



National Academy of Sports Medicine

# Assessments: Collecting Dietary Information

BY

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*Jamie's intention is to lose weight, but she admits to feeling overwhelmed by the wealth of information (and misinformation) she reads on the Internet and in various fitness magazines. She previously worked with a trainer, who asked her to keep a three-day food log. He used this information to analyze her caloric intake and devise a plan. At the time, she felt that the log and the plan were not truly effective to helping her lose weight for a variety of reasons; she never managed to successfully lose much weight and maintain her weight loss. Jamie has not lost faith however, and decides to work with a NASM Fitness Professional, whom she believes will offer better solutions to help her lose weight and maintain her weight loss.*

### **Introduction**

No weight loss program is complete without consideration of food intake for quantitative assessments (macronutrient and caloric intake) and qualitative assessments (food choices). Traditional methods used to collect information include 24-hour recalls, food logs or journals, and food frequency questionnaires (FFQ), but these protocols can be time-consuming and unless the individual is highly motivated, somewhat inaccurate. Self-reported data is subject to limitations in accuracy and validity (subjective bias and the Hawthorne Effect). One research study demonstrated that 31% of people who had just eaten could not remember how much bread they had consumed five minutes after dining, and underestimated the amount of bread consumed by 28% (1).

Technology however, is simplifying the process of tracking food intake with a variety of resources that range from free online databases (e.g., Choosemyplate.gov) to a variety of quick and accessible mobile applications. Hopefully, this will improve the reliability of self-reported information.

### **Self-Reported Assessment Tools**

Although the value of self-reported data is questionable, the true benefit to maintaining food logs or reporting dietary intake lies with increasing an individual's awareness, because intention to change behavior only occurs after an individual becomes consciously aware of his or her undesirable behaviors (i.e., mindless to mindful). While we are often consciously aware of a missed meal or overindulging at lunch or dinner (exceeding 500



calories) we often neglect the mindless margin between 50 - 300 kcal — the range where we tend to overeat without conscious awareness (2, 3). This is most apparent with snack food that is conveniently accessible; we often find ourselves snacking subconsciously while performing other duties (e.g., while working at an office desk). Oftentimes, when people are asked about the calories they consumed as snacks, they underestimate the amount by 20 – 40% (4, 5).

Another concern lies with compliance in keeping or completing food logs. Desired behaviors rely heavily upon high levels of motivation and ability. A major cause of poor compliance in completing food logs is attributed to low ability levels; individuals need adequate knowledge and skills to estimate portion sizes correctly and identify ingredients within combination foods (e.g., salads, home cooked and restaurant meals). While weight loss may be important for many reasons, the fact is that this process is not simple; it erodes self-efficacy and lowers motivational levels.

### Reflection Exercise

Think of the tools that you, as a Health and Fitness Professional, have used over the past few years to help clients quantify their caloric intake. Then, answer the following questions:

1. What tool(s) did you use to gather information on an individual's food intake?
2. How reliable was the information?
3. Did you implement any strategies to validate the self-reported information you collected?
4. Did you quantify the caloric intake (i.e., calculate the total number of calories)?
5. Did you use this number to develop a weight loss strategy?
6. In retrospect, did you discover any shortcoming or flaws with the process you followed?

### 24-Hour Recall

The primary purposes behind using a 24-hour recall are twofold:



- Rough quantitative estimate of calories consumed in a 24-hour period. However, a one-day snapshot may not accurately reflect one's true caloric intake.
- General qualitative assessment that provides insight into eating behaviors (e.g., number of meals, time of meals, general food choices). This is perhaps the more important component as it is estimated that by adulthood, 70 – 75% of our food preferences (choices) are established and can be defined by approximately 100 foods (3). Therefore, the foods identified using this tool can provide valuable insight to general food choices.

### **Food Logs or Journals**

More meaningful information for a quantitative assessment (calories, macronutrient composition, servings per food group) can be obtained by recording food intake for three to seven days or longer. By doing so, an individual can obtain a better representation of one's consistent eating behaviors; however, the quality of the information relies heavily upon accurate recording. Unless the process is simplified (e.g., using technology to take pictures or select foods from basic menus as opposed to physically recording foods as journal entries), as the reporting days progress, enthusiasm and compliance generally wane. One issue often overlooked by Health and Fitness Professionals involves time and compensation for one's services. A full three-day or longer dietary assessment is a very labor-intensive process, especially if the individual consumes large quantities of calories. This should raise the question of compensation for the Health and Fitness Professional and whether this is a billable expense. As a credible professional, you need to determine whether you should, or can afford to, give away your services for free.

### **Food Frequency Questionnaires (FFQ)**

When you consider how many of our choices are established by early adulthood, a Food Frequency Questionnaire is an effective tool for mapping food choices consistently. Furthermore, it also serves as an excellent validation tool to cross-reference food log or journal entries. For example, a client completes a three-day food log, submits it, and then completes a FFQ that inquires about the frequency of common foods eaten in a typical week. The Health and Fitness Professional can then gauge the accuracy and honesty of the logs against the FFQ. For example, if milk is not evident anywhere on the three-day



food log, yet the FFQ indicates that the individual typically consumes milk once a day, the professional has cause to question the client's entries. Remember: the efficacy of a weight loss program depends in part upon the accuracy of the self-reported data on food intake. Thus professionals should make every effort to validate the information.

### Theory to Practice

1. Step One: Take a moment to think through your week and draw up a list of foods you eat most frequently. Attempt to create a list of approximately 100 foods.
2. Step Two: Seal this Food Frequency (FF) list into an envelope, and store it in a secure location.
3. Step Three: A minimum of three days later, start collecting (and complete) a three-day food log, recording all foods consumed. The interval between step one and two is intended to reduce bias in your food choices linked to your FF list – be truthful!
4. Step Four: One week after completing your three-day log, open your FF list and use it as a FFQ, indicating on average how many times a week you consume every food listed.
5. Step Five: Using your three-day log, examine how your dietary behaviors match up against the FFQ. Ideally, you would discover a strong correlation between the two tools which would validate the data collection process, but realistically, this exercise should shed light on the inaccuracies associated with the standard practice of logging food as journal entries.

### Dietary Exchanges

If you are successful in acquiring reliable information, the next challenge lies with assessing the intake. This assessment requires access to a nutrient software or food database (e.g., choosemyplate.gov). Static software programs are costly and become quickly outdated (requiring continuous updates) whereas live database libraries are accessible to most but may require a usage subscription.

In the 1950's, the American Diabetes Association (ADA), in conjunction with the U.S. Public Health Service, introduced an "exchange scheme," later referred to as "exchanges"



that divided foods into groups based on the three major nutrients: carbohydrates, proteins, and fat (6). As illustrated in Table 1, foods are subdivided into seven groups (i.e., exchange lists) based on similar nutritional profiles with standard portion sizes. These groups are listed in Table 1, along some examples of common portion sizes in Table 2.

The goal of exchange lists was to establish a means for professionals to make specific recommendations for exchanges from each group based upon individual needs, and spread exchanges throughout the day to keep blood sugar levels within target ranges (given the similar nutrient profiles of the exchanges and the manner in which they affect blood sugar). In essence, it simplified the process of counting carbohydrates.

Despite the fact that that more precise methods for counting carbohydrates do exist, this exchange system has been revised several times since its inception (most recently in 1995 with the American Dietetic Association — ADA — now called the Academy of Nutrition and Dietetics — AND) and has survived for some 50 years as a frequently-used tool by dietitians (7).

As foods are grouped by macronutrient composition (carbohydrates, proteins, fats) rather than under the traditional USDA food groups, some foods shift to different categories (e.g., cheeses fall under the meat category and not dairy; potatoes and peas move from the vegetable group to the starch group). While this method of grouping foods can confuse the public, it offers an alternative and potentially simpler way to make reasonably accurate estimates of macronutrient composition and caloric value of food intake, while respecting scope of practice (working with energy balance and macronutrients and NOT micronutrients).

It is important to note that the caloric values presented in Table 1 are only estimates and are not intended for use during a comprehensive dietary assessment. For example, a serving of vegetables contains five grams of carbohydrates ( $5 \text{ g} \times 4 \text{ kcal} / \text{g} = 20 \text{ kcal}$ ) and two grams of protein ( $2 \text{ g} \times 4 \text{ kcal} / \text{g} = 8 \text{ kcal}$ ), yielding a total of 28 kcal, yet under the exchanges the caloric value is listed as 25 kcal. This discrepancy will create mathematical

errors when trying to accurately assess overall caloric intake from macronutrient totals (i.e., the amounts of each macronutrient eaten).

Table 1: Dietary Exchanges per Serving				
Exchange	Carbs (g)	Protein (g)	Fat (g)	Calories
<b>Fruits</b>	15	0	0	60
<b>Vegetables</b>	5	2	0	25
<b>Dairy:</b>				
• <b>Nonfat</b>	12	8	trace	90
• <b>Low-fat</b>	12	8	5	120
• <b>Whole</b>	12	8	8	150
<b>Meat</b>				
• <b>Very Lean</b>	0	7	< 1	35
• <b>Lean</b>	0	7	3	55
• <b>Medium-fat</b>	0	7	5	75
• <b>High-fat</b>	0	7	8	100
<b>Starch/grain</b>	15	3	trace	80
<b>Fat</b>	0	0	5	45
<b>Free Foods</b>	0	0	0	0

For more on using exchange lists and categorizing foods, visit the online store of the American Diabetes Association at [www.shopdiabetes.org](http://www.shopdiabetes.org) to purchase *Choose your Food: Exchange Lists for Weight Management*. The publication includes comprehensive lists of foods in each category as well as many common combination foods (e.g., macaroni and cheese), but practitioners should always refer back to the food labels for macronutrient quantities that are not in the publication. Bear in mind, however, that using exchange lists to assess dietary intake from food logs is still labor-intensive and subject to the unreliability of self-reported data. Furthermore, it is not an interactive tool, thus it fails to empower individuals to identify their own eating problems or to develop practical strategies for change.



**Table 2: Sample Exchange List Serving Sizes**

Type	Example of One Serving Size	
<b>Fruits</b>	<ul style="list-style-type: none"> <li>1 cup chopped fresh fruit, medium sized piece (2 – 2½” diameter), 4½ - 5” banana,</li> <li>12 cherries, 15 grapes</li> </ul>	<ul style="list-style-type: none"> <li>½ cup canned fruit (no added sugar)</li> <li>½ cup fruit juice,</li> <li>¼ cup dried fruit</li> </ul>
<b>Vegetables</b>	<ul style="list-style-type: none"> <li>½ cup cooked vegetables</li> <li>1 cup raw vegetables</li> <li>½ cup vegetable juice</li> </ul>	<ul style="list-style-type: none"> <li>Starchy vegetables and legumes are not included here, but listed under starches/ grains:</li> </ul>
<b>Dairy</b>	<ul style="list-style-type: none"> <li>1 cup milk, ½ cup evaporated milk,</li> <li>1 cup of 8 oz. plain yogurt</li> </ul>	<ul style="list-style-type: none"> <li>Cheese is not included here, but listed under the meat group</li> </ul>
<b>Starches / Grains</b>	<ul style="list-style-type: none"> <li>¾ cup dry unsweetened cereal,</li> <li>½ cup cooked, sweetened or bran cereals,</li> <li>1½ cups puffed unsweetened cereal</li> <li>½ cup cooked pasta</li> <li>½ cup cooked rice</li> </ul>	<ul style="list-style-type: none"> <li>½ cup corn / 6” cob,</li> <li>⅓ cup yams / ¾ cup squash</li> <li>1 oz. bread</li> <li>½ 6” pita / 6” tortilla</li> <li>½ small bagel and muffin</li> <li>1 cup croutons</li> <li>3 cups popcorn</li> </ul>
<b>Fats</b>	<ul style="list-style-type: none"> <li>1 tsp. margarine, butter, mayonnaise, oil</li> <li>1 tbsp. diet margarine, mayonnaise</li> <li>⅛ medium avocado</li> </ul>	<ul style="list-style-type: none"> <li>15 peanuts, 6 almonds, 2 pecans and walnuts, 1 tbsp. cashews</li> <li>1 tbsp. creamy salad dressings</li> <li>2 tbsp. reduced-calorie dressing</li> </ul>
<b>Meats – Very Lean</b>	<ul style="list-style-type: none"> <li>1 oz. 99 % fat-free meats</li> <li>1 oz. fat-free cheeses</li> </ul>	<ul style="list-style-type: none"> <li>2 egg whites</li> </ul>
<b>Meats – Lean</b>	<ul style="list-style-type: none"> <li>1 oz. USDA Good or Choice beef cuts (lean), hams, venison, veal (not cutlets), poultry or wild bird (without skin)</li> <li>1 oz. fresh or frozen fish, shellfish,</li> <li>¼ cup canned tuna/fish (in water)</li> </ul>	<ul style="list-style-type: none"> <li>¼ cup cottage cheese</li> <li>1 oz. diet cheeses</li> <li>2 tbsp. parmesan</li> <li>1 oz. 95 fat-free deli cuts</li> <li>3 egg whites or ¼ cup egg substitute</li> </ul>
<b>Meats – Medium Fat</b>	<ul style="list-style-type: none"> <li>1 oz. beef, pork, lamb, veal cutlets, poultry (with skin), or organ meat</li> <li>¼ cup tuna (in oil, drained)</li> </ul>	<ul style="list-style-type: none"> <li>¼ cup ricotta</li> <li>1 oz. mozzarella cheese</li> <li>1 whole egg, 4 oz. tofu</li> <li>1 oz. 86% fat-free deli-cuts</li> </ul>
<b>Meats – High Fat</b>	<ul style="list-style-type: none"> <li>1 oz. USDA prime beef cuts, regular ground beef, pork ribs or sausage</li> </ul>	<ul style="list-style-type: none"> <li>1oz. luncheon meats (salami, bologna, etc.), sausages, bratwurst</li> <li>1 tsp. peanut butter</li> </ul>



Table 3 provides a sample meal recorded from a food log and illustrates how a Health and Fitness Professional can use this information to quantify macronutrient and caloric intakes, and determine if the dietary intake is balanced in accordance to current USDA dietary guidelines (8).

<b>Table 3: Macronutrient and Caloric Analysis Using Exchange Lists</b>					
<b>Food Item</b>	<b>Portion</b>	<b>Exchanges</b>	<b>Carbs (g)</b>	<b>Protein (g)</b>	<b>Fat (g)</b>
Cheerios	¾ cup (170 g)	1 starch	15	3	0
Skim milk	½ cup (118 mL)	½ nonfat dairy	6	4	0
Wheat toast	1 oz. (30 g) slice	1 starch	15	3	0
Margarine	1 tsp.	1 fat	0	0	5
Peanut butter	1 tbsp.	1 high-fat meat	0	7	8
Orange juice	8 oz. (236 mL)	2 fruit	30	0	0
Banana	5" (13cm)	1 fruit	15	0	0
<b>Total Quantities:</b>			<b>81 g</b>	<b>17 g</b>	<b>13 g</b>
			<b>4 kcal / g</b>	<b>4 kcal / g</b>	<b>9 kcal / g</b>
<b>Calories:</b>			<b>324 kcal</b>	<b>68 kcal</b>	<b>117 kcal</b>
<b>Total:</b>			<b>509 Kcal</b>		
<b>Macronutrient Contribution (i.e., % contribution) *</b>			<b>63.7%</b>	<b>13.3 %</b>	<b>23.0 %</b>
<p><i>* In comparison to current 2010 USDA Acceptable Macronutrient Distribution Ranges (AMDR):</i>  <i>Carbohydrates = 45 – 65% of total caloric intake</i>  <i>Proteins = 10 – 35% of total caloric intake</i>  <i>Fats = 20 – 3 % of total caloric intake</i></p>					



### Do the Math

Using the information provided in Tables 1 and 2, determine the total quantities of each macronutrient and total kcal in the following meal.

- One slice (1 oz.) regular cheddar cheese (high fat meat)
- Two slices (1 oz. each) whole wheat bread (starch / grains)
- One 8 oz. glass of low-fat milk (low-fat dairy)
- One Snicker's bar (58.7g – 280 kcal – visit [snickers.com](http://snickers.com))

### Answers:

Total carbohydrates = 77g

Total protein = 25g

Total fats = 27g

### Simpler Choices

Quantifying numbers is time-consuming and difficult to log, calculate, and follow (for both clients and Health and Fitness Professionals), and also prone to error. As such, it may be more productive to shift your approach to changing dietary behaviors away from a quantitative method and towards a more qualitative approach (i.e., making healthier selections and controlling portion sizes).

Although a general lack of understanding of standard portion sizes is a leading contributor to overeating, making healthier food selections can be equally as challenging. Savvy Health and Fitness Professionals tackle portion-size challenges by equating standard serving sizes with common household items (e.g., computer mouse, tennis ball) or various hand positions (e.g., cupped palm, clenched fist). However, they still struggle with the complexity of coaching for healthier food selections.

### Nuval®

Nuval® is a new nutritional scoring system aimed at simplifying the decision-making process on healthier foods – visit [www.nuval.com](http://www.nuval.com) for more information. Developed by an independent panel of nutrition and medical experts, this system generates a single



numerical score on a 1-100 scale to rank a food's quality (higher scores reflect better nutrition). The scoring algorithm considers 30-plus nutrients in the food—both good and bad— and condenses overall nutrient quality into a single number (9). This simplified approach allows individuals to move towards making healthier choices by seeking comparable foods with higher scores than what they already eat.

### **Points System**

Weightwatchers® is one of the more successful commercial dietary programs available to the public. Part of their success is attributed to their PointsPlus® system and “four pillars approach” that promote accountability and behavioral change. Through their point system, consumers increase awareness of healthy and unhealthy foods. Their system however, is not without its challenges given the need to understand (a) portion sizes, and (b) the advanced point system for foods eaten and totals allowed.

Consider adopting your own points system, but utilize a simplified approach. First, educate your clients or patients on standardized portion sizes for the 100 foods they consume most frequently. Then, using this list of foods, devise a food checklist that:

- Earns positive points per serving for healthy foods (whole grains; fruits / vegetables – raw, frozen; very lean / lean meats – baked, grilled; dairy - low / nonfat)
- Earns negative points per serving for unhealthy foods (refined starches; fats; sweets; salty snacks; fruits/vegetables – canned in syrup, deep fried; medium / high-fat meats – fried, etc.; dairy – whole)

Use a FFQ or ask the individual to list their commonly-consumed foods, then score and tabulate a typical day's points. Use this data to help the individual identify unhealthy choices, set challenges to gain more positive points, and then guide them in their quest to find ways to boost their daily scores. Table 4 offers examples of positive and negative points, whereas Table 5 offers examples of point allocations for some meals. As illustrated, a quarter-pound cheeseburger served on a white bun with 16 ounces (475 mL) of regular soda would earn -6 points (-2 points for two refined starch servings, -1 point for one high-fat meat (cheese) serving, -1 point for high-fat meat (beef patty) serving, and -2



points for 16 ounces of a sugary beverage), whereas a healthy breakfast of Cheerios (dry, unsweetened, whole wheat cereal) with 4 ounces (118 mL) of skim milk and a medium banana, could earn +4 points.

<b>Table 4: Positive and Negative Point Allocation for Foods</b>		
<b>Food Choice</b>	<b>Point Score</b>	<b>Serving Size</b>
Whole Grains	+ 1 point	1 oz. (30 g)
Fruits	+ 1 point	½ cup (114 g) raw / frozen
Vegetables	+ 1point	½ cup (114 g) raw / frozen
Dairy	+ 1 point	1 cup (236 mL) or 1 oz. nonfat / low-fat
Lean Meats, Fish, Poultry (no skin), Eggs, Egg Whites	+ 1 point	1 oz. broiled / baked / grilled
Soy, Legumes, Nuts and Seeds	+ 1 point	½ cup raw or cooked
Fats	- 1 point	1 tsp.
Sweets	-1 point	2 bites, 8 oz. sweetened drink
Salty / Fried Snacks	- 1 point	1 oz.
Refined Grains and Starches	- 1 point	1 oz.
Dairy	- 1 point	1 cup whole, 1 oz. regular cheese
High-fat Meats, Fish, Poultry (skin), Luncheon Meats	- 1 point	1 oz. - fried or battered

Table 5: Point Allocation Examples for Meals

Food Item	Portion	Points
Cheerios (dry, unsweetened) cereal	¾ cup (170 g)	(+ 1.0)
Skim milk	½ cup (118 mL)	(+ 0.5)
100% whole wheat toast	2 slices	(+ 2.0)
Margarine (regular)	2 tsp.	(- 2.0)
Peanut butter – (reduced fat)	1 tsp.	(+ 1.0)
Orange juice (with pulp)	8 oz. (236 mL)	(+2.0)
Banana	5"	(+1.0)
	<b>Total:</b>	<b>(+ 5.5)</b>
Food Item	Portion	Points
¼ lb. Cheeseburger	2oz. meat, 1 oz. cheese	(- 3.0)
White Bun	2 oz. (60 g)	(- 2.0)
French fries	1 oz. (30 g)	(- 1.0)
Regular soda	16 oz. (236 mL)	(- 2.0)
	<b>Total:</b>	<b>(- 8.0)</b>

### Summary

The reality is that while obesity is a complex disease, the causes of which are not fully understood, we have many prudent, effective, and simple solutions that we can use to empower people to change. Visit the National Weight Control Registry (NWCR), developed by Dr. James Hill and Dr. Rena Wing, as it provides an aggregated databank of long-term successful weight-loss and maintenance strategies (10). A review of best practices within this databank reveals a common thread for sustained weight loss: simplicity.



It is a daunting task to implement a safe, effective, and prudent plan when the media constantly bombards us with a myriad of quick-fix strategies that appeal to the human desire for instant gratification and overnight weight loss. As Health and Fitness Professionals, we recognize the pitfalls and empty promises, and must stay true to the course by adopting realistic, simplified approaches to weight loss that focus upon the processes (e.g., challenges, tasks) rather than the outcomes (e.g., number of calories).

*Jamie is thankful for the decision she made to meet with a NASM Fitness Professional as she was able to help her understand that her previous approach was doomed from the start given the errors associated with quantitative assessments. She has never enjoyed the process of trying to log and count calories, and feels more confident in her abilities to adopt a more simplified method where she will learn to:*

- *Gauge proper portion sizes of the foods she eats more frequently*
- *Utilize a simple point-system approach to evaluate these foods to increase her awareness of the healthy and unhealthy foods she typically eats*
- *Use the Nuva<sup>®</sup> system as a guide to help her make healthier choices of the foods she enjoys*

*She embraces the fact that these changes are important and recognizes that over time, they will help her achieve her goal of weight loss to improve her health.*

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