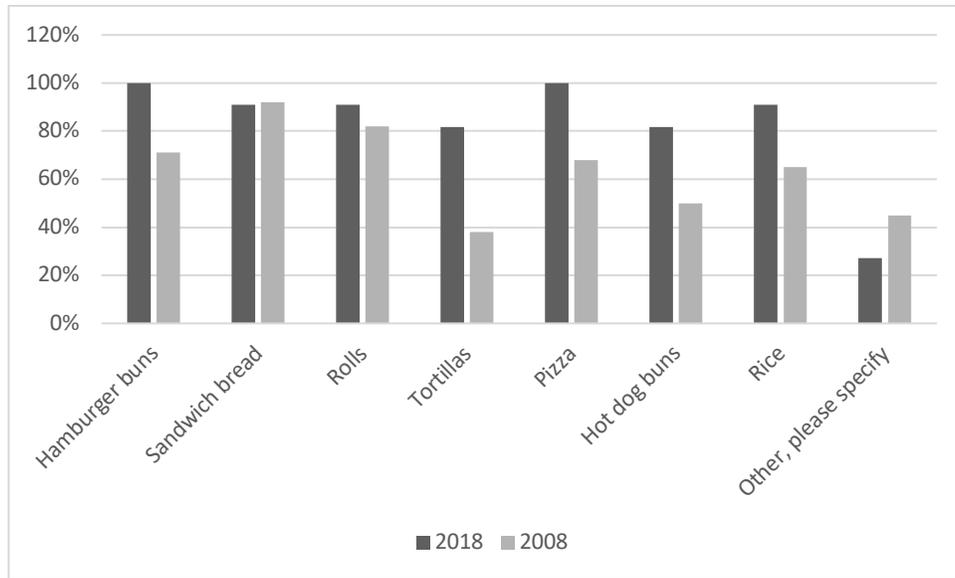
HUSSC Gold school food service professionals were asked what percent of whole grain is in the foods that are currently being served in their schools (Figure 3). Sixty-three percent of participants in 2018 and 46% of participants in 2008 indicated that the percentage of whole grain in foods currently served in schools was 51-75%. Thirty-six percent in 2018 and 18% in 2008 indicated that the percentage of whole grain in foods currently served in schools was 76-100%. While, 11% in 2008 indicated the percentage of whole grain in foods was 26-50% and 4% in 2008 indicated the percentage of whole grain in foods was 0-25%.



**Figure 4.** *What percentage of your whole grain requirement is met by using 100% whole wheat?*

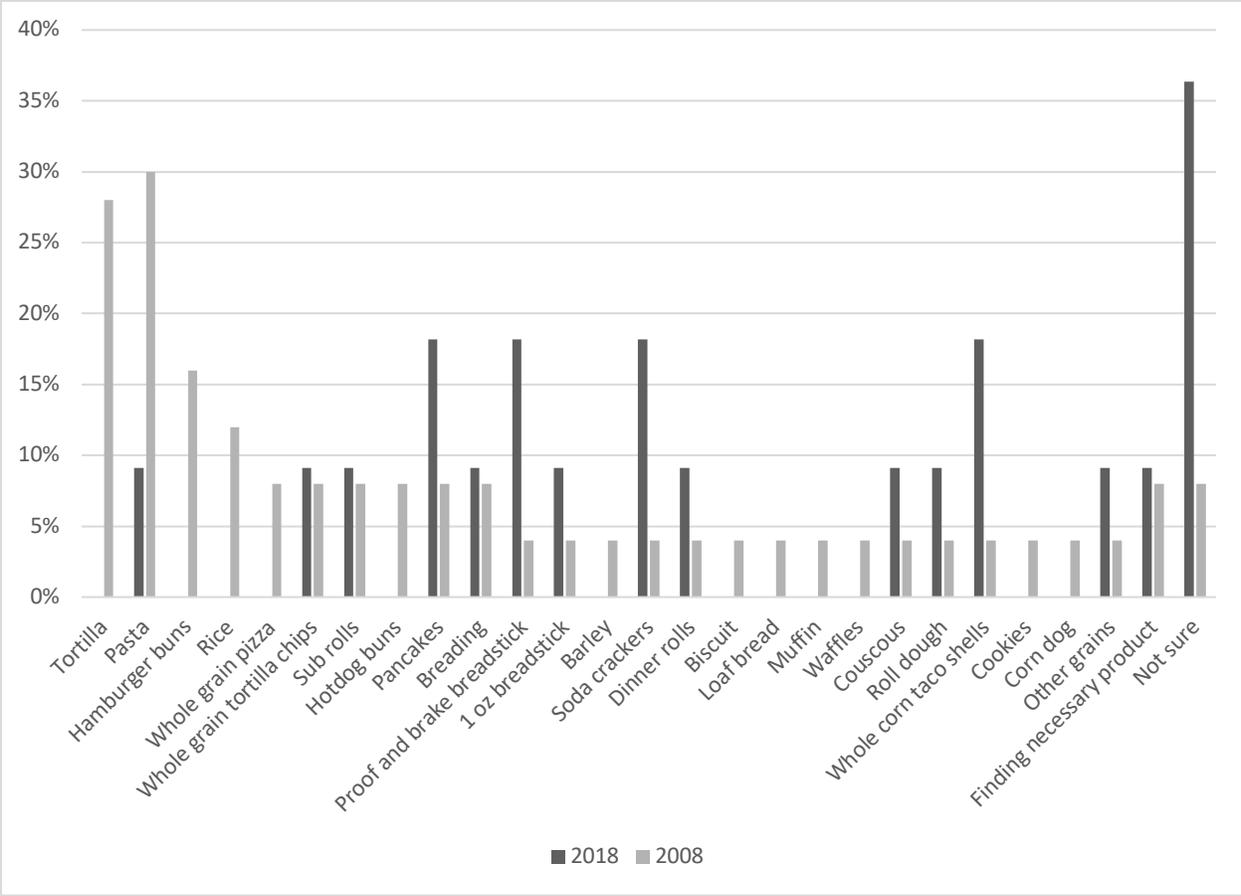
Survey participants in 2018 and 2008 were asked what percentage of their whole grain requirement is met by using 100% whole wheat. Twenty-seven percent of participants in 2018 and 22% of participants in 2008 indicated that 100% of whole grains served were met by using 100% whole wheat. In 2018, 9% of participants and in 2008, 30% of participants indicated that 75-99% of whole grains served in schools were met using 100% whole wheat. Eighteen percent of participants in 2018 and 26% of participants in 2008 indicated that 50-74% of whole grains served were met using 100% whole wheat. Nine percent of participants in 2018 and seven percent of participants in 2008 indicated that 25-49% of whole grains served were met using 100% whole wheat. Thirty-six percent of participants in 2018 and 15% of participants in 2008 indicated that 0-24% of whole grains served were met using 100% whole wheat.

## Whole Grain Food Items Served



**Figure 5.** *What types of whole grain foods are your students currently eating?*

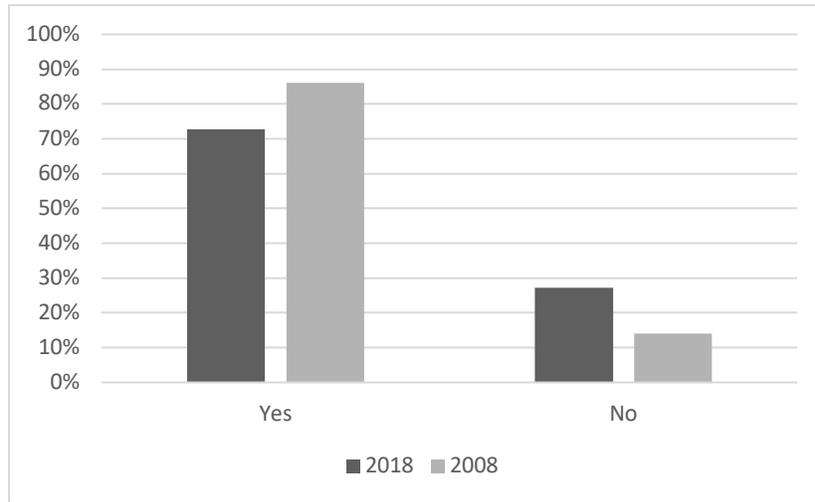
In 2018, hamburger buns (100%) and pizza (100%) were the most commonly served foods in HUSSC Gold schools (Figure 5). Sandwich bread (90%), rolls (90%), rice (90%), tortillas (81%), and hotdog buns (81%) were the next most commonly served foods. Rice and tortillas are available as USDA commodity products. In 2008, sandwich bread (93%) was the most commonly served food in HUSSC Gold schools followed by rolls (82%), hamburger buns (71%), pizza (68%), and rice (64%). These responses revealed that in 2018 the most commonly served foods were similar to those in 2008. However, hamburger buns and pizza grew in popularity over the past ten years in HUSSC Gold schools. Other responses include: pasta, biscuits, saltine crackers, eggrolls, cookies, corn tortilla chips, whole grain cereals, and whole grain breakfast entrees (pancakes, banana bread, muffins, etc.)



**Figure 6.** *If you could purchase 3-4 additional whole grain food products available on the market to offer in your schools, what would they be?*

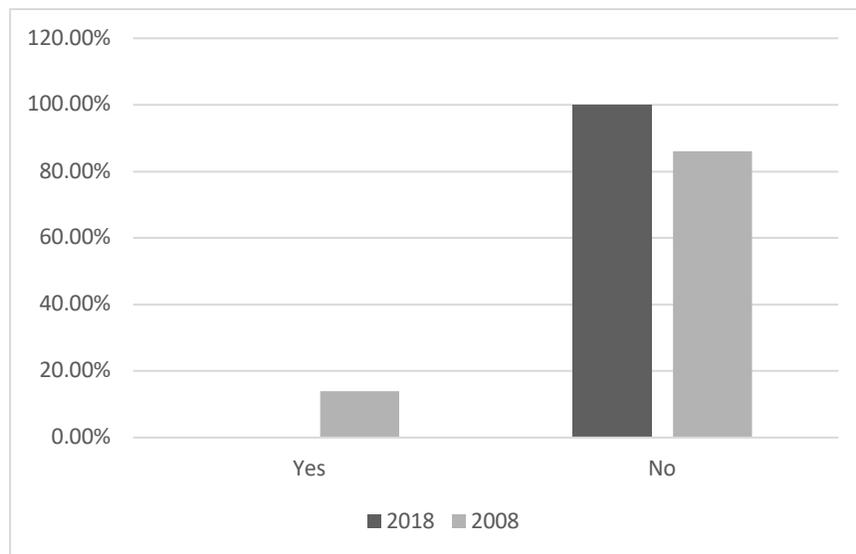
Food service professionals in 2008 and 2018 were asked what additional whole grain food products they would like to offer in schools (Figure 6). In 2018, participants indicated they would like to see pancakes (18%), proof and bake breadsticks (18%), soda crackers (18%), whole grain taco shells (18%). In addition, participants would also like pasta (9%), whole grain tortilla chips (9%), sub rolls (9%), breading (9%), 1 oz. breadsticks (9%), dinner rolls (9%), couscous (9%), and roll dough (9%). In 2008, participants indicated they would like to see tortillas (28%), pasta (20%), hamburger buns (16%), and rice (12%). In addition, participants would also like whole grain pizza (8%), hotdog buns (8%), pancakes (8%) and dinner rolls (4%). Over the past ten years, more whole grain food products have been made available on the

market. This is seen in the results as there is a shift of which products participants would like to purchase.



**Figure 7.** *Have you ever requested your vendors to carry specific whole grain foods to serve in your schools?*

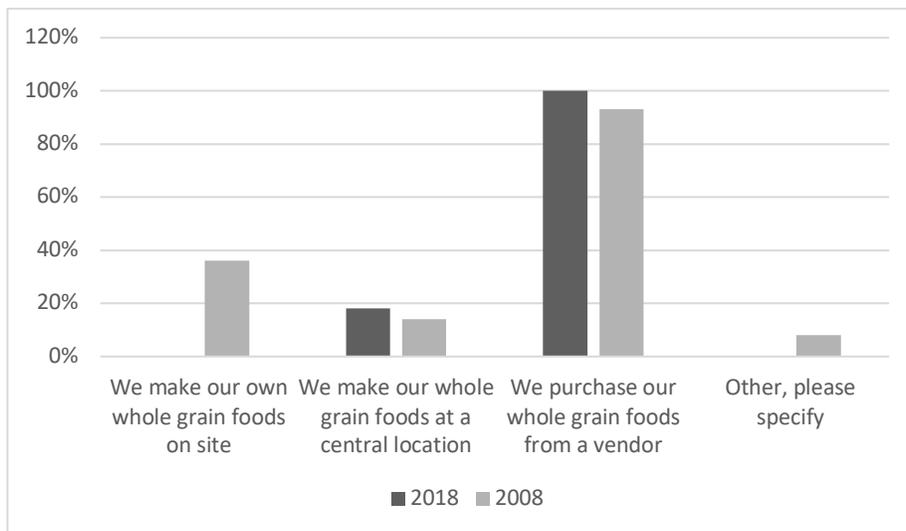
The majority of participants in both 2018 (72%) and 2008 (86%) indicated they had requested vendors to carry specific whole grain foods to serve in their schools (Figure 7).



**Figure 8.** *Compared to your award-winning elementary school(s), is there any difference in the types of whole grain foods that you offer at your elementary schools versus your intermediate/junior high schools and high schools?*

Food service professionals were asked to compare the types of whole grains served in elementary schools to intermediate/junior high schools and high schools in their school district to determine if there was a difference in the types of whole grains offered (Figure 8). In 2018, 100% of participants reported that there was no difference in whole grains offered in elementary, intermediate/junior high schools, and high schools. In 2008, 86% of participants reported that there was no difference in whole grains offered while only 14% of participants reported that there was a difference in whole grains offered in elementary, intermediate/junior high schools, and high schools.

### Incorporation Methods

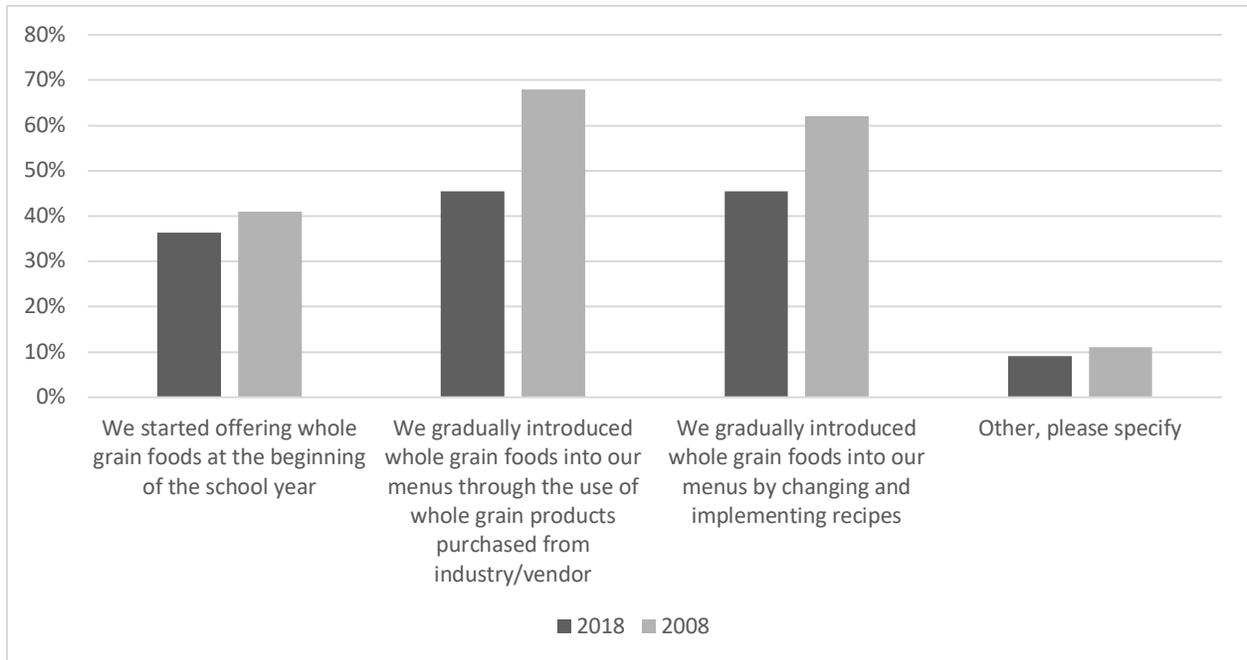


**Figure 9.** *What steps did you take to comply with the criteria for the HealthierUS School Challenge?*

*Other responses include: “We purchased only one item” and “All purchased bread products are whole wheat: (2008)*

The majority of participants in 2018 (100%) and 2008 (93%) indicated that they purchase whole grain foods from a vendor in order to comply with the criteria for the HealthierUS School Challenge (Figure 9). Eighteen percent in 2018 and 14% in 2008 indicated that they make their

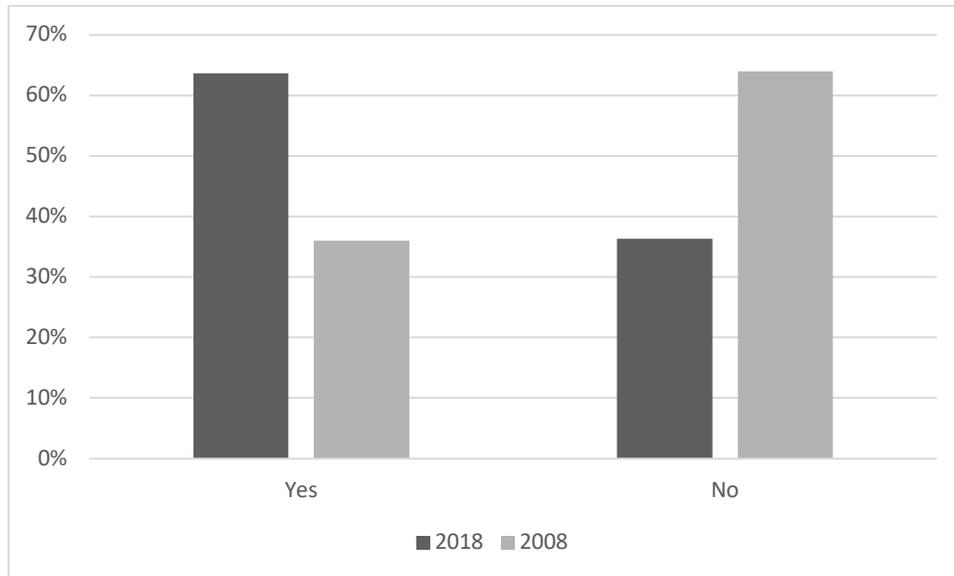
whole grain foods at a central location. Zero percent in 2018 and 36% in 2008 indicated that they make their own whole grain foods on site.



**Figure 10.** *How did you incorporate whole grain foods into your schools?*

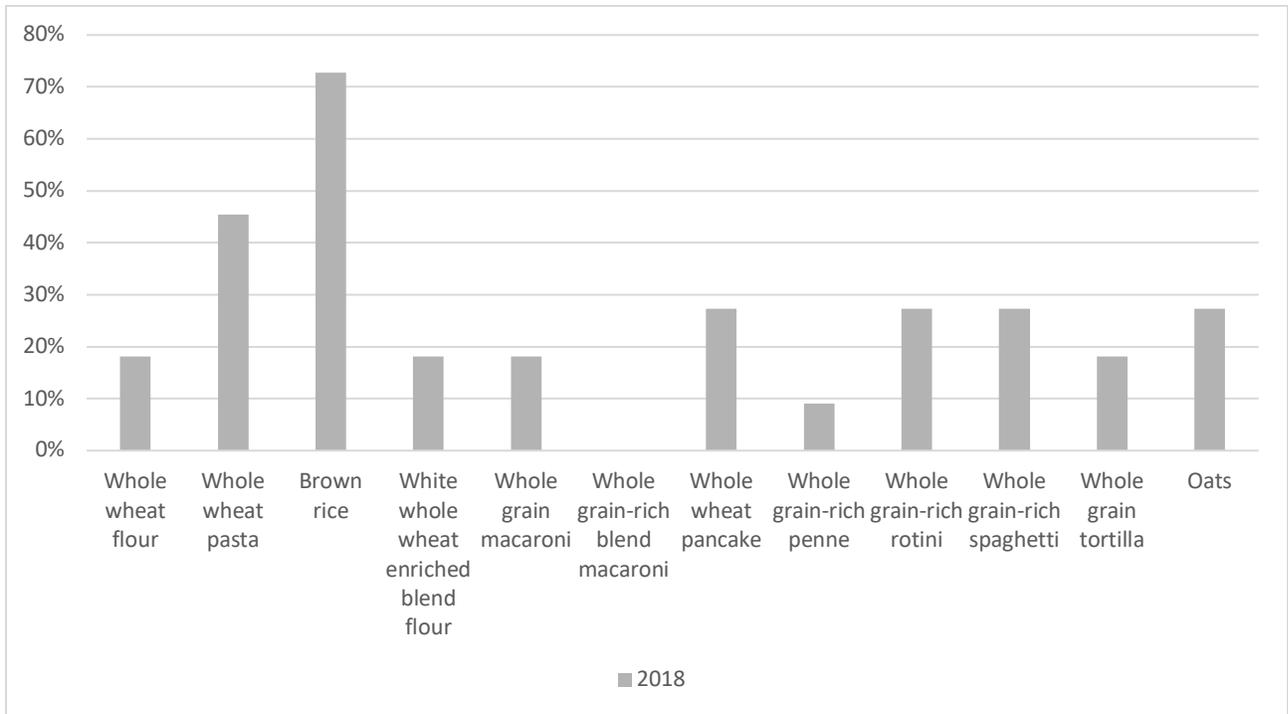
*Other responses include: transitioning to whole grains at the beginning of the school year, and the use of brown rice and whole wheat pastas (USDA commodity products)*

Food service professionals were asked how they incorporated whole grain foods into their schools (Figure 10). Thirty-six percent of participants in 2018 and 41% of participants in 2008 indicated they started offering whole grain foods at the beginning of the school year. Forty-five percent of participants in 2018 and 68% of participants in 2008 indicated they gradually introduced whole grain foods into their menus using whole grain products purchased from industry/vendor. Forty-five percent of participants in 2018 and 62% of participants in 2008 indicated they gradually introduced whole grain foods in their menus by changing and implementing recipes.

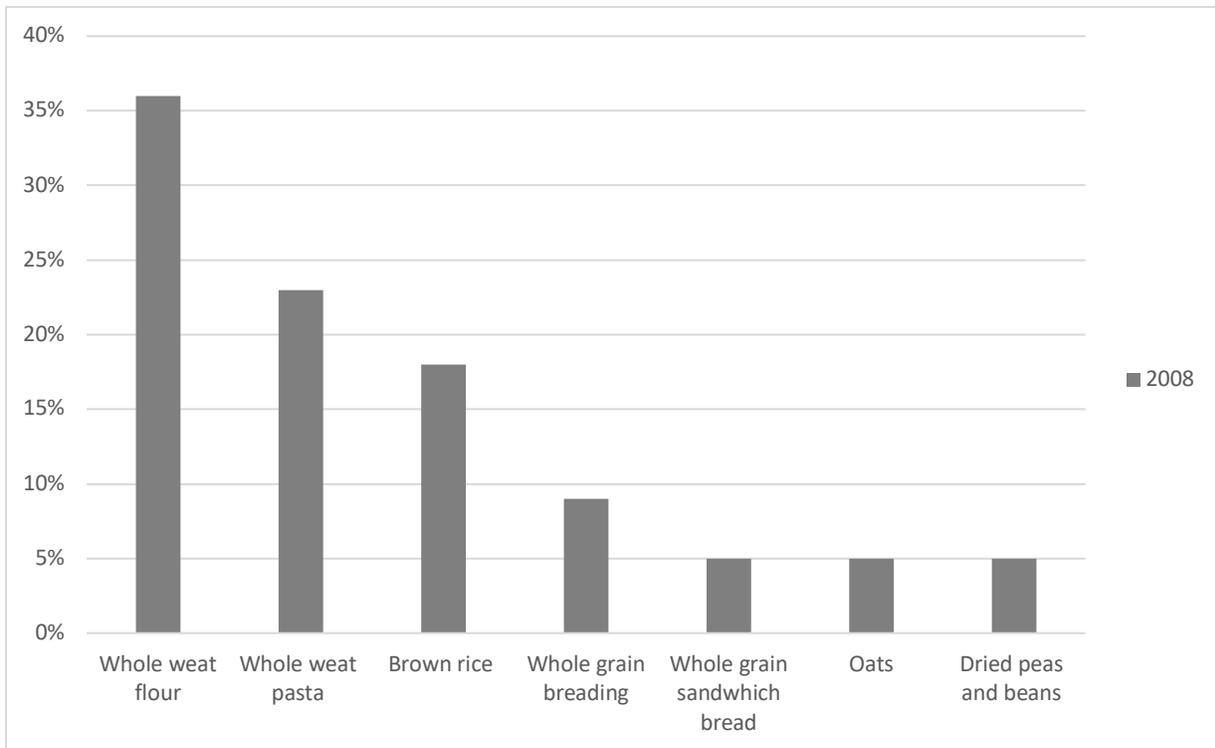


**Figure 11.** *Do you serve any of the whole grain food items or flour available from USDA-FNS?*

HUSSC Gold school food service professionals were asked if they served any whole grain food items or flour available from USDA-FNS (Figure 11). In 2018, 63% of participants indicated they did serve whole grain food items or flour available from USDA-FNS and 37% indicated that they did not. However, in 2008, only 36% of participants indicated they did serve whole grain food items or flour available from USDA-FNS and 64% indicated that they did not.



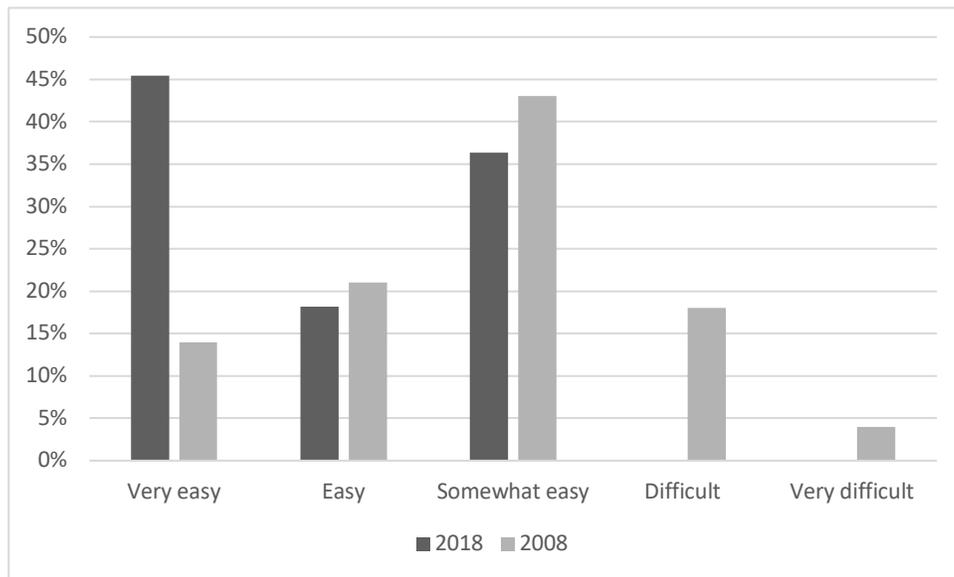
**Figure 12.** If you did serve whole grain food items or flour available from USDA-FNS, which items did you use? (2018)



**Figure 13.** If you did serve whole grain food items or flour available from USDA-FNS, which items did you use? (2008)

In 2018, brown rice (72%) was the primary item participants received from USDA-FNS followed by whole wheat pasta (45%), whole wheat pancake (27%), whole grain-rich rotini (27%), whole grain-rich spaghetti (27%), and oats (27%) (Figure 12). In 2008, whole wheat flour (36%) was the primary item participants received from USDA-FNS followed by whole wheat pasta (23%), brown rice (18%), whole grain breading (9%), whole grain sandwich bread (5%), oats (5%), and dried peas and beans (5%) (Figure 13).

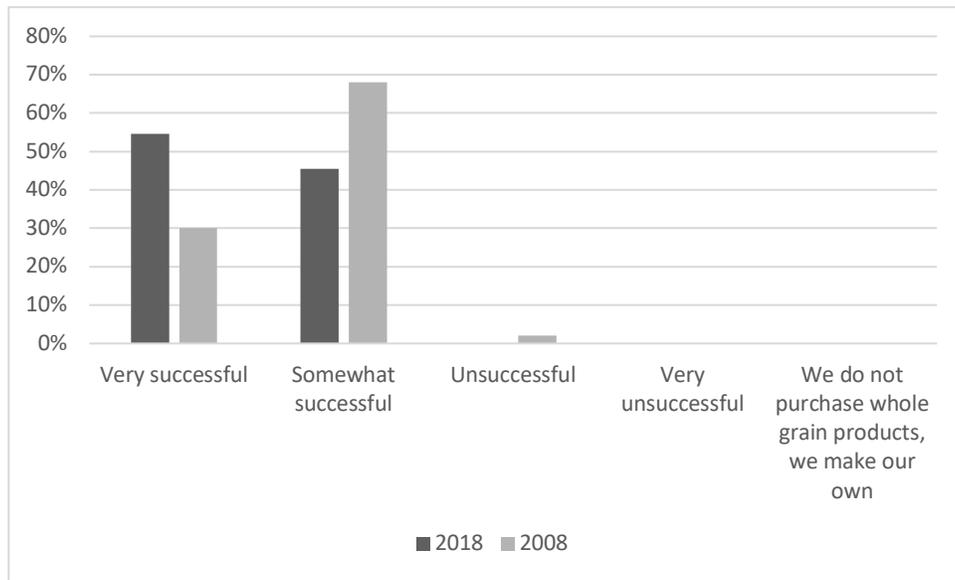
### Barriers



**Figure 14.** From a food service director's perspective, how easy or difficult has it been for you to find and purchase the whole grain foods served in your schools?

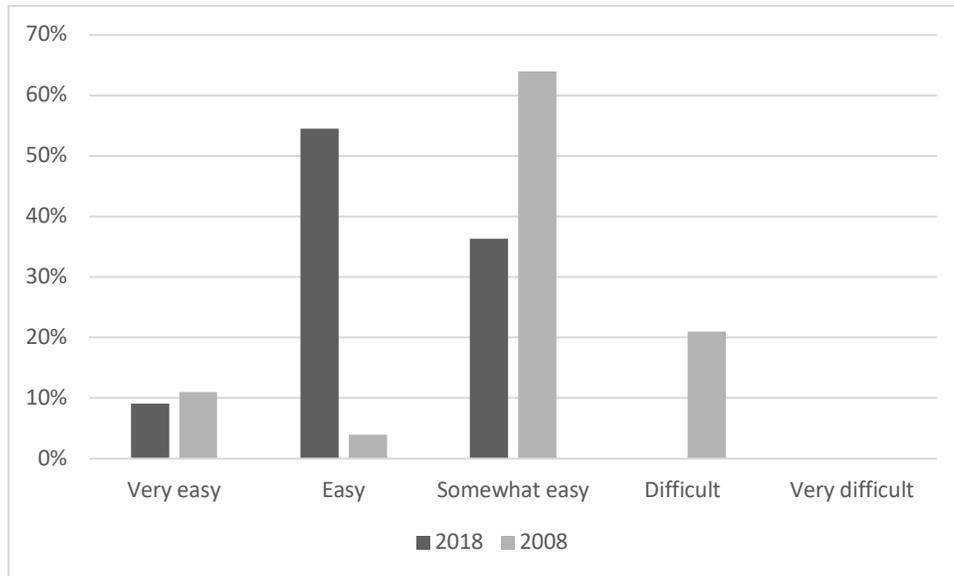
HUSSC Gold school food service professionals were asked how easy or difficult it has been to find and purchase the whole grain foods served in their schools (Figure 14). In 2018, 45% indicated it was very easy, 18% indicated it was easy, 36% indicated it was somewhat difficult, and 0% indicated it was difficult or very difficult to find and purchase whole grain foods served in their schools. In 2008, 14% indicated it was very easy, 21% indicated it was

easy, 43% indicated it was somewhat easy, 18% indicated it was difficult, and 4% indicated it was very difficult to find and purchase whole grain foods served in their schools.



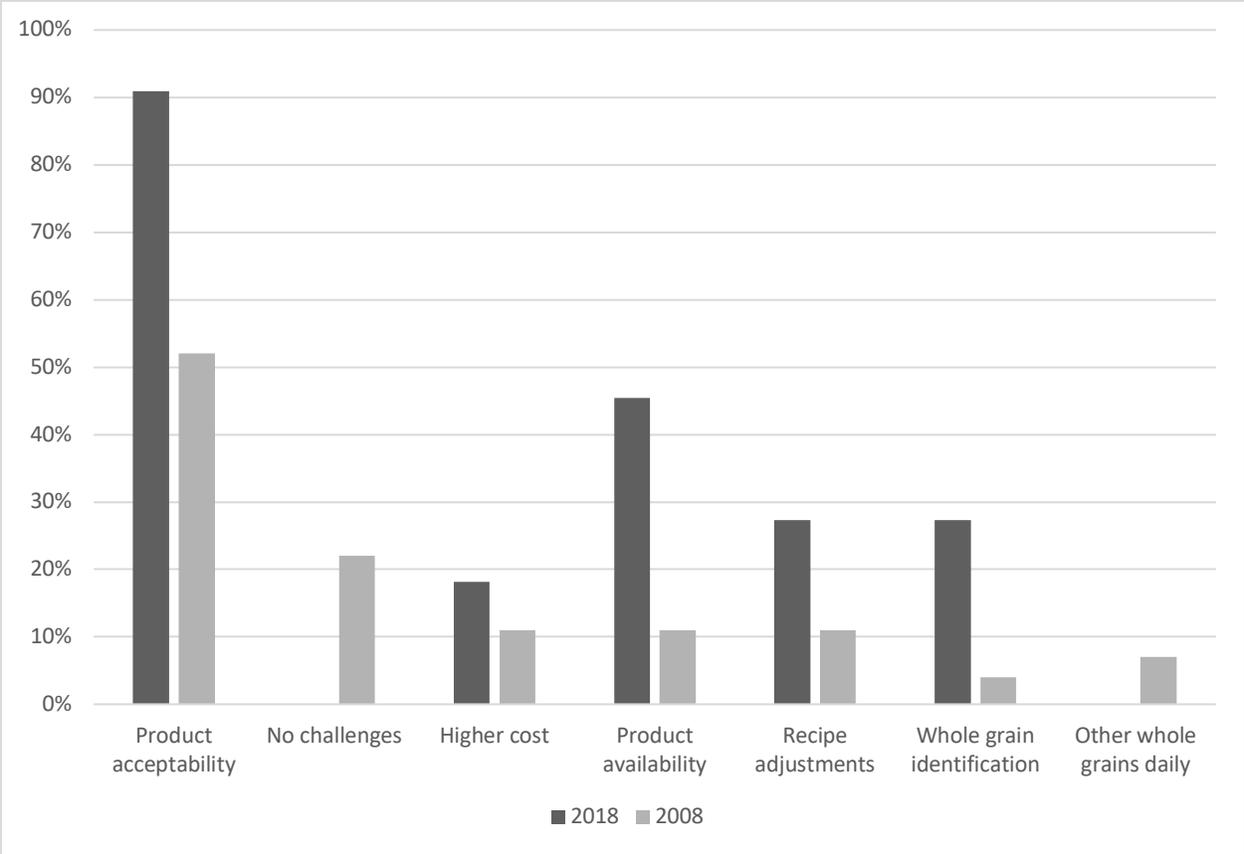
**Figure 15.** *How successful have you been in obtaining whole grain products from your vendors?*

In 2018, 54% of participants were very successful in obtaining whole grain products from vendors, compared to 30% in 2008. Forty-five percent of participants in 2018 were somewhat successful (Figure 15). While, 68% of participants were somewhat successful, and 2% of participants were unsuccessful in 2008.



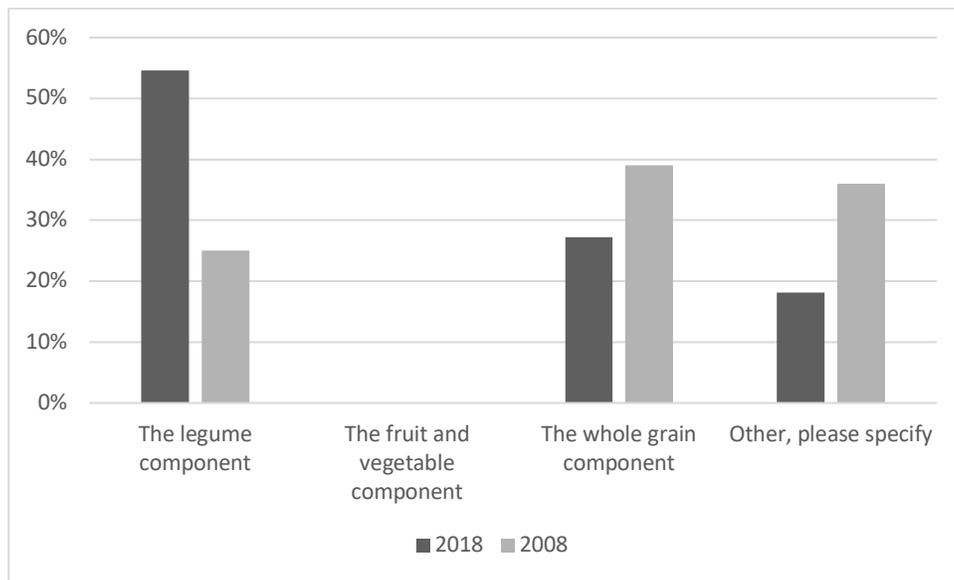
**Figure 16.** *How easy or difficult was it to meet the criteria for the HealthierUS School Challenge?*

HUSSC Gold school food service professionals were asked how easy or difficult it was to meet the criteria for the HealthierUS School Challenge (Figure 16). In 2018, 9% of participants indicated it was very easy to meet the criteria for the HealthierUS School Challenge, 54% of participants indicated that it was easy, and 36% of participants indicated that it was somewhat easy. In 2008, 11% of participants indicated it was very easy to meet the criteria for the HealthierUS School Challenge, 4% of participants indicated that it was easy, 64% of participants indicated that it was somewhat easy, and 21% indicated that it was difficult.



**Figure 17.** *What were specific challenges you have had to overcome when you added whole grain foods into your menus?*

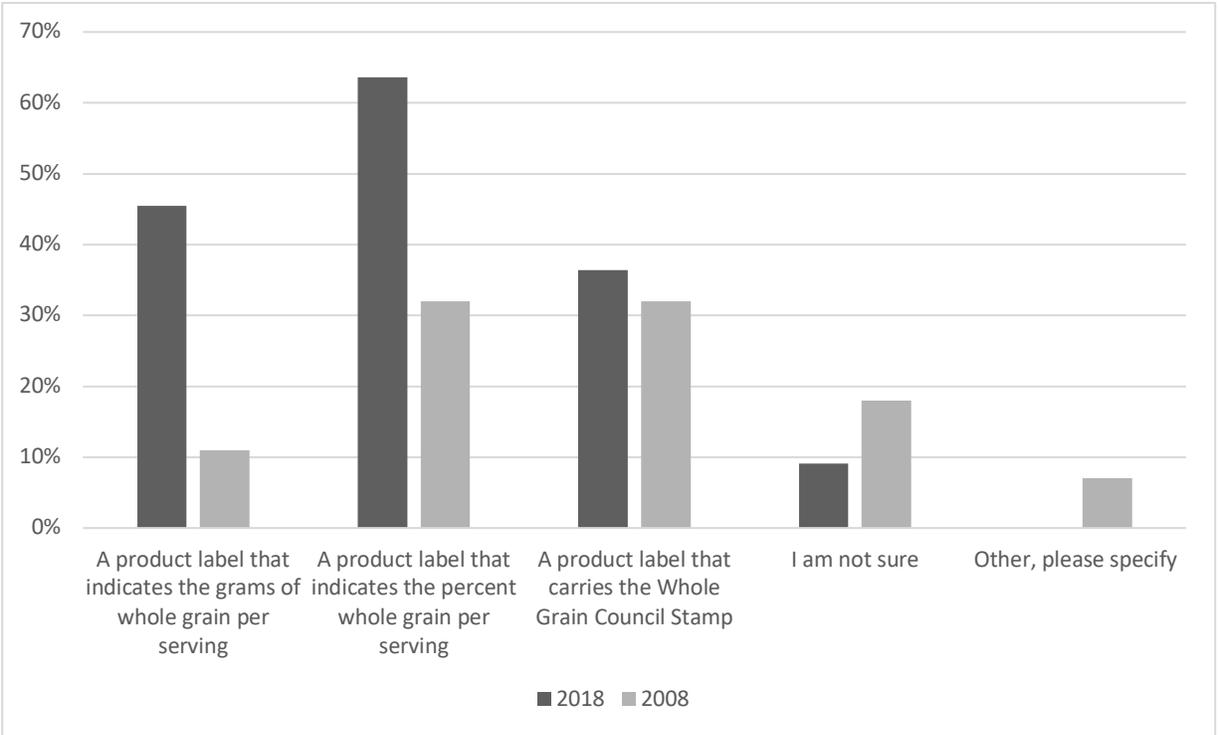
Food service professionals were asked what specific challenges they had to overcome when they added whole grain foods into their menus (Figure 17). In 2018, the majority of responses (90%) indicated that product acceptability was a challenge. Other challenges included product availability (45%), recipe adjustments (27%), whole grain identification (27%), and higher cost (18%). In 2008, over half of participants (52%) indicated that product acceptability was a challenge. Other challenges in 2008 include higher cost (11%), product availability (11%), recipe adjustments (11%), other whole grains daily (7%), whole grain identification (4%). While, 22% of participants indicate no challenges were experienced while incorporating whole grains into their menus.



**Figure 18.** *What was the hardest component of the HealthierUS School Challenge criteria to meet?*

*Other responses include: physical activity, upholding it even though the students do not like it or eat it at home, entrees under 40% calories from fat, application process, expense, dark green or orange fruits and vegetables, obtaining nutrition education information and physical activity information*

In 2018, 54% of participants indicated that the legume component was the hardest component of the HealthierUS School Challenge criteria to meet compared to 25% in 2008. The whole grain component was the hardest component to meet in 27% of participants in 2018 compared to 39% in 2008. Eighteen percent in 2018 responded “other” which included: physical activity, upholding it even though the students do not like it or eat it at home. In 2008, thirty-six percent responded “other” which included: entrees under 40% calories from fat, application process, expense, physical activity, dark green or orange fruits and vegetables, obtaining nutrition education information and physical activity information. In both, 2018 and 2008 food service professionals did not find the fruit and vegetable component challenging to meet.

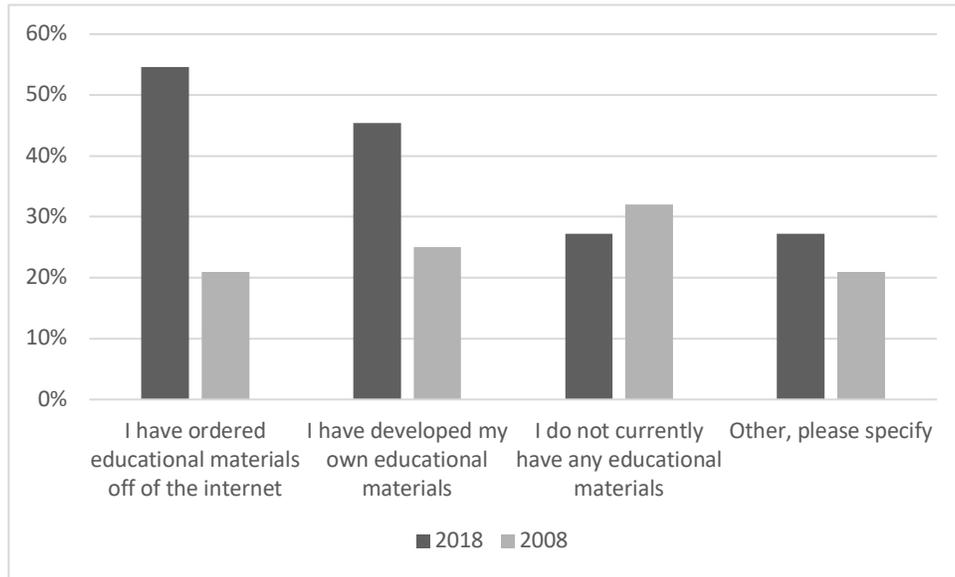


**Figure 19.** *What type of information would you like to see on grain food labels that would help you understand the product is a 100% whole grain food?*

HUSSC Gold school food service professionals were asked what type of information they would like to see on grain food labels that would help them understand that a product is a 100% whole grain food (Figure 19). In response, 45% of participants in 2018 and 11% of participants in 2008 indicated that a product label that indicates the grams of whole grain per serving would be helpful in understanding if a product is a 100% whole grain. Sixty-three percent of participants in 2018 and 32% of participants in 2008 indicated a product label that indicates the percent whole grain per serving would be helpful. Thirty-six of participants in 2018 and 32% of participants in 2008 indicated a product label that carries the Whole Grain Council Stamp would be helpful. Nine percent of participants in 2018 and 18% of participants in 2008 were not sure what would help them understand the product is a 100% whole grain food. Other responses

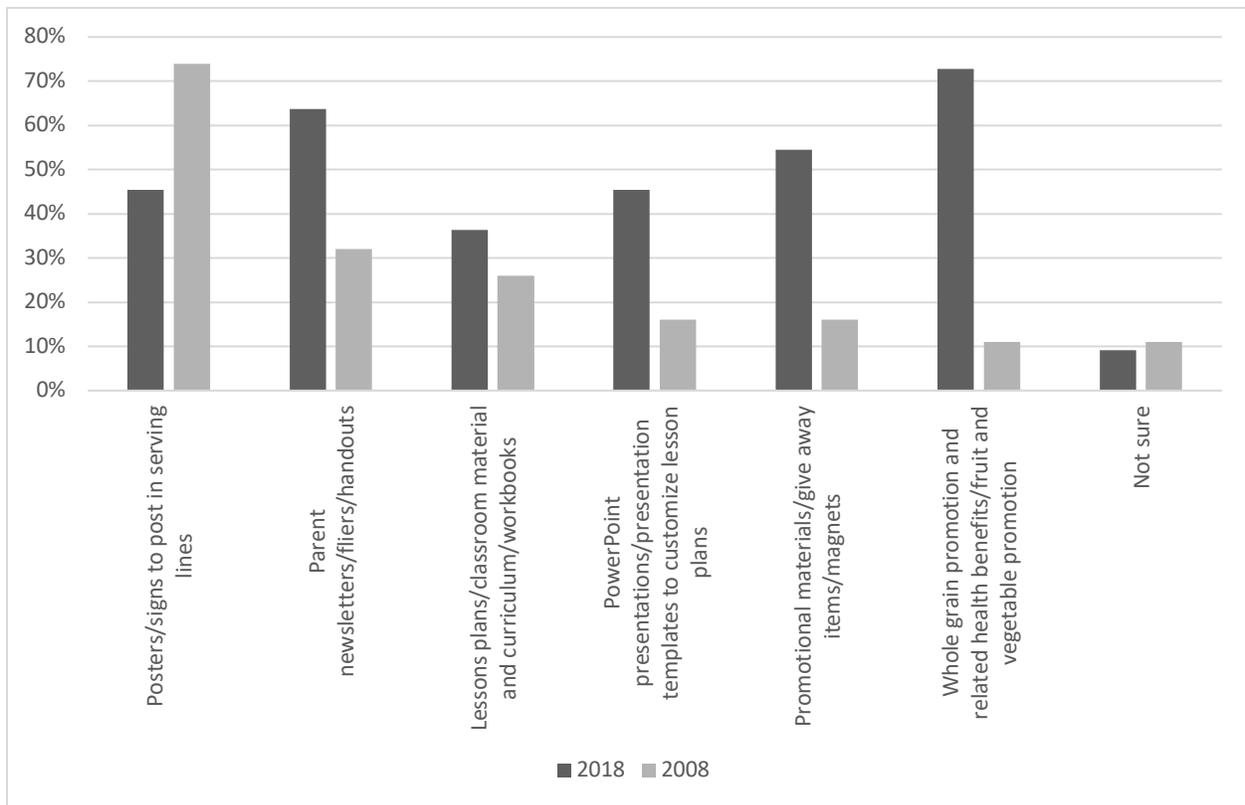
included: “depends on what is around the road for requirement” and “clearly identifying whole grain as the first ingredient”

### Educational and Promotional Tools



**Figure 20.** *What types of nutrition education tools do you use in order to promote whole grain food consumption in your schools?*

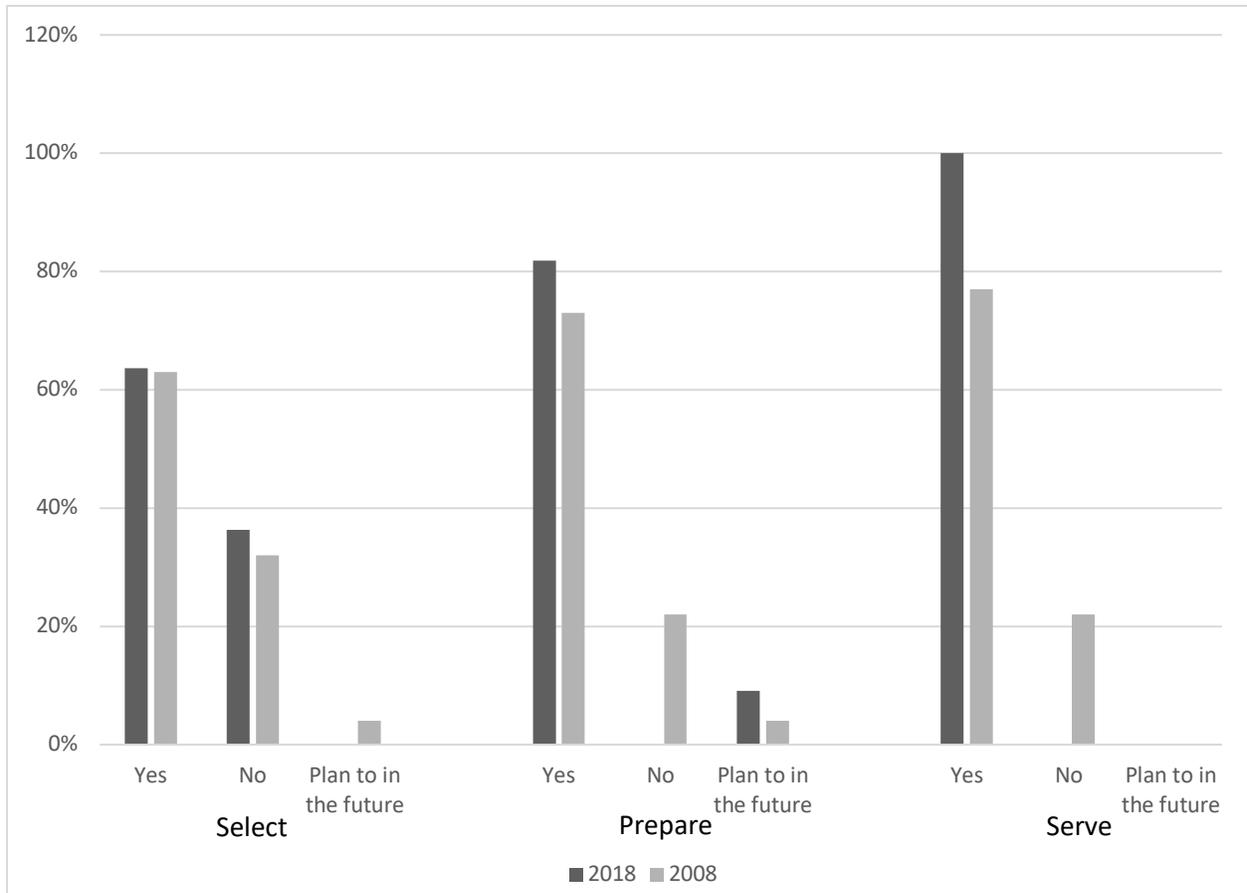
Participants were asked what types of nutrition education tools are used in order to promote whole grain food consumption in their schools (Figure 20). Fifty-four percent of participants in 2018 and 21% of participants in 2008 indicated that they have ordered educational materials off the internet. Forty-five percent of participants in 2018 and 25% of participants in 2008 indicated that they have developed their own educational materials. Twenty-seven percent of participants in 2018 and 32% of participants in 2008 indicate they do not currently have any educational materials. Other responses included: Chartwells Nutrition Education, newsletters and menus, materials from SNA and ADA, Idaho wheat commission materials, partner organization resources, MyPlate resources, and educational materials created by dietetic interns.



**Figure 21.** *What types of promotional materials would you like to see in your schools?*

HUSSC Gold school food service professionals were asked what types of promotional material they would like to see in their schools (Figure 21). Forty-five percent of participants in 2018 and 74% of participants in 2008 indicated they would like posters/signs to post in serving lines. Sixty-three percent of participants in 2018 and 32% of participants in 2008 indicated they would like parent newsletters/fliers/handouts. Thirty-six percent of participants in 2018 and 26% of participants in 2008 indicated they would like lesson plans/classroom materials and curriculum/workbooks. Forty-five percent of participants in 2018 and 16% of participants in 2008 indicated they would like PowerPoint presentations/presentation templates to customize lesson plans. Fifty-four percent of participants in 2018 and 16% of participants in 2008 indicated they would like promotional materials/give away items/magnets. Seventy-two percent of participants in 2018 and 11% of participants in 2008 indicated they would like whole grain

promotion and related health benefits/fruit and vegetable promotion. Nine percent of participants in 2018 and 11% of participants in 2008 indicated that they were unsure.

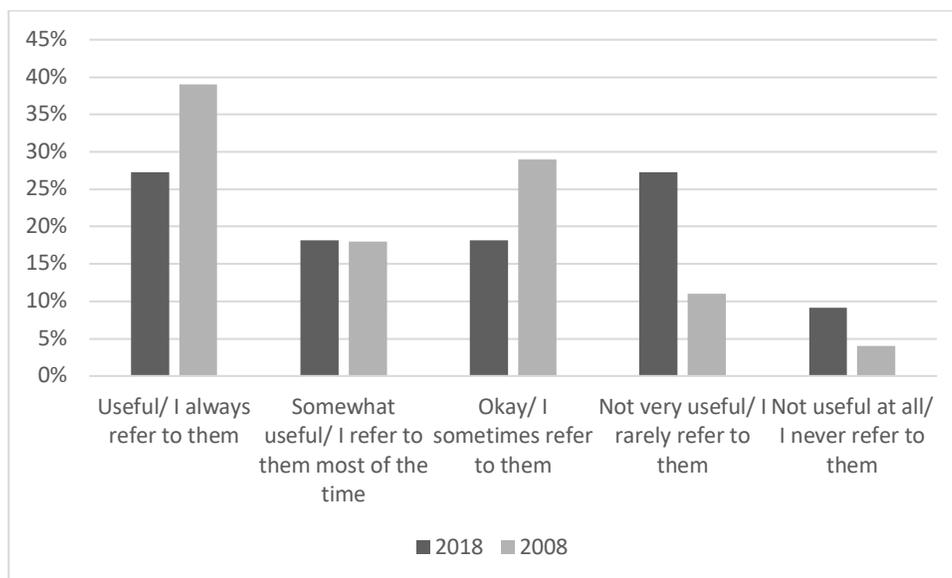


**Figure 22.** Have you performed any training with your food service personnel on how to select, prepare, or serve whole grain foods?

Participants were asked if they had performed any training with their food service personnel on how to select, prepare, or serve whole grain foods (Figure 22). In 2018, 63% indicated they had trained food service personnel on how to select whole grain foods, 81% indicated they had trained food service personnel on how to prepare whole grain foods, and 100% indicated they had trained food service personnel on how to serve whole grain foods. In 2008, 63% indicated they had trained food service personnel on how to select whole grain foods,

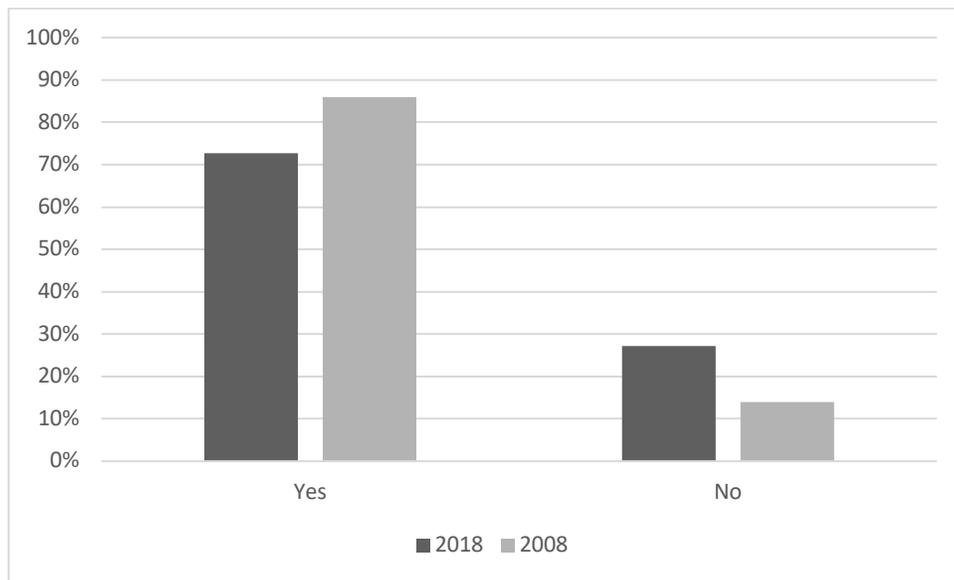
73% indicated they had trained food service personnel on how to prepare whole grain foods, and 77% indicated they had trained food service personnel on how to serve whole grain foods.

### USDA-FNS Website Information



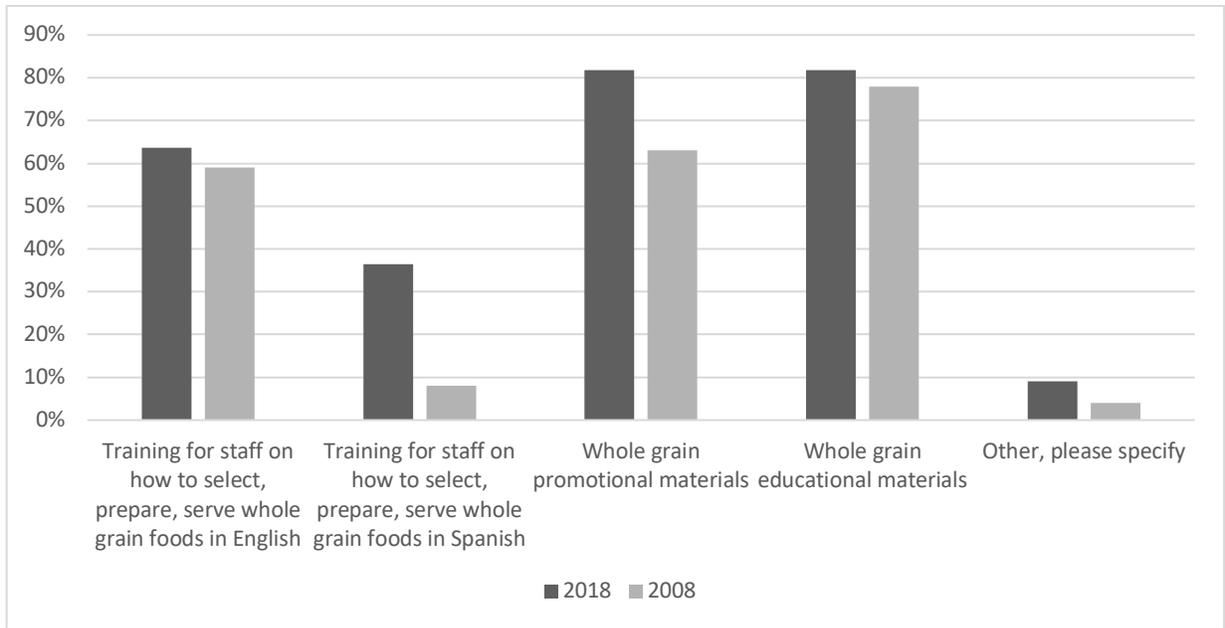
**Figure 23.** Please rate the usefulness of the current USDA-FNS website in terms of its resource material on whole grains.

HUSSC Gold School food service professionals were asked to rate the usefulness of current USDA-FNS website in terms of its resource material on whole grains (Figure 23). In response, 27% of participants in 2018 and 39% of participants in 2008 indicated it was “useful/I always refer to them”. Eighteen percent in 2018 and 2008 indicated it was “somewhat useful/I refer to them most of the time.” Eighteen percent of participants in 2018 and 29% of participants in 2008 indicated it was “okay/I sometimes refer to them”. Twenty-seven percent of participants in 2018 and 11% of participants in 2008 indicated it was “not very useful/I rarely refer to them”. Lastly, 9% of participants in 2018 and 4% of participants in 2008 indicated it was “not useful at all/I never refer to them”.



**Figure 24.** *The USDA-FNS website does not currently offer information concerning commercially available consumer whole grain food products that are also available to the school lunch program. Would adding this material to the website be useful to you?*

Seventy-two percent of participants in 2018 and 86% of participants in 2008 answered adding information to the USDA-FNS website concerning commercially available consumer whole grain food products available to the school lunch program would be useful to them (Figure 24). Twenty-seven percent of participants in 2018 and 14% of participants in 2008 indicated that it would not be useful to them.



**Figure 25.** Which of the following items would be useful for you and your staff if you could access this information on the USDA-FNS website? (check all that apply)

HUSSC Gold school food service professionals were asked which of the following items would be useful for them and their staff on the USDA-FNS website. In response, 63% of participants in 2018 and 59% of participants in 2008 indicated training for staff on how to select, prepare, and serve whole grain foods in English would be useful. Thirty-six percent of participants in 2018 and 8% of participants in 2008 indicated training for staff on how to select, prepare, and serve whole grain foods in Spanish would be useful. Eighty-one percent of participants in 2018 and 63% of participants in 2008 indicated whole grain promotional materials would be helpful. Eighty-one percent of participants in 2018 and 78% of participants in 2008 indicated whole grain educational materials would be helpful. Other responses included educational materials for both students and staff.

## CHAPTER V

### DISCUSSION

This study examined the indicators of success in providing whole grains in school meals for the HealthierUS School Challenge Gold rated schools in 2018. The findings of this study were compared to the 2008 findings and there were many similarities noted.

Food service professionals recognize that there are challenges and barriers in serving whole grain food products and have expressed the challenges they have encountered. Although there have been barriers while incorporating whole grain food products these food service professionals have still found ways to be successful in serving whole grains daily. Findings generated from this study and the previous study done in 2008 may provide assistance to other school districts who are interested in incorporating more whole grain products into their school meals.

#### **HUSSC Gold or Gold of Distinction Schools in 2018**

Food service directors have found successful ways of incorporating whole grain food products into their menus. In 2018, food service professionals have access to a wider variety of whole grain food products from vendors and 100% of food service professionals purchase their whole grain foods from a vendor (Figure 9). Each food service director has found their own unique way to obtain product acceptability from their students. The results show that 45% of food service professionals gradually introduced whole grain foods into their menus by changing and implanting recipes while 35% started offering whole grain foods at the beginning of the school year (Figure 10).

### **Most Frequently Served Whole Grain Food Products**

In both 2008 and 2018, food service directors were serving whole grain food products that their students enjoyed. In 2008, the most frequently served whole grain food products was sandwich bread (93%), rolls (82%), hamburger buns (71%), pizza (68%), and rice (64%) (Figure 5). In 2018, the most frequently served whole grain food products were hamburger buns (100%), pizza (100%), sandwich bread (90%), rolls (90%), and rice (90%) (Figure 5). Although these responses suggested that the most commonly served foods were similar in both 2008 and 2018, hamburger buns and pizza grew in popularity over the past ten years. This is likely due to food service directors having easier access to whole grain food products from vendors.

### **Incorporation Methods**

In order to be successful, these Gold rated school food service professionals have found unique ways to incorporate whole grain food products. In both 2008 and 2018, food service directors preferred purchasing their whole grain food products from a vendor instead of preparing these whole grain foods from scratch (Figure 9). This is due to cost, time, and access to proper equipment. Food service professionals in both 2008 and 2018 preferred gradually introducing whole grain foods into the using whole grain products that were purchased from a vendor while other food service professionals preferred introducing whole grain foods into the menus by changing and implementing recipes (Figure 10).

### **Barriers**

The barriers food service professionals encountered in proving whole grains in school meals included acceptability of whole grain products, availability of whole grain products, repeated exposure to new foods, cost of whole grain food items, education of whole grains to staff and students, and the HUSSC whole grain criteria.

HealthierUS Gold school food service professionals expressed that a significant barrier in incorporating whole grain food products is student acceptability of these products. This is a common barrier in school-aged children and has been discussed in other studies, as well.<sup>39,40</sup> Students may perceive whole grain foods products to be secondary in taste, texture, and color compared to refined grain food products. Our study's participants addressed issues regarding taste, texture, and color of whole grain products compared to refined grain products in several different ways. Some participants dealt with the issue by serving products containing 51-75% whole grain content versus 100% whole grain (Figure 4), which allowed for greater product acceptability. This was a similar finding in both 2008 and 2018.

School food service professionals found unique ways of incorporating whole grains to increase product acceptability. Some participants found it helpful to gradually incorporate whole grain products at the beginning of the school year instead of in the middle of the school year (Figure 10). Other participants found it helpful to gradually introduce whole grain foods into their menus using whole grain food products purchased from vendors. While other participants found it helpful to introduce these foods by changing and implementing recipes. Food service professionals also gradually decreased the ratio of refined grain food products and increase whole grain food products throughout the school year to allow the students to have an easier transition. Gradually incorporating whole grain foods products with varying whole grain content is a method commonly discussed to increase student acceptability of new foods.<sup>41</sup>

Comparatively, food service professionals in 2018 had a wider variety of whole grain food products to choose from than food service professionals in 2008. Figure 5 shows that many whole grain food items such as hamburger buns and pizza grew in popularity and availability over the past ten years. However, participants expressed that there are still whole grain products

they would like to serve in their schools including: pancakes, breadsticks, soda crackers, whole grain taco shells, pasta, tortilla chips, sub and dinner rolls, breadings, couscous, and roll dough (Figure 6).

Regarding the HealthierUS School Challenge, food service professionals in 2008 found the whole grain component to be the most challenging component to meet. However, in 2018 food service professionals found the legume component to be the most challenging component to meet. This is likely due to wider availability of whole grain food products available from vendors and increased knowledge of knowing how to prepare and serve whole grain food products.

Participants indicated challenges regarding increased cost of whole grain foods compared to refined grain food products and difficulty purchasing whole grain foods for their school meals. The majority of school food service professionals in both 2008 and 2018 reported they purchased their whole grain foods from a vendor instead of making whole grain foods from scratch.

HealthierUS Gold school food service professionals identified the need for students and staff to be educated on the importance of consuming whole grains. Currently, participants are utilizing educational materials they have created or found on the internet to promote whole grain food consumption in their schools (Figure 20). Participants expressed that they would like posters and signs to hang in the cafeteria, parent newsletters or fliers, lesson plans/classroom materials, and promotional materials in order to promote whole grain food consumption (Figure 21).

Participants are working on training staff in order to properly select, prepare, and serve whole grain food items within their schools (Figure 22). Participants reported there was still a need for staff training in regards to selecting, preparing, and serving whole grain food items. This

is important because knowing how to properly handle whole grain food items, as well as promoting them for their taste may increase student acceptability of these products.

### **Limitations**

After the deployment of this survey, it was announced the HealthierUS School Challenge would be ending July 1<sup>st</sup>, 2018. This announcement may have influenced HUSSC school food service personnel participation in the survey, limiting the final number of responses. In December 2018, the Trump administration rolled back the Obama-era rules on school lunches.<sup>18</sup> Under these new rules, only half of the grain products on the schools weekly menus must be whole grain-rich whereas before all of the grains products served daily must be whole-grain rich.<sup>18</sup> The Trump administration's relaxing of the previously implemented rules on school lunches may have also influenced food service professionals to not participate in this study. Although some of the Obama-era rules have been relaxed, many food service directors may not revert back to serving more refined grain food products than whole grain food products. This will be due to a variety of factors such as the food service director's opinion on what is served in their schools, whole grain accessibility, and socioeconomic status of the school districts population. Lastly, the small sample size of 11 food service professionals is a significant limitation of the study.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

Increased whole grain incorporation in schools has stemmed from the Dietary Guidelines for Americans (DGA).<sup>4</sup> The DGA has emphasized that American children, adolescents, and adults should consume at least half of the servings as whole grains (3-1 ounce servings per day).<sup>4</sup> School meals are in a unique position since they have the potential to have a large impact on children's nutrition status.<sup>4</sup> This is due to schools having the opportunity to serve 2 out of 3 daily meals to children.

There have been research studies on how to incorporate new foods into a child's diet.<sup>42,43</sup> These studies suggest that children require repeated exposure to the new food before the child will accept a novel food item.<sup>42,43</sup> These researchers stress offering new food items regularly over a period of time in order to increase consumption and acceptance of novel foods.<sup>42,43</sup> Food service professionals also recognize they need to be persistent in their approach of incorporating whole grain food items in their schools before the students will accept these food items. Participants gradually increased whole grain food products either at the beginning of the school year or throughout the school year to allow students to become acquainted to these new food products.

School food service professionals encountered many challenges and barriers while attempting to implement these dietary changes. The barriers food service professionals encountered in providing whole grains in school meals included: acceptability of whole grain products, availability of whole grain products, repeated exposure to new foods, cost of whole grain food items, education of whole grains to staff and students, and the HUSSC whole grain criteria.

The HealthierUS School Challenge Gold rated school food service professionals have found ways around these barriers in order to successfully incorporate whole grains into their school meals. Participants gradually incorporated whole grain into menus, made recipe modification, purchased whole grain food items through vendors, and providing adequate training to staff regarding selecting, preparing, and serving whole grain food items. The HUSSC criteria requires that schools incorporate one whole grain food item every day of the week. These Gold rated schools successfully met or exceeded this criteria by incorporating whole grains daily and demonstrating to other schools that serving whole grain food products is manageable.

Since 2008, there has been an increase in schools that have achieved the HealthierUS School Challenge Gold status. Although, the HealthierUS School Challenge ended July 1<sup>st</sup>, 2018 schools are still in a unique position to incorporate more nutritionally balanced food choices on their menus. This survey studied the indicators of success in providing whole grains in school meals from HealthierUS Challenge Gold rated school food service professionals.

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APPENDIX A

**Institutional Review Board, Texas Woman's University Approval**



**Institutional Review Board**  
Office of Research and Sponsored Programs  
P.O. Box 425619, Denton, TX 76204-5619  
940-898-3378  
email: IRB@twu.edu  
<http://www.twu.edu/irb.html>

DATE: March 9, 2018

TO: Ms. Sarah Aldouri  
Nutrition & Food Sciences

FROM: Institutional Review Board (IRB) - Denton

Re: *Exemption for Indicators of Success in Providing Whole Grains in School Meals: the Healthier US School Program (Protocol #: 19977)*

The above referenced study has been reviewed by the TWU IRB (operating under FWA00000178) and was determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. Because a signed consent form is not required for exempt studies, the filing of signatures of participants with the TWU IRB is not necessary.

Although your protocol has been exempted from further IRB review and your protocol file has been closed, any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Shane Broughton, Nutrition & Food Sciences  
Dr. Cynthia Warren, Nutrition & Food Sciences  
Graduate School

APPENDIX B

**Consent to Participate in Research Form**

**TEXAS WOMAN’S UNIVERSITY**  
**CONSENT TO PARTICIPATE IN RESEARCH**

**Title:** Indicators of Success in Providing Whole Grains in School Meals: the HealthierUS School Challenge in 2018

**Principal Investigator:** Sarah Aldouri, [saldouri@wu.edu](mailto:saldouri@wu.edu)

**Faculty Research Advisor:** Cynthia Warren, PhD, (940) 898-2647, [cwarren2@twu.edu](mailto:cwarren2@twu.edu)

**Explanation and Purpose of the Research**

You are being asked to participate in a research project to determine the indicators of success in providing whole grain in school meals. This study is being conducted by Sarah Aldouri, a Masters’ student and her faculty advisor, Cynthia Warren, Ph.D. in the Department of Nutrition and Food Science at Texas Woman’s University. You are being contacted to participate because you have been successful in incorporating whole grain foods in your school district as required by the Gold or Gold of Distinction certification with USDA-FNS’ HealthierUS School Challenge.

**Description of Procedures**

Your participation in this survey is voluntary. If you decide to participate in this survey research, you are free to withdraw at any time. In this survey, you will be asked questions regarding how you successfully incorporated whole grain food products into school meals. Depending on the amount of time it takes to think of your answers to the questions, the survey could take from 20-30 minutes of your time. The answers recorded from each survey will be collected in a spreadsheet, categorized into groups, and compared. This survey study has been approved by the Institutional Review Board at Texas Woman's University.

**Potential Risks**

Confidentiality will be protected to the extent that is allowed by law. All information will remain confidential between the principal investigator and the faculty research advisor and there will be no link to your name or personal information. There is a risk of breach in confidentiality through email and internet exchanges. Nevertheless, precautions will be taken to ensure all information remains secure.

Participation in this online survey is completely voluntary and is associated with no monetary incentive or penalty. You have the right to decline the survey if for any reason; you do not want to partake in it. If you change your mind while taking the survey, you may exit out of the screen at any time. Your answers will not be saved nor submitted for the study if you decide to cancel while in the middle of the survey.

All print records of this study will be secured in the TWU Old Main Building in room 313A and will be shredded within 5 years from the end of the study. All technological files will be secured on the personal computer of the principal investigator and her faculty advisor's TWU computer and will be erased within 5 years from the end the study.

### **Participation and Benefits**

As a voluntary participant, you have the opportunity to take part in research that can benefit other school districts in successfully providing acceptable whole grain foods students will consume on a regular basis. Your answer will effectively contribute to research exploring how to help schools participating in the USDA-FNS' meal programs increase whole grain consumption in their students. Upon request, the results of the survey will be provided via email with the participants by contacting the Principal Investigator listed above.

### **Questions Regarding the Study**

Below there is a link to open the PDF file of this consent form. It is recommended that you save the form for your personal records. If you have any questions about your participation based on the description of this survey study, feel free to contact the Principal Investigator, [saldouri@wu.edu](mailto:saldouri@wu.edu). If you have questions about your rights as a research subject, you may contact the Texas Woman's University Office of Research and Sponsored Programs at (940) 898-3378 or [irb@twu.edu](mailto:irb@twu.edu).

APPENDIX C

**Whole Grains in School Meals: HUSSC Survey Instrument**

## Survey Questions

1. When looking at whole grain labels, what serves as the best indicator to you that the product is whole grain?
  - a. Ingredient list
  - b. The listed percentage of whole grains per serving
  - c. Nutrition facts panel on the label
  - d. Grams of whole grain per serving
  - e. Other, please specify
  
2. How would you define the term “whole grain”?
  - a. First/primary listed ingredient is “whole wheat”
  - b. A product that is 51% or more whole grain
  - c. Containing all 3 components: bran germ, endosperm
  - d. Not refined white flour, rice, and beans
  - e. Whole wheat flour
  - f. Outer covering not removed
  - g. Contains the entire grain seed
  - h. Not processed to take away the nutrient value of the grain
  - i. HealthierUS criteria
  - j. “Good source of whole grain”
  - k. 100% whole wheat
  - l. 50% or more grain in the product is whole wheat
  
3. How do you interpret the phrase, “this is a 100% whole grain food”?
  - a. 100% whole wheat or other grain
  - b. 51% of total flour content is whole wheat or other grain
  - c. 51% of the product, by weight, is whole wheat or other grain
  - d. Other, please specify
  
4. What percent of whole grain is in the foods that you currently serve in your schools?
  - a. 0-25%
  - b. 26-50%
  - c. 51-75%
  - d. 76-100%
  - e. Not sure
  
5. What percentage of your whole grain requirement is met by using 100% whole wheat?
  - a. 100% of your whole grain foods served
  - b. 75-99% of your whole grain foods served
  - c. 50-74% of your whole grain foods served
  - d. 25-49% of your whole grain foods served
  - e. 0-24% of your whole grain foods served
  
6. What types of whole grain foods are your students currently eating?

- a. Hamburger buns
  - b. Sandwich bread
  - c. Rolls
  - d. Tortillas
  - e. Pizza
  - f. Hot dog buns
  - g. Rice
  - h. Other, please specify
7. If you could purchase 3-4 additional whole grain food products available on the market to offer in your schools, what would they be?
- a. Tortilla
  - b. Pasta
  - c. Hamburger buns
  - d. Rice
  - e. Whole grain pizza
  - f. Whole grain tortilla chips
  - g. Sub rolls
  - h. Hotdog buns
  - i. Pancakes
  - j. Breading
  - k. Proof and brake breadstick
  - l. 1 oz breadstick
  - m. Barley
  - n. Soda crackers
  - o. Dinner rolls
  - p. Biscuit
  - q. Loaf bread
  - r. Muffin
  - s. Waffles
  - t. Couscous
  - u. Roll dough
  - v. Whole corn taco shells
  - w. Cookies
  - x. Corn dog
  - y. Other grains
  - z. Finding necessary product
  - aa. Not sure
8. Have you ever requested your vendors to carry specific whole grain foods to serve in your schools?
- a. Yes
  - b. No

9. Compared to your award winning elementary school(s), is there any difference in the types of whole grain foods that you offer at your elementary schools versus your intermediate/junior high schools and high schools?
  - a. Yes
  - b. No
  
10. If “yes” is your response to the previous question: “Is there a difference in the whole grain foods offered in your elementary schools versus your intermediate/junior and high schools”, what is the difference?
  
11. Why is there a difference in the whole grain foods offered in your elementary schools versus your intermediate/junior and high schools?
  
12. What steps did you take to comply with the criteria for the HealthierUS School Challenge? (check all that apply)
  - a. We make our own whole grain foods on site
  - b. We make our whole grain foods at a central location
  - c. We purchase our whole grain foods from a vendor
  - d. Other, please specify
  
13. How did you incorporate whole grain foods into your schools? (check all that apply)
  - a. We started offering whole grain foods at the beginning of the school year
  - b. We gradually introduced whole grain foods into our menus through the use of whole grain products purchased from industry/vendor
  - c. We gradually introduced whole grain foods into our menus by changing and implementing recipes
  - d. Other, please specify
  
14. Do you serve any of the whole grain food items or flour available from USDA-FNS?
  - a. Yes
  - b. No
  
15. If you did serve whole grain food items or flour available from USDA-FNS, which items did you use?
  - a. Whole wheat flour
  - b. Whole wheat pasta
  - c. Brown rice
  - d. Whole grain breading
  - e. Whole grain sandwich bread
  - f. Oats
  - g. Dried peas and beans
  
16. From a food service director’s perspective, how easy or difficult has it been for you to find and purchase the whole grain foods served in your schools?
  - a. Very easy
  - b. Easy

- c. Somewhat easy
  - d. Difficult
  - e. Very difficult
17. If you answered "difficult" or "very difficult" when finding and purchasing whole grain foods served in your schools, please tell us why.
18. How successful have you been in obtaining whole grain products from your vendors?
- a. Very successful
  - b. Somewhat successful
  - c. Unsuccessful
  - d. Very unsuccessful
  - e. We do not purchase whole grain products, we make our own
19. How easy or difficult was it to meet the criteria for the HealthierUS School Challenge?
- a. Very easy
  - b. Easy
  - c. Somewhat easy
  - d. Difficult
  - e. Very difficult
20. If you answered "difficult" or "very difficult" when meeting the HealthierUS School Challenge criteria, please tell us why.
21. What were specific challenges that you have had to overcome when you added whole grain foods into your menus?
- a. Product acceptability
  - b. No challenges
  - c. Higher cost
  - d. Product availability
  - e. Recipe adjustments
  - f. Whole grain identification
  - g. Other whole grains daily
22. What was the hardest component of the HealthierUS School Challenge criteria to meet?
- a. The legume component
  - b. The fruit and vegetable component
  - c. The whole grain component
  - d. Other, please specify
23. What type of information would you like to see on grain food labels that would help you understand the product is a 100% whole grain food?
- a. A product label that indicates the grams of whole grain per serving
  - b. A product label that indicates the percent whole grain per serving
  - c. A product label that carries the Whole Grain Council Stamp
  - d. I am not sure
  - e. Other, please specify

24. What types of nutrition education tools do you use in order to promote whole grain food consumption in your schools?
- I have ordered educational materials off of the internet
  - I have developed my own educational materials
  - I do not currently have any educational materials
  - Other, please specify
25. What types of promotional materials would you like to see in your schools?
- Posters/signs to post in serving lines
  - Parent newsletters/fliers/handouts
  - Lessons plans/classroom material and curriculum/workbooks
  - PowerPoint presentations/presentation templates to customize lesson plans
  - Promotional materials/give away items/magnets
  - Whole grain promotion and related health benefits/fruit and vegetable promotion
  - Not sure
26. Have you performed any training with your food service personnel on how to select, prepare, or serve whole grain foods?
- Select
    - Yes
    - No
    - Plan to in the future
  - Prepare
    - Yes
    - No
    - Plan to in the future
  - Serve
    - Yes
    - No
    - Plan to in the future
27. Please rate the usefulness of the current USDA-FNS website in terms of its resource material on whole grains.
- Useful/ I always refer to them
  - Somewhat useful/ I refer to them most of the time
  - Okay/ I sometimes refer to them
  - Not very useful/ I rarely refer to them
  - Not useful at all/ I never refer to them
28. The USDA-FNS website does not currently offer information concerning commercially available consumer whole grain food products that are also available to the school lunch program. Would adding this material to the website be useful to you?
- Yes
  - No

29. Which of the following items would be useful for you and your staff if you could access this information on the USDA-FNS website? (check all that apply)
- a. Training for staff on how to select, prepare, serve whole grain foods in English
  - b. Training for staff on how to select, prepare, serve whole grain foods in Spanish
  - c. Whole grain promotional materials
  - d. Whole grain educational materials
  - e. Other, please specify

30. Please include any additional comments and suggestions here: