

Introduction

With so many different types of nonalcoholic beverages from which to choose, what do Americans actually consume? The average American consumed 50 gallons of carbonated soft drinks in 1999, followed by 25 gallons of coffee, 23 gallons of milk, 16 gallons of bottled water, 16 gallons of fruit juices and drinks, and 8 gallons of tea, according to Economic Research Service (ERS) food supply data, which includes at-home and away-from-home beverage intake (fig. 1). Almost all fruit juices were consumed at home (82.3 percent), while most soft drink (60.2 percent) and bottled water (69.1 percent) choices were consumed away from home (fig. 2).

The nonalcoholic beverage industry is very competitive, with hundreds of new products introduced annually. In 1999, the industry spent \$165.6 million in magazine advertising and \$355 million on network television advertising (Statistical Abstract of the United States: 2000). These advertising expenditures are lower bounds because these figures do not include the dairy industry's advertising expenses.

With all of the competing products in this segment, substitution effects are dominant. A study in 1999 revealed that soft drinks had displaced milk and fruit juice (Harnack et al., 1999). The knowledge of such effects is important in order to be able to understand trends and to monitor the changing environment of the nonalcoholic beverage industry.

Articles about nonalcoholic beverages have become common in the press, focusing on their nutrition and the heavy consumption of specific beverages. Articles such as "Obesity Campaign Eyes School Drinks" (Buckley, 2003) and "Legislators Try to Limit Soft Drinks, Sugary Snacks at Schools" (Hellmich, 2003) address the trend of children overconsuming sweetened beverages and address ways to correct the problem through various forms of action. An article in the Journal of the American Dietetic Association stated that "consumers who are concerned about energy [caloric] intake should be made aware of the energy content of beverages, especially soft drinks and alcoholic beverages" (Chanmugan et al., 2003). Excess energy content, measured as calories, is directly related to obesity in children and adults. Obese children are more likely to have health and social problems than those who are not obese (Gortmaker et al., 1993).

This study examines the beverage purchase choices made by households and the nutritional consequences of those choices. The subject has policy significance for the U. S. Department of Agriculture (USDA) because it is the lead Federal agency for providing nutrition information to the public. Through the Food Guide Pyramid, the Dietary Guidance for Americans (produced jointly by USDA and the Department of Health and Human Services), and related materials, USDA provides consumers with information on the food and beverage choices they should make to have healthy diets. Many government programs tied to nutrition are in need of information on nonalcoholic beverage consumption. The Food Stamp Program, National School Lunch Program, School Breakfast Program, and Special Supplemental Nutrition Program for Women, Infants, and Children are examples of USDA-sponsored food assistance programs. USDA provided food assistance and nutrition

benefits to one out of five Americans at a cost of \$41.6 billion in fiscal year 2003. The largest of these programs, the Food Stamp Program, allows consumers to make their own food purchase choices. But, through funding for food stamp nutrition education, the program attempts to educate low-income households to use their food assistance benefits to make wise food choices.

Other programs, such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), Child and Adult Care Food Program (CACFP), and the School Meals Programs, mandate certain choices. WIC vouchers can be spent only on certain foods, with milk and vitamin C-rich fruit juices the only beverage choices allowed for women and young children. The Child Nutrition Programs (CACFP, School Meal Programs, and Summer Food Service Program) require that meals and snacks subsidized through these programs follow a nutritious pattern, with milk a required element in meals. Fruit juice also is allowed.

By contract, School Meal Program regulations require that soft drinks not be served while USDA-subsidized meals are being served, although soft drinks can be available in vending machines in other locations in some of these schools. Despite USDA efforts to encourage milk and juice beverage choices, there has been a trend among schoolchildren to drink less milk and to drink more of other beverages, especially soft drinks. Concerns have been raised that this trend may contribute to excess calorie consumption and declining intakes of important nutrients such as calcium. More recently, trends seem to be shifting, with bottled water consumption becoming increasingly important.

Policy Implications

Understanding beverage choices made by households, especially low-income households and households with children, is important to guiding USDA nutrition policy. The media coverage regarding obesity and nutrition-related health concerns of the increased consumption of sweetened nonalcoholic beverages has called attention to the problem. This study provides economic and nutritional benefit information on nonalcoholic beverage consumption for future studies. The findings are useful for the design of nutrition education programs and may also provide insights into how nutrition guidelines for foods provided through WIC and the Child Nutrition Programs can improve the overall nutritional quality of children's diets.

Influence of Beverage Choice on Obesity and Overweight

As a category, beverages vary tremendously in their energy (calorie) content and nutrient composition. Therefore, beverage choice has an important influence on dietary quality and the risk of obesity and overweight. With overweight and obesity now considered the most important nutrition-related health problem in America (HHS, Healthy People 2010, 2003), the caloric contribution of beverages to the problem is important. Such beverages offer a wide range of calorie options—from 0 calories for bottled water and diet soft drinks to high-calorie coffee drinks that can provide more than 400 calories per 16-ounce cup (Yale-New Haven Nutrition Advisor, 2004).

Research indicates that calories from liquids (especially clear, nonviscous liquids like soft drinks and juices) are regulated differently than calories from solid food (Mattes, 1996). They do not trigger feelings of satiety that limit additional eating. Therefore, beverage preferences may be important for avoiding excess eating and cutting the risk of obesity. Individuals who prefer water or diet soft drinks run less risk of excess calorie consumption than those who prefer caloric beverages.

Impact on Nutrient Intake

Nutrients can be obtained from many different food sources, including beverages. Milk, in particular, is a major source of calcium and vitamin D, two nutrients that are of current public health concern (HHS, Healthy People 2010, 2003). Yen and Lin (2002), in an analysis of USDA food consumption survey data, found that on average, for each 1-ounce reduction in milk consumption, a child's calcium consumption declines by 34 mg.

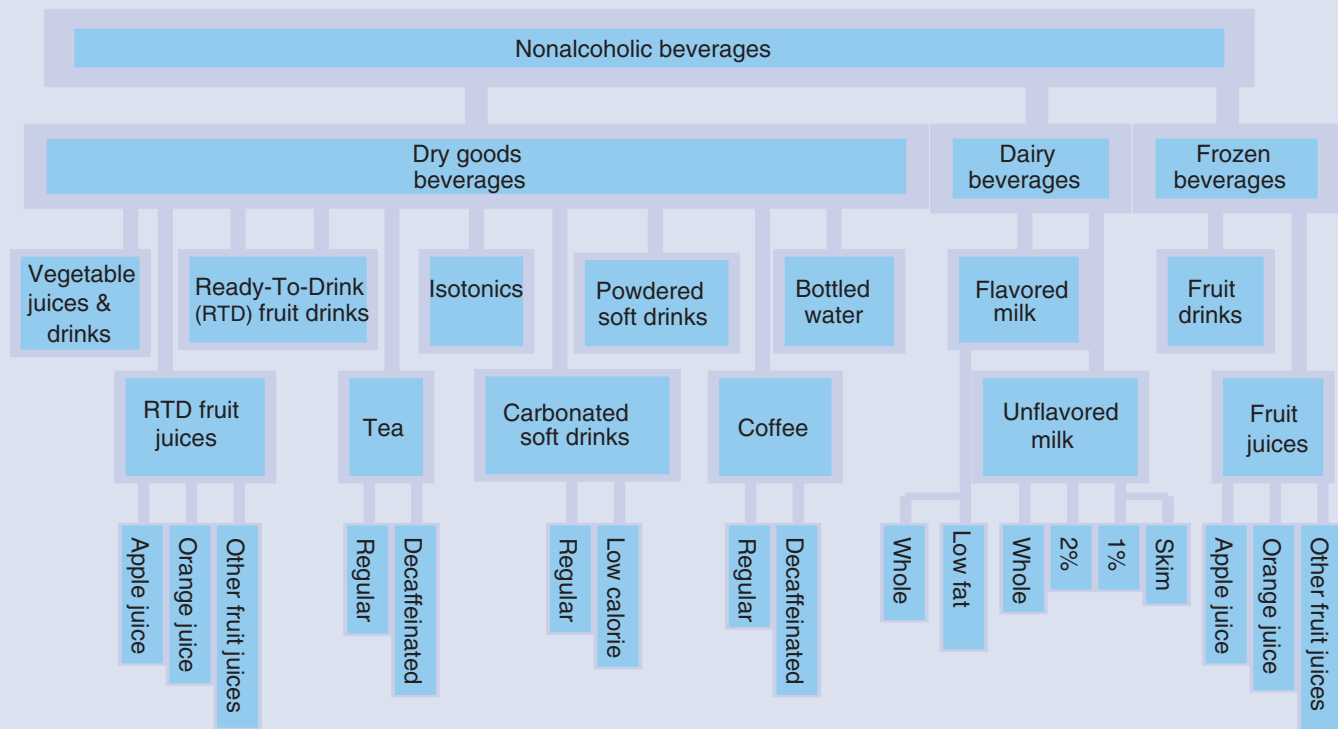
Juices vary in nutrient content depending on the fruit or vegetable from which they are extracted, but they are generally good sources of vitamin C, either naturally or through fortification. USDA's WIC program includes vitamin C-rich fruit and vegetable juices in the package it provides to recipients. Fruit-flavored drinks and "-ades" (e.g., lemonade) are commonly fortified with vitamin C. They also are sources of added sugars, a nutrient category that USDA's Food Guide Pyramid recommends limiting. Among the general population, fruit-flavored drinks and "-ades" contribute approximately 10 percent to total consumption of added sugars. They are a more important source of added sugars for young children, contributing approximately 19 percent to the added-sugars intake of children 2-5 years of age (Guthrie and Morton, 2000).

Soft drinks are the major source of added sugars in American diets, contributing approximately a third of the added-sugars intake of Americans 2 years of age and older (Guthrie and Morton, 2000). Soft-drink consumption has risen dramatically in the past decades; USDA food supply data show that availability of regular soft drinks rose from 28.7 gallons per capita in 1977 to a high of 38.2 gallons in 1999. Figures for 2000-01 show a slight decline to 37.2 gallons per capita in 2001. Despite Americans' professed concern with losing weight, diet soft drinks grew slowly from 4.3 gallons per capita in 1977 to 11.8 gallons per capita in 2001.

Soft drinks may displace more nutritious beverages from the diet and, if the soft drinks are sweetened (nondiet), they add calories. Yen and Lin found that, on average, for each 1-ounce reduction in milk consumption, a child consumes 4.2 ounces of soft drinks, resulting in a net gain of 31 calories, as well as a loss in calcium intake.

The growth of soft-drink consumption also has made these beverages major contributors to caffeine intake, especially among children. Ahuja and Perloff (2001) estimate that caffeine-containing carbonated beverages contribute 52 percent of the caffeine in the diets of children 9 years of age and younger. Chocolate milk, coffee, and tea also contribute caffeine to the diets of children and adults. (See "Beverage Categories" box for list of drinks.)

ACNielsen Homescan Data Beverage Categories



Source: ACNielsen Homescan data.

Role of the Home Food Supply in Beverage Consumption

In recent decades, there has been a steady rise in the consumption of food prepared away from home. Between 1977-78 and 1994-96, consumption of food prepared away from home increased from 18 percent to 32 percent of Americans' total calories (Guthrie et al., 2002). Shifts in sources of beverages consumed parallel this trend; French et al. (2003) report that in 1994-98 compared with 1977-78, children obtained an increasing share of their total soft drink intake from restaurants, fast food places, and vending machines. The home food supply was still the most important source of soft drinks consumed by children. Therefore, the home food supply still has an important impact on overall beverage consumption. In addition, it may shape tastes and preferences that influence choices made outside the home.

Objectives

The hypothesis set forth in this study is that nonalcoholic beverage consumption differs by socioeconomic and demographic factors, resulting in a range of nutrient intakes per person derived from beverages purchased for at-home consumption. This study addresses and analyzes the nutrients available for intake from nonalcoholic beverages consumed at home, focusing on calories, calcium, vitamin C, and caffeine. Using a specialized scanner data set with demographics attached, the 1999 ACNielsen Homescan panel, the focus is on household purchases over an entire year recorded by scanning

equipment. USDA also employs the Continuing Survey of Food Intakes for Individuals (CSFII), which focuses on food intake, based on individual recall, over 2 nonconsecutive days (within a 3-week period). Consequently, the Homescan panel offers a potentially richer and more recent database than the CSFII, which has not been done since 1994-98.

A limitation of the Homescan panel is that it reflects only household availability of nutrients; there is no further disaggregation into within-household differences in consumption. Moreover, some food purchased for home consumption may go uneaten or be consumed by guests. Nevertheless, purchasing patterns provide insight into the beverage choices available to household members and can be particularly useful for nutrition education programs that include information on improving household purchasing choices, such as USDA Food Stamp Nutrition Education.

A comparative investigation of both at-home and away-from-home intakes of selected products would be ideal. This study, however, will center attention only on at-home household use of the selected products, for two major reasons. First, data on away-from-home consumption with household demographic variables are not generally available for such research. Available data are focused on at-home consumption and do not reflect away-from-home consumption patterns. Second, available price series are limited to commodities and products consumed in the at-home market.