Food Purchasing and Preparation at Child Day Care Centers Participating in the Child and Adult Care Food Program in the United States, 2017

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Abstract

Background: More than 3.6 million children are served daily by the Child and Adult Care Food Program (CACFP)-participating child day care centers. This study provides a nationwide assessment of center-level responsibilities for menu, meal/snack preparation, meal preparer training, and food and beverage (F&B) purchasing.

Methods: A nationally representative survey of 5483 CACFP child day care centers was conducted between August 22, 2017, and September 30, 2017. One thousand three hundred forty-three centers (25% response) in 47 states and the District of Columbia responded. Descriptive statistics describe center-level menu, meal, and purchasing practices and center characteristics. Multivariate logistic regressions examined characteristics associated with F&B purchasing sources.

Results: Menus were primarily prepared by directors/assistant directors and on-site food manager/cooks, while site staff primarily prepared meals/snacks. Fifty-two percent of meal preparers held a food sanitation license, but only 5% had formal nutrition training (e.g., Registered Dietician). Most centers purchased F&B from food service providers (63%), local grocery stores (59%), warehouse stores (40%), or from 2+ sources (50%). Independent centers were more likely to purchase F&B from local grocery stores or 2+, while free or state-subsidized sites were more likely to purchase from a food service provider and less likely to purchase from other sources than were centers charging between \$101 and \$201.99 per week. Centers where an on-site cook/food manager prepared the meals were significantly more likely to purchase their F&B from local grocery and/or warehouse stores and/or from 2+ sources.

Conclusions: Opportunities exist to target CACFP training to specific roles within and specific types of CACFP-participating child day care centers to facilitate compliance with the updated CACFP standards.

Keywords: CACFP; early child care; meal preparation; nutrition; purchasing

Introduction

In 2015–2016, 13.9% of children ages 2–5 years were obese.¹ Research indicates that children who are obese are at greater risk for becoming adults who are obese.² More than 12 million children ages birth to 5 years attend some type of child care setting,³ making the providers an important part of developing healthy eating habits for these children. The US Department of Agriculture's (USDA's) Child and Adult Care Food Program (CACFP) serves more than 3.6 million children meals and snacks daily through nonhome-based child day care centers nationwide.⁴ The CACFP annual budget for the full program (child care

centers, child care homes, homeless shelters, at-risk after-school programs, and adult care) for fiscal year 2016 is \$3.5 million⁵ distributed to participating centers per child based on parental income eligibility and meal/snack at reimbursement rates of \$.08–\$5.24 in 2017–2018.⁶ All CACFP centers must serve one or more meal types, including breakfast, lunch, dinner, and/or snack daily⁷; the meals/snacks must meet specific nutritional standards for fruits and vegetables (F&V), milk, whole grains, meats and meat alternatives, and added sugars^{8–10}; and all centers participating in the CACFP must adhere to the USDA procurement and purchasing regulations that govern the procurement of foods, goods, and services, the purchasing

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of locally grown foods, and menu planning, including more local control over menu planning.^{11–13}

In addition to regulatory requirements, several factors influence early child care centers' food procurement, purchasing, and service decisions, including the menus, the training of the food service personnel, cost, and procurement sources.^{14–20} The American Dietetic Association issued benchmarks for nutrition in child care settings that call for menus that reflect actual food and beverage (F&B) served, that food preparation and service be consistent with national food safety/sanitation standards and recommendations, that providers receive appropriate child nutrition training, and that food and nutrition practitioners provide consultation to early child care programs on best practices and the latest dietary guidelines.¹⁴

To date, limited research has assessed menu development, meal/snack preparation, provider meal preparation-related training, and food purchasing at early child care centers. Dave and Cullen conducted on-site observations and menu coding in nine CACFP early care and education (ECE) centers in Texas to assess agreement between what was served and the posted menu items as well as to compare what was served and/or on the menus with the updated CACFP meal pattern standards. They found high rates (94%–100%) of agreement between what was served and posted on menus and found centers were meeting USDA-updated standards regarding milk, but only partially meeting the F&V standards and not meeting the standards/best practices for fruit juice, legumes, whole grain-rich foods, and meat and meat alternatives.²¹

Otten et al. found a variety of center-, vendor/supplier-, regulatory-, and individual-level influences on food purchasing and service decisions in a qualitative study of 16 Puget Sound area ECE centers.¹⁷ Breck et al. observed F&B served and menu content in 95 New York City child care centers and found at least a 60% agreement between menu items and F&B served for all major food groups. They also found that when the center's chef was responsible for food purchasing, the correlation between what was served and what was listed on the menu was 8%–10% higher compared with when other staff had purchasing responsibilities.²⁰

Also, the National Food Service Management Institute conducted a CACFP-related literature review and recommended that more research be conducted on the perceived barriers to CACFP providers' procurement practices, on the impact of "effective" procurement on nutritional quality and financial integrity, and that training programs be developed to educate CACFP providers on "effective" procurement practices.²² These studies collectively highlight the importance of the staff person making decisions, the importance of menu planning, and the need to better understand food purchasing decisions.

The purpose of this study was to provide nationwide data on CACFP child day care centers' menu preparation, meal and snack preparation, provider training, and food pur-

chasing sources. The study builds on the literature in this area by providing national data on CACFP practices and highlights areas for training and technical assistance to facilitate CACFP standards' compliance.

Methods

Study Sample

Between September 2016 and March 2017, a national frame of CACFP-participating child day care centers was developed based on lists obtained from state agencies; in nine states, lists were obtained via an open records request. Forty-eight states and the District of Columbia (DC) provided lists; Louisiana only provided sponsor-level (not center-level) information and Maine did not respond to multiple requests. Based on the lists compiled, we developed a frame of 38,760 eligible, nonhome-based child day care centers serving children aged 0–5 years. From that frame, a random sample of CACFP child day care centers was selected, proportional to center allocations across census divisions (based on the number of CACFP providers by state and division obtained from the USDA²³).

Initially, 5604 centers were randomly sampled. Between January and August 2017, study staff attempted to validate the state-provided information on each center via Internet research and/or calls to the centers. In most instances, the state-provided information required updating. The most common changes were to the center director name, missing e-mail information, and centers closing. Centers that had closed or were determined to be ineligible were replaced until September 20, near the end of survey administration; the final sample included 5483 eligible centers.

Survey Development and Administration

A closed-ended survey (see Appendix; available online at www.liebertpub.com/chi) was developed based on the updated CACFP meal pattern standards and prior child day care/early child care nutrition-related surveys,^{8–10,24–28} input from nutrition and ECE experts, and following cognitive interviews (CIs) to test question wording and format^{29,30} with center directors at eight CACFP child day care centers located in Illinois and Florida where two of the study authors reside. The University of Illinois at Chicago's Institutional Review Board approved a claim of exemption for the study (protocol #2017-0549).

Relative to the current analysis, the survey included questions about menu preparation (Question 19), meal (Question 17a1) and snack (Question 18a1) preparation, the training of the person preparing meals (Questions 17b1), and where F&B for meals were purchased (Question 20), with response options noted in Table 1. "Other" open-ended responses were recoded for this analysis (as presented in Table 1). Initially, the survey included a question on the amount spent on F&B at each center. This question was removed after the CI because many center

Table 1. Menu and Meal/Snack Preparation and Food Purchasing Characteristics (Weighted)

Characteristics	%	95% CI
Who prepares the menus for your site? (Select all that apply)		
Center director/assistant director	38.85	35.89–41.90
On-site kitchen/food manager/cook	36.71	33.82–39.69
Food program sponsor	17.14	14.90–19.63
Corporate office	13.16	11.26–15.33
Health and/or nutrition professional ^a	6.84	5.52–8.45
Food service provider/vendor ^a	5.58	4.25–7.30
Meal planning service	4.53	3.31–6.18
Other (includes administration, school district, other, and I don't know)	6.22	4.87–7.91
Who prepares meals for children ages 2–5? (Select all that apply)		
Site staff	82.96	80.53–85.14
Catering company/vendor	13.18	11.19–15.45
Sponsor delivers to site	5.30	4.08–6.87
School district ^a	1.94	1.33–2.82
Central kitchen ^a	1.51	0.97–2.35
Other (includes hospital/nursing home/ senior dining service, other, and unknown)	1.88	1.22–2.89
Who prepares snacks for children ages 2–5? (Select all that apply)		
Site staff	86.50	84.15–88.55
Catering company/vendor	7.51	5.92–9.48
Sponsor delivers to site	3.95	2.96–5.27
Central kitchen ^a	1.29	0.79–2.09
School district ^a	0.78	0.43–1.42
Other	1.68	0.99–2.82
What is the training of the person preparing the meals at your site? (Select all that apply)		
Food sanitation license	52.27	48.91–55.61
Nutrition or food program/safety training course/certificate ^a	13.48	11.38–15.89
Federal or state training (includes state/federal training, CACFP training) ^a	8.91	7.25–10.89
In-house training ^a	7.31	5.92–8.99
Experience ^a	5.84	4.42–7.67
Formal education in food and/or nutrition (includes registered dietitian) ^b	5.33	4.02–7.04
Food manager training certificate/license ^a	1.98	1.18–3.28

*continued on page 377***Table 1. Menu and Meal/Snack Preparation and Food Purchasing Characteristics (Weighted) continued**

Characteristics	%	95% CI
Other (includes I don't know, other, none)	19.50	16.95–22.33
Where are foods and beverages for meals purchased? (Select all that apply)		
Food service provider	63.15	59.97–66.21
Local grocery store	58.72	55.46–61.91
Warehouse store	40.34	37.14–43.62
At least two out of food service provider, local grocery store, or warehouse store	50.22	46.95–53.48
All three out of food service provider, local grocery store, or warehouse store	16.25	13.95–18.84
Catering company ^a	2.27	1.41–3.63
Local farmers ^a	1.06	0.64–1.75
Online grocery store ^a	0.17	0.05–0.53
Other (includes food bank, school district, other, and I don't know)	4.24	3.16–5.67

N = 1343 CACFP child day care centers. The number of cases included varied by question: *n* = 1341 for menu preparation; *n* = 1326 for meal preparation (only asked of 1327 respondents indicating site served 2–5-year olds and provided meals); *n* = 1290 for snack preparation (only asked of 1295 respondents indicating site served 2–5-year olds and provided snacks); *n* = 1103 for training of the person preparing meals (only asked of 1106 respondents indicating meals were prepared by site staff); *n* = 1173 for where foods and beverages for meals were purchased (only asked of 1174 respondents indicating meals were prepared by site staff or other).

^aResponse option was not present on original survey, but was recoded based on open-ended responses.

^b“Registered dietitian” was present on the original survey; this broader category was recoded based on open-ended responses.

CACFP, Child and Adult Care Food Program; CI, confidence interval.

directors did not do the F&B purchasing and could not easily answer the question.

The survey was administered as a web-based survey using a Research Electronic Data Capture (REDCap) system.³¹ The entire survey took ~10–20 minutes to complete and was sent to center directors/assistant directors and, in some cases, sponsors, between August 22, 2017, and September 30, 2017 (before the updated CACFP standards' effective date). Reminder e-mails and calls to nonresponding centers were conducted approximately weekly following the initial invitation. An invitation letter with a survey web link was mailed to 681 centers without accessible e-mail addresses. Completed surveys were

obtained from 1343 centers in 47 states and DC (25% response rate out of 5483 eligible centers in the final sample using the American Association of Public Opinion Research Outcome Rate Calculator³²).

No responses were received from the centers surveyed in Arkansas and, as noted above, Louisiana and Maine did not provide center-level lists. Surveys were partially completed (but not used in the current analysis) by 142 (3%) of the sample and survey invitations and follow-up reminders were suspended for 297 nonresponding centers (5% of the sample) located in areas affected by Hurricanes Harvey and Irma. The final completed response rate was comparable with the current literature on web-based survey response rates generally,^{33,34} particularly hard-to-reach populations such as low-income child day care centers, and was similar to response rates obtained in similar surveys and data collection efforts involving CACFP or child day care nutrition-related practices conducted in specific states.^{24,35–38}

The survey was primarily completed by center directors/assistant directors (71%) and/or center owners/franchisees (19%); in 7% of cases, a sponsor or corporate representative completed (or participated in completing) the survey. Respondents who completed the survey were provided an opportunity to earn 1 of 20, \$150 Amazon electronic gift cards for their center.

Analyses

Nonresponse weights were calculated using propensity score methods based on zip code-level characteristics for each center that were obtained from the American Community Survey (ACS) 2011–2015 5-year estimates.³⁹ The ACS zip code-level characteristics were included in a logistic regression model interacted with the census division to estimate the probability of nonresponse for each sampled center. Nonresponse weights were calculated within deciles of the estimated nonresponse probabilities, using the inverse of the response rate. Zip code-level characteristics for the respondents were comparable with those for the full sample after the nonresponse adjustment.

All analyses were conducted using STATA/SE 13.1, accounting for survey design and weights. Descriptive statistics were computed for the respondent center characteristics and for each of the relevant survey questions presented herein. In addition, multivariate logistic regression analyses were conducted to assess the factors associated with where centers primarily purchased F&B for meals. The key factors examined in these models included center characteristics, state-enhanced CACFP standards,⁴⁰ region, and zip code-level characteristics (all noted in Table 2)^{39,41,42} and two variables from Table 1 (menu preparation and training of meal preparer). One of the center characteristics, “Independent Center,” was computed based on a response of “No” to each of the survey questions that asked if the center was corporate owned (*e.g.*, KinderCare), franchise owned (*e.g.*, Kiddie Academy), Head Start-affiliated, and/or had a Federal Food Program Sponsor (*i.e.*, an external organization that helps

Table 2. Child and Adult Care Food Program Child Day Care Center Sample Characteristics (Weighted)

Characteristics	% or mean	95% CI
Independent center (not corporate owned/Head Start/food program sponsored)	31.33	28.58–34.22
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, years		
<10	38.12	35.04–41.30
10+	61.88	58.70–64.96
Familiarity with updated CACFP 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) (mean)	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, which only affected one observation).

CACFP, Child and Adult Care Food Program; CI, confidence interval.

Table 3. Characteristics Associated with Child and Adult Care Food Program Child Day Care Center Food and Beverage Purchasing Source

Center characteristics	Food and beverage purchasing source											
	Food service provider			Local grocery store			Warehouse store			At least two out of food service provider, local grocery store, or warehouse store		
	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI
Independent (not corporate owned/Head Start/food program sponsored)												
No	58.97	Ref.	1.00–1.00	62.01	Ref.	1.00–1.00	46.32	Ref.	1.00–1.00	54.54	Ref.	1.00–1.00
Yes	60.29	1.08	0.74–1.56	76.10	2.27***	1.49–3.44	51.49	1.29	0.90–1.85	64.31	1.58*	1.10–2.26
State-enhanced CACFP standards												
No	55.27	Ref.	1.00–1.00	68.35	Ref.	1.00–1.00	48.40	Ref.	1.00–1.00	58.62	Ref.	1.00–1.00
Yes	62.68	1.50*	1.04–2.15	65.40	0.84	0.57–1.25	48.22	0.99	0.69–1.41	57.35	0.94	0.68–1.31
Total enrollment capacity												
1–25 children	42.44	0.26**	0.09–0.71	70.27	1.84	0.63–5.38	43.88	0.95	0.31–2.92	49.97	0.75	0.30–1.88
26–50 children	39.35	0.22***	0.12–0.41	81.66	3.91***	1.98–7.72	42.90	0.91	0.47–1.75	54.65	0.93	0.49–1.77
51–100 children	60.47	0.62*	0.39–0.99	68.45	1.65*	1.05–2.62	53.84	1.55*	1.02–2.38	61.88	1.31	0.85–2.00
101–499 children	69.33	Ref.	1.00–1.00	58.96	Ref.	1.00–1.00	44.91	Ref.	1.00–1.00	56.19	Ref.	1.00–1.00
Familiarity with updated CACFP standards												
Not at all/I don't know	80.63	4.18**	1.43–12.21	49.71	0.36**	0.16–0.78	50.45	1.08	0.49–2.37	49.03	0.60	0.28–1.31
Somewhat	58.74	1.05	0.72–1.54	64.58	0.78	0.52–1.18	46.18	0.87	0.59–1.28	54.76	0.79	0.55–1.13
Very much	57.87	Ref.	1.00–1.00	68.95	Ref.	1.00–1.00	49.00	Ref.	1.00–1.00	59.90	Ref.	1.00–1.00
No. of staff employed at center												
1–10 employees	50.82	Ref.	1.00–1.00	73.01	Ref.	1.00–1.00	51.78	Ref.	1.00–1.00	57.66	Ref.	1.00–1.00
11–20 employees	59.40	1.54*	0.96–2.47	66.37	0.68	0.40–1.15	48.69	0.86	0.52–1.42	58.44	1.04	0.64–1.68
21–30 employees	71.23	2.96***	1.59–5.51	61.46	0.52+	0.26–1.03	44.08	0.68	0.37–1.27	57.71	1.00	0.54–1.85

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Table 3. Characteristics Associated with Child and Adult Care Food Program Child Day Care Center Food and Beverage Purchasing Source *continued*

Center characteristics	Food and beverage purchasing source											
	Food service provider			Local grocery store			Warehouse store			At least two out of food service provider, local grocery store, or warehouse store		
	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI
≥31 employees	69.27	2.64*	1.19–5.84	58.94	0.46*	0.21–1.00	43.30	0.66	0.31–1.39	56.98	0.97	0.46–2.02
Length center participated in CACFP, years												
<10	48.49	Ref.	1.00–1.00	67.10	Ref.	1.00–1.00	52.91	Ref.	1.00–1.00	55.64	Ref.	1.00–1.00
10+	66.84	2.62***	1.82–3.76	66.34	0.96	0.66–1.40	44.71	0.67*	0.47–0.95	59.45	1.20	0.84–1.70
Weekly rate for 2–5-year-old children												
Free/no cost OR state subsidized	74.75	3.33***	1.80–6.14	51.63	0.36***	0.21–0.64	15.64	0.12***	0.06–0.25	47.44	0.57*	0.34–0.95
\$1–\$100.99	57.21	1.18	0.70–2.00	75.99	1.39	0.73–2.65	54.35	0.98	0.59–1.61	66.95	1.40	0.83–2.37
\$101–\$200.99	54.10	Ref.	1.00–1.00	70.66	Ref.	1.00–1.00	54.81	Ref.	1.00–1.00	59.96	Ref.	1.00–1.00
≥\$201	63.19	1.64*	1.02–2.65	58.39	0.51**	0.32–0.83	46.65	0.69	0.44–1.09	51.69	0.69+	0.44–1.06
Compliance checks conducted by state												
No	58.59	Ref.	1.00–1.00	65.31	Ref.	1.00–1.00	42.37	Ref.	1.00–1.00	54.55	Ref.	1.00–1.00
Yes	60.12	1.09	0.77–1.53	67.75	1.15	0.80–1.66	52.84	1.68**	1.19–2.36	60.62	1.33+	0.96–1.84
On-site kitchen/food manager/cook prepares site menus												
No	56.81	Ref.	1.00–1.00	62.72	Ref.	1.00–1.00	43.92	Ref.	1.00–1.00	51.07	Ref.	1.00–1.00
Yes	62.73	1.38+	0.97–1.98	72.05	1.71**	1.16–2.52	53.77	1.63**	1.15–2.30	67.09	2.11***	1.49–2.97
Specific training of person preparing meals ^a												
No	57.60	Ref.	1.00–1.00	69.42	Ref.	1.00–1.00	48.21	Ref.	1.00–1.00	60.83	Ref.	1.00–1.00
Yes	60.04	1.14	0.78–1.68	65.69	0.80	0.54–1.20	48.33	1.01	0.69–1.46	56.90	0.83	0.58–1.19

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Table 3. Characteristics Associated with Child and Adult Care Food Program Child Day Care Center Food and Beverage Purchasing Source *continued*

Center characteristics	Food and beverage purchasing source											
	Food service provider			Local grocery store			Warehouse store			At least two out of food service provider, local grocery store, or warehouse store		
	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI	Adj. prev. (%)	AOR	95% CI
Majority race (zip code level)												
Majority (≥50%) non-Hispanic white	62.28	Ref.	1.00–1.00	70.00	Ref.	1.00–1.00	45.66	Ref.	1.00–1.00	59.62	Ref.	1.00–1.00
Majority (≥50%) non-Hispanic black	55.72	0.70	0.36–1.37	60.00	0.57 ⁺	0.30–1.10	58.41	1.89 ⁺	0.95–3.75	57.33	0.90	0.48–1.68
Majority (≥50%) Hispanic	56.81	0.74	0.40–1.38	54.36	0.43 ^{***}	0.24–0.77	45.40	0.99	0.55–1.76	44.15	0.49 [*]	0.28–0.87
Mixed	53.21	0.61 ⁺	0.37–1.02	70.25	1.01	0.59–1.73	52.74	1.42	0.85–2.35	63.82	1.22	0.75–2.00
% Urban (zip code level)	—	1.00	0.99–1.00	—	1.00	0.99–1.00	—	1.01 ^{***}	1.00–1.02	—	1.00	1.00–1.01
Census region												
Northeast	52.31	0.37 ^{***}	0.21–0.65	54.66	0.50 [*]	0.30–0.86	38.37	0.62 ⁺	0.35–1.09	40.00	0.35 ^{***}	0.21–0.58
Midwest	55.22	0.43 ^{***}	0.27–0.68	72.02	1.31	0.79–2.17	43.85	0.81	0.52–1.25	56.81	0.74	0.49–1.13
South	70.26	Ref.	1.00–1.00	67.45	Ref.	1.00–1.00	48.15	Ref.	1.00–1.00	63.10	Ref.	1.00–1.00
West	43.01	0.23 ^{***}	0.14–0.39	68.93	1.09	0.64–1.84	60.29	1.85 [*]	1.10–3.11	60.95	0.90	0.57–1.43

Results shown are from survey-adjusted logistic regression models controlling for the variables shown. Adjusted prevalences for all dichotomous/categorical covariates were computed from the fitted model, fixing all observations to the given level of that variable. For example, an adjusted prevalence of 52.31% for the Northeast census region indicates that the average estimated probability of the outcome is 52.31% if all centers are treated as being in the Northeast. N = 916 CACFP-participating centers.

⁺p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

^aIncludes “food sanitation license,” “nutrition or food program/safety training course/certificate,” “CACFP training,” “registered dietitian,” “state/federal training,” and “formal education in food and/or nutrition.”

AOR = adjusted odds ratio; Ref., referent category.

an individual center administer its CACFP and that provides oversight, reporting, and compliance checks, where applicable). The regression analyses were limited to 916 centers that responded to the food purchasing question and for which there were no missing center characteristic data. Adjusted prevalence rates and odds ratios, as well as confidence intervals, were computed for each characteristic included in the regression models.

Results

Information on the menu preparation, meal and snack preparation, staff training, and food purchasing practices of the respondent centers is presented in Table 1. More than one-third of the centers reported that menus were prepared by the center director/assistant director and/or by an on-site kitchen/food manager/cook. Less than 20% of the centers indicated that their sponsor or corporate office prepared the menus for the site and only 4.5% of the centers reported using a meal/menu planning service. Approximately 83% and 87% of the centers reported that site staff prepared the meals and snacks for children aged 2–5, respectively. The majority of centers indicated that the person preparing the meals for the center had a food sanitation license (52%). Few centers reported that the person preparing the meals had a nutrition or food program/safety training course or certificate (13.5%) or that this person had formal nutrition training such as being a registered dietitian (5%).

Also, most centers purchased their F&B for meals from a food service provider (63%), a local grocery store (59%), or a warehouse store (40%). In fact, most centers (50%) purchased their F&B from at least two sources, while about one-sixth purchased from all three. Characteristics of the centers included in the analysis are presented in Table 2.

The variation in food purchasing sources enabled us to assess the factors associated with where centers purchased F&B for meals. Table 3 provides detailed results; here we highlight certain factors that were consistently associated with F&B purchasing sources. Independent centers were more likely to purchase F&B for meals from local grocery stores or two or three sources compared with non-independent centers. [Interestingly, independent centers were also more likely to purchase specifically from both food service providers and warehouse stores (adjusted odds ratio: 1.77, 95% confidence interval: 1.18–2.66), although we did not find a significant association with purchasing from either of those sources individually.]

Centers that were free/no cost or state-subsidized were more likely to purchase their F&B from a food service provider and less likely to purchase their F&B from all other sources (compared with centers charging between \$101 and \$200.99/week). Centers that had an on-site kitchen/food manager/cook prepare their meals were significantly more likely to purchase their F&B from local grocery stores, warehouse stores, at least two sources, or all

three sources (including food service providers) than were centers without such a person on-site. Also, centers located in the Northeast (compared with the South) were significantly less likely to purchase their F&B from food service providers, local grocery stores, and two or three sources.

Discussion and Conclusions

To our knowledge, this is the first nationwide study of CACFP child day care centers' menu, meal, and snack preparation practices, training, and F&B purchasing. Although the data in this study were limited, they provide new insights into CACFP child day care centers' food preparation and procurement practices. How CACFP child day centers prepare and procure F&B is important because these choices could have lifelong health and wellness implications for the 3.6 million children they serve.

Notably, many of our sites were in states with enhanced CACFP standards which, according to Otten et al. and Briley et al., would influence food purchasing and service decisions at child care centers.^{17,18} At the same time, the location where food is purchased affects child care centers' food purchasing decisions.¹⁷ The US Economic Research Service reports that nontraditional food retailers [*i.e.*, super centers, wholesale clubs (warehouse stores in this article)] are gaining a larger share of the market for households because there is an average of 5%–25% lower food costs than at traditional retailers [*i.e.*, conventional grocery store (local grocery store in this article)].⁴³

Most centers in the present study purchased food from a food service provider, local grocery store, or warehouse store. There is a potential opportunity to partner with these entities to make purchasing qualifying foods easier for those with and without formal nutrition education. Many local groceries already have systems in place to help customers identify healthy F&B options or F&B that qualify for the Women, Infants, and Children Nutrition Program.^{44–46} In addition, the Healthier Generation Store, a partnership between the Alliance for a Healthier Generation and Amazon that sells products meeting USDA Smart Snacks in School standards, may provide a model for a similar type of online store targeted at CACFP providers.⁴⁷

The present study found that menus were most often prepared by center directors/assistant directors, while meals were most often prepared by someone without formal education in nutrition, such as being a Registered Dietician Research indicates that the skills of the person making the menu/food decisions is another factor influencing child care centers' food purchases and service^{17,18,48,49}; although we did not find that the training of the person preparing the menus was a significant predictor of F&B purchasing sources, we did find having an on-site cook/food manager who prepared meals to be significantly associated with F&B purchasing sources. The USDA and state agencies should continue to promote and encourage those preparing site menus and preparing meals and snacks to participate in online trainings such as

through USDA or provided by the Institute of Child Nutrition, particularly independent centers that may have less resources and expertise.

The findings presented herein should be considered within the context of the following limitations. First, this was a cross-sectional study conducted in 2017 so the purchasing-related regression results are correlational rather than causal. Second, although the survey was nationally representative, the sample frame did not include centers in Louisiana or Maine (where center lists could not be obtained) and no centers responded to the survey from Arkansas. Thus, while the study results are nationally representative based on census divisions, there are no respondents included in the study from those three states.

Third, the study was based on a self-reported survey of primarily center directors/assistant directors or center owners/franchisees; thus, the responses provided may be subject to respondent bias, but such respondents are also the ones to have the most information about how the center prepares and purchases F&B. Fourth, our 25% response rate was low but was comparable with similar CACFP or early child care nutrition-related studies^{24,35–38} and response rates for web-based surveys more generally.^{33,34} Future studies would be well served to incentivize all respondents as we were unable to do so due to project resources. Finally, the survey was limited to English-speaking respondents so language barriers may have contributed to some nonresponse.

In conclusion, this study sheds new light on present CACFP child day care center menu and meal/snack preparation, training, and purchasing practices nationwide. The findings highlight opportunities for targeted training and technical assistance for centers during this transition year⁹ related to menu and meal/snack preparation, particularly given the wide variation in training of the individuals preparing the meals at the centers. One of the most noteworthy findings was that independent centers were significantly more likely to purchase their F&B from local grocery stores; this points to a need to provide specific training for independent centers on CACFP standards, to familiarize them with USDA's *Food Buying Guide*,⁵⁰ and to conduct specific interventions with local grocery store providers to better enable independent centers to ensure that the F&B that they are purchasing are CACFP compliant. Finally, future studies should delve deeper into the food preparation and purchasing practices of CACFP child day care centers nationwide to provide more comprehensive insights for future decision-making and training and technical assistance.

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