



Published in final edited form as:

*J Am Diet Assoc.* 2010 December ; 110(12): 1890–1895. doi:10.1016/j.jada.2010.09.012.

## Comparison of Menus to Actual Foods and Beverages Served in North Carolina Child-Care Centers

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### Abstract

Menus from child-care centers are an important source of information for parents, researchers, and child-care regulators, but previous research suggests that menus do not accurately represent foods served. The purpose of this study was to compare menus with actual foods and beverages served to children in child-care centers. Menus were collected and a dietary observation was conducted to document all foods and beverages served to children during the course of 1 day in 84 child-care centers in North Carolina in the fall of 2005. Frequencies of foods and beverages on the menus vs those served were computed by eating occasion, food category, and individual foods and beverages. Of the 254 meals and snacks served, 131 (52%) meals and snacks matched entirely what was stated on the menu. Of the 820 individual foods and beverages served, 710 (86.6%) matched those listed on the menus. An additional 110 foods and beverages were served but not listed on the menus. Grains, juice, and vegetables were served less often than indicated on the menus, and milk, protein-rich foods, fruits, mixed dishes, and foods of low nutritional value were served more often than listed on the menus. Overall, just over half of all meals and snacks matched menus, and nearly 90% of individual foods and beverages served matched those stated on menus. Parents of children in child care and dietetics practitioners providing consultation to child-care centers can encourage not only provision of healthy foods and beverages, but also accurate menus in child care.

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Menus from child-care centers are an important source of information for parents, researchers, dietetics practitioners, and child-care regulators. State and federal regulators

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST: No potential conflict of interest was reported by the authors.

often review menus to ensure that child-care providers serve appropriate foods and beverages to children. They also use menus to monitor adherence to program guidelines or state regulations as menu review is often the most cost-effective method to monitor foods served in child care. The Child and Adult Care Food Program (1), a federal entitlement program that provides reimbursement for meals and snacks to eligible child-care facilities, sets nutrition standards including meals patterns and minimum portion sizes for participating child-care facilities. Centers that participate in the Child and Adult Care Food Program, which include all Head Start Program (2) centers, must provide copies of menus to ensure compliance with program requirements. Through their state child-care regulations, a number of states also require accurate menus in child care, mandating that child-care providers note any changes or substitutions on the menu (3).

Researchers and dietetics practitioners also use menus to assess diet quality of foods and beverages served to children attending child care (4,5), and to identify opportunities for improvement through dietary intervention (4,6–9). Only one previous study examined the accuracy of menus in child care. Fleischhacker and colleagues (10) reviewed menus from a single child-care center over several months and found that foods and beverages served to children rarely matched those stated on the menus. The purpose of this study was to compare menus with actual foods and beverages served to children during the course of a single day in a larger sample of child-care centers.

## METHODS

### Study Sample

Data for this cross-sectional descriptive study were collected between September and December of 2005 as part of a larger intervention trial. The Nutrition and Physical Activity Self-Assessment for Child Care intervention was a randomized, controlled trial designed to improve nutrition and physical activity policies and practices in child care through environmental assessment and change (11–13). A convenience sample of 84 child-care centers located in diverse geographic regions in North Carolina were recruited to participate in the Nutrition and Physical Activity Self-Assessment for Child Care study. Centers were eligible to participate in the study if they had a current enrollment of 15 to 150 children and did not have an open or pending case of child abuse or neglect; Head Start program centers were not eligible to participate because they follow more stringent federal standards related to nutrition and physical activity. All centers were privately operated and served children up to 6 years of age. Recruitment and retention protocols for the study have been published previously (11). Briefly, eligible centers were invited to participate in a nutrition and physical activity intervention. Centers were told that a research assistant would visit the center before the start of the study to document current nutrition and physical activity environments. After a 1-day observation to collect baseline data, the 84 centers were randomized to either the control or intervention condition.

Because data were collected on the child-care environment and not the children in care, center directors provided written informed consent to participate in the study; consent was not required from parents for the children in care. This study was approved by the University of North Carolina at Chapel Hill Institutional Review Board.

### Dietary Observation

A trained research assistant visited each of the 84 centers to record foods and beverages served for all meals and snacks during a single day of observation to collect baseline data for the Nutrition and Physical Activity Self-Assessment for Child Care study. These visits were scheduled in advance, but center directors were not aware that menus would be compared to

actual foods and beverages served. Center directors were told that menus for the day, along with other center documents such as the parent handbook, center policies, and provider training schedule, would be collected at the end of the visit. Observations took place in one classroom that served children 3 to 5 years of age and were conducted using a method developed to help evaluate the Nutrition and Physical Activity Self-Assessment for Child Care intervention (11,14). Briefly, the research assistant documented foods and beverages provided to all children in the observation classroom, including specific information about the food or beverage, the method of preparation, and any additions during cooking or preparation. When not easily discernable, the research assistant asked the food preparer for additional detail. Dietary intake by the children was not recorded. All observations took place on a typical weekday ranging in season from early fall to early winter. No meals or snacks were served in conjunction with a holiday or celebration because observations were scheduled in advance to avoid these events.

### Review of Menus

Menus were collected at the end of the day to allow appropriate time for food and beverage substitutions to be noted by child-care providers. For example, if centers planned to serve peaches for breakfast but served apples instead, this change should have been written on the menu in compliance with North Carolina state child-care regulations (3). If substitutions were noted on the menus, they were used in the comparison to actual foods served for this analysis.

### Comparison of Menus to Foods Served

Frequencies of foods and beverages served and on the menus were calculated by eating occasion (eg, lunch), general food category (eg, grain), and individual foods and beverages (eg, bread). Eating occasions included: breakfast/morning snack, lunch, and afternoon snack. Foods and beverages were categorized as follows: milk, juice, fruit, vegetable, grain, protein-rich food, mixed dish, and other. "Other" foods consisted of foods of low nutritional value such as cookies, cakes, fruit punch and juice drinks, chips, and popsicles. Condiments were not included in the analysis as they are not typically recorded on the center menu. Whenever possible, mixed dishes were broken down to their general food categories. Macaroni and cheese, lasagna, casseroles, pizza, and similar combination foods were categorized as mixed dishes. Percent omissions from the menus and percent additions to the menus were also computed for individual foods and beverages and food categories.

Typically, menus provide limited information about the food or beverage, including the method of preparation and any additions used in preparation or cooking. For example, a menu might state that lunch consisted of a chicken sandwich with lettuce and tomato on a bun, peaches, and milk. The chicken may have been fried, the bun made of whole wheat flour, the peaches canned in heavy syrup, and the milk 2% fat, but this information is rarely specified on the menu. For this study, we compared the foods and beverages listed on the menu in any amount of detail to the actual foods and beverages served to children, consistent with methods used in the previous study by Fleischhacker and colleagues (10). If the menu stated "whole-wheat bread," that was the standard used to assess congruence with the type of bread served. The majority of time, however, menus were not specific. In addition, none of the menus collected for this study specified the amount of food/beverage. As a result, portion sizes were not considered for this study, which was also the approach taken in the previous study (10).

## RESULTS

All 84 centers in the Nutrition and Physical Activity Self-Assessment for Child Care study provided menus and participated in the 1-day diet observation. Eighty-two percent of centers participated in the Child and Adult Care Food Program and 11% were accredited through the National Association for the Education of Young Children. Centers were in operation for a mean of 18 years (standard deviation [SD = 13.4 years), with 77 (SD = 49.1) children enrolled, 6 (SD = 3.1) classrooms, and 16 (SD = 12.2) providers on staff.

A total of 254 eating occasions were observed in 84 centers. Of these, 131 (52%) eating occasions matched entirely what was stated on the menu. Forty-five of 88 (51%) breakfasts/morning snacks, 45 of 83 (54%) lunches, and 41 of 83 (49%) afternoon snacks matched information provided on the menus. Juice, vegetables, and grains were served less often than listed on the menu (Table 1). Milk, fruit, protein-rich foods, mixed dishes, and “other” foods were served more often than indicated on the menu. Foods in the “other” category were the most common type of additions (35%), but were served relatively infrequently (45 matches plus 25 additions = 70 times/820 foods = 8.5%), and mostly at afternoon snack.

Of the 820 individual foods and beverages served, 710 (86.6%) matched those listed on the menus. An additional 110 foods and beverages were served but were not included on the menu. The top five most common foods and beverages both listed on the menus and served are presented in Table 2.

## DISCUSSION

In this study comparing menus with actual foods and beverages served to children in child care, menus were accurate sources of information for approximately half of all meals and snacks. When individual foods and beverages were examined, percent agreement between menus and foods and beverages served increased to nearly 87%. The largest discrepancies were found with juice, fruit, and foods of low nutritional value (“other” foods). Other foods such as cake, cookies, chips, and sugar-sweetened beverages were served infrequently during the day of observation, but were rarely noted on the menu. Sugar-sweetened beverages were served more often than listed on the menu more than any other food or beverage, although they were served relatively infrequently. In comparison to the morning snacks and lunches, the afternoon snacks rarely included milk or vegetables, but commonly included juice and “other” foods. One hundred and ten extra foods and beverages were served in the 84 centers, but were not included on the menu. Nearly one fourth of these additions fell within the “other” food category.

Despite the fact that foods of low nutritional value were offered infrequently, these additions have important implications. Parents rely on their child-care centers to provide healthy meals and snacks (12), and also expect menus to reflect actual foods and beverages served to their children. Dietetics practitioners can work with providers to ensure that menus match actual foods and beverages served. Inaccurate menus have implications for researchers as well. Researchers using menus to assess diet quality in child care will have missed a number of both healthy and less-healthy foods and beverages that may contribute a substantial amount of fat, protein, and calories to children’s diets. Previous studies that used menus as a proxy for foods and beverages served to children in child care found that children were provided insufficient calories and nutrients (5,15). Using menus to assess nutrition quality in child care is problematic because of the general inaccuracy of menus noted in this and a previous study (10), the limited information about the specific types of foods/beverages, and the method of preparation. Other methods of dietary assessment in child care, such as direct

observation (16), are more costly and labor-intensive, but may provide more accurate data on nutritional quality of foods served to children.

In some cases, it may not be necessary for individual foods to match those stated on the menu, if substitutions within categories (eg, pears for applesauce) are acceptable. Child-care providers are likely to meet the Child and Adult Care Food Program regulations as long as substitutions are made within these general food categories and portion size requirements are met. In addition, the Child and Adult Care Food Program allows for additions of items of low nutritional value but does not provide reimbursement for these foods/beverages.

State regulations, on the other hand, often specify that menus much match actual foods served. In 2008, 27 states required menus to reflect foods served to children in child-care centers (3). Twenty-six states, including North Carolina, also specified that child-care providers must note any deviations from the menu in advance of the meal or snack (3), presumably providing enough time to notify parents of the change. Typically though, substitutions are noted on the menu just before or immediately after the meal or snack. In the 26 states that require substitutions to be documented on the menu, centers that fail to do so are not complying with their state regulations and are jeopardizing their license to operate the facility. State licensing agencies assess adherence to this regulation and others during inspections, which typically occur once per year or even less often (3). In this study, we did not collect specific information about when substitutions were noted on the menu and by whom, nor did we obtain information on how centers in our sample distributed menus or communicated substitutions on menus to parents.

Results from this study are notably different from a previous study by Fleischhacker and colleagues (10), where the authors found that only four of 269 meals served to children in one child-care center matched menus completely (10). Differences are to be expected, as the authors examined multiple days of menus and diet data from a single center, whereas this study evaluated a larger number of centers during a single day. Both studies did find that milk was the most commonly matched food/beverage. A second difference is that the previous study examined menus and foods/beverages served in a Head Start Program center, and not the private child-care centers assessed in this study. Because all Head Start Program centers participate in the Child and Adult Care Food Program, as noted previously, substitutions are allowed if the food/beverage is within the same general category. Therefore, menus may be less accurate in Head Start Program centers and other centers participating in the Child and Adult Care Food Program. Eighty-two percent of centers in this study, however, also participated in the Child and Adult Care Food Program, so participation may not explain observed differences. Because a small minority of centers in this study did not participate in the Child and Adult Care Food Program (n=15), differences between the two groups of centers (Child and Adult Care Food Program vs non-Child and Adult Care Food Program) were not examined.

This study has a number of limitations. First, 1 day of menu review and diet observation may not reflect usual practice in child care. Because center directors were aware that research assistants visiting their centers were assessing current nutrition and physical activity environments, providers may have changed usual practice during the day of observation. If that were the case, agreement between menus and actual foods and beverages served may be inflated in this study. In addition, observation visits were scheduled around holidays and other celebrations, instances where foods and beverages served may be even less likely to match menus. Second, one classroom was observed in each center so results reflect practices in that specific classroom. Foods and beverages though are likely to be consistent among all classrooms serving preschool-aged children because centers do not typically prepare different meals or order different foods from their caterer for different

classrooms because of cost and convenience. A third limitation is that menus were not assessed for nutritional quality or adequacy. The purpose of this study was to compare menus with actual foods served to children, and not to evaluate the nutritional quality of foods and beverages served or make recommendations for improvement. Previous studies have evaluated the nutritional quality of foods and beverages served to children in child-care centers in North Carolina and found that children consumed inadequate servings of fruits, vegetables, and whole grains (17). Portion sizes were also not considered in this study, as they are rarely noted on the center menu. The type of food and method of food preparation, also stated infrequently on the menu, were not taken into account for this study. Although condiments were not included in this review, they may contribute a substantial amount of fat, sugar, salt, and total calories. Condiments are rarely noted on the menu, although recommendations to do so may be warranted. Another limitation of this study is that data on the source of food provided to centers were not collected, so differences between centers with an on-site cook compared with centers who received food from a vendor or caterer could not be assessed. In addition, centers were not asked who developed the menu (eg, director, on-site cook, or caterer) or about barriers to providing accurate menus, so specific recommendations on how to improve accuracy cannot be made.

## CONCLUSIONS

In this study, menus were a somewhat accurate source of information about foods and beverages served to children in child care, although there were a number of food/ beverage additions and omissions. Overall, child-care providers served slightly more foods and beverages to children than originally planned. Most often, providers served milk, fruit, protein-rich foods, and foods of low nutritional value that were not listed on the menu. Child-care providers have a responsibility to maintain menus that reflect accurately all foods and beverages served to children in care and, in some cases, providers can be held accountable by their state licensing agencies for inaccurate menus. Future reviews of the accuracy of menus should include multiple days of observation, but, from a child-care licensing standpoint, even 1 day or one meal of inaccurate menus may be a violation of state law. Federal and state regulators can influence practice by providing incentives for accurate menus or imposing penalties for inaccurate menus.

Researchers interested in diet quality of foods and beverages served to children in child care may wish to explore additional methods of dietary assessment until menus more closely reflect actual foods and beverages served to children. Parents can also advocate for accurate menus by expressing interest in menus and communicating the importance of knowing all foods and beverages served to their children in care. Dietetics practitioners who provide consultation to child-care centers can help influence the accuracy of menus by encouraging providers to serve foods and beverages listed on the menu.

## Acknowledgments

FUNDING/SUPPORT: This work was supported by a Potential Extramural Projects grant from the Centers for Disease Control and Prevention and a contract from the North Carolina Department of Health and Human Services, Division of Public Health.

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Table 1

Frequency of foods and beverages on the menu compared with those served, by category, for 254 meals and snacks in 84 North Carolina child-care centers in 2005

Food or beverage category	Breakfast/Morning Snack (n = 88)			Lunch (n = 83)			Afternoon Snack (n = 83)		
	No. of times on menu and served (matches)	No. of times on menu but not served (omissions)	No. of times served but not on menu (additions)	No. of times on menu and served (matches)	No. of times on menu but not served (omissions)	No. of times served but not on menu (additions)	No. of times on menu and served (matches)	No. of times on menu but not served (omissions)	No. of times served but not on menu (additions)
Milk	73	2	9	71	2	7	16	1	3
Juice	17	8	3	2	2	4	36	8	6
Fruit	34	6	9	50	2	8	11	8	6
Vegetable	0	1	1	78	6	6	1	3	0
Grains	64	1	1	59	7	3	26	5	5
Protein	12	3	5	83	5	5	12	6	5
Mixed dishes	1	0	0	3	1	1	16	0	3
"Other" foods	6	2	4	4	2	4	35	2	17
Total	207	23	32	350	27	38	153	33	45



**Table 2**

Frequency of individual foods and beverages on the menu, percent omissions, and percent additions, compared with the 820 total foods and beverages served in 84 North Carolina child-care centers in 2005<sup>a</sup>

Food or beverage category and individual foods and beverages	No. of times on menu and served (matches)	No. of times on menu but not served (omissions)	% of Time on menu but not served <sup>b</sup> (omissions)	No. of times served but not on menu <sup>c</sup> (additions)	% of Time served but not on menu <sup>c</sup> (additions)	% Matches of 820 total foods served
Milk	160	5	3.1	19	11.9	19.5
Juice	55	18	24.7	13	19.1	6.7
Fruit (all)	95	16	14.4	23	19.5	11.6
Top 5 fruits						
Peaches	16	4	20.0	8	33.3	2.0
Applesauce	16	4	20.0	6	27.3	2.0
Apples	12	1	8.3	8	40.0	1.5
Pears	12	6	33.3	1	7.7	1.5
Mixed fruit	11	12	52.2	5	31.3	1.3
Vegetable (all)	79	10	11.2	7	8.1	9.6
Top 5 vegetables						
Green beans	12	3	20.0	3	20.0	1.5
Peas	10	3	23.1	0	0.0	1.2
Salad	5	3	37.5	0	0.0	1.0
Broccoli	3	2	40.0	0	0.0	0.4
French fries	4	1	20.0	1	20.0	0.5
Grains (all)	149	13	8.0	9	5.7	18.2
Top 5 grains						
Bread	55	14	20.3	4	6.8	6.7
Crackers	20	3	13.0	3	13.0	2.4
Cereal with milk	18	3	14.3	3	14.3	2.2
Biscuit	10	0	0.0	2	16.7	1.2
Goldfish crackers	8	3	27.3	3	27.3	1.0
Protein (all)	107	14	11.6	15	12.3	13.4
Top 5 protein foods						
Chicken	18	5	21.7	0	0.0	2.2
Beans	10	0	0.0	2	16.7	1.2

Food or beverage category and individual foods and beverages	No. of times on menu and served (matches)	No. of times on menu but not served (omissions)	% of Time on menu but not served <sup>b</sup> (omissions)	No. of times served but not on menu (additions)	% of Time served but not on menu <sup>c</sup> (additions)	% Matches of 820 total foods served
Beef	8	1	11.1	2	20.0	1.0
Turkey	6	0	0.0	3	33.3	0.7
Sausage	5	0	0.0	2	28.6	1.0
Mixed dishes (all)	20	1	4.8	4	16.7	2.4
Top 5 mixed dishes						
Pizza	5	0	0.0	3	37.5	1.0
Ravioli	3	0	0.0	0	0.0	0.4
Macaroni and cheese	2	1	33.3	0	0.0	0.3
Lasagna	2	0	0.0	0	0.0	0.3
Chicken salad	1	0	0.0	0	0.0	0.1
“Other” foods (all)	45	6	11.8	25	35.7	5.5
Top 5 “other” foods						
Cookies	14	5	26.3	7	38.1	1.7
Chips	5	0	0.0	3	37.5	1.0
Doughnuts	2	0	0.0	1	33.3	0.3
Ice cream	2	0	0.0	1	33.3	0.3
Sugar-sweetened beverages	1	1	50.0	3	75.0	0.1

<sup>a</sup>Top 5 foods presented for each food category.

<sup>b</sup>(number of times on menu but not served)/(total number of times on menu) × 100.

<sup>c</sup>(number of times served but not on menu)/(total number of times served) × 100.