

Early Childhood Education Centers' Reported Readiness to Implement the Updated Child and Adult Care Food Program Meal Pattern Standards in the United States, 2017

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Abstract

Background: The Child and Adult Care Food Program (CACFP) serves nutritious meals/snacks to >3.6 million children in early childhood education (ECE) centers. This study provides a nationwide assessment of nonhome-based CACFP-participating ECE centers' awareness of and reported readiness for implementing updated CACFP standards/best practices that took effect October 1, 2017.

Methods: A national frame of 38,760 centers serving children ages 0–5 was developed. A web-based survey of 5483 sampled centers, stratified by census division, was conducted between August 22 and September 30, 2017. One thousand three hundred forty-three centers (25%) located in 47 states and the District of Columbia responded. Surveys were primarily completed by center directors/assistant directors (71%). Nonresponse adjusted multivariate regressions were conducted, controlling for center/zip code-level characteristics.

Results: The majority of centers reported being “very” familiar with the updated standards and met specific standards/best practices. Centers that reported being “somewhat” (vs. “very”) familiar with the standards were less prepared and likely to have begun implementation and more likely to need additional time, money, and staff. Centers that reported being “not”/“somewhat” familiar (vs. “very”) with the updated standards were also less likely to meet specific standards/best practices. Center preparedness and standards/best practices varied by weekly rates/fees charged. Centers in the West (vs. South) were more likely to report meeting sugary cereal standards and fruits and vegetables as a snack component best practice.

Conclusions: While most centers reported familiarity with and were prepared to implement the updated CACFP standards, readiness is not universal. Technical assistance and training should ensure that all centers are trained on the updated standards.

Keywords: CACFP; early child care; nutrition; regulation

Introduction

More than 3.6 million children are enrolled in early childhood education (ECE) centers that participate in the Child and Adult Care Food Program (CACFP), which provides nutritious meals and snacks to participants.^{1,2} CACFP is open to child care providers who serve children from families that meet the U.S. Department of Agriculture's (USDA's) income eligibility guidelines for free and reduced-price meals.³ Nutrition standards for the program are issued by the USDA. Effective October 1, 2017, updated

CACFP meal pattern standards took effect. The updated standards required CACFP-participating child care centers to serve more whole grains, a wider variety of fruits and vegetables (F&V), and less solid fats and added sugars.^{1,4}

Strengthening the meal pattern standards for centers serving children younger than 5 years was considered important because this is an influential age for food preference development.⁵ USDA provided a 1-year transition period for centers making a “good faith” effort to comply with the standards.⁶ Before the updated standards, researchers found CACFP-participating centers in certain

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states to have stricter nutrition practices or to be more compliant with standards than non-CACFP-participating sites, to have more supportive nutrition practices, and to report better child health outcomes.^{7–17}

To date, only a few studies have assessed readiness for implementing and/or compliance with state and/or federal ECE nutrition standards. Research conducted in California found that 2 months after a new state-level beverage policy for child care centers was implemented, more than 60% of sampled sites (CACFP sites, 67.3% and non-CACFP sites, 42.2%) were aware of the policy. Only 25% of sampled sites were in full compliance, with CACFP sites significantly more likely to comply than non-CACFP sites. Compliance was attributed to policy awareness and information being provided to families.¹⁶

Also, two studies examined readiness for implementing and/or compliance with the updated CACFP standards. Schwartz et al. (2015) assessed lunches through direct observation in 38 CACFP-participating Connecticut child care sites and compared the current (at that time) CACFP requirements with the 2011 Institute of Medicine recommendations and USDA's January 2015 proposed CACFP rule. They found CACFP-participating child care sites generally complied with the proposed rule amounts for each meal component to be served at lunch.¹⁸ Recently, Dave and Cullen (2018) assessed the 2016 menus of nine CACFP-participating child care sites in Texas to determine adherence to the updated CACFP standards. They found that sites fully met 50% of updated meal pattern requirements and partially or fully met 60% of the best practices.¹⁹

The current study builds on this prior work with a nationwide sample. The goal of the present study was to assess nonhome-based CACFP-participating ECE centers' reported readiness for implementing the updated CACFP meal pattern standards. For the purposes of this study, "readiness" was viewed from the lens of the theoretical literature. For example, in the Stages of Change Transtheoretical Model, the preparation (readiness) stage is the stage at which people have a plan, are ready to make changes within the next month, and/or have already been making changes over the past year, and it immediately precedes the action stage.²⁰

While a literature around nutrition standards and practices in ECE settings and CACFP-participating centers, specifically, has been emerging, there has not been a nationwide study of such practices or an assessment of where centers' practices stand nationally relative to the USDA's updated standards; this study aimed to help fill this gap.

Methods

Sample Frame

No national sample frame of CACFP ECE centers existed, and so, one was developed by obtaining lists from each state CACFP agency between September 2016 and March 2017. Open record requests were required for nine states' lists. Lists were obtained for all states and the

District of Columbia (DC) except for Maine (no response from the state) and Louisiana (only sponsor information provided). The final frame included 38,760 eligible, nonhome-based, CACFP-participating centers (henceforth referred to as "Centers") that served children ages 0–5 years in 48 states and DC.

Home-based centers were excluded from the sample because of the relatively low number of children attending child care homes that participate in the CACFP (756,947 children in fiscal year 2017),² and state and federal child care registries are only able to document about 10% of paid home-based centers making it difficult to develop a reliable sample from this center type.²¹

Sample Selection and Verification

To obtain a nationally representative sample, we randomly sampled Centers within each of the nine census divisions using stratified sampling with proportional allocation. USDA's counts of CACFP ECE centers by state were used to compute census division shares.²² Although USDA's list included all CACFP providers (including home-based and adult care) and, unlike our frame, was not restricted to traditional child care centers serving children ages 0–5, the numbers in our frame and USDA's list provided similar division shares. Given the possibility that some ineligible centers remained in our frame, the USDA list was chosen as the most reliable source for computing proportional division shares. Ultimately, 5604 of the 38,760 ECE centers included in our frame were sampled.

Between January and August 2017, we attempted to verify the state-provided information for the sampled centers via Internet research or telephone calls. Of the originally sampled centers, 19% were ineligible or closed and were replaced, while we obtained new or updated contact information for about half.

Survey Development and Administration

A primarily closed-ended survey (see Supplementary Appendix) was developed to align with the updated standards and best practices⁴ and to draw on prior relevant CACFP and/or ECE surveys.^{12,23–26} Consultants with expertise on early childhood nutrition and CACFP also provided input to the survey content. Cognitive interviews were conducted with seven center directors (or their designees) located in Illinois and Florida (where two of the study authors reside) to test the survey wording and design.^{27,28} The cognitive interviews led to a number of survey changes (see Supplementary Appendix for an explanation of changes and the rationale; Supplementary Data are available online at www.liebertpub.com/chi).

Food and beverages (F&B) included in the survey were selected based on the cognitive interview conversations to reflect those items most commonly offered/served/consumed at the child care centers. Unfortunately, a vegetable selection from the peas/legumes group was inadvertently left off the survey. The final survey was programmed and

administered as a web-based survey using a Research Electronic Data Capture (REDCap) system.²⁹ The survey took 10–20 minutes to complete. All survey respondents were provided an opportunity to earn 1 of 20 \$150 Amazon electronic gift cards for use by their center. UIC's Institutional Review Board granted a claim of exemption for the study (protocol #2017-0549).

The survey was fielded between August 22 and September 30, 2017 (before the October 1 effective date for the updated standards), with reminder e-mails sent weekly. Invitations were sent to center directors/assistant directors or the sponsor, and survey instructions asked that the people responsible for center CACFP participation and F&B provision, respectively, complete the corresponding survey sections. The e-mail invitation provided centers with an opportunity to complete the survey by phone (four sites chose this option) and we mailed a copy of the invitation letter to 681 centers where e-mail addresses could not be obtained. On fielding the survey, additional centers were deemed ineligible, resulting in a final sample of 5483 eligible centers.

Completed surveys were obtained from 1343 centers (25% response rate using the American Association of Public Opinion Research Outcome Rate Calculator³⁰) located in 47 states and DC. An additional 142 (3%) surveys were partially completed but were not used. Invitations were suspended to 297 (5%) centers located in areas affected by Hurricanes Harvey and Irma. Our final completed response rate was comparable with that of prior CACFP- or ECE nutrition-related studies that used similar survey administration methods^{12,16,31–33} and is consistent with recent literature on low web-based survey response rates,^{34,35} particularly for hard-to-reach populations. The survey was primarily completed by center directors/assistant directors (71%).

The survey data were weighted to account for nonresponse using propensity score methods. Zip code-level characteristics for each center were obtained from the American Community Survey 2011–2015 5-year estimates³⁶ and included in a logistic regression model interacted with the census division to estimate the probability of nonresponse for each site. Nonresponse weights were computed within deciles of the estimated nonresponse probabilities using the inverse of the response rate. Weighted data on zip code-level community characteristics from the responding centers were comparable with characteristics of the full sample, as shown in Supplementary Table S1.

Analyses

All analyses were conducted using STATA/SE 13.1, accounting for the survey design and weights. Descriptive statistics were computed for the center characteristics and outcome measures (Tables 1 and 2). Multivariate logistic regressions were used to assess measures of reported implementation readiness (Table 3), and to assess F&B practices meeting required standards and best practices

Table 1. Child and Adult Care Food Program Child Day Care Center Sample Characteristics (Weighted)

Characteristic	% or Mean	95% CI
Corporate owned	30.11	27.39–32.97
Head Start/Early Head Start	34.09	31.24–37.06
Food program sponsored	38.93	35.98–41.96
State-enhanced CACFP standards	55.16	52.30–57.99
Compliance checks conducted by state	53.93	50.86–56.97
Length center participated in CACFP		
<10 Years	38.12	35.04–41.30
10+ Years	61.88	58.70–64.96
Familiarity with revised standards		
Not at all/I don't know	7.67	6.11–9.60
Somewhat	28.14	25.47–30.98
Very much	64.19	61.17–67.09
No. of staff employed at center		
1–10 Employees	34.34	31.49–37.32
11–20 Employees	38.02	35.10–41.03
21–30 Employees	15.63	13.50–18.02
≥31 Employees	12.01	10.20–14.09
Total enrollment capacity		
1–25 Children	7.30	5.88–9.03
26–50 Children	17.15	14.97–19.57
51–100 Children	39.76	36.76–42.83
101–499 Children	35.79	32.92–38.77
Weekly rate for 2–5-year-old children		
Free/no cost OR state subsidized	20.42	18.09–22.97
\$1–\$100.99	14.12	11.96–16.61
\$101–\$200.99	49.03	45.96–52.12
≥\$201	16.42	14.48–18.57
Majority race (zip code level)		
Majority (≥50%) non-Hispanic white	56.17	53.07–59.23
Majority (≥50%) non-Hispanic black	12.61	10.45–15.13
Majority (≥50%) Hispanic	14.64	12.52–17.05
Mixed	16.58	14.28–19.17
% Urban (zip code level)	82.72	81.10–84.34
Census region		
Northeast	17.50	16.31–18.75
Midwest	18.63	17.74–19.54
South	42.21	40.92–43.51
West	21.67	20.69–22.68

N = 1343 CACFP Child Day Care Centers; n = 1190–1343 due to missing data (and a skip pattern for weekly rate that only affected one observation).

CACFP, Child and Adult Care Food Program.

Table 2. Readiness and Food and Beverage Practice Characteristics (Weighted)

Characteristic	% or Mean	95% CI
Readiness outcomes (of those reporting being “somewhat” or “very familiar”) with the standards		
Very prepared to make changes	72.24	69.33–74.97
Began implementing standards: very much	57.44	54.26–60.56
Additional time needed to implement	61.37	58.22–64.42
Additional \$ needed to implement	66.87	63.86–69.76
Additional staff needed to implement	50.35	47.17–53.54
Staff opposition to revised standards	24.61	21.94–27.48
Food and beverage practices		
Meets beverage standards/best practices ^a (Std./BP)	86.31	83.91–88.41
<6 g sugar per dry ounce of cereal (Std.)	69.90	67.00–72.64
Only plain/unflavored or no yogurt (Std.)	32.58	29.71–35.59
100% whole grains (BP)	94.43	92.77–95.73
Fruit or vegetable as component of snack at least once a day (BP)	63.51	60.49–66.43
Dark green vegetables at least once a week (BP)	63.53	60.57–66.39
Red/orange vegetables at least once a week (BP)	75.96	73.22–78.50
Starchy vegetables at least once a week (BP)	70.61	67.78–73.29
Other vegetables at least once a week (BP)	82.55	80.13–84.74
Processed meats <1 time per week (BP)	71.93	69.01–74.68

N = 1343 CACFP Child Day Care Centers. The number of cases included varied by question: $n = 1241$ – 1244 for readiness outcomes (which were only asked of 1245 centers that reported being “somewhat” or “very much” familiar with the standards) and $n = 1295$ – 1334 for food and beverage practices (which were asked of 1340 centers, excluding 3 centers that did not provide meals/snacks or did not serve 2–5-year olds).

^aIncludes fresh water availability, never serving flavored milk, serving 100% juice less than twice a day, and never serving fruit drinks or regular soda.

CACFP, Child and Adult Care Food Program; Std., standard; BP, best practice.

(Table 4). All regression models controlled for center and community characteristics, as shown in Table 1, including center-level characteristics obtained from Section A of the survey, whether the state had enhanced CACFP nutrition standards (before the USDA update),³⁷ census region, and ZIP code-level race/ethnicity and urbanicity obtained from the Census Bureau.^{36,38,39}

Missing center-level characteristic data limited the maximum number of cases in regression models to 1102. Questions about implementation readiness (Table 3) were only asked where respondents stated being “somewhat” or “very much” familiar with the revised standards. That skip pattern and additional missing data on specific outcomes left a range of 1041–1098 cases in the analyses presented herein.

Results

Weighted characteristics of the centers are presented in Table 1. Table 2 presents descriptive data on centers’ reported readiness for implementing the updated standards. The majority of centers reported being “very” prepared to

make changes, to have “very much” begun implementing the standards, and needing at least “some” additional time and money to implement the standards. Half of the centers reported needing at least “some” additional staff for implementation.

Most of the centers reported meeting the beverage standards/best practices for fresh water availability, never serving flavored milk, serving 100% juice <2 times/day, and never serving fruit drinks or regular soda. The majority of centers reported meeting the standards for only serving cereals with <6 g of sugar/dry ounce and the best practice for serving 100% whole grains; however, only 33% of the centers reported serving only plain/unflavored yogurt or no yogurt (we were unable to assess the sugar content of yogurt). In terms of best practices, the majority of centers reported serving a fruit or vegetable (F/V) as a component of a snack at least 1 time/day and served at least one serving each of dark green leafy vegetables, red or orange vegetables, starchy vegetables, and other vegetables at least 1 time/week. Nearly three-quarters of the centers reported meeting the best practices for serving processed meats <1 time/week.

Table 3. Readiness to Implement Revised Child and Adult Care Food Program Standards

Center characteristic	Very prepared to make changes		Began implementing revised standards: very much		Additional time needed to implement standards		Additional \$ needed to implement standards		Additional staff needed to implement standards		Staff opposition to revised standards: any	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
State-enhanced CACFP standards												
No	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
Yes	1.23	0.84-1.79	1.09	0.79-1.52	0.69*	0.50-0.95	1.08	0.78-1.49	0.84	0.62-1.13	0.59**	0.42-0.84
Familiarity with revised standards												
Somewhat	0.11***	0.08-0.16	0.21***	0.15-0.29	1.69**	1.21-2.36	1.81***	1.28-2.57	2.15***	1.56-2.96	1.63**	1.16-2.30
Very much	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
No. of staff employed at center												
1-10 Employees	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
11-20 Employees	1.20	0.72-1.98	0.69+	0.45-1.07	1.41	0.91-2.17	0.86	0.55-1.33	1.00	0.64-1.56	2.23**	1.31-3.80
21-30 Employees	1.55	0.77-3.10	0.61	0.33-1.12	2.10*	1.16-3.78	0.87	0.47-1.61	1.27	0.71-2.29	2.80**	1.42-5.54
≥31 Employees	1.19	0.53-2.67	0.53+	0.27-1.04	1.18	0.63-2.22	0.89	0.46-1.71	1.77+	0.92-3.38	4.42***	2.09-9.38
Length center participated in CACFP												
<10 Years	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
10+ Years	1.18	0.81-1.73	1.48*	1.06-2.08	0.89	0.64-1.23	1.04	0.75-1.45	0.85	0.62-1.16	1.09	0.77-1.55
Weekly rate for 2-5-year-old children												
Free/no cost OR state subsidized	3.14***	1.62-6.11	1.67+	0.97-2.88	0.62+	0.37-1.05	0.40***	0.24-0.68	0.42***	0.25-0.70	0.64	0.35-1.14
\$1-\$100.99	0.96	0.55-1.67	0.48**	0.30-0.79	2.39**	1.41-4.05	0.98	0.60-1.60	1.92**	1.20-3.08	1.84*	1.14-2.97
\$101-\$200.99	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
≥\$201	1.74*	1.03-2.97	1.03	0.64-1.65	0.71	0.46-1.10	0.66+	0.43-1.03	1.05	0.70-1.57	0.70	0.43-1.13
Census region												
Northeast	0.52*	0.30-0.90	0.64+	0.39-1.07	1.46	0.91-2.36	2.08**	1.25-3.44	1.71*	1.06-2.74	1.66+	0.98-2.82
Midwest	0.67	0.41-1.08	0.64*	0.42-0.98	1.51*	1.00-2.26	1.70*	1.12-2.58	1.83**	1.24-2.69	1.28	0.81-2.02
South	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
West	0.72	0.44-1.18	0.67+	0.43-1.05	1.38	0.90-2.10	1.29	0.84-1.96	1.38	0.92-2.08	1.03	0.64-1.67
Observations	1043		1043		1044		1042		1041		1043	

All models also controlled for center-level corporate ownership, Head Start/Early Head Start participation, food program sponsorship, total enrollment capacity, whether the state conducts compliance checks as well as zip code-level majority race and urbanicity (most were not significant at the $p < 0.05$ level).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

AOR, adjusted odds ratio; CACFP, Child and Adult Care Food Program; CI, confidence interval; Ref, referent category.

Table 4. Extent to Which Child and Adult Care Food Program Child Day Care Centers Meet Selected Food and Beverage Standards or Best Practices

Center characteristic	Meets beverage Std./BP		<6 g Sugar per dry ounce cereal (Std.)		Plain/unflavored or no yogurt served (Std.)		100% Whole grains (BP)		Fruit or vegetable as a snack component (BP)		Processed meat, <1 x /week (BP)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Corporate owned												
No	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
Yes	1.29	0.76-2.18	1.62***	1.13-2.32	1.05	0.76-1.47	0.93	0.48-1.81	0.80	0.58-1.11	1.27	0.89-1.80
Head Start or Early Head Start affiliated												
No	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
Yes	0.80	0.44-1.48	1.82*	1.11-2.97	0.93	0.58-1.48	1.69	0.61-4.67	1.03	0.66-1.61	1.00	0.63-1.58
State-enhanced CACFP standards												
No	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
Yes	1.66*	1.05-2.62	1.08	0.79-1.49	1.21	0.88-1.66	1.35	0.74-2.48	1.32 ⁺	0.98-1.78	1.12	0.81-1.56
Familiarity with updated CACFP standards												
Not at all/I don't know	0.28***	0.13-0.60	0.72	0.37-1.38	0.56	0.24-1.31	0.18***	0.07-0.46	0.67	0.35-1.29	0.49*	0.25-0.99
Somewhat	0.57*	0.36-0.90	0.69*	0.49-0.97	1.05	0.76-1.46	0.44**	0.24-0.81	0.68*	0.50-0.95	0.91	0.65-1.28
Very much	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
Length center participated in CACFP												
<10 Years	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
10+ Years	1.68*	1.07-2.64	1.27	0.91-1.77	1.39 ⁺	1.00-1.93	1.82*	1.01-3.30	0.92	0.66-1.26	1.08	0.77-1.50
Weekly rate for 2-5-year olds												
Free/no cost OR state subsidized	2.56*	1.07-6.15	1.86*	1.03-3.37	0.83	0.46-1.49	0.73	0.23-2.29	0.90	0.53-1.54	2.69***	1.48-4.90
\$1-\$100.99	0.48*	0.28-0.84	0.63*	0.41-0.98	0.88	0.55-1.44	0.66	0.28-1.58	0.93	0.59-1.46	1.05	0.66-1.67
\$101-\$200.99	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
≥\$201	3.25**	1.47-7.19	1.89*	1.16-3.09	0.87	0.56-1.37	3.31*	1.13-9.68	1.55 ⁺	1.00-2.42	2.49***	1.57-3.95
Census region												
Northeast	0.76	0.42-1.39	0.96	0.60-1.54	1.01	0.62-1.65	0.61	0.26-1.44	1.28	0.80-2.05	1.18	0.70-1.99
Midwest	1.53	0.85-2.75	0.89	0.59-1.35	0.88	0.58-1.33	0.74	0.38-1.46	1.02	0.69-1.50	1.18	0.79-1.77
South	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00	Ref	1.00-1.00
West	1.93 ⁺	0.97-3.83	2.90***	1.80-4.69	0.82	0.54-1.27	2.00	0.77-5.17	2.60***	1.66-4.09	0.89	0.57-1.38
Observations	1087		1098		1079		1072		1077		1085	

All models also controlled for center-level food program sponsorship, total enrollment capacity, no. of staff, whether the state conducts compliance checks as well as zip code-level majority race and urbanicity (virtually all were not significant at the $p < 0.05$ level).

⁺ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

AOR, adjusted odds ratio; BP, best practice; CACFP, Child and Adult Care Food Program; Ref, referent category; Std., standard.

Factors Influencing Readiness to Implement the Updated Standards

Characteristics associated with center-reported readiness to implement the updated standards are presented in Table 3. Centers located in states with enhanced CACFP standards were *less likely* to report needing additional time to implement or facing staff opposition to the standards. Centers that were only “somewhat” as opposed to “very” familiar with the updated standards were *less likely* to report being “very” prepared to make changes and to have “very much” begun implementation; and were *more likely* to report needing additional time, money, or staff to implement the standards and to face staff opposition. Centers with more staff (>10 employees) were *more likely* to report staff opposition to the revised standards than were centers with <10 employees.

Centers that were free or state-subsidized were *more likely* to report being “very prepared” to make changes and were *less likely* to report needing additional money or staff for implementation compared with those charging \$101–\$200.99 per week for 2–5-year-old children.

Meeting F&B Standards or Best Practices

Table 4 presents factors associated with centers’ reportedly meeting selected CACFP F&B standards/best practices. Centers in states with enhanced CACFP standards were *more likely* to report meeting beverage standards/best practices but not the other food standards/best practices. Centers that reported being less familiar with the updated standards (*i.e.*, “somewhat” or “not at all/I don’t know”) were *less likely* to meet the beverage standards/best practices and the whole grain best practices than centers that were “very much” familiar with the standards.

Centers that were only “somewhat” familiar with the standards were *less likely* than those that were “very much” familiar with the standards to report meeting the low sugar cereal standard or to include an F/V as a component of a snack at least 1 time/day, while centers that were “not at all/I don’t know” familiar were significantly *less likely* than those that were “very much” familiar with the standards to report meeting the processed meat best practices.

Notably, weekly enrollment rates were significantly associated with meeting all of the F&B standards/best practices studied herein except for yogurt and including an F/V as a snack component, as reported by the center. Specifically, free or state-subsidized centers and those charging \geq \$201 weekly were more likely to meet specific standards/best practices compared with those charging \$101–\$200.99, while centers charging \$1–\$100.99 were less likely to meet some standards/best practices.

Although not presented in the Table, centers that were free or state-subsidized reported being *less likely* than those charging \$101–\$200.99 to serve at least one serving each per week of dark green leafy vegetables [adjusted odds ratio (AOR)=0.48, 95% confidence interval (CI)=0.29,0.80], red or orange vegetables (AOR=0.27,

95% CI=0.15–0.48), starchy vegetables (AOR=0.37, 95% CI=0.22–0.62), and other vegetables (AOR=0.41, 95% CI=0.21–0.80).

Discussion and Conclusions

To our knowledge, this was the first nationwide survey of nonhome-based, CACFP-participating ECE centers. The study goal was to provide a baseline understanding of the centers’ awareness of and reported readiness to implement the updated standards, and to understand their F&B practices. It was encouraging that most of the centers reported being “very much” familiar with the updated standards before their effective date, being “very prepared” to make changes, and to have begun implementation at the time of survey. Equally encouraging were the high rates of center-reported practices for children ages 2–5 years that met USDA’s standards or best practices.

Prior studies reported high rates of CACFP-participating center compliance with nutrition standards,^{9,11–14,16,17} which could be partly attributable to extensive training provided about the program from corporate headquarters, the Head Start program, and/or from Federal Food Program sponsors. Given that nearly 69% of our survey respondents fell into one of these categories, high levels of reported compliance are not surprising; however, even so, only 64% of these centers reported being “very much” familiar with the updated standards. In addition, approximately one-half of respondents indicated needing additional time, staff, or money to implement the updated standards.

Prior studies called for ongoing and continued training of ECE providers on regulatory compliance and supportive nutrition practices. Findings reported herein support this recommendation, given that center readiness for implementation was heavily influenced by reported familiarity with the standards (Tables 3–4). Ensuring that all centers are not only familiar with the updated standards but also properly trained on what meets the standards and how to best implement them will be important. Future research also should assess the best methods and formats for the trainings and related materials and priority topic areas.

Two prior CACFP-related studies examined the whole grain changes in the proposed and eventually promulgated updated CACFP standards. Schwartz et al. found that centers thought they were serving 100% whole grain bread because the bread was not white in color¹⁸ and Dave and Cullen found centers were only partially meeting the 100% whole grain requirement.¹⁹ In the current study, most centers reported serving 100% whole grain products based primarily on (>80%) reading the nutrition label (data not shown). Our results, when informed by prior work, suggest there may be training opportunities in label reading for those who are responsible for planning, purchasing, and preparing/cooking meals and snacks at ECE centers.^{18,19}

Schwartz et al. also examined whether policy changes related to offering a greater variety of F&V would increase

F&V consumption as seen in prior state work.¹⁸ While our study did not involve direct observation, the majority of centers reported serving a variety of vegetables from the USDA's vegetable groups. This is likely underreported given that our list of vegetables to select from was small to minimize respondent burden.

Although we attempted to follow survey design and web-based survey best practices,⁴⁰ the study was subject to several limitations. First, we had to develop a national sample frame of nonhome-based, CACFP-participating ECE centers. Child care homes were excluded due to resource limitations and challenges with obtaining home-based CACFP provider lists, given that such sites are infrequently (10%) found on state or federal child care registries.²¹ Future research should include home-based centers.

Also, the final frame and respondent sample did not include centers from Louisiana or Maine (where center lists were not available) and Arkansas (no respondents). Second, while our overall completion response rate was low (25%), it is consistent with similar CACFP and ECE center provider surveys^{12,16,31–33} and with survey research literature on declining web-based survey response rates.^{34,35} Unfortunately, we did not have the resources to incentivize each respondent, which could have increased response rates, and in the future we plan to send an advance message before fielding the survey. However, weighted community characteristics of responding centers were quite comparable with those of the full sample. Third, this was a cross-sectional survey and, therefore, the results reported herein reflect associations rather than causation.

Fourth, this was a descriptive, exploratory study that examined a wide range of possible associations, so there is a significant possibility that some associations found herein are spurious type I errors. Future studies should try to confirm specific hypotheses based on this work. Fifth, the survey was based on self-reported responses and, therefore, may overstate actual practices. Resources permitting, future studies would benefit from objective data collection as well (including menu and food purchasing receipt audits). Sixth, to maintain a survey length that centers would complete with minimal burden, our lists of F&V and yogurt options were limited. Future studies should include an expanded list of items to better understand the degree of compliance. Finally, the survey was only administered in the English language, making it possible that some nonresponse was language related.

In summary, this was the first survey of nonhome-based, CACFP-participating ECE centers nationwide. The findings presented herein provide encouraging insights as to center-reported readiness for implementing the updated federal standards and highlight opportunities for education and training, particularly of smaller, independent centers that are not corporate owned, Head Start affiliated, or with a Federal Food Program sponsor. During this transition year,⁶ it will be important to provide centers with the necessary training and technical assistance to ensure that all centers can comply with the federal regulations.

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Author Disclosure Statement

No competing financial interests exist.

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