



Mission Possible: Kids Will Eat School Meals

An Overview of Dietary Assessment Methods

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Disclosures



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Have the new school meal regulations resulted in increased food waste?

**Popular Media:
Yes**

**Research:
Yes and No**



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How do we know what children eat at school?



DIETARY ASSESSMENTS USING CHILDREN'S SELF-REPORTED INTAKE

- Dependent on memory and cognitive abilities
- Portion sizes may be difficult to estimate



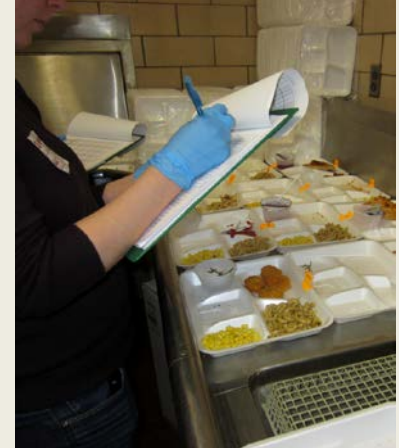
DIETARY ASSESSMENTS USING MEAL OBSERVATIONS

- Collects information on food selection and plate waste
- Objective measure independent of self-reporting errors

Dietary Assessment Methods



- Weighed Plate Waste
 - Individual
 - Aggregate
- Direct Observation
 - 5-6 point Scales
- Digital Imaging
 - Selection And Waste
 - Combined with Observation



Weighed Plate Waste Methods

Individual

Salad Bar evaluation (Adams, JADA 2005)

Program evaluation (Cohen, JAMA Ped 2015)

- Label Student Trays
- Establish baseline weights (5-10 random samples)
- Observe/count/weigh student selections
- Collect trays and weigh remaining food

$S - W = \text{Consumption}$

S=weight of selected food(s)

W=weight of student waste

Aggregate

Gamification increases fruit & vegetable consumption (Jones, Prev Med 2014).

$P - U - W / N = \text{Consumption}$

P=weight of prepared food(s)*

U=weight of unserved food(s)*

W=weight of student waste

N=number of students

*Relies on *Production records*



Direct Observation Methods



- **New school meals in Los Angeles** (Gase, Prev Med 2014)
- **Home Packed vs School Lunches** (Farris, JNEB 2014)
- **Fruit/Vegetable Selection & Consumption** (Cullen, J Acad Nutr Diet 2015)

- **Comstock's 6-point scale** (J Am Diet Assoc 1981)
None, Taste (10%), Some ($\frac{1}{4}$), Half ($\frac{1}{2}$), Most ($\frac{3}{4}$), All
- **5-point Scale** (Hanks, J Acad Nutr Diet 2014)
None, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, All

- **Observer training and reliability testing**



Digital Imaging Method

- Determination of average serving weights of FV



- FV selection image
- FV plate waste image
 - Percentage consumed estimated using a five or six-point scale



- Farm to School Program evaluation (Yoder, JNEB 2014)
- Foods brought from home (Hubbard, J Acad Nutr Diet 2014)
- New School Meal Regulations (Schwartz, Childhood Obes 2015)
- Program Evaluation (Shaping Healthy Choices) (Scherr, JNEB 2014)

Utilizing School-Based Volunteers for Digital Imaging Data Collection

- Compared DI data collected and transmitted by parents and teachers to the UVM research team.
- Teachers may be better at collecting DI dietary assessment data than parent volunteers and university researchers.



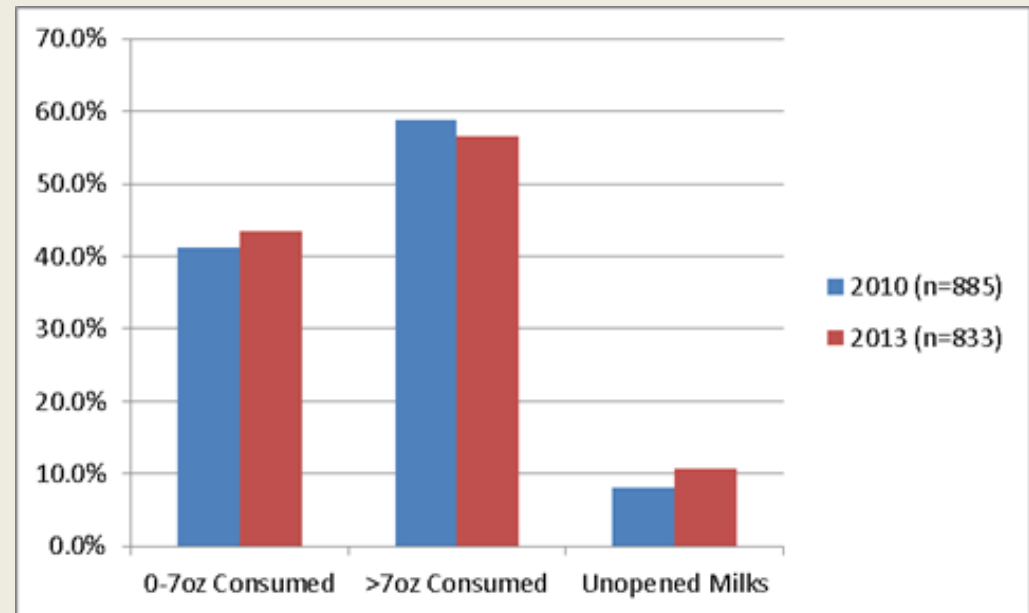
Feasibility of Collecting Digital Image Pairs in Two Elementary School Cafeterias (Grades 3-5)

	UVM	Parents		UVM	Teachers
Lanyards distributed to students	320	294		401	268
Percent DI pairs	82%	74%		91%	96%

WPW: Children's Milk Consumption



- 10 elementary schools (7 northeast, 3 south)
- Individual WPW (grades 3-5)
- Overall, no change in flavored milk consumption.
- Differences between and within schools (SES, grade, sex, milk packaging).



2010: 150-170 calories, 0-1% fat, 22-27gm total sugars
2013: 110-130 calories, 0% fat, 18-22 gm total sugars

Selection

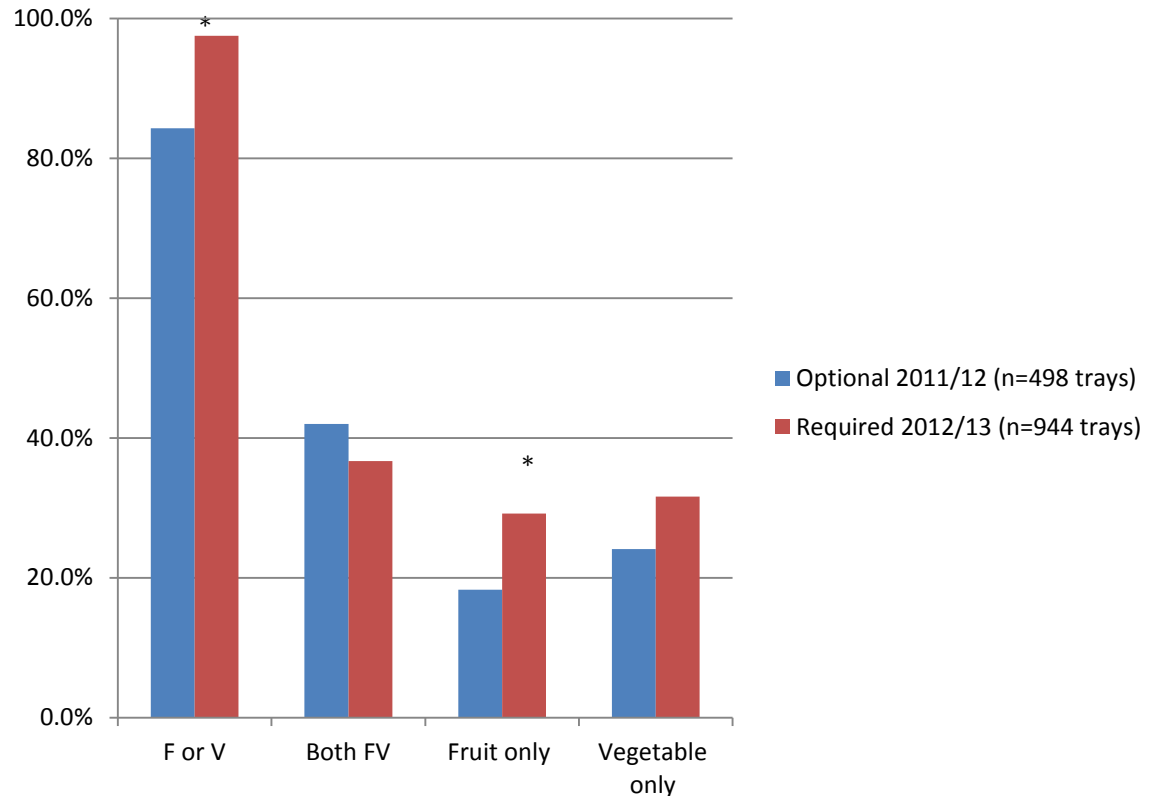
- More lunch trays contained fruits or vegetables, in larger amounts (fruit)
- Fewer children selected both fruits and vegetables

Consumption

- FV consumption decreased 12%
- FV waste increased 56% (mostly fruit)

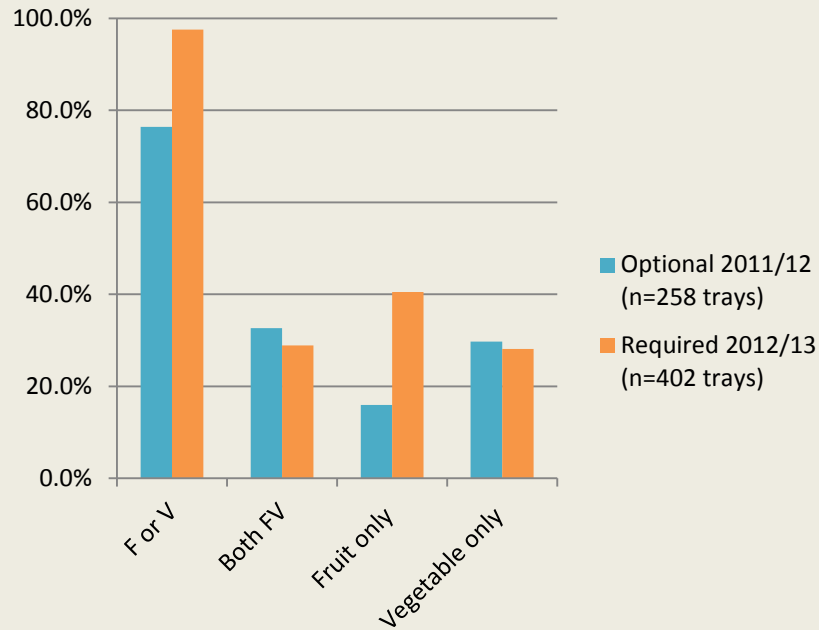
Digital Imaging

Percent of elementary student lunch trays with fruit and/or vegetables when optional versus required

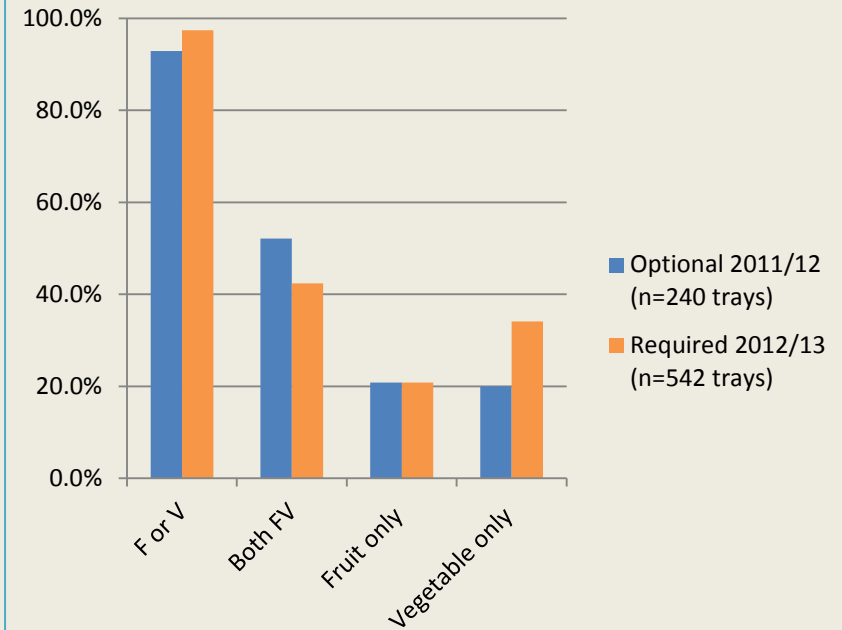


Digital Imaging Farm to School/Non-Farm to School

Farm to School



Non-Farm to School



Opportunities – Universal Recycling/Composting



- Aggregate WPW Method simplified
- Food scrap weights can be compared to:
 - Menu/Entrée selection
 - Pre/Post Intervention

Next Steps



- Objective dietary assessment methods can evaluate menu changes, educational programming, cafeteria environment.
- Digital Imaging methods continue to evolve.
- What role does the Cafeteria Environment play?
 - Amount of time in service line/at table
 - Increases in fruit or vegetable selection may be a result of:
 - greater variety
 - placement at register/POS



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UVM'S DIETARY ASSESSMENT TEAM