ECHO
Environmental influences on Child Health Outcomes
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A comparison of the Remote Food Photography Method and the Automated Self-Administered 24-Hour Dietary Assessment Tool for measuring full day dietary intake among school-aged children

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It is unclear how to best measure dietary intake among school-age children

- To advance the science in dietary assessment among school-aged children:
  - Identify the tools that maximize accuracy and minimize participant burden
  - Identify and overcome challenges to dietary assessment that are unique to school aged-children

Compare 2 methods for measuring dietary intake, with a focus on identifying opportunities to reduce misreporting and participant burden

Remote Food Photography Method (RFPM)

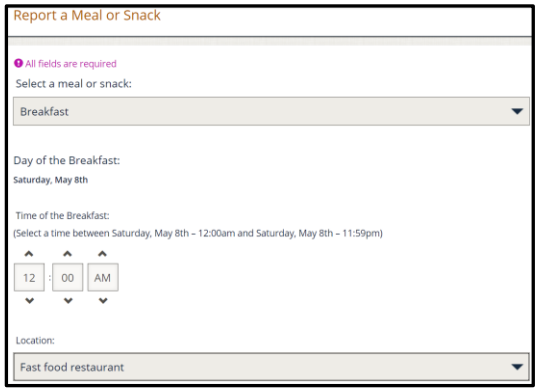
- Photograph foods offered and plate waste
- Food descriptors
- Eliminates misreporting due to poor recall
- Portion size estimated by staff
- Customized text reminders
- Novel data on foods offered and plate waste
- Validated against DLW, weighed food

Before

After

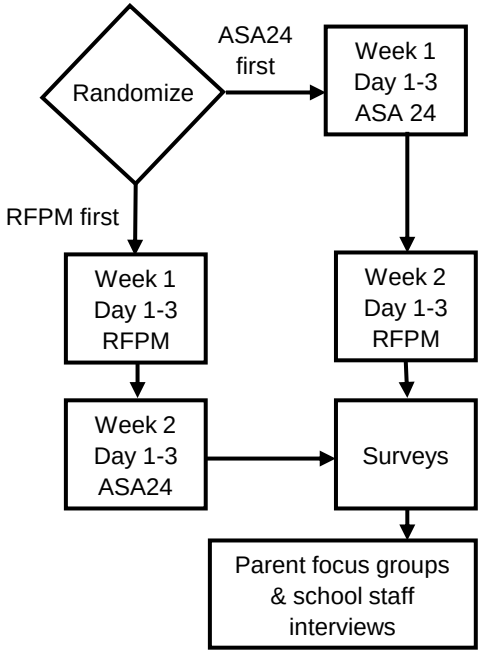
ASA24

- Free, web-based recall
- Searchable food database
- Portion size images, recipe creation
- Standardized prompts, branching logic
- Updated features (e.g., find misspelled foods)
- Validated against multiple-pass method



Bekelman TA, Martin CK, Johnson SL, Glueck DH, Sauder KA, Harrall KK, Steinberg RI, Hsia D, Dabelea D on behalf of program collaborators for ECHO. Under review: *British Journal of Nutrition and Journal of the Academy of Nutrition and Dietetics*

Study design and population



Participant characteristics	Full sample
Number of dyads	40
Child sex, % female	55
Child race/ethnicity, % NHW	50
Child BMI, % overweight or obese	26
Household income, % <$50,000/year	29
Number of elementary schools in which research staff photographed lunch intake	21

Participant burden, satisfaction and ease of use by method

Comparing ASA24 and RFPM	ASA24 % (n)	RFPM % (n)	P
Which method would you rather use to record what your child ate for 7 days?	39 (15)	61 (24)	0.15
Which method required more time to complete?	74 (29)	26 (10)	0.002
Which technology platform did you prefer (ASA24 website or RFPM app)?	39 (15)	61 (24)	0.15
Satisfaction, Ease of Use and Participant Burden with Each Method	**ASA24 Median (IQR)**	**RFPM Median (IQR)**	**P**
How satisfied are you with this method for recording what your child ate?	5 (2)	5 (2)	0.77
How easy was it to use this method for recording what your child ate?	5 (1)	5 (2)	0.46
How often was it burdensome to use this method for recording intake?	4 (2)	4 (3)	0.52

N=39 parent-child dyads

Higher scores (maximum score = 6) represent higher satisfaction and ease of use, and lower burden.

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Reported energy intake with the ASA24 was 231 kcal higher than the EER. Reported energy intake with the RFPM did not differ significantly from the EER.

	Overall		Girls		Boys	
Predicted means						
	Mean (SE)		Mean (SE)		Mean (SE)	
ASA24	1675 (70)		1541 (91)		1809 (105)	
RFPM	1296 (77)		1351 (102)		1241 (116)	
EER	1444 (34)		1361 (46)		1526 (50)	
Predicted differences						
	Difference (95% CI)	p	Difference (95% CI)	p	Difference (95% CI)	p
ASA24 – RFPM	379 (194, 564)	0.0002	190 (-51, 432)	0.12	567 (287, 848)	0.0002
ASA24 - EER	231 (63, 400)	0.008	179 (-44, 403)	0.11	283 (31, 536)	0.03
RFPM - EER	-148 (-321, 26)	0.09	-11 (-240, 218)	0.92	-284 (-545, -24)	0.03

Parent perceptions of the **RFPM** assessed via focus groups

	Perceived strengths of RFPM	Opportunities to improve the RFPM
Minimize burden	• Phone app easy to use • Real-time communication • Customized text reminders • Portion size quantified by research team • Positive experience for children • Provides parents with helpful insights	• Minimize disruption to routines • Consolidate workload • Incorporate alternate caregivers • Minimize child embarrassment at school lunch • Minimize parent embarrassment • Minimize disruption to school routines
Maximize accuracy	• Intake documented in real time • Portion size quantified by research team	• Reduce missing photos • Improve documentation of unobserved intake • Incorporate alternate caregivers • Ensure documentation of usual intake

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Parent perceptions of the **ASA24** assessed via focus groups

	Perceived strengths of the ASA24	Opportunities to improve the ASA24
Minimize burden	• Consolidated workload (once/day) • Structured data entry	• Minimize time commitment • Minimize parent embarrassment • Expand database options for restaurant and ethnic foods to avoid recipe creation
Maximize accuracy	• Food images to help estimate portion size	• Expand options for restaurant and ethnic foods in the database • Improve portion size estimation • Improve documentation of unobserved intake

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Unobserved intake: “How much do you think parents know about what their children eat at school?”

“I really think they have no idea.”

– Second grade teacher

“Kids tend to throw away unopened food or they’ll just take the whole lunch box and dump it into the trash. So they go home with an empty lunchbox and their parents had no idea that they really didn’t eat anything except for their cookies for lunch.”

– Dean of Operations and lunchroom supervisor

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Take Home Points:
Dietary Assessment in School-Aged Children

- Continued effort to improve the accuracy of both the ASA24 and RFPM is justified given their high acceptability.
- Technology-based measures bring many advantages, but also new potential sources of misreporting and burden.
- Dietary assessments in which parents are proxy reporters for their children have unique challenges above and beyond dietary assessments in which adults report their own intake.
- Interpretation of findings in dietary assessment studies should account for the unique characteristics and limitations of each method.
- Future research is needed for not only accuracy and parent burden, but also cost, child burden, researcher burden, and burden on schools.

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