

School Nutrition Professionals' Usage and Perceptions of USDA Recipes and the Impact of Student Enrollment

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ABSTRACT

Purpose/Objectives

The purpose of this study was to explore the frequency of usage of the United States Department of Agriculture (USDA) Recipes for Schools and investigate factors influencing their usage. The relationship between these variables and school district size (student enrollment) was also investigated.

Methods

An expert panel convened to identify the major issues related to school nutrition (SN) professionals' preferences of USDA recipes for meeting the USDA meal pattern requirements. Findings were used to develop an online survey which was sent to a random sample of 2,100 SN directors, representing the seven USDA regions. Descriptive statistics included frequencies, percentages, means, and standard deviations. Chi Square and one-way analysis of variance (ANOVA) with Tukey's post hoc tests were conducted to determine the relationship between research variables.

Results

The response rate to the survey was 23.4% (N=511). The majority of SN directors (74.6%) indicated they used USDA recipes. District enrollment appeared to play a significant role in usage; as enrollment size increased, usage of USDA recipes significantly decreased ($p < .001$). Most SN directors indicated that the USDA recipes adequately support participation in the National School Lunch Program (NSLP), compliance with food based menu planning specifications, menu planning for meat items; and the skill level of SN staff. However, the majority of directors rated the USDA recipes unfavorably for participating in breakfast initiatives, menu planning for dark green vegetables, complying with sodium regulations, supporting budget constraints for food cost, or meeting the trends of today.

Applications to Child Nutrition Professionals

Results of this study suggest the need for improvements to the USDA recipes. It is recommended that further research be conducted to identify ways of adapting the USDA recipes to better support the program needs of SN directors regardless of school district size.

Keywords: USDA Recipes; National School Lunch Program; usage; perceptions; student enrollment

INTRODUCTION

The United States Department of Agriculture (USDA) has been involved in the development of standardized recipes for school lunch since the 1920's (USDA, 1925). In 2007 the USDA Recipes for Schools (hereafter referred to as "USDA recipes") were modified to reflect the 2001

revisions to the *USDA Buying Guide for Child Nutrition Programs* (USDA, 2008). In 2010, as part of First Lady Michelle Obama's Let's Move initiative, chefs, students, food service professionals, and parents across the country were invited to participate in the Recipes for Healthy Kids (R4HK) competition. The objective of the competition was to develop student friendly school lunch recipes that meet nutritional requirements of the National School Lunch Program (NSLP) for three recipe categories: whole grains, dark green and/or orange vegetables, and dry beans and peas (legumes). In 2013, 30 of the award winning recipes from R4HK competition (USDA, 2014a) were added to the USDA recipes to support compliance with the Healthy, Hunger-Free Kids Act of 2010 (National Congress of State Legislators, 2011). The current file of USDA recipes is online at the National Food Service Management Institute (NFSMI) Web site. This file consists of 226 recipes divided into nine categories: grains/breads (28); desserts (35); main dishes (69); salads and salad dressing (21); sandwiches (17); sauces, gravies, and seasoning mixes (17); soups (15); vegetables (21); and breakfast (3). (NFSMI, 2014)

Several studies throughout the years have identified and investigated factors that impact student participation and satisfaction with the NSLP (Asperin, Nettles, & Carr, 2008; Asperin, Nettles, & Carr, 2009; Fogleman, Dutcher, McProud, Nelken, & Lins 1992; Hutchinson, Brown & Gilmore, 2000; Hutchinson, Gilmore, & Brown, 1998; McConnell, Matta, & Shaw, 1997; Meyer & Conklin, 1998; Roseman & Niblock, 2006). However, there appears to be a dearth of research investigating school nutrition (SN) professionals' usage or perceptions of the USDA recipes for meeting their SN program needs.

When the USDA began developing recipes for schools in the 1920s, the availability of pre-prepared menu items that did not require recipes was non-existent (Martini, 2009). Today there is vast array of pre-made menu items that do not require recipes available to SN operations. Additionally, societal changes in the United States throughout the years have altered students' expectations and desires regarding school food service (Bevans, Sanchez, Teneralli, & Forrest, 2011; de Vet, de Ridder, & de Wit, 2010; French, Story, & Jeffery, 2001).

Current literature suggests there is a resurgence of scratch cooking in some school districts (Collins, 2012; Godfrey, 2012; Godfrey, 2011; Stanley, Colasanti, & Conner, 2012). The *School Nutrition Operations Report 2011* (School Nutrition Association, 2011) indicates there has been a small increase in the amount of entrees and side dishes prepared from scratch in schools since 2009. Further, it appears that the smallest school districts, those with student enrollment of < 1,000 are more likely to prepare scratch foods, especially bakery items and entrees, compared to larger school districts (School Nutrition Association, 2011). Participation in Farm-to-School programs also appears to be on the rise (USDA, 2014b). These increases in scratch cooking and participation in Farm-to-School programs may increase the need for standardized recipes in schools.

In 2010, new regulations for meal patterns and nutrition standards for the NSLP and School Breakfast program (SBP) were enacted, requiring most schools to increase the availability of fruit, vegetables, whole grains, fat free milk, and low fat milk in school meals; reduce sodium, saturated fat, and trans fat in school meals; and meet the nutrition needs of children with calorie requirements (USDA, 2012). In 2014, these regulations were updated to include nutrition standards for snack foods and beverages sold to students during the school day, specifically

controlling the amount of calories, fat, sugar, and sodium these foods can contain (USDA 2014c). While the USDA recipes have continued to evolve, it is unclear if this evolution has kept pace with the needs of SN operations.

The purpose of this study was to explore the frequency of usage of USDA recipes and investigate factors influencing their usage. The relationship between these variables and school district size (student enrollment) was also investigated.

METHODOLOGY

Instrument Development

This project received approval from the Institutional Review Board (IRB) at The University of Southern Mississippi prior to implementation. To achieve the purpose and objectives, the project was divided into three phases. In phase I, recommendations for expert panel participants were solicited from state agency directors based on potential panelist's knowledge and experience utilizing and modifying the USDA recipes to meet the new menu planning standards. The expert panel meeting consisted of a one and a half day session with SN directors and state agency staff. Throughout the session, participants were asked semi-structured, open ended questions related to the research objectives. Afterwards, the responses recorded during the expert panel were incorporated into statements that were utilized to develop a draft online survey in Survey Monkey.

In phase II, a review panel of 18 SN professionals reviewed the survey for face and content validity. The review panel was made up of SN professionals who were recommended by state agency directors to participate in the expert panel, but who were unable or not selected to participate. The final version of the survey was revised based on review panel comments and included 32 multiple choice questions. Only the 15 questions related directly to the study objectives, of the 32 total questions, are presented in this article, they are discussed below. Three questions pertained to the usage of USDA recipes (e.g. "Do you use USDA recipes?" and "How often do you use each recipe category?"). Eleven questions asked SN directors to rate their perceptions of the USDA recipes for meeting their SN program needs based on multiple issues. Those issues included: participation in various programs/activities, menu planning for each meal component, compliance with meal pattern specifications, and other miscellaneous program issues such as skill level of SN staff and availability of food preparation equipment. One question asked respondents to identify the student enrollment size of the school district.

Sample

In phase III, a random sample of 2,100 SN directors representing the seven USDA regions was sent a letter inviting them to participate in the online survey. The sample was selected from a data base of school districts maintained by Market Data Retrieval, a company that specializes in the school market. The invitation letter included the following information: the research objectives, instructions for locating and completing the survey (including a URL), a confidentiality statement, and contact information for the Human Subjects Protection Review Committee. A follow-up postcard was sent approximately one week after initial mailing encouraging directors to complete the survey if they had not already done so.

Data Analyses

The statistical package SPSS Version 21.0 for Windows was utilized to analyze survey data. Descriptive statistics included frequencies, percentages, means, and standard deviations. Chi Square and one-way analysis of variance (ANOVA) with Tukey's post hoc tests were conducted to determine the relationship between research variables.

RESULTS AND DISCUSSION

The response rate to the survey was 23.4% (N=511). The distribution of respondents based on school district student enrollment was as follows: < 1,000=40.4%, 1,000-2,499=29.2%, 2,500-4,999=19.3%, 5,000-9,999=13.3%, 10,000-24,999=7.7% and \geq 25,000=8.7%. As this demonstrates, the majority of respondents (69.6%) were from districts with enrollment of less than 2,500 students.

Frequency of USDA Recipe Usage

Most SN directors (74.6%) indicated they used USDA recipes; of those, 55.1% said they modified the recipes to meet their needs. The majority of respondents indicated they used the following menu categories one or more times per month: main dishes (82.9%), vegetables (56.8%) (Table 1). The following recipe categories were used by respondents less than once a year: breakfast (56.6%); sauces, gravies, and seasonings (44.4%); desserts (43.3%), and salads and salad dressings (40.4%); sandwiches (35.3%); soups (34.0%); and grains/breads (31.7%) (Table 1).

Table 1. How Often USDA Recipes Are Prepared by Recipe Category

Recipe Category	<i>n</i>	≥ 1	1 – 3	≥ 2	Once	< 1	Never/
		time	times	times	a	time	Not
		a	per	per	year	per	Applicable
		week	month	year		year	
		%	%	%	%	%	%
Grains /Breads	325	32.0	23.4	12.9	5.2	7.7	18.8
Desserts	319	5.6	24.8	26.3	6.0	11.6	25.7
Main Dishes	334	41.6	41.3	12.9	1.5	0.9	1.8
Salads/Salad Dressings	322	18.3	28.6	12.7	5.6	7.8	27.0
Sandwiches	323	14.6	36.5	13.6	5.0	7.1	23.2
Sauces/Gravies/Seasonings	320	10.3	27.5	17.8	6.9	8.1	29.4
Soups	321	5.9	34.0	26.2	4.7	7.5	21.8
Vegetables	322	24.5	32.3	13.4	4.0	7.1	18.6
Breakfast	321	10.6	16.8	15.9	3.4	11.8	41.4

Table 2. Mean Ratings of the USDA Recipes for Participation in Various Programs/Activities, Menu Planning, and Compliance with Meal Pattern Specifications

	<i>M</i>	<i>SD</i>
Participation in Various Programs^a		
National School Lunch Program (NSLP)	3.66	1.14
Child and Adult Care Feeding Program (CACFP)	3.53	1.16
Summer Food Service Program (SFSP)	3.40	1.21
HealthierUS School Challenge (HUSCC)	3.33	1.18
Fresh Fruit and Vegetable Program (FFVP)	3.31	1.20
Salad Bars	3.21	1.21
School Breakfast Program (SBP)	3.15	1.27
Healthier School Day (Smart Snacks in School)	3.06	1.19
Breakfast after first period (Mid-Morning Nutrition Break)	2.91	1.15
Farm-to-School	2.80	1.20
Breakfast in the Classroom (BIC)	2.54	1.36
Grab n' Go Breakfast	2.51	1.38
Breakfast Carts	2.37	1.28
Menu Planning by Meal Component[*]		
Meat	3.58	1.19
Meat Alternatives	3.21	1.34
Fruit	3.14	1.36
Beans and Peas (Legumes)	3.08	1.34
Starchy Vegetables	3.05	1.32
Whole Grains	3.01	1.37
Red/Orange Vegetables	2.99	1.36
Dark Green Vegetables	2.90	1.39
Compliance with Meal Pattern Specification[*]		
Food Based Menu Planning	3.44	1.29
Offer Versus Serve	3.44	1.29
Trans Fat	3.30	1.30
Grades 9 – 12	3.27	1.32
Grades K – 5	3.25	1.34
Grades 6 – 8	3.23	1.33
Saturated Fat	3.22	1.29
Calories	3.17	1.28
Sodium	2.94	1.33
No Syrup	2.82	1.37
No Added Sugar	2.69	1.39

^a Mean ratings in this section are based on a five-point rating scale: 5=excellent, 4=good, 3=undecided, 2=fair and 1=poor.

Factors Influencing Usage

Participation in various programs/activities. When respondents were asked to rate how well the USDA recipes support their needs for participating in various programs and activities based on a five-point scale ranging from 5=excellent to 1=poor, the specific programs/activities for which the USDA recipes received the highest mean ratings were the NSLP (3.66 ± 1.14), the Child and Adult Care Feeding Program (CACFP) (3.53 ± 1.16), and the Summer Food Service Program (SFSP) (3.40 ± 1.21) (Table 2). The programs/activities for which the USDA recipes received the lowest mean ratings were: breakfast carts (2.37 ± 1.28), grab n' go breakfast (2.51 ± 1.38), and breakfast in the classroom (BIC) (2.54 ± 1.36) (Table 2).

Menu planning. Respondents were asked to rate how well the USDA recipes met their menu planning needs, based on a five-point scale (5=excellent to 1=poor). Meat and meat alternatives were the meal components for which USDA recipes received the highest mean rating (3.58 ± 1.19 and 3.21 ± 1.34 ; respectively), while dark green vegetables and red/orange vegetables were the meal components for which USDA recipes received the lowest mean rating (2.90 ± 1.39 and 2.99 ± 1.36 ; respectively) (Table 2).

Table 3. Mean Ratings of the USDA Recipes Concerning Impact on Cost, Accessibility, and Miscellaneous Program Issues

	<i>M</i>	<i>SD</i>
Impact of USDA Recipes on Cost^a		
Labor cost	3.80	0.75
Food cost	2.01	0.58
Accessibility^b		
Ease of finding the USDA recipes online	4.41	0.49
Miscellaneous Program Issues^c		
Overall format of recipes	4.02	0.80
Available food preparation equipment	3.74	1.00
Skill level of school nutrition staff in your school district	3.70	1.03
Simplicity of recipes	3.69	1.00
Ease of quantity modification	3.55	1.04
Visual appeal of recipes	3.30	1.06
Ease of costing recipes	3.28	1.08
Taste of recipes	3.26	1.10
Variety of recipes	2.97	1.20
Student friendliness of recipes	2.92	1.11
Regional appropriateness of recipes	2.66	1.10
Cultural diversity of recipes	2.62	1.15
Meets the trends of today	2.54	1.22

^a Mean ratings in this section are based on a five-point rating scale: 5=very reasonable, 4=reasonable, 3=undecided, 2=unreasonable and 1=very unreasonable.

^b Mean ratings in this section are based on a five-point rating scale: 5=very easy, 4=easy, 3=undecided, 2=difficult and 1=very difficult.

^c Mean ratings in this section are based on a five-point rating scale: 5=excellent, 4=good, 3=undecided, 2=fair and 1=poor.

Compliance with meal pattern specifications. When respondents were asked to rate how well the USDA recipes support their compliance with meal pattern specifications using a five-point scale (5=excellent to 1=poor), the areas where the recipes received the highest mean ratings were food based menu planning and offer versus serve (3.44 ± 1.29 and 3.44 ± 1.29 ; respectively). “No added sugar,” “no syrup,” and “sodium” were the areas where the USDA recipes received the lowest mean ratings (2.69 ± 1.39 , 2.82 ± 1.37 , and 2.94 ± 1.33) (Table 2).

Cost and accessibility. Overall the USDA recipes received a somewhat favorable rating concerning their impact on labor cost (3.80 ± 0.75), but a fairly low rating concerning their impact on food cost (2.01 ± 0.58); the rating scale range for each was 5=very reasonable to 1=very unreasonable. The majority of respondents indicated the USDA recipes were easy to find online (4.41 ± 0.49); the rating scale range was 5=very easy to 1=very difficult (Table 3).

Miscellaneous program issues. Respondents were asked to use a five-point scale (5=excellent to 1=poor) to rate how well the USDA recipes support their needs regarding several miscellaneous program issues. Issues that received the highest mean ratings were “overall format of recipes” (4.20 ± 0.80), “availability of food preparation equipment at the SN program” (3.74 ± 1.00), “skill level of SN staff in your district” (3.70 ± 1.03), “simplicity of recipes” (3.69 ± 1.00), and “ease of quantity modification” (3.55 ± 1.04). Issues that received the lowest mean ratings were “meets the trends of today,” (2.54 ± 1.22) “cultural diversity” (2.62 ± 1.15) “regional appropriateness,” (2.66 ± 1.10) “student friendliness” (2.92 ± 1.11), and “variety of recipes” (2.97 ± 1.20) (Table 3). When respondents were asked to select from a provided list, all the reasons they do not use USDA recipes, the reasons most selected were “We have other recipes we prefer” (47.2%), “USDA recipes are not current with today’s trends” (40.4%), “There is not enough variety in the selection of USDA recipes” (29.3%), “We mainly use pre-processed and ready-made foods” (28.8%), and “USDA recipes are not student friendly” (23.7%) (Table 4).

Table 4. Reasons School Nutrition Directors Do Not Use USDA Recipes

Statement	n ^a	% ^b
We have other recipes we prefer.	195	47.2
The USDA recipes are not current with today’s trends.	167	40.4
There is not enough variety in the selection of USDA recipes.	121	29.3
We use mainly pre-processed and ready-made foods.	119	28.8
The USDA recipes are not student friendly.	98	23.7
We do not have adequate staffing to prepare USDA recipes.	91	22.0
The USDA recipes require too much time to process.	87	21.1
There are not enough USDA recipes that are appropriate for our region of the country.	69	16.7
Our students do not like the USDA recipes.	60	14.5
Our staff does not have the necessary skills to prepare USDA recipes.	45	10.9
Most of the ingredients in the USDA recipes are not on the state bid.	33	8.0
I did not know there were USDA recipes.	20	4.8
I did not know how to find or access the USDA recipes.	16	3.9

^a Respondents were instructed to select all that apply for this question.

^b Total exceeds 100% as respondents could indicate more than one reason

Associations

Application of Chi Square testing revealed a significant association between school district size and usage of USDA recipes. Further, one-way ANOVA and Tukey's post hoc tests demonstrated several significant associations between school district size and the SN directors' mean ratings of the USDA recipes for the following factors: participating in various programs/ activities, compliance with meal pattern specifications, and miscellaneous program issues. The results of each of these significant associations are presented below. No significant associations were observed between school district size and SN directors mean ratings of the USDA recipes for the following factors: menu planning and cost/accessibility.

Enrollment and usage. As student enrollment increased, usage of USDA recipes significantly decreased ($p < .001$). The majority of respondents (76.1%) from districts with student enrollment of $\leq 10,000$ reported using USDA recipes, while a little less than half (48.5%) of those with student enrollment of $\geq 10,000$ reported using the recipes.

Enrollment and participation in various programs/activities. Significant associations were observed between enrollment and SN directors' ratings of USDA recipes for participating in the following programs/activities: Fresh Fruit and Vegetable Program (FFVP), the SFSP, and BIC. A common theme in each of these associations was for SN directors in districts with enrollment of $< 1,000$ to rate the USDA recipes significantly more favorable compared to directors from districts with enrollment of $\geq 25,000$. No significant associations were observed between enrollment and directors' mean ratings of the USDA recipes for participating in the other 10 programs/ activities listed in Table 2.

SN directors from districts with enrollment of $< 1,000$ were significantly more likely to rate the USDA recipes favorably for participating in the FFVP (3.86 ± 0.89), compared to directors from districts with enrollments of 1,000-2,499 (3.68 ± 1.06) ($p < .002$) and $\geq 25,000$ (2.33 ± 1.51) ($p < .042$). No other significant associations were observed between "participating in the FFVP" and enrollment.

Directors from districts with student enrollment $\geq 25,000$ were significantly more likely to rate the USDA recipes unfavorably for participating in the SFSP (2.30 ± 1.34) compared to directors from districts with enrollments of 1,000-2,499 (3.71 ± 1.13) ($p < .015$) and $< 1,000$ (3.94 ± 0.90) ($p > .008$). No other significant associations were observed between "participating in the SFSP" and enrollment.

Mean ratings of the USDA recipes for participating in BIC were significantly higher from SN directors with district enrollment of $< 1,000$ (4.11 ± 0.60) compared to directors from districts with enrollments of 1,000-2,499 (2.08 ± 1.38) ($p < .002$), 2,500-4,999 (2.00 ± 1.15) ($p < .001$) and $\geq 25,000$ (1.83 ± 1.17) ($p < .006$). No other significant associations were observed between "participating in the BIC" and enrollment.

Enrollment and compliance with meal pattern specifications. Sodium was the only compliance factor (Table 2) where a significant association was observed with enrollment. SN directors from districts with enrollment of $< 1,000$ were significantly more likely to rate the

USDA recipes favorably for complying with sodium regulations (3.43 ± 1.25) compared to directors from districts with enrollment of 1,000-2,499 (2.80 ± 1.32) ($p < .038$).

Enrollment and miscellaneous program issues. Significant associations were observed between enrollment and SN directors' rating of the USDA recipes concerning the following miscellaneous program issues: "meets trends of today," "regional appropriateness," and "cultural diversity." The common thread in each of these associations was for SN directors in districts with enrollment of <1,000 to rate the USDA recipes significantly more favorable compared to directors from districts with enrollment of >1,000-2,499. No significant associations were observed between enrollment and directors' mean ratings of the USDA recipes for the other 10 miscellaneous program issues listed in Table 3.

School nutrition directors from districts with enrollment of <1,000 were significantly more likely to rate the USDA recipes favorably for "meets the trends of today" (3.06 ± 1.30) compared to directors from districts with enrollments of 1,000-2,499 (2.46 ± 1.22) ($p < .025$), 2,500-4,999 (2.27 ± 1.03) ($p < .005$) and 5,000-9,999 (2.33 ± 1.18) ($p < .028$). No other significant associations were observed between enrollment and "meets trends of today."

Directors from districts with enrollments of <1,000 were significantly more likely to rate the USDA recipes positively for "regional appropriateness" (3.16 ± 1.24) compared to directors from districts with enrollments of 1,000-2,499 (2.56 ± 1.19) ($p < .021$) and 5,000-9,999 (2.44 ± 1.16) ($p > .028$). No other significant associations were observed between enrollment and "regional appropriateness."

Mean ratings of the USDA recipes regarding "cultural diversity" were significantly more favorable from SN directors with district enrollments of <1,000 (3.16 ± 1.15) compared to directors from districts with enrollments of 1,000-2,499 (2.46 ± 1.13) ($p < .002$), 2,500-4,999 (2.52 ± 1.14) ($p < .031$) and >25,000 (2.28 ± 1.23) ($p < .043$). No other significant associations were observed between enrollment and "cultural diversity."

CONCLUSIONS AND APPLICATION

The findings of this study demonstrate the following. Main dish items, by far are the most frequently utilized recipe category. A significant percentage of SN directors utilize the remaining recipe categories less than one a year, with breakfast identified as the least used category. The results presented in Tables 2 to 4 provide two broad insights into the possible rationale behind this underutilization.

First, approximately one-half (Table 1) of respondents reported using USDA breakfast recipes less than once a year, which coincides with the unfavorable ratings SN directors gave the USDA recipes for participating in breakfast initiatives such as breakfast carts, grab n' go breakfast, BIC, and breakfast after first period (Table 2). This is most likely attributable to the fact that the USDA recipe file only contains three recipes in the breakfast category.

Second, approximately one-fourth to one-third of respondents reported using the following recipe categories less than once a year: sauces, gravies, and seasonings, desserts, salads and salad

dressings, sandwiches, soups, grains and bread, and vegetables. The USDA recipes received unfavorable ratings by the majority of respondents concerning the following issues: “meets trends of today,” “cultural diversity,” “regional appropriateness,” “student friendly,” and “variety.” Approximately one-half to one-fourth of respondents do not use the USDA recipes for the following reasons: they have other recipes they prefer; the recipes are not current with today’s trends (40.4%); there is not enough variety and selection in the USDA recipes, they use mainly pre-made items at the SN program, and the USDA recipes are not student friendly.

Most SN directors agreed that the USDA recipes meet their program needs for the following issues: participating in the NSLP, CACFP and the SFSP; menu planning for meat and meat alternative items; and complying with the meal pattern specifications for food based menu planning and offer versus serve. School nutrition directors as a whole were satisfied with how the USDA recipes are formatted and how well the recipes meet their program needs with regards to the availability of food preparation equipment and the skill level of SN staff in their SN program. A preponderance of SN directors concur that the USDA recipes have a reasonable impact on labor cost and the recipes are easy to find online.

The majority of SN directors perceived that the USDA recipes do not adequately support the following issues: menu planning for dark green vegetables and red/orange vegetables and compliance with meal pattern specifications regarding “no added sugar,” “no syrup,” and “sodium.” These issues are especially important because the criteria for each of these items became more stringent with the passage of the Healthy Hunger-Free Kids Act of 2010 (USDA 2014b) and the Healthier School Day update to that legislation (USDA 2014c). Most SN directors reported the USDA recipes have an unreasonable impact on food cost. This is important, because a major aspect of a SN director’s job is maintaining budget compliance.

Directors from school districts with student enrollment of $\geq 10,000$ were much less likely to use USDA recipes compared to directors from smaller school districts. This is important; while only 6.5% of public school districts in the United States have student enrollment of $\geq 10,000$, they represent 53.9% of the public school student population (National Center for Educational Statistics, 2010). This suggests that the USDA recipes are not meeting the needs of school districts serving approximately one half of the public school students in the United States.

Two trends were observed between enrollment and respondents ratings of the USDA recipes; one trend involved participation in programs / activities, while the other trend was related to customer service issues. School nutrition directors from districts with enrollment of $\geq 25,000$ were more likely to rate the recipes unfavorably compared to directors with enrollment of $<1,000$ for participating in the FFVP, SFSP, and BIC. Directors from districts with enrollment of 1,000-2,499 were more likely to rate the USDA recipes unfavorably for the following customer service issues: “compliance with sodium regulations,” “meets trends of today,” “regional appropriateness,” and “cultural diversity,” compared to directors from districts with enrollment of $< 1,000$. This may be partially explained by fact the school districts with student enrollment of $< 1,000$ are more likely prepare more foods from scratch compared to larger schools districts. Therefore, directors from these smallest districts are more likely to place a higher value on the USDA recipes for meeting their program needs (i.e. participating in programs such as FFVP,

complying with regulations such as sodium, and other customer service related issues such as “meets the trend of today.”)

Limitations of the Study

The response rate to the survey of 23.4% was lower than expectations. However, it was observed that the distribution of respondents based on district enrollment size was similar to the distribution for the country reported by the National Center for Education Statistics (2014), suggesting that our sample is representative of the United States.

Recommendations

This research demonstrates several potential areas where the USDA recipes can be improved. It appears that most SN directors perceive that the USDA recipes do meet their needs for participating in the following activities: breakfast initiatives such as breakfast carts, grab n’ go breakfast, and breakfast in the classroom; menu planning for dark green vegetables and red/orange vegetables; complying with meal pattern specification regarding “no added sugar,” “no syrup,” and “sodium.” The majority of SN directors believe that the USDA recipes do not favorably support their budgetary needs with regards to food cost, and most agree the USDA recipes do not support their program needs with regards to “variety,” “student friendliness,” “trendiness,” “cultural diversity,” or “regional appropriateness.” Furthermore, nearly half of all SN directors in districts with student enrollment of $\geq 10,000$ do not use USDA recipes.

Based on the results of this study it is suggested that further research be conducted to identify the most effective methods for updating the USDA recipe system to best meet the needs of SN directors regardless of school district size. The objectives of this update should include the following goals: increase usage of USDA recipes in school districts with student enrollment of $\geq 10,000$; improve the selection of breakfast recipes to better support breakfast initiatives; identify the necessity of each recipe category and increase the usage of the vital categories; improve the variety of the recipes in the vital categories to be more student friendly, current with the trends of today, culturally diverse and regionally appropriate for all regions of the country; improve the selection of dark green and red/orange vegetable recipes; update the USDA recipes to better support regulatory compliance with “no added sugar,” “no syrup,” and “sodium;” and update the recipes to better support food cost control. This research should involve qualitative and quantitative activities such as focus groups, recipe testing and surveys with a wide variety of SN stakeholders (e.g., students, parents, community leaders, school administration and staff, and SN management and staff) representing every region of the country.

It is recommended that the USDA recipes be updated based on the findings of the future research. Next, training resources should be developed to support SN directors in implementing the updated recipes. Afterwards, promotional activities should be implemented to ensure all SN directors are aware of the changes to the USDA recipes, how these changes will support their program needs, and what resources are available to support the implementation of the updated recipes.

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The information provided in this manuscript is the result of independent research produced by NFSMI and is not necessarily in accordance with U.S. Department of Agriculture Food and Nutrition Service (FNS) policy. FNS is the federal agency responsible for all federal domestic child nutrition programs including the National School Lunch Program, the Child and Adult Care Food Program, and the Summer Food Service Program. Individuals are encouraged to contact their local child nutrition program sponsor and/or their Child Nutrition State Agency should there appear to be a conflict with the information contained herein, and any state or federal policy that governs the associated Child Nutrition Program. For more information on the federal child nutrition programs please visit www.fns.usda.gov/cnd.

REFERENCES

- Asperin, A. E., Nettles, M. F., & Carr, D. H. (2008). *Investigation of factors impacting participation of high school students in the National School Lunch Program*. University, MS: National Food Service Management Institute. Retrieved from <http://www.nfsmi.org/documentlibraryfiles/PDF/20100315042240.pdf>
- Asperin, A. E., Nettles, M. F., & Carr, D. H. (2009). *Exploring factors that affect the school lunch experience of high school students participating in the National School Lunch Program* (Technical Report No. R-147-09). University, MS: National Food Service Management Institute. Retrieved from <http://www.nfsmi.org/documentlibraryfiles/PDF/20090910084551.pdf>
- Bevans, K. B., Sanchez, B., Teneralli, R., & Forrest, C. B. (2011). The importance of nutrition standards for foods in schools. *Journal of School Health*, 81(7), p424-429. doi:10.1111/j.1746-1561.2011.00611.x
- Collins, B. (2012). Can schools save kids' palates? Cooking from scratch in schools—The greatest food service challenge of our times. *Childhood Obesity*, 8(4), 323–326.
- de Vet, E., de Ridder, D. T. D., & de Wit, J. B. F. (2010). Environmental correlates of physical activity and dietary behaviours among young people: A systematic review of reviews. *Obesity Reviews*, 12, e130–e142. doi:10.1111/j.1467-789X.2010.00784
- Fogleman, L., Dutcher, J., McProud, L., Nelken, I., & Lins, A. (1992). High school students' attitudes toward and participation in the National School Lunch Program. *School Food Service Research Review*, 16, 36-42.
- French, S. A., Story, M., & Jeffery, R. W. (2001). Environmental influences on eating and physical activity. *Annual Review of Public Health*, 22, 309-335. doi:10.1146/annurev.publhealth.22.1.309

- Gilmore, S. A., Hutchinson, J., & Brown, N. E. (2000). Situational factors associated with student participation in the National School Lunch Program. *The Journal of Child Nutrition & Management*, 24(1), 8-12.
- Godfrey, J.R. (2012). Fulfilling the highest nutrition standards in Burke County district schools. *Childhood Obesity*, 8(4), 400–403.
- Godfrey, J.R. (2011). The renegade lunch lady, Ann Cooper, implements her lunch lessons from Berkeley, California to Boulder, Colorado. *Childhood Obesity*, 7(3), 247–251.
- Hutchinson, J., Brown, N. E., & Gilmore, S. A. (1998). High school students' perceptions associated with their participation in the National School Lunch Program. *The Journal of Child Nutrition & Management*, 22(2), 87-94.
- Lewi, J., & Coppess, S. (2011). *School Nutrition Operations report: The state of school nutrition 2011*. National Harbor, MD: School Nutrition Association.
- Martini, S. A. (2009). Nutrition and food commodities in the 20th century. *Journal of Agricultural & Food Chemistry*, 23(57), 8130-8135. doi:10.1021/jf9000567
- McConnell, P., Matta, G., & Shaw, J. (1997). Factors affecting breakfast and lunch participation by middle school students in Fairfax County, Virginia. *School Food Service Research Review*, 21, 18-23.
- Meyer, M. K., & Conklin, M. T. (1998). Variables affecting high school students' perceptions of school foodservice. *Journal of the American Dietetic Association*, 98(12), 1424-1429. doi:dx.doi.org/10.1016/S0002-8223(98)00322-8
- National Center for Education Statistics. (2014). *Digest of Education Statistics*. Retrieved from http://nces.ed.gov/programs/digest/d11/tables/dt11_092.asp
- National Congress of State Legislators. (2011, March). *Healthy Hunger-Free Kids Act of 2010 (P.L. 111-296) summary*. Retrieved from: <http://www.ncsl.org/research/human-services/healthy-hunger-free-kids-act-of-2010-summary.aspx>
- National Food Service Management Institute. (January, 2014). *USDA recipes for schools*. Retrieved from: <http://www.nfsmi.org/Templates/TemplateDefault.aspx?qs=cEIEPTEwMg>
- Roseman, M., & Niblock, J. R. (2006). A culinary approach to healthy menu items: Middle school student's opinion of school lunch and lunch decision factors. *Journal of Culinary Science & Technology*, 5(1), 75-90.
- Stanley, L., Colasanti, K.J.A., & Conner, D.S. A. (2012). “Real chicken” revolution: How two large districts are shifting the school poultry paradigm with scratch cooking. *Childhood Obesity*, 8(4), 384–387.

U.S. Department of Agriculture. (1925). *School lunches* (Farmers' Bulletin No. 712). Retrieved from <http://books.google.com/books?id=YbEoAAAAYAAJ&dq=lunch%20recipes&pg=PP1#v=onepage&q=lunch%20recipes&f=false>

U.S. Department of Agriculture, Food and Nutrition Service. (2008). *Food buying guide for child nutrition programs*. Retrieved from <http://www.fns.usda.gov/tn/food-buying-guide-for-child-nutrition-programs>

U.S. Department of Agriculture, Food and Nutrition Service. (2012). *Federal Register: Nutritional standards in the National School Lunch and School Breakfast Programs: Final rule*. Vol 77, No. 17, CFR Parts 210 and 220.

U.S. Department of Agriculture, Food and Nutrition Service. (2014a). *Recipes for healthy kids: Cookbooks for child care Centers and schools*. Retrieved from <http://www.fns.usda.gov/tn/recipes-healthy-kids-cookbook-child-care-centers-0>

U.S. Department of Agriculture, Food and Nutrition Service. (2014b). *Farm to school*. Retrieved from <http://www.fns.usda.gov/farmentoschool/farm-school>

U.S. Department of Agriculture, Food and Nutrition Service. (2014c). *Healthier school day*. Retrieved from <http://www.fns.usda.gov/healthierschoolday/tools-schools-focusing-smart-snacks>

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