How to Assess Food Served in Child Care Settings

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February 7, 2012
Methodologies for Assessing Foods Served in Child Care

- Plate waste
- Direct observation
- Provider self-report
- Childcare menus
- Food purchase receipts
Plate Waste Studies

Choose MyPlate.gov
Plate (Waste) Measurement

• Plate waste method:
  – Foods at meal (or snack) are determined and portions provided are weighed prior to service (and waste weighed after eating)
  – Specific foods and amounts translated into macro- and micro-nutrients using database and/or software

Buzby et al. Plate waste in school nutrition programs: final report to congress. USDA ERS.
# Plate Waste

## Strengths
- Provides for a more precise estimate of food provided
- Foods served can easily be translated into nutrients using appropriate database or software program

## Limitations
- Works better with plated meals or snacks
- Requires handling foods which may not be permitted
- Labor-intensive and costly
Direct Observation

• Visual estimation of types and amounts of all foods and beverages served
• Considered next best alternative when plate waste is not feasible
• Although a number of studies have used direct observation, variation in methodology exists (e.g., training required, specific protocols, precision obtained)
• Requires considerable training, demonstration of precision, and certification
Direct Observation: Days

- Most observational studies are based on relatively small number of centers (fewer conducted in homes)
- Number of days of intakes observed varies across studies
  - Half day (~8 am to 2pm) at 40 centers  \((Erinosho \text{ et al.}, 2011)\)
  - 2 consecutive days at 20 centers  \((Ball \text{ et al.}, 2008)\)
  - 3 consecutive days at 12 centers  \((Briley \text{ et al.}, 1999)\)
  - 14 days,: 7 days in the Fall and 7 days in the Spring at 2 centers  \((Bruening \text{ et al.}, 1999)\)
DOCC: Diet Observation in Child Care (Ball et al., 2007)

- Used extensive training of 5 observers to visually estimate amount and type of foods served
- Training time: 56 hours over 1 month
- Practice using measuring cups and spoons
- Test of 20 common child care foods prior to certification
- Certification in child care setting

Diet Observation for Child Care (DOCC)

- Field observers were first certified using a 20-food certification test (ICC = 0.99)
  - e.g., Applesauce, animal crackers, spaghetti
- Observers (n=5) clarified foods not easy to discern with classroom staff and cook
- Certification standard required: ICC ≥ 0.85); field results of 56 foods & beverages was 0.88
Variation in Quantity Estimate by Observation for 12 Common Child Foods

Figure 2. Variation in food-quantity estimates by individual food item. The mean observer value is plotted +/- 1 standard deviation (not the standard error). The food items are numbered.
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Direct Observation

Limitations

• Requires extensive training to ensure inter-rater reliability
• Small number of children can be observed by one observer
• Observers may need to clarify foods that are not easy to decipher with food service staff

Strengths

• Less intrusive than food weighing
• Provides a replicable dietary observation approach that is potentially more usable by researchers
Provider Self-Report
Self-Report

- Self-report by providers (directors, teachers, food staff, etc.) has been used to assess food provided to children in child care.
- Self-reporting can obtain types of foods provided, and sometimes amount is assessed as well.
- Self-reporting has also been used in combination with observation, often on a sub-sample of centers and/or homes.
How Well Can Providers Report?

- Conducted a study in 50 child care centers in NC
- Part of an effort to develop a self-report instrument for assessing nutrition and physical activity environments at child care
- Translated observation instrument (EPAO, Ward et al., 2008) for use as self-report
Methods

• Centers visited every day for 4 days
• Trained observers assessed nutrition environment, including foods served (not portions) in target classrooms
• Teachers were asked to report on foods and beverages served to children each day (for 4 days)
• Assessed reliability and validity evidence
Reliability of Provider Reports

• Staff provided reports of foods served (portion size only for juice)
• ICC of 0.6 considered acceptable
• Day-to-day report: ICC ranged from 0.021 (desserts) to 0.982 (1% milk)
• 4-day report: ICC ranged from 0.091 (desserts) to 0.996 (1% milk)
  – Fruit (4d) = 0.72; Grains (4d) =0.60
  – Fruit juice (4d) =0.79
Validity of Provider Reports

- Observers present for all 4 days to observe foods served on same days reported
- Total fruit & veggie, grains, meats, desserts, 100% FJ: low to poor validity (<0.6)
- Fried potatoes: moderate validity (0.653 over 4 days)
- Fresh fruit & total potatoes: food validity 0.703-0.706)
- Raw veggies & milk: strong validity (0.805-0.864)
Recent CACFP Evaluations

- Early Childhood and Child Care study (1997)
- Effects of Lower Meal Reimbursement (2002)
  - Assessed the nutrient content of meals & snacks offered by CACFP providers
  - Similar methods used in both projects
# Early Childhood and Child Care Study: USDA, 1997

## Research Objective, Data Collection Strategy, and Sample

<table>
<thead>
<tr>
<th>Research Objective</th>
<th>Data Collection Strategy</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the food and nutrient content of meals and snacks offered by CACFP providers</td>
<td>Mail survey of CACFP providers to collect information on foods included in all meals and snacks offered during a specified five-day period</td>
<td>1,962 CACFP providers¹</td>
</tr>
<tr>
<td>Describe the nutrient content of meals and snacks consumed by participating children</td>
<td>Observation of all meals and snacks consumed by sampled children while in child care on two nonconsecutive days</td>
<td>1,347 children receiving child care in CACFP sites²</td>
</tr>
</tbody>
</table>

¹Sample size varies for different meals and snacks because all providers do not offer all meals and snacks.
Provider Self-Report

- Report by all foods beverages offered to children by CACFP providers

- Method: Menu survey
  - Self-administered survey over 5-day period (including recipes)
  - Did not ask for portion size from providers as pre-test showed data were inadequate
### SAMPLE
### MENU FOR BREAKFAST

<table>
<thead>
<tr>
<th>Abt Staff</th>
<th>What Did You Serve?</th>
<th>Please Describe Each Food</th>
<th>Did you Prepare the Food or was it Ready-To-Eat?</th>
<th>To Which Age Groups Did You Serve the Food or Drink?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Only</td>
<td>List all foods and drinks.</td>
<td>Include brand name, cooking method, salt, and type of fat used, if applicable.</td>
<td>Check one box for each food. Follow instructions in the Food You Prepared section.</td>
<td>Check the box(es) for each age group served this food.</td>
</tr>
<tr>
<td>Please do not write in this column.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BREAKFAST

<table>
<thead>
<tr>
<th></th>
<th>Prepared Myself</th>
<th>Ready-to-Eat</th>
<th>1-2 Years</th>
<th>3-5 Years</th>
<th>6-12 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>cereal</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>sugar</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>milk</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>juice</td>
<td>orange, Minute-Maid, made from frozen concentrate</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>banana</td>
<td>fresh, sliced</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
FOOD YOU PREPARED
SAMPLE

Please fill in one of these pages for any food you made from scratch or by combining two or more foods or ingredients, for example, chili, tuna salad, mashed potatoes, salad, pancakes, and homemade cookies.

Name of food: Banana Bread

Please use same name you used on the Menu page.

Number of servings prepared: 2

Size of each serving: 1 slice

Examples: 1/2 cup, 4 oz, 1 cup, 1 lb, 4 oz

When was food served? Check all that apply and indicate date(s) served.

Date(s) served: 6/1/92

- Breakfast
- Lunch
- Supper
- Snack

EXTRAS

<table>
<thead>
<tr>
<th>What Ingredients or Foods Did You Use?</th>
<th>How Much Did You Use?</th>
<th>Please Describe Each Ingredient or Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>List all Ingredients and Foods</td>
<td>Examples: 3 tsp, 1/2 cup, 1 lb, 4 oz</td>
<td>Was it raw or cooked? shredded, chopped, sliced, crushed, or whole?</td>
</tr>
<tr>
<td>Butter</td>
<td>1/3 cup</td>
<td>regular, salted</td>
</tr>
<tr>
<td>Sugar</td>
<td>1 cup</td>
<td>white</td>
</tr>
<tr>
<td>Eggs</td>
<td>2</td>
<td>large, whole, fresh</td>
</tr>
<tr>
<td>Bananas</td>
<td>3</td>
<td>mashed</td>
</tr>
<tr>
<td>Flour</td>
<td>2 cups</td>
<td>white, all purpose</td>
</tr>
<tr>
<td>Baking Soda</td>
<td>1 tsp</td>
<td></td>
</tr>
<tr>
<td>Salt</td>
<td>1 tsp</td>
<td>regular</td>
</tr>
<tr>
<td>Walnuts</td>
<td>1/4 cup</td>
<td>chopped</td>
</tr>
</tbody>
</table>

PREPARATION AND COOKING METHOD

1. If cooked, what cooking method did you use? (Check one)
   - Bake
   - Roast
   - Stir fry
   - Boil
   - Deep fry
   - Other (specify):__

2. If you prepared meat (beef, pork, chicken, turkey, etc.), did you: (Check all that apply)
   a. Trim the visible fat? Yes No
   b. Drain fat after cooking? Yes No
   c. Remove bone before serving? Yes No
   d. Remove skin before serving? Yes No
Portion Information: Meal Observation

- Conducted in subset of child care facilities
- Trained field staff (8 hr.) observed all meals & snacks on 2 non-consecutive days
- Prior to meal or snack, observers weighed or measured 5 reference portions (smallest possible portion could be serve/selected) of each food offered
- During meal time, observers estimated amount of food received and leftover by each child using visual methods
- Up to 6 children per observation on same week as menu survey
- Observation data used to develop estimates of avg. portions for calculating nutrient content of foods offered
Calculating the Nutrient Content

- Using FIAS code and avg. portion estimated from observation, data were imputed to Menu Survey to obtain nutrient content of foods provided for each provider
  - Total nutrient content of each daily meal and snack offered
  - Average nutrient content of meals & snacks offered during target week by age-group
Provider Self-Report: Limitations and Strengths

• Limitations
  – Risk of misreporting
  – Possibly inaccuracies
  – May require multiple days of reporting

• Strengths
  – Less expensive
  – Can implement in large numbers of centers & homes
  – Observation can supplement self-report
Child Care Menus

- Detailed list of foods and beverages to be served to children for meals and snacks
- Cycles vary from 5 days to several weeks
- Inform parents, researchers, and childcare regulators about foods served to children
Child Care Menus

• Used to monitor adherence to CACFP guidelines and state regulations

  – CACFP-participating centers are required to provide copies of menus to ensure compliance with program requirements
  – 27 states require that menus reflect foods served to children
  – 26 states require childcare providers to note substitutions on menu before the meal or snack is served
Childcare Menus: Two Examples

• Listed foods may not match foods served; result is miscalculations of nutrient adequacy and quality
  – Comparison of 77 days of direct observation with 6 monthly menus at 1 Head Start Center (Fleishhacker, 2006)
    • Of 269 meals and snacks observed, only 3 breakfast meals and an “ethnic day” matched menu
  – Comparison of 1 day of direct observation with menus at 84 North Carolina childcare centers (Benjamin-Neelon, 2010)
    • 131 (52%) of 254 meals and snacks served matched menus
    • 710 (87%) of individual items served matched menus
    • Additional 110 foods/beverages were served but not listed
Childcare Menus: Limitations

• Many centers do not describe beverages provided on menus
• Menus may not often specify specific types of foods and beverages provided
  – e.g., low-fat milk, fruit canned in juice or syrup, canned vegetables, fruit juice versus 100% fruit juice
• Menus do not often specify method of foods preparation
  – e.g., baked vs. fried chicken sandwich, type of bread served with sandwich
• Difficulty deciphering condiments in dishes
• Recipes may not be easily available or easy to decipher for specific ingredients (e.g., casseroles)
Childcare Menus: Strengths

• When accurate, provide a quick and easy way of collecting information about foods served to children
• Provide a quick and easy form of nutrition education along with ideas of balanced meals and healthy foods
• Supply low-cost source of consistent nutrition information to parents
• Facilitates discussions about food and nutrition among children, parents, and childcare providers
Food Purchase Receipts

• Have been used to evaluate associations between food cost and quality of foods served (Monsivais et al. Public Health Nutr. 2011; 15: 370-376)
  – n = 60 home childcare providers in Washington State
  – Providers filled in details about types of foods/beverages served (menus) daily in real time on forms provided by research staff
  – Also filled-in information about food characteristic
    • e.g., 22oz. Oven Joy brand white bread from Safeway
  – Found that higher quality = greater cost
Childcare Food Purchase Receipts: Limitations and Strengths

• Limitations
  – Missing or lost receipts
  – Social desirability bias
    • Providers spending more on certain food types
  – Provide information about foods purchased/served and not actual consumption

• Strengths
  – Provides a quick, easy, and cheap way of collecting data about types of foods and beverages offered to children
  – Little to no burden on participants especially if receipts are being collected over short period of time
Conclusion: Food Served Methods

• Measuring foods (to obtain nutrients) provided to children in child care settings is a challenge
• Each method has associated limitations and strengths
• Using multiple methods may help ensure accurate data are being collected, e.g.,
  – Validating menus with actual observations
  – Validating self-reports with actual observations
  – Using self-reports, menus, and observations to get a full picture of types and amounts foods and beverages served
• Regardless of method, careful protocols should be tested and results certified before large-scale implementation
Questions?