

Incorporation of Nutrient Data into Assessment Systems

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a.k.a....The Link Between Dietary Assessment and Food Composition Data



Background

Importance of Dietary Assessment

Type Assessment	Individual Counseling	Sub-group Research	National Surveillance
X-Sectional (Snapshot)	24HR, FR, Screener	24HR, FR, Screener	24HR
Retro (Past Diet)	FFQ, Diet History	FFQ, Diet History	
Prospective (over Time)	24HR, FR, FFQ, Screener	24HR, FR, FFQ, Screener	
Intervention	24HR, FR, FFQ, Screener	24HR, FR, FFQ, Screener	

Background

Research Studies with Dietary Assessment

Studies	Assessment	24HR	Records	FFQ	Screeners
CDC BRFSS	X-Section				✓
USDA CSFII	X-Section	✓			
NHLBI DASH	Intervention			✓	
EPIC	Prospective			✓	
NICHD NCS	Prospective	✓		✓	
NCHS NHANES	X-Section	✓		✓	
NCHS NHIS	X-Section				✓
NHLBI GHS	Prospective		✓		
NCI PPT	Intervention	✓		✓	
NCI PLCO	Prospective			✓	
Harvard NHS	Prospective			✓	
NHLBI WHI	Prospective			✓	

Dietary Assessment Databases

- Accurate and up to date
- Represent foods and nutrients of interest
- Specific and precise
- Nutrient data complete
- Uniform

Research Nutrient Database

USDA Nutrient Database for Standard Reference NDB SR

- Food and Nutrient Database for Dietary Studies (FNDDS)
- CSFII Technical Support Files

Research Databases - 24HR/Food Records

Thick crust pepperoni pizza w/ vegetables

PIZZA W/ MEAT & VEG, THICK CRUST = 58106730 (FNDDS)

Research Databases - FFQ

- Create DB of food codes that represent each food line item.
- DB usually begins with the USDA NDB
- Customized to fit the food list

Research Databases - FFQ

Pizza

- Pizza = 28 food codes
- Pizza w/pepperoni/sausage/other meat = 14 food codes

This session will describe how dietary databases are developed for Food Frequency Questionnaires

Step 1: Define Purpose

- Population
- Foods/nutrients of interest
- Rank individuals or absolute intake

Step 2: Identify Data Source

- National dietary data
- Recall/record data from population of interest
- Food composition tables

Step 3: Create Food List

- What target population consumed
- Stepwise multiple regression

Step 4: Assess Portion Size

- Default portion
- Portion included in question
- Discrete question for portion

Default Portion

	HOW OFTEN IN THE PAST 6 MONTHS							
	NEVER	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY
How often in the past 6 months did your child eat the following <u>breakfast type foods and cheese</u> ?								
Sweetened cereals like Frosted Flakes, Fruit Loops, Lucky Charms, Cocoa Puffs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Any other cold cereal, like Corn Flakes, Cheerios, Rice Krispies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooked cereals like oatmeal, Malt 'o Meal, cream of wheat or grits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Milk on cereal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pancakes, waffles, french toast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

From the Kids Block 2-7 (2004)

Copyright Block Dietary Data Systems



Question Includes Portion

26. For each food listed, fill in the circle indicating how often on average you have used the amount specified during the past year.


Please try to average your seasonal use of foods over the entire year. For example, if a food such as cantaloupe is eaten 4 times a week during the approximate 3 months that it is in season, then the average use would be once per week.

FRUITS		Never, or less than once per month	1-3 per month	1 per week	2-4 per week	5-6 per week	1 per day	2-3 per day	4-5 per day	6+ per day
Raisins (1 oz. or small pack) or grapes		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prunes (7 prunes or 1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prune juice (small glass)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bananas (1)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cantaloupe (1/4 melon)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Applesauce (1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fresh apples or pears (1)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apple juice or cider (small glass)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oranges (1)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Orange juice (small glass)	Calcium fortified	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Regular (not fortified)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grapefruit (1/2) or grapefruit juice (small glass)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other fruit juices (small glass)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strawberries, fresh, frozen or canned (1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blueberries, fresh, frozen or canned (1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peaches, apricots or plums (1 fresh, or 1/2 cup canned)		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Discrete Portion Question - Specific Portions

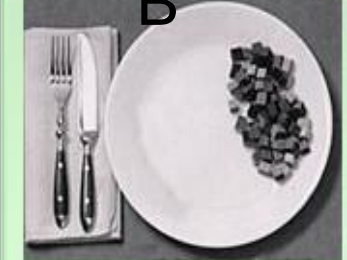
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	2 TIMES per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY	
Green beans or green peas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>HOW MUCH ON THOSE DAYS SEE PORTION SIZE PICTURES FOR A-B-C-D</p> <p>How much <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C</p> <p>How much <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C</p> <p>How much <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C</p> <p>How much <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C</p> <p>How much <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>
Spinach (cooked)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Greens like collards, turnip greens, mustard greens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sweet potatoes, yams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
French fries, home fries, hash browns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

A



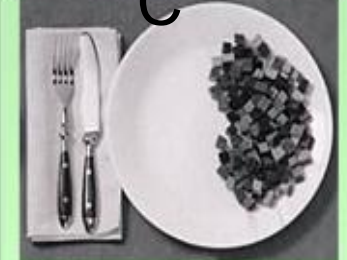
1/4 cup

B



1/2 cup

C



1 cup

D



2 cups

Discrete Portion Question - Range of portions

1. Over the past 12 months, how often did you drink **tomato juice** or **vegetable juice**?

- NEVER (GO TO QUESTION 2)
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2-3 times per month | <input type="radio"/> 2-3 times per day |
| <input type="radio"/> 1-2 times per week | <input type="radio"/> 4-5 times per day |
| <input type="radio"/> 3-4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5-6 times per week | |

1a. Each time you drank **tomato juice** or **vegetable juice**, how much did you usually

- Less than $\frac{3}{4}$ cup (6 ounces)
 $\frac{3}{4}$ to $1\frac{1}{4}$ cups (6 to 10 ounces)
 More than $1\frac{1}{4}$ cups (10 ounces)

Over the past 12 months...

4. How often did you drink other **fruit drinks** (such as cranberry cocktail, Hi-C, lemonade, or Kool-Aid, diet or regular)?

- NEVER (GO TO QUESTION 5)
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2-3 times per month | <input type="radio"/> 2-3 times per day |
| <input type="radio"/> 1-2 times per week | <input type="radio"/> 4-5 times per day |
| <input type="radio"/> 3-4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5-6 times per week | |

4a. Each time you drank **fruit drinks**, how much did you usually drink?

- Less than 1 cup (8 ounces)
 1 to 2 cups (8 to 16 ounces)
 More than 2 cups (16 ounces)

Step 5: Assign Nutrients

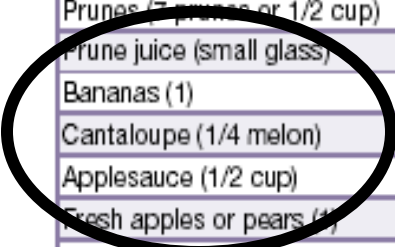
- One food code in a food composition database
- Weighted mean nutrient value for similar foods codes
- Mean nutrient value within portion range for similar food codes

Single Food Code

26. For each food listed, fill in the circle indicating how often on average you have used the amount specified during the past year.

Please try to average your seasonal use of foods over the entire year. For example, if a food such as cantaloupe is eaten 4 times a week during the approximate 3 months that it is in season, then the average use would be once per week.

FRUITS		Never, or less than once per month	1-3 per month	1 per week	2-4 per week	5-6 per week	1 per day	2-3 per day	4-5 per day	6+ per day
Raisins (1 oz. or small pack) or grapes		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prunes (7 prunes or 1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prune juice (small glass)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bananas (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cantaloupe (1/4 melon)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Applesauce (1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fresh apples or pears (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apple juice or cider (small glass)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oranges (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Orange juice (small glass)	Calcium fortified	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Regular (not fortified)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grapefruit (1/2) or grapefruit juice (small glass)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other fruit juices (small glass)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strawberries, fresh, frozen or canned (1/2 cup)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Vit C for NDB code X equivalent gram wt = Vit C value for cantaloupe x frequency = total contribution of Vit C from cantaloupe

Weighted Mean Nutrient Value

	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	2 TIMES per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY	
Green beans or green peas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	▶ How much <input type="radio"/> A <input checked="" type="radio"/> B <input type="radio"/> C
Spinach (cooked)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	▶ How much <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C
Greens like collard, turnip greens, mustard greens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	▶ How much <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C
Sweet potatoes, yams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	▶ How much <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C
French fries, home fries, hash browns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	▶ How much <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D

Weighted mean Vit C value of all reports = Vit C value for green beans x frequency x portion = total contribution of Vit C from green beans

Mean Nutrient Value Within Portion

1. Over the past 12 months, how often did you drink **tomato juice or vegetable juice**?

- NEVER (GO TO QUESTION 2)
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2-3 times per month | <input type="radio"/> 2-3 times per day |
| <input type="radio"/> 1-2 times per week | <input type="radio"/> 4-5 times per day |
| <input type="radio"/> 3-4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5-6 times per week | |

1a. Each time you drank **tomato juice or vegetable juice**, how much did you usually

- Less than $\frac{3}{4}$ cup (6 ounces)
 $\frac{3}{4}$ to $1\frac{1}{4}$ cups (6 to 10 ounces)
 More than $1\frac{1}{4}$ cups (10 ounces)

Female

Over the past 12 months,

4. How often did you drink other **fruit drinks** (such as cranberry cocktail, Hi-C, lemonade, or Kool-Aid, diet or regular)?

- NEVER (GO TO QUESTION 5)
- | | |
|---|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2-3 times per month | <input type="radio"/> 2-3 times per day |
| <input type="radio"/> 1-2 times per week | <input type="radio"/> 4-5 times per day |
| <input checked="" type="radio"/> 3-4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5-6 times per week | |

4a. Each time you drank **fruit drinks**, how much did you usually drink?

- Less than 1 cup (8 ounces)
 1 to 2 cups (8 to 16 ounces)
 More than 2 cups (16 ounces)

Mean Vit C value of all reports = Vit C value for fruit drinks for females for portion x frequency = total contribution of Vit C from fruit drinks

Summary

- Dietary assessment relies on accurate food composition data
- FFQs are most commonly used
- FFQs require own food composition database
- You should understand/feel comfortable with the food list, portion assessment, and method used to apply nutrients.



Thank you!