Intake of added sugars in the United States: what is the measure?

Dear Sir:

We read with interest the recent article by Welsh et al (1). Welsh et al state that “the last published description of added-sugar intake used dietary data collected in 1994–1996.” My colleagues and I respectfully point to the oversight of our article, “Intake of added sugars and selected nutrients in the United States, National Health and Nutrition Examination Survey (NHANES) 2003–2006,” which was published in Critical Reviews in Food Science and Nutrition in 2010 (2). This article is fully indexed in PubMed, and it is regrettable that Welsh et al did not consider these data as part of their reference literature and in project development. A specific purpose of our study was to update and expand the estimates from the 1994–1996 CSFII (Continuing Survey of Food Intakes by Individuals) added-sugar intake data (3).

Direct comparison between our article and that of Welsh et al is made challenging by a number of methodologic differences. Among other differences, we used the Food and Nutrition Board age and sex groupings to allow comparisons with previous literature, whereas Welsh et al elected another approach; we also included consideration of weekend effects on food intake in our analysis (4), whereas no mention of this aspect was included in the Welsh et al study.

One critical difference is in the number of survey days included in the estimates by Welsh et al. Although the later data in the Welsh et al study (NHANES 2003–2008) included two 24-h recalls, the earlier NHANES that they used (NHANES 1999–2000 and 2001–2002) did not. Welsh et al reported that they thus used only the first day of recall from the 2001–2002 data for consistency. Research has shown that use of multiple 24-h recalls improves intake estimates through modeling of within-person and between-person variation (5), and there are multiple approaches that can be used to address this issue when there is only one 24-h recall in a survey (6). We applied the National Cancer Institute (NCI) method (7) for estimation of usual intakes or long-term average intakes. For our food-source models, we also incorporated covariates from the NHANES food-frequency questionnaire, which can further improve the power of models by accounting for a portion of the variation in intake in the recall data (8). Although it is not typically necessary to generate usual intakes of nutrients if only means are compared, episodically consumed dietary components such as added sugars may benefit from this adjustment. Without estimating the distribution of usual intake, the Welsh et al analysis does not support direct comparison to dietary recommendations; a simple comparison of mean intakes to recommended intakes provides no information on the proportion of Americans who are exceeding these limits. The Marriott et al article provides further explanation of why the NCI method results in estimates that may better represent the typical population intake.

Welsh et al did not report energy-adjusted intake values, stating that there was no significant difference by sex, nor did it appear that the food-source analysis was adjusted for energy. In contrast, Marriott et al adjusted for energy in the sugars by using food-source analysis, primarily in response to criticism of the Institute of Medicine macronutrient report [Appendix Table J (9–11)]. Finally, Marriott et al applied the same food categorization scheme as did Guthrie and Morton (3) to facilitate comparison to historical data, whereas Welsh et al applied a different scheme, which makes comparison somewhat difficult. The studies both matched foods across cycles and imputed the values of added sugars for the later NHANES cycles because the MyPyramid serving-size equivalents were available only for foods reported through the NHANES 2003–2004 cycle.

With these differences considered, it is interesting to compare the total population data for the midpoint of the Welsh et al analysis with the Marriott et al results, both of which are based on survey years 2003–2006. Added-sugar intake in the Marriott et al article for the US population aged ≥4 y was 82.9 g/d, which falls between the 88.1 and 80.1 g/d for individuals aged ≥2 y reported by Welsh et al for survey years 2003–2004 and 2005–2006, respectively. In terms of food sources, results are parallel in that “sodas” or “regular soft drinks” are the largest contributors to added-sugar intakes, with “sweetened grains” and “grains” not very far behind (Marriott et al and Welsh et al categories, respectively).

We appreciate this opportunity to point to the recent publication of our data and hope that future research in this area will consider the full body of literature on this topic.

The authors declared no conflicts of interest.

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Reply to BP Marriott et al

Dear Sir:

We thank Marriott et al for their interest and comments in response to our recent publication on the trends in added-sugar intake in the US diet (1). Their letter highlights work that they have done to describe added-sugar consumption in the United States in relation to the intake of key nutrients. Their publication (2) is a valuable contribution to the literature, and we regret that we neglected to reference it in our study.

As indicated by Marriott et al, the data used in their study were the same as those used for a portion of ours, but the analytic approaches used were different. This is to be expected because the purposes of our respective studies were different. The purpose of the Marriott et al study was to provide an updated estimate of the consumption of added sugars in the US diet and to examine how this consumption relates to the intake of selected nutrients. As was appropriate, they used statistical adjustments to account for the within-person variation in order to characterize nutritional adequacy for different population subgroups. The purpose of our study was to assess recent national trends in the mean intake of added sugars. Because the mean intake of commonly consumed nutrients is not affected by within-person variation (3), methods to account for it were not required. To facilitate comparisons with earlier estimates, we used methods similar to those used by Guthrie and Morton (4) who reported on sources of added sugar in 1994–1996 and those used by Popkin and Nielsen (5), which provided an estimate of added-sugar intake trends from 1977–1978 to 1994–1998.

We are pleased to note that, despite the varying purposes and methods of the 2 studies, the mean intake of added sugar and the relative importance of its key sources, as estimated by both, were consistent.

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