

Expanding portion sizes in the US marketplace: Implications for nutrition counseling

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ABSTRACT

The greater energy content of larger food portions could be contributing to the increasing prevalence of overweight. Prevention guidelines recommend “sensible” portion sizes but do not define them. The US Department of Agriculture (USDA) defines standard serving sizes for dietary guidance, and the Food and Drug Administration (FDA) defines standard servings for food labels. To use these standards in counseling, nutritionists must know the sizes of portions available in the marketplace. We determined marketplace portion sizes, identified changes in these sizes with time, and compared current marketplace portions with federal standards. Most marketplace portions exceed standard serving sizes by at least a factor of 2 and sometimes 8-fold. Portions have increased over time; those offered by fast-food chains, for example, often are 2 to 5 times larger than the original size. The discrepancy between marketplace portions and standard servings suggests the need for greater emphasis on the relationship of portion size to energy intake as a factor in weight maintenance. *J Am Diet Assoc.* 2003;103:231-234.

The portion sizes of commonly consumed foods appear to have increased in size during the past 20 years (1). Larger food portions provide more energy (kcal) than smaller portions and could be contributing to the increased prevalence of overweight and obesity since the 1970s (2-4). The 2001 Surgeon General’s *Call to Action* on obesity prevention stressed the need to address portion size as a factor in weight control, raise consumer awareness of reasonable portion sizes, and encourage food companies to provide reasonably sized portions (5). Because larger portions have become typical, consumers have increasing difficulty recognizing amounts of food that are appropriate for their weight

and activity levels (6,7). Although the *Call to Action* advised consumers to “choose sensible portions,” it did not define the sizes of such portions (8).

Nutritionists use two sets of standard serving sizes when counseling clients about healthful eating and weight-loss strategies: one developed by the US Department of Agriculture (USDA) for dietary guidance and the other by the Food and Drug Administration (FDA) for food labeling. Both define serving sizes of specific weight and volume and, therefore, energy and nutrient content. The USDA’s Food Guide Pyramid, for example, lists the sizes of standard grain servings as follows: 1 slice bread, ½ cup cooked pasta, ½ bagel, or 1 oz ready-to-eat cereal (9). In

defining standard servings, the USDA considered nutrient content, ease of use, tradition, and typical intake based on median amounts reported in the 1977-1978 Nationwide Food Consumption Survey (NFCS) (10-12). When the 2000 edition of the Dietary Guidelines advises choosing “sensible portions,” it refers to Pyramid serving definitions (13). The FDA defines somewhat different serving sizes for Nutrition Facts labels. These were intended to represent amounts of foods commonly consumed based on data from dietary intake surveys: the National Food Consumption Surveys of 1977-1978 and 1987-1988 and the 1985-1986 Continuing Survey of Food Intake of Individuals (CSFII) (14,15). Because the surveys were conducted 15 to 25 years ago, standard servings may be smaller than marketplace portions (16). If so, nutritionists need to be able to compare serving size standards with the sizes of foods purchased (“marketplace portions”) and, presumably, consumed; nearly half of all food expenditures are for items prepared and served outside the home (17). However, because so little is known about the sizes of marketplace portions, we measured them directly and compared them with USDA and FDA standards. We also investigated trends in portion sizes to determine whether they correlate to rising rates of obesity.

METHODS

We examined the sizes of ready-to-eat foods from take-out places, fast-food outlets, and family-type restaurants; these account for much of the recent increase in out-of-home food consumption, rank highest in sales, and exhibit the highest sales growth (18-20). We sampled foods from categories reported in national surveys as major contributors of energy in US diets and marketed as single portions: white bread products, cakes, alcoholic beverages, hamburgers, steak, soda, french fries, pasta, and pizza (21,22). We obtained size information from package labels or from manufacturers. When such information was unavailable, and to confirm the accuracy of label weights and manufacturers’ information, we weighed at least two samples of each food item from the same location using a calibrated Sysco Digital Portion Scale (Model SDS-10; Sysco Foodservice, Houston, TX) and recorded average weights. A pilot project

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Table 1
Measured sizes of ready-to-eat prepared foods (marketplace portions) compared with USDA¹ and FDA¹ serving sizes

| Food | # of samples tested ^a | Measured weights (oz or fl oz) ^b | | | Standard serving sizes (oz or fl oz) ^b | |
|--|----------------------------------|---|----------|--------------|---|-----------|
| | | Mean | Median | Range | USDA Food Guide Pyramid | FDA label |
| Sliced white bread | 12 | 1.0 | 1.0 | 0.9-1.2 | 1.0 | 1.8 |
| Bagel | | | | | | |
| Chain store | 6 | 4.4 | 4.5 | 3.9-5.0 | 2.0 | 2.0 |
| Independent bagel store | 12 | 5.9 | 5.8 | 4.9-6.7 | 2.0 | 2.0 |
| Muffin | 39 | 6.5 | 6.5 | 4.1-12.0 | 1.5 ^c | 2.0 |
| Cookie, chocolate chip | 15 | 4.0 | 3.8 | 3.3-4.9 | 0.5 ^c | 1.1 |
| Brownie | 30 | 3.2 | 3.5 | 1.3-4.6 | — | 1.4 |
| Hamburger bun | | | | | | |
| Fast food outlet | 7 | 2.2 | 2.2 | 1.8-2.7 | 2.0 | 1.8 |
| Chain restaurant | 5 | 2.9 | 3.0 | 2.6-3.2 | 2.0 | 1.8 |
| Beer | 8 | 15.4 | 14.0 | 10.0-23.0 | 12.0 | 8.0 |
| Hamburger^d | | | | | | |
| Fast-food outlet | 13 | 3.9 | 3.0 | 1.2-9.0 | 2.5 ^e | — |
| Chain restaurant | 6 | 5.3 | 6.0 | 3.8-6.0 | 2.5 ^e | — |
| Steak^d | 15 | 8.1 | 7.5 | 6.0-10.5 | 2.5 ^e | — |
| Roast beef, sandwich filling | 8 | 6.0 | 5.8 | 3.9-7.9 | 2.5 ^e | — |
| Soda^f | | | | | | |
| Fast-food outlet | 17 | 23.0 | 22.0 | 12.0-42.0 | 12.0 | 8.0 |
| Chain restaurant | 4 | 16.0 | 16.0 | 16.0-16.0 | 12.0 | 8.0 |
| French fries^g | | | | | | |
| Fast-food outlet | 15 | 5.3 | 5.5 | 2.4-9.0 | 10 fries | 2.5 |
| Chain restaurant | 5 | 6.7 | 7.0 | 4.0-12.4 | 10 fries | 2.5 |
| Cooked pasta,^h without sauce | 6 | 2.9 cups | 2.9 cups | 2.6-3.3 cups | 0.5 cup | 1.0 cup |
| Cheese pizza, by the slice | | | | | | |
| Chain pizza parlor | 5 | 7.0 | 6.6 | 6.0-8.1 | — | 5.0 |
| Independent store | 24 | 7.1 | 7.2 | 6.0-8.8 | — | 5.0 |

^aSample size varies for items depending on the availability of manufacturers' information on weight and nutrient content. We weighed fewer samples of items labeled with this information (24).

^bSizes are stated in ounces (oz) for solid foods (eg, bread, muffins, french fries) or fluid ounces (fl oz) for beverages, unless otherwise indicated.

^cWeight of a "medium" serving, derived from USDA definitions. One grain serving=1 oz. One medium muffin=1.5 servings. Two "medium" cookies=one grain serving.

^dCooked weight.

^eMean weight of 2 to 3 oz, cooked.

^fFluid ounce of cup size. Fluid ounce of poured soda will vary by amount of ice added. Chain restaurants offer free refills.

^gSizes are stated in ounces, except for USDA Food Guide Pyramid (reference 9) servings of french fries; these are given in by number of fries, not ounces.

^hCooked volume of pasta without sauce, measured in cups.

¹USDA=US Department of Agriculture.

¹FDA=US Food and Drug Administration.

demonstrated that this method would be effective (23). We sampled foods from at least four of each type of venue (eg, four fast-food chains), totaling 32 establishments. Details about the weighing method and its validation are described elsewhere (24). We compared current marketplace portion sizes to USDA and FDA standard servings. We obtained information about past portion sizes directly from manufacturers or indirectly by examining trade publications, professional journals, marketing and advertising publications, menu collections, cookbook recipes, fast-food guides, and older editions of food composition tables.

RESULTS

Table 1 compares the portion sizes of

ready-to-eat prepared foods to federal standard serving sizes. These data indicate that with the exception of sliced white bread, the sizes of marketplace portions exceed federal standards, often by at least a factor of 2 (bagels, sodas) and sometimes by as much as 8 (cookies). Table 2 compares the sizes of selected food products when first introduced with the sizes now available. Manufacturers generally introduced foods in only one size; this size was smaller than or equal to currently available portion sizes (25-27). For example, the original Hershey bar was 0.6 oz, but current bars range from 1.6 to 8.0 oz. Fast-food chains offer larger sizes of hamburger, sodas, and french fries; current sizes are often 2 to 5 times larger than the original size. We found

additional evidence supporting a trend toward larger portion sizes. Larger sodas are reflected in new names such as "Supersize" or "Double Gulp." Fast-food companies actively promote larger portions with signs, staff pins, and placemats. Reviews refer to large restaurant portions ("Godzilla-sized burgers") (28). Chain restaurants promote larger items on menus ("hefty helpings"). Foodservice establishments use larger dinner plates, larger pans to bake muffins and pizzas, and larger containers for sodas and fries (24). Identical recipes in old and new editions of classic cookbooks such as *The Joy of Cooking* (29-31) or those for tollhouse cookies (32,33) yield fewer servings today than in the past. Overall, the data suggest an increase in

Table 2
Marketplace portion sizes of selected foods and beverages when first introduced compared with marketplace portions in 2002^a

| Food/beverage | Year introduced | Size at introduction, oz or fl oz | 2002 sizes, oz or fl oz |
|---|-----------------|-----------------------------------|--|
| Beer | | | |
| Can, Budweiser | 1936 | 12.0 | 8.0, 12.0, 16.0, 24.0 |
| Bottle, Budweiser | 1976 | 7.0 | 7.0, 12.0, 22.0, 40.0 |
| Chocolate bar, milk chocolate | | | |
| Hershey's | 1908 | 0.6 | 1.6, 2.6, 4.0, 7.0, 8.0 |
| Nestlé Crunch | 1938 | 1.6 | 1.6, 2.8, 5.0 |
| French fries | | | |
| Burger King | 1954 | 2.6 (Regular) | 2.6 (Small), 4.1 (Medium), 5.7 (Large), 6.9 (King) |
| McDonald's | 1955 | 2.4 (Fries) | 2.4 (Small), 5.3 (Medium), 6.3 (Large), 7.1 (Supersize) |
| Hamburger, beef only^b | | | |
| McDonald's | 1955 | 1.6 | 1.6, 3.2, 4.0, 8.0 |
| Howard Johnson's | 1970s | 3.5 | 5.0, 8.0 |
| Hamburger sandwich^c | | | |
| Burger King | 1954 | 3.9 | 4.4 (Hamburger), 6.0 (Whopper Jr.), 6.1 (Double hamburger), 9.9 (Whopper), 12.6 (Double whopper) |
| Soda, poured from fountain | | | |
| Burger King | 1954 | 12.0 (Regular) 16.0 (Large) | 12.0 (Kiddie), 16.0 (Small), 22.0 (Medium), 32.0 (Large), 42.0 (King) |
| McDonald's | 1955 | 7.0 | 12.0 (Child), 16.0 (Small), 21.0 (Medium), 32.0 (Large), 42.0 (Supersize) |
| 7-Eleven stores | 1973 | 12.0 20.0 | 16.0 (Gulp), 32.0 (Big Gulp), 44.0 (Super Big Gulp), 64.0 (Double Gulp) |
| Soda, commercially packaged, | | | |
| Coca Cola, bottle and can | 1916 | 6.5 | 8.0, 12.0, 20.0, 34.0 |

^aInformation obtained from manufacturers. Sizes are stated in ounces (oz) for solid foods such as chocolate bars, french fries, hamburger beef, and sandwiches; and fluid ounces (fl oz) for beverages such as beer and soda. Manufacturers are the following: Anheuser-Busch, Inc. (St Louis, MO); Burger King Corporation (Miami, FL); The Coca-Cola Company (Atlanta, GA); Franchise Associates (South Weymouth, MA); Hershey Foods Corporation (Hershey, PA); McDonald's Corporation (Oakbrook, IL); Nestle USA (Solon, OH); and 7-Eleven, Inc. (Dallas, TX).

^bPrecooked beef.

^cIncludes cooked beef, bun, vegetable, and condiment. Does not include cheese.

the sizes of *most* foods and beverages prepared for immediate consumption.

DISCUSSION

Our observations have implications for nutrition counseling about healthful eating. Because marketplace portions are consistently larger than USDA standard servings, nutritionists need to explain the difference to clients. The Pyramid recommendation to consume 6 to 11 grain servings/day refers to *standard* serving sizes. Whereas a standard bagel is 2 oz and 2 grain servings, one marketplace bagel is nearly 6 oz, and, therefore, 6 grain servings, which is sufficient for people consuming 1,600 kcal/day. Similarly, one muffin or one pasta entrée in a restaurant can easily comprise 6 grain servings. This discrepancy explains why many Americans view 6 to 11 grain servings as too much to eat (34). Similarly, a USDA standard meat serving is 2 to 3 oz, and the recommendation is two to three servings for a daily total of 5 to 7 oz, but steak at family-type restaurants

typically exceeds 8 oz (3 to 4 standard servings), and steakhouse steaks weigh as much as 24 oz (8 to 12 servings) (35). Because portion distortion is so prevalent among Americans (36), the USDA lists the number of standard servings obtained from eating marketplace portions of several foods (37).

Marketplace portions also exceed standard serving sizes on food labels. Labels list kcal/serving, but individually packaged muffins, candy bars, and single bottles of soda sometimes contain 2.5 or more standard label servings. Adding to this confusion is the FDA rule that a food weighing less than twice the standard serving amount may be labeled "one serving per container." Because a standard soda serving is 8 oz, both 8-oz and 12-oz sodas are labeled as one serving, but a 20-oz soda must be labeled as 2.5 servings. Also confusing are the differences between USDA and FDA standard servings. For example, the standard FDA serving of cooked pasta or rice is one cup, but the USDA standard is half as much. These

distinctions require clarification, especially as they apply to weight management.

Also needing emphasis is the basic fact that large portions contain more calories than small portions. A McDonald's small french fries (2.4 oz) contains 210 kcal, whereas the "Supersize" (7.1 oz) provides 610 kcal; a small Coca-Cola (16 fl oz), more than twice the volume of the original, contains 150 kcal, whereas the "Supersize" (42 oz) contains 410 kcal (38). Together, the larger portions of these two foods provide 1,020 kcal, which is half the daily energy required by large segments of the US population (39). A Burger King Double Whopper alone provides nearly 1,000 kcal. Giant size chocolate bars are more than ten times larger than the size of bars when first introduced and contain ten times as much energy (26).

The trend toward larger marketplace portions has occurred in parallel with rising rates of obesity. Much evidence supports a causal connection. The availability of energy in the US food

supply also has increased in parallel (40), as has energy intake reported in dietary surveys (41). For complicated reasons of farm policy, the low cost of basic food commodities means that larger portions do not cost much more (42,43). Larger portions encourage people to eat more (44-47) and stimulate sales of products to adults (48,49) and children (50).

APPLICATIONS

■ Many Americans believe that the kind of food they eat is more important than its quantity (51). On quantitative grounds alone, clients need to be advised about the relationship of market-place portions to standard servings. Nutritionists counseling clients—and the public—about healthy eating and weight loss strategies should make every effort to emphasize the relationship between portion sizes, energy intake, and weight management. Even though it may seem intuitively obvious, we cannot overemphasize the point that larger portions contain more calories.

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