The Nutrient Content of U.S. Household Food Purchases by Store Type

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Introduction: Little is known about where households shop for packaged foods, what foods and beverages they purchase, and the nutrient content of these purchases. This study describes volume trends and nutrient content (nutrient profiles, food and beverage groups) of household packaged foods purchases (PFPs) by store type.

Methods: Cross-sectional analysis of U.S. households' PFPs (Nielsen Homescan) from 2000 to 2012 (N=652,023 household-year observations) with survey weights used for national representativeness. Household PFP trends (% volume), household purchases of key food and beverage groups based on caloric contribution, and mean caloric and nutrient densities (sugars, saturated fat, and sodium) of household PFPs were analyzed by store type. Data were collected from 2000 to 2012. Analyses were conducted in 2014–2015.

Results: The proportion of total volume of household PFPs significantly increased from 2000 to 2012 for mass merchandisers (13.1% to 23.9%), convenience stores (3.6% to 5.9%), and warehouse clubs (6.2% to 9.8%), and significantly decreased for grocery chains (58.5% to 46.3%) and non-chain grocers (10.3% to 5.2%). Top common sources of calories (%) from household PFPs by food/beverage group included: savory snacks, grain-based desserts, and regular soft drinks. The energy, total sugar, sodium, and saturated fat densities of household PFPs from mass merchandisers, warehouse clubs, and convenience stores were higher compared with grocery stores.

Conclusions: PFPs from stores with poorer nutrient density (more energy, total sugar, sodium, and saturated fat-dense), such as warehouse clubs, mass merchandisers, and convenience stores are growing, representing a potential U.S. public health concern.

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Introduction

State and national programs and policies[1–4] focus on building grocery stores in food deserts to improve household food purchases and dietary quality while reducing health disparities. A major concern is that people living in food deserts have limited access to healthy foods and relatively easier access to unhealthy foods, diminishing the nutritional quality of purchased foods, and ultimately increasing the risk of obesity and nutrition-related chronic diseases.[5] These strategies rely on the assumption that people shopping at larger retail stores, such as grocery stores, have a better nutrient profile of food purchases because grocery stores sell a greater variety of foods with higher nutritional quality at lower prices than other stores (e.g., convenience stores) and because larger stores have more capacity to handle perishables safely and efficiently.[6] Yet a clear understanding of the types of stores where people actually shop for food, the foods they purchase, and the nutrient profile of their purchases is lacking. Furthermore, no literature exists on how store selection for food shopping changes over time.

Most studies looking at associations of the food environment with diet and health lack data on where people shop for food, what they actually purchase, or information on the nutrient profile of these purchases.[7–10] Studies on where people shop for food rely on the presence of stores located within people's residential food environment[11,12] or the location of people's principal

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food store.[13,14] These studies infer associations between where people shop for food and diet or health without directly linking consumed foods to the stores where foods were purchased.[15] Additionally, these studies fail to capture all possible stores where people may shop. The few food purchase studies use small samples[16–18] and focus on specific food groups, ignoring the entire set of purchases made at the store.[19,20] Moreover, studies have collected data on a limited number of days of purchases,[21] failing to capture usual shopping habits.

To address these gaps, this study uses Nielsen Homescan, a nationally representative sample of U.S. households. Homescan is unique for studying packaged food purchases (PFPs comprise all foods and beverages with a barcode) across stores because households record the store source and all packaged foods and beverages purchased from every shopping occasion over 1 or more years. Improving the food environment includes a key focus on PFPs, which account for 78% of store-based food expenditures.[22] This analysis focuses on three research questions:

1. At what types of stores do U.S. households shop for food?
2. Does store type shopping change over time?
3. Do nutrient profile and types of foods/beverages purchased by U.S. households vary by store type?

Methods

Study Design and Population

This study used PFP data from the U.S. Homescan Consumer Panel data set from 2000 to 2012.[23] Participating households receive barcode scanners, and are instructed to scan barcodes on all purchased items and report the outlet's name upon returning home after every shopping trip. Scanning occurred continuously through the year and included products purchased from all food retailers. For inclusion in the panel, households needed to report ≥10 months of purchases. Demographic characteristics and household composition were collected by questionnaire. Homescan uses direct mailing (targeting low-income and racial/ethnic minority groups) and the Internet to recruit households. Homescan uses an open cohort study design. Households may exit any time, and new households are enrolled to replace dropouts based on demographic and geographic targets.[24] Households were sampled from 52 metropolitan and 24 non-metropolitan areas (i.e., markets), weighted to be nationally representative.

This study included all households from 2000 to 2012 (N=670,782 household-year observations). Cross-sectional analysis was conducted, treating each survey year as an independent nationally representative sample of U.S. households. To ensure usual purchases were captured, the authors excluded household-quarter observations deemed unreliable (<$135 worth of PFPs in a 4-week period for ≥2 member households and <$45 for single-member households) and household-year observations including >1 unreliable quarter. This excluded 2.1% household-year observations. The final analytic sample included 652,023 household-year observations. Analyses were conducted in 2014–2015.

Measures

To determine the nutritional content of household PFPs, each uniquely barcoded product captured in Homescan was linked with Nutrition Facts Panel data. This methodology is described elsewhere.[25,26] Non-packaged foods were not included (e.g., many produce items, meats, breads, prepared foods) because products without barcodes cannot be scanned. However, packaged produce and meats were included (e.g., bag of apples, frozen meats).

For every shopping occasion, each household reported the name of the store where they shopped for food. To define store type, this study used Nielsen's store categorization based on the size, annual sales/revenue, and proportion of items in stock. Consequently, some of the industry categorizations, such as the supermarkets/grocery store sector, represent a heterogeneous group of stores. Therefore, the name of the store and Internet searches were used to further classify the supermarkets/grocery store sector into corporate-owned grocery chains (≥10 stores), non-chain grocery (<10 stores), ethnic stores, and specialty stores, using 2012 information. Based on the mean proportion of volume of PFPs from each store type, the authors combined ethnic with specialty stores, and convenience with dollar and drug stores. Finally, stores were classified into seven mutually exclusive categories:

1. warehouse clubs (e.g., Costco, Sam's);
2. mass merchandisers–supercenters, hereafter mass merchandisers (e.g., Walmart, Super-Target);
3. grocery chains (e.g., Kroger, Safeway);
4. non-chain grocery;
5. convenience–drug–dollar, hereafter convenience stores (e.g., Seven Eleven, CVS, Dollar General);
6. ethnic–specialty (e.g., Compare Foods, Whole Foods Market); and
7. others (e.g., department stores, book stores).

Analyses focused on the first six store types because "others" represented a heterogeneous group.

To capture usual shopping habits, all analyses were conducted at the household-year level. To understand at what store types U.S. households shop and whether store type shopping changed over time, the proportion of volume of PFPs was calculated by store type. Volume was selected to capture low-caloric and non-caloric foods and beverages possibly missed in the calorie trends.

To understand whether the nutrient profile and types of foods/beverages purchased by U.S. households vary by store type, the authors calculated four measures:

1. caloric and nutrient densities (grams of total sugar, grams of saturated fat, and milligrams of sodium) per 100 grams of household PFPs by store type;
2. grams of PFPs per household per day by store type;
3. proportion of calories and volume by food and beverage group (Appendix 1, available online) by store type; and
4. per household per day absolute number of calories and volume by food and beverage group by store type.

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