Toward a Uniform Serving Size and its Interpretation

Uniform serving size section

Since its passage in 1990, the Nutrition Labeling and Education Act (NLEA), has led to improvement of understanding of ingredient content and subsequent versions continue to maintain many of the original classifications such as serving size, servings per container and nutrient amounts (1). However, terminology and frequent up-dating of labeling have led to confusion within the general public (2,3) and problems with labeling appears on America's "Gripe-o-meter" #15 list (4). To prove a point, a short quiz on how well **you** understand nutrition labeling is available, which can be accessed at: https://md.rcm.upr.edu/biochemistry/nutritional-labelling-quiz/.

Suggested here is the creation of a **Uniform Serving Size** which will be **100 Calories (Cal)** for packaged and container items independent of size or weight and for beverages with added sugar. Table 1 illustrates the confusion with the current system by using the packaged recommended serving size. To minimize differences between products and brands, items listed in Table 1 are all breakfast cereals with the **same** manufacturer. One cup of cereal could be between 100 and 400 Cal, a difference of 400%. Even more extreme results would be expected if **different** products and brands were used as examples. Currently, several manufacturers have made available 100 Cal snacks, including cookies, crackers, popcorn, nuts, chips and other products and while this practice should be encouraged it is not always the norm.

Table 1. Examples of inconsistency between serving size and caloric content

Cereal	Size	Calories	Cereal	Size	Calories
Corn Flakes	1 cup	100	Sugar Flakes	1 cup	120
Multi-Grain (M-G)	2/3 cup	100	M-G + Apples	1 cup	190
M-G + Coconut	1 cup	200	M-G + Almond	¾ cup	110
Rice Type	1¼ cup	130	Granola Type	½ cup	200
Honey Sweetened	¾ cup	100	Fruit Sweetened	1 cup	110

This suggestion raises several questions. Would not 100 Cal containers (which are generally small) promote wastage of packing materials? Not necessarily. 100 Cal packets could be placed within conventional boxes. Research groups in the food industry are developing edible packaging which could also improve product stability, quality and convenience for consumers (5). What about non-packaged edibles? Items with a high "nutrient rich foods index" (6) are exempt. Fruits, vegetables, 100% juices , etc. should be relished in abundance, independent of caloric content. Similarly, consumables such as prepared by butchers or in delicatessens, where caloric content is not easily determined, are not included however choices should be selected according to the most recent US Dietary Guidelines for Americans (7).

Perhaps the greatest benefit of this suggestion deals with limiting intake of sugar-sweetened beverages which have been significantly linked to overweight, obesity and type 2 diabetes (8). Since many of sodas, sweetened juices and energy and sports drinks have similar sugar-content, **100 Cal is contained in 7.5 oz or 225 ml** which should be set as **standard serving**. Of interest, prior to 1950, and the obesogenic environment, 6.5 oz bottles were the typical soda size.

Of course, this suggestion cannot dictate uniformity of serving size such as found in fast-food or table-serving restaurants, where portions are determined by the licensee. However it is hoped that recommendations herein might be a target for the food-serving industry.

Interpretation section

Therefore, if 100 Cal is accepted as standard serving size (or multiples of this value, such as 200 Cal being 2 servings, 300 Cal being 3 servings, etc) how does this benefit consumers any more than the present system? The answer is by having a convenient number to determine the amount of energy output (physical activity) required to balance energy intake (food). There is often a disconnect in relating caloric input with output (9), however, this suggestion is designed to simplify the relationship. This can be accomplished by listing energy expended in typical physical activity according to the amount of time required to "burn" 100 Cal (or multiples thereof). Table 2 is an example of how this information could be presented.

This suggestion doesn't claim to be without problems. Values in Table 2 are simplified since factors such as body weight and muscle mass will affect activity time. Likewise, calorie input can be influenced by factors not considered here but which can be found elsewhere (10). The suggestion I wish to present is the creation of a system, in which consumers can relate the energy used for typical activities to a standard, and easily remembered value (100 Cal) thereby allowing them to better maintain energy balance and subsequent weight control.

Table 2. Activity and time to "Burn" 100 Cal* (Efficiency: best→worst)

Activity	Time (min)	Activity	Time (min)
Running (6 mph)	6	Stair climbing	11
Soccer (casual)	11	Swimming (casual)	15
Baseball (catch)	18	Weeding the garden	18
Dancing (light)	20	Walking (3 mph)	20
Mopping the floor	20	Basketball (hoops)	20
Washing the car	20	Biking (casual)	23
Sweeping the floor	23	Playing with kids	23
Cleaning the house	25	Volleyball (casual)	26
Cooking	34	Shopping	38
Sleeping	70	Watching TV	80

*150 lb adult

Alan M. Preston, PhD, Biochemistry Department, University of Puerto Rico, Medical Sciences Campus. Email: alan.preston@upr.edu

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