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# Bridging the gap: Food choices and the Dietary Guidelines for Americans

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Diet-related diseases are among the most pressing public health concerns in the United States. According to a recent report by the U.S. Department of Agriculture (USDA), almost half of all American adults have preventable chronic diseases, and around two thirds of them are overweight or obese (DGAC USDA, 2015). Several studies have shown that there are strong connections between health related life-style behaviors—such as food choices and the level of physical exercise—and health outcomes. In particular, the consumption of unhealthful foods has been linked, in various degrees, to several negative health outcomes that are prevalent in the U.S. population (Beatty et al. 2014).

Given the high monetary and non-monetary costs associated with the high prevalence of diet-related diseases, the USDA in conjunction with the U.S. Department of Health and Human Services (HHS) issue dietary recommendations for the US population, known as the Dietary Guidelines for Americans (DGA). The primary goal of the DGA is to raise awareness of food intake and accomplish positive changes in people's diets. The recommendations are published every five years, and were most recently released in January 2016. The simplified version of the DGA is disseminated to the public in the form of MyPyramid, and more recently, MyPlate. The main outlets through which the DGA reach the general public include media coverage, advice from nutritionists and medical doctors, and through various institutional policies including the types of foods served in school cafeterias, etc. Yet, given the current trends of food choices and health issues, it seems that there is a large discrepancy between the recommended diets and the actual diets of the population. In a recent study, Volpe and Okrent (2012) use food-at-home purchase data and show that the average American household reaches a Healthy Eating Index score of 56.4 out of 100. Additionally, there are variations in diet quality based on different demographic and environmental factors.

In light of these issues, the most recent DGA emphasize substitution of less healthful foods for more healthful foods, instead of just increasing the overall intake of healthful foods without a reduction of the consumption of unhealthful foods. In this paper, I investigate the degree to which substitution for more healthful food items is possible within the given household's food budget, and the degree to which such substitutions lead to overall improved diets for American households. Specifically, I use the food availability information in grocery stores in which households make their purchases in order to investigate how household food baskets would have to change in order to get closer to USDA's recommendations, for the same level of food dollars spent. This study is the first to analyze the information on both food purchases and food availability to investigate the gap between USDA's recommendations and households' actual food purchases.

Using food substitution, households may increase the healthfulness of their diets by either substituting into more healthful products within the same food category or by substituting into products from another food category. I focus on the substitutions that households can make within the same category. For example, a household may substitute pasta made from refined grains for pasta made with whole grains which would increase the household's overall healthfulness score of food purchases. Using monthly food baskets, I first determine the healthfulness score of the food purchases for at-home consumption for each of the households in the sample, using methods suggested by the literature. As a second step, I search for possible substitutions within each food category, considering foods available at the specific store in which the household shops, prices, and the household's food budget. If the household shops at more than one store in the course of the month, food availability and prices in all grocery stores in which the household reports to shop, will be considered. The third step is to calculate the healthfulness score for the optimal monthly basket, that is, the food basket that incorporates the substitutions for more healthful products and satisfies the food availability and food budget constraints. Finally, I calculate the differences between the healthfulness score of the actual food purchases and the healthfulness score of the optimal basket given the above-mentioned constraints. Additionally, using household demographics, I investigate whether specific segments of the US population are more likely to substantially increase the healthiness of their food purchases by making substitutions for healthier

alternatives. This analysis will provide important information on the degree to which substitution for healthier alternatives within the same food categories will lead to improved diets, and as such, it will be highly relevant to policymakers working in the area of food policy.

In order to answer the research question posed above, I combine three datasets. First, I use Nielsen Homescan data to investigate the actual food choices of a panel of households that is representative of the non-institutionalized US population. The data include information on characteristics of the products purchased (price, quantity, size, flavor, brand), date of purchase, total amount spent, type of store visited, and availability of promotions. The data also include information on household demographics such as income, employment status, and presence of children. Second, I use Nielsen store scanner data which provide information on weekly product sales, for a large set of supermarkets in the US. This dataset is used to determine product availability in the stores in which households report to shop. The combination of these two datasets provides information on the food products that households chose as well as the food products that were available at the time of the purchase, which households could conceivably substitute for.

Third, in order to determine the relative healthfulness of the products within the same category, I use the NuVal score system. The NuVal scores range from 0 to 100, with higher scores indicating a higher degree of product healthfulness. The score is based on a complex formula devised by nutrition experts, and takes into account both nutrients recommended for increased consumption (a higher density of which leads to a higher score), and nutrients recommended for decreased consumption (a higher density of which leads to a lower score) (Katz et al. 2007). I merge product-level UPCs with NuVal scores, and use this information to analyze product substitutes within the same food category.

The results of this study will make an important contribution to the literature on food choices and dietary improvements in the American population. Furthermore, understanding any patterns of substitutions that more effectively lead to healthier overall diets is of great importance to policy and will aid policymakers working in informing and incentivizing households to consume healthier food products.

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