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Quantifying The Effect Of Nutrition Assistance Program Design

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Quantifying the Effect of Nutrition Assistance Program Design

Assessment of Purchase Behavior among Participants in the Supplemental Nutrition Assistance Program and the Special Supplemental Nutrition Program for Women, Infants and Children

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Abstract

Federal food assistance and nutrition programs share a mission of helping low-income households achieve adequate nutrition, but the benefit structures of the programs differ significantly. The Women, Infants and Children program (WIC) offers vouchers for a limited number of nutritious foods, while the Supplemental Nutrition and Assistance Program (SNAP) has few restrictions on benefit use. The objectives of this research were to compare the composition of grocery purchases among WIC and SNAP households and assess the effect of benefit design on total grocery purchases. To accomplish these objectives, transaction data from a supermarket chain was used to assess store purchases (n=7,358,835) of 22,464 low-income households in January-June 2011. Purchased products were classified into fourteen categories and thirty subcategories. The proportion of grocery spending was compared for four groups of low-income households: Former WIC, WIC, SNAP and WIC & SNAP. General linear regression models controlling for program participation and store level socio-demographics were used to predict purchase behavior by food category. Participation in nutrition assistance programs is associated with purchasing behavior. WIC households spent a larger proportion of grocery dollars within WIC targeted categories and a smaller percentage of grocery dollars within discretionary food categories (e.g., snack foods, desserts), compared to the other three groups. The percent of purchases within WIC-targeted food categories exceeded the share of WIC spending in total groceries, indicating a spillover effect of WIC-category purchases into personal funds. Conversely, SNAP households spent a greater proportion of grocery dollars within discretionary food categories, crowding out spending on fruits, vegetables and dairy, compared to the other groups. These results suggest the benefit design of WIC appears to influence purchasing decisions, including those made with personal funds. Limiting SNAP purchases could shift spending towards recommended foods, and likely improve the diets of participating households.

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Introduction

Federal food and nutrition assistance programs provide supplemental nutrition assistance to one in four US households.¹ The two largest programs, the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) share the mission of increasing access to a healthful diet of low-income individuals and families via financial assistance for food purchases.² Despite a common mission and oversight by common governmental agencies, the benefit designs of these two programs differ greatly. The WIC program has a highly prescriptive design, providing participants with vouchers for specific nutrient-dense foods (e.g., milk, cereal, 100% juice, fruit and vegetables, infant formula). With the exception of fruit and vegetable cash vouchers, WIC vouchers list specific amounts of the approved products that vary by participant category. In contrast, SNAP provides a direct monetary transfer (through an electronic benefit transfer) to participants with few limits on which foods and beverages can be purchased. Specifically, SNAP benefits cannot be used to purchase any non-food items, alcoholic beverages, tobacco, vitamins, medicines, hot foods and ready-to-eat foods meant to be consumed in the store (e.g., deli items).³ A greater understanding of purchase behavior using personal funds within a prescriptive program such as WIC can provide insights as to the potential impact for SNAP recipients.

The purpose of this study was to assess household purchasing behavior among WIC and SNAP participants, based on share of market basket, using nutrition assistance program dollars and personal funds. Outcomes of this research have broad policy implications as to the most beneficial design of nutrition assistance programs.

Background

Program Design and Participation

The history of the Supplemental Nutrition Assistance Program (SNAP) dates back to 1939, when the first pilot food stamp program was introduced as a means to manage commodity surpluses (1939 – 1943).⁴ Participants could purchase one dollar worth of food stamps to be used on any foods, and receive an

additional fifty cents in commodity-specific food stamps. This program helped the US manage commodity surpluses of specific items while reducing hunger and malnutrition during an economically depressed period.⁴

⁵ The program was reintroduced in the early 1960's as a pilot program by President Kennedy, and was made permanent through The Food Stamp Act of 1964. The Act established eligibility criteria, purchase criteria and the role of federal and state governments in the administration of the program. The modern food stamp program is a result of a series of legislative amendments and acts occurred throughout the late 1960's and early 1970's which expanded the food stamp program eligibility criteria, increased funding for the program and redefined foods eligible for purchase to limit non-consumables and alcohol.⁵

To qualify, participating households must have a gross income at or below 130% of the Federal Poverty Level, and net income at or below 100% of the Federal Poverty Level. In addition, participants must have limited resources available, such as savings and assets (e.g., household vehicles) which are factored into total income.⁶ The name of the food stamp program was changed to the Supplemental Nutrition Assistance Program (SNAP) as a part of the 2008 Farm Bill.⁴

The monthly SNAP benefit received varies by household net income and size; in 2011, an average of \$133.85 per person, or \$283.99 per household was disbursed.⁷ There is not a specific nutritional package participants receive with SNAP, participating households may purchase all consumable items and seeds, excluding alcohol, tobacco products, non-food items, household items, vitamins, medicine, and ready-made foods meant to be consumed within the store.⁸ SNAP funding and program limits are authorized through The Farm Bill, which is reauthorized by Congress every five years. While limits on allowable foods have been considered in the program's history they have been deemed "administratively costly and burdensome."⁹ All benefits are distributed via electronic benefit transfer (EBT) cards, which participants can use to purchase food at any SNAP eligible merchant. SNAP is administered at a Federal and State level, by the United States Department of Agriculture (USDA) and state departments of social services.

In 2011, SNAP's estimated participation was 44.7 million individuals and 21.1 million households.⁷ Over two-thirds of participating SNAP households are families with children, and over 50% of participating individuals are under the age of eighteen.¹⁰ Approximately 71% of eligible individuals receive SNAP benefits, a participation rate that has steadily increased since the early 2000's, when participation was approximately 54% of individuals eligible.¹⁰

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) began as a pilot program in 1972, following increased national concern for malnutrition among pregnant women, infants and young children.¹¹ The program was made permanent in 1975 as a discretionary grant program that is authorized by Congress and funded through The Farm Bill every five years. The WIC program is administered at the federal and state level by the USDA and state departments of health, and consists of over 1,900 local agencies and over 10,000 clinics.¹² Given the program structure and funding limits, great efforts have been made to create a cost effective, yet nutritionally beneficial program that meets the needs of the target population.

The WIC program serves low-income pregnant and postpartum women, infants and children up to the age of five years old. Participants must meet four requirements to be eligible: (1) income level must be at or below 185% of the Federal Poverty Level, (2) participants are limited to women (pregnant and postpartum), (3) participants must meet the nutritional risk level, including medical and dietary risk, (4) and must live within the State.¹³ Additionally, in order to qualify for nutritional benefits, women must participate in nutrition education, counseling, and be screened for other social services such as Medicaid or SNAP.

There are five main food packages within the WIC program design, and participants can select based on pregnancy and postpartum status, breast feeding status and the age of the child. Key nutritional components include milk, cheese (limited access) cereal, eggs, fruits and vegetables, fruit juices, bread, fish (limited access), legumes, peanut butter, formula, infant cereal and baby foods. Availability of limited foods is based on

whether a woman is exclusively breastfeeding (EBF). The five main packages are outlined in greater detail below:¹⁴

1. Women (3 packages total, amounts vary by pregnancy and breastfeeding status): Includes Juice, Milk, Cereal, Cheese (only for EBF women), Eggs, Fruits and Vegetables, Whole Wheat Bread or substitute (only for EBF women), Fish (only for EBF women), Legumes or Peanut Butter
2. Infant (formula fed): Formula (up to 6 months); Formula, Infant Cereal, Baby food – fruits and vegetables (6 – 11 months)
3. Infant (partially breast fed): Formula (up to 6 months); Formula, Infant Cereal, Baby food – fruits and vegetables (6 – 11 months)
4. Infant (exclusively breast fed): Nothing (up to 6 months); Infant Cereal, Baby food – fruits and vegetables, Baby food – meat (6 – 11 months)
5. Children (up to age five): Includes Juice, Milk, Cereal, Eggs, Fruits and Vegetables, Whole Wheat Bread or substitute, Legumes or Peanut Butter

There have been recent changes to the WIC food packages based on recommendations from the Institute of Medicine and are better aligned with the national nutritional guidelines. These design changes, introduced in 2009, increase the fruits and vegetable benefit, switched from white breads to whole grain breads, specified no added sugars for some products, allowed for low and no salt alternatives, and realigned packages to promote exclusive breastfeeding among participants.¹⁴ In addition to the benefit design, target population and limited foods available, the disbursement WIC benefits to participants also differ from the SNAP program. Though efforts are underway to create an EBT system for WIC redemption that is similar to SNAP in many states, benefits are primarily distributed through paper coupons redeemable for specific foods.¹⁵

The current WIC food benefit totals \$46.67 per person.¹⁶ Despite the limited benefit and prescriptive plan design compared to the SNAP program, program participation in 2011 was approximately 8.96 million women, infants and children.¹⁷ Based on 2007 data, approximately 59% of WIC eligible individuals participate in the program, a coverage rate that has remained static over the last 10 years; WIC currently serves 53% of the infants born in the US.¹⁷ The number of WIC eligible individuals has increased in the past few years due to the decline in the economy.

Nutritional and Health Benefits

The dietary and health outcomes of the two programs differ as well. Based on existing research, WIC participation appears to provide significantly more nutritional benefits than SNAP.^{18, 19} Among children, WIC participation increased intake of iron, potassium and fiber, while SNAP participation had a small negative effect on fiber intake with no significant benefits for any nutrients studied.²⁰ Another study on dietary energy density of low-income households showed a positive link between SNAP participation and higher energy density, but no association with WIC participation.²¹ To date, studies of the relationship of SNAP participation and overweight and obesity are inconclusive. Some have found a positive association with participation (short- and long-term), though only among non-elderly women and teenage girls.²²⁻²⁵ One study showed that the overweight and obesity gap among SNAP participants and eligible non-participants was shrinking, mainly due to non-participant rates of obesity catching up to SNAP levels.²⁶ A study of child participants concluded that SNAP participation may reduce probability of overweight and obesity among young boys and girls, and older boys.²⁷ In research to date, WIC participation was not associated with increased or decreased risk or prevalence of overweight or obesity.²⁸⁻³¹ Both the SNAP and WIC programs were shown to be successful in reducing the level of food insecurity among low-income participants.^{32, 33}

Purchase Behavior

Research on spending patterns among WIC and SNAP recipients is limited, for both benefit-related purchases and purchases made using personal funds. Existing research on SNAP spending behavior has found that SNAP recipients demonstrate time inconsistent spending patterns throughout the monthly SNAP benefit cycle. Food spending tends to spike within the first three days following disbursement of benefits and is weighted toward the first two weeks of the month followed by a dip in spending.³⁴⁻³⁶ This spending pattern may result in varied consumption patterns, energy intake and the quality of the food consumed throughout the month.

Analysis of a USDA funded exploratory assessment into the use grocery store scanner data in one geographic market (South Carolina) revealed that SNAP households with children purchased 5.5% of grocery redemptions on produce, 48% on grocery categories (packaged and canned goods), 26% on meat products, 1.9% on deli items, 8.1% on dairy, and 7.8% on frozen food items.³⁷ In comparison, non-SNAP households spent a larger percent of expenditures on fruits and vegetables, and were less likely to purchase whole milk, high-sugared cereals and low-iron cereals. Though this study is not representative of the total SNAP population, it does show differences in spending patterns among SNAP and non-SNAP households.³⁷ A qualitative assessment of food stamp recipients in Minnesota identified the foods most commonly purchased include meat (ground beef, pork, chicken), potatoes, hotdogs, white bread, bananas, large eggs, milk and sugar. When asked which foods recipients would purchase if they had more money, less than half mentioned fruits and vegetables.³⁸ These studies demonstrate that while SNAP benefits are intended to improve the nutritional quality of the diet; food purchase behavior may deliver divergent outcomes.

A 1990 study of WIC purchase and consumption behavior concluded that WIC participants are more likely to purchase WIC eligible foods than non-participants, likely a result of the prescriptive benefit design. In addition, the prescriptive design also results in a reduced propensity to purchase food away from home.³⁹

Plan Design and Behavior

Given the evidence of positive nutritional and health outcomes of the WIC program and the mixed to negative nutritional and health outcomes of the SNAP program, modifying the program design of SNAP seems to be an obvious conclusion. The USDA has been unwilling to approve pilot programs that limit purchases under the SNAP program,^{40, 41} rather the USDA has recommended broader environmental changes in the area of marketing and food positioning, and use of pre-commitment devices for healthy purchases as alternative approaches.⁴²

Despite the USDAs apprehension, a systematic study has found individuals react to changes in prices for certain food categories. Food away from home, soft drinks, juice, and meats are most responsive to price

changes.⁴³ Alston and colleagues modeled the effect of limiting SNAP purchases to healthy foods (similar to WIC benefits), and concluded with greater limits SNAP recipient purchases would likely become healthier, though the overall diet composition (SNAP plus personal expenditures) remains unclear.⁴⁴ The authors note that by limiting SNAP purchases to healthier foods may result in unintended consequences, due to shifts in demand for certain foods.⁴⁴

A greater understanding of purchase behavior among participants is important in assessing the impact of the two programs. While both groups can choose to purchase any items with personal funds, it is unknown to which extent a more prescriptive program influences the composition of grocery store purchases, including those made with personal funds, and if there are any broader nutritional benefits to a more restrictive program design. States have petitioned the USDA for waivers to limit the purchase of unhealthy foods such as sugar sweetened beverages (SSBs), but all requests have been denied.⁴¹ Proponents of limiting unhealthy purchases with SNAP funds report the potential health benefits of the restrictions, including the reduction in discretionary calories consumed and shifts in eating behavior toward healthier foods.⁴⁵ Opponents of limiting SNAP purchases cite excessive paternalism, administrative costs and inability to control purchases with personal funds as reasons to eschew such restrictions.^{40, 46}

Methods

Scanner Data

The analysis completed in this study was based on grocery store scanner data from a large supermarket chain with stores in several Northeastern states (more than fifty grocery stores included in sample). The supermarket chain employs a loyalty card system, which allows customers to scan their cards at the point of sale and receive product discounts and store promotions. Each loyalty card is assumed to represent a single household, though some households may have multiple loyalty cards. The grocery chain reports a loyalty card is used in at least 90% of purchases, and it is standard policy to ask for a customer's loyalty card with each purchase. There is no identifiable information for each loyalty card, making it impossible to identify

duplication among households or household level demographics. The loyalty card allows for the tracking of purchases over time as well as the type(s) of payment used in each transaction. The payment sources tracked in this analysis included WIC benefits (paper-based vouchers), SNAP benefits (food benefits via an EBT card), non-food EBT (direct cash assistance delivered via an EBT card), and personal funds (cash, check, credit, or debit transaction). Multiple payment sources may be used in a single transaction. The use of WIC or SNAP benefits indicates participation in the respective program(s) at the time of purchase. Any purchases made without scanning a loyalty card were not tracked and not included in this study.

Study Sample

Through the agreement with the grocery chain, the purchase data was limited to a subset of households shopping at all stores of the chain. The sample included households that used WIC benefits (i.e., had a WIC transaction) within a chain store at least once during January 2009 through June 2011. Transactions could not be monitored retrospectively and are not included in this analysis. Conditioning the sample on WIC participation was intended to provide a policy-relevant subset of low-income households with young children. Many WIC households were also participants in the SNAP program (55% within our January – June, 2011 sample). This sample, however, is not reflective of all SNAP participants, such as low-income households with no children, low-income households with children ages five or older, and the elderly.

This study presents data for all grocery store purchases made by sample households from January through June 2011 within the store chain. Four groups of households were identified based on their use of WIC and SNAP benefits at the store chain: (1) former WIC households (only used personal funds, such as cash, in all grocery purchases); (2) WIC households (used WIC benefits in at least one purchase, but never used SNAP benefits), (3) SNAP households (used SNAP benefits in at least one purchase Jan. – June, 2011, but never used WIC benefits; note, used WIC benefits prior to January, 2011), and (4) SNAP & WIC households (both SNAP and WIC benefits were used).

Households (loyalty cards) were included based on an average monthly threshold for SNAP, WIC and total expenditures. The thresholds were developed based on univariate analysis of mean monthly spending behavior by household group. The first quartile of the range in mean monthly spending was used as the threshold. The threshold amounts used were a mean monthly minimum spending of \$20 in total spending for former WIC households, \$15 in WIC spending for WIC households, \$30 in SNAP spending for SNAP households, and \$15 in WIC spending and \$30 in SNAP spending for SNAP & WIC households. The mean monthly spending was used as the threshold due to the timing and distribution of WIC vouchers, which are typically distributed every three months. The thresholds applied to the sample eliminated most households that are not regular shoppers in the sample or households purchasing few items from the store chain. Loyalty cards were also excluded from the analysis if they appeared to be outliers (based on median monthly transaction volume greater than 50 transactions per month *and* greater than \$1,000 to total grocery purchases). There were seventeen outliers identified and removed from the sample. The final sample in this analysis included 22,464 households.

Categorization of Purchases

For each transaction, the items purchased (n=7,358,835) were classified into one of fourteen primary categories and the thirty subcategories based on the department number, category number and subcategory number associated with each Universal Product Code (UPC) (**Table 10**). The department, category and subcategory are standard codes and definitions for UPCs sold in all grocery stores. The categorization of UPCs reflected the 2010 Nutritional Guideline categories, where appropriate.⁴⁷ Items not included in the USDA's recommended dietary guidelines were grouped based on the category description and common food types (e.g., beverages, desserts and sweets, and prepared foods). One category, beverages with added sweeteners (SSB), were identified based on the category and subcategory descriptions as well as merging the UPC-level data with a commercial nutrition database by Gladson.⁴⁸ The Gladson database contains product information for each UPC, including product size, description and ingredients. For unmatched beverage UPCs, each was manually coded based on item description or product searches on company websites. The

net spending (factoring discounts or coupons) on the items purchased within each category was summed at a monthly level and averaged across months purchases were made. Given the distinct eligibility differences between the two samples and the greater likelihood for WIC participants to purchase baby food and infant formula, and the high cost of these products, the products were removed from the analysis and not factored into the total monthly sales figure of household purchases.

Statistical Methods

For each household included in the sample, the mean percent of total purchases was computed for each category and subcategory defined. Using general linear regression models (GLM), the dependent variables (category or subcategory percent of total purchases) were regressed on group status (Former WIC, WIC, SNAP, and SNAP & WIC), state within which the purchase was made and store-level socio-demographic indicators such as income, unemployment, education, race, and language spoken in the home at the census tract level.⁴⁹ The model can be written as:

$$Y_i = \beta_0 + \beta_1 \text{GROUP}_i + \beta_2 \text{STATE}_i + \beta_3 \text{DEMS}_i$$

Where Y is equal to the category percent of total purchases (dollar amount purchased per month) for household i , GROUP is variable identifying the group status (Former WIC, WIC, SNAP or SNAP & WIC) of the household, STATE is a dummy variable representing the state the household shopped, and DEMS represents the store-level socio-demographic indicators for where households shopped (household composition, language spoken in the home, mean percent with high school education, unemployment rate, poverty rate, mean percent Hispanic, mean percent black).

Because household demographic information is unavailable within the sample, store-level demographic indicators (based on census tract location of store) were used as a proxy for household demographics. Households may shop at multiple stores within a month or over the six-month timeframe. To account for households shopping at multiple locations, weighted mean demographic percentages were calculated based

on the number and frequency of stores each month. Multiple comparisons of category percent of spending means were performed for each group pair using the Bonferroni adjustment.

To provide a more tangible estimate of the differences among SNAP and WIC household spending, differences in spending by category were calculated by applying WIC mean percent spending and SNAP mean percent spending across the categories. The percent spending by category for each of the household groups was multiplied by the mean monthly grocery spending by SNAP households. The difference between the two estimates of monthly spending by category was then calculated to derive the final estimated difference in spending. The equation to define the calculation is represented below:

$$(\text{WIC \% spending by category} * \text{SNAP Mean Purchases}) - (\text{SNAP \% spending by category} * \text{SNAP Mean Purchases})$$

Using the average retail prices of foods, example foods and quantities (e.g., one pound of apples) were identified to represent the difference in spending for each quantity. The estimated difference in spending by category was also extrapolated to a national level by multiplying the difference in spending by twelve (to estimate annual difference in spending) and then multiplying that figure by the number of SNAP households nationally. Confidence intervals are developed based on bootstrapping the standard errors. All analyses were conducted using SAS 9.2 in 2012.

Results

The final sample of households included 7,651 Former WIC households, 4,117 WIC households, 6,125 SNAP households and 4,130 SNAP & WIC households. **Table 1** presents descriptive information by household group. Participation in food assistance programs was significantly related to the types of purchases and mean percent of dollars spent.

Table 1: Descriptive Statistics of Sample, January – June, 2011

	Former WIC	WIC	SNAP	SNAP & WIC	
Number of Households	7,651	4,117	6,416	4,280	
Average Number of Months Shopped (over 6 months)	4.10	3.64	4.34	4.39	
Average Monthly Total Purchases (Excluding Infant Formula & Baby Foods)	\$135.91	\$153.28	\$171.90	\$241.71	
Average Monthly WIC Dollar Expenditure	—	\$45.09	—	\$44.53	
Average Percent of Total Purchases with WIC Funds	—	29.4%	—	18.4%	
Average Monthly SNAP Dollar Expenditure	—	—	\$112.34	\$135.03	
Average Percent of Total Purchases with SNAP Funds	—	—	68.4%	57.9%	
Average Percent of Total Purchases with Personal Funds	100.0%	70.6%	31.5%	23.7%	
Store Level Demographics (Census Tract Level)					National
Median Household Income	\$61,110	\$60,481	\$54,793	\$55,505	\$51,914
Percent of Households with Children	30.2%	29.7%	29.9%	29.5%	30.6%
Percent with High School Degree	32.3%	32.2%	33.6%	33.6%	29.0%
Percent with 4-Year Bachelor's Degree	17.1%	17.0%	15.0%	15.5%	17.6%
Percent Households English not Spoken in Home	15.0%	15.1%	18.4%	16.5%	20.1%
Percent Unemployed	7.4%	7.5%	8.3%	8.3%	7.9%
Percent of Households with Children in Poverty	11.1%	11.3%	14.4%	14.1%	15.7%
Percent of Population Hispanic	7.3%	7.5%	10.3%	9.2%	15.7%
Percent of Population Black, Non-Hispanic	3.8%	3.7%	4.5%	4.0%	12.2%
Note: Store level demographic percentages are calculated based on the mean number of visits to store(s) each month, and then averaged for all months shopped. They are not representative of the individuals shopping at the stores, rather the average demographics of the store location where household groups tend to shop.					
Source: U.S. Census Bureau, 2006-2010 American Community Survey.					

Former WIC households spent on average \$136 per month on their groceries, while the WIC group had an average monthly spending of \$153, with 29% (or \$45) paid by WIC benefits. The SNAP group spent on average \$172 per month, 68% of which was paid by SNAP benefits. Finally, households participating in both SNAP & WIC had the highest grocery spending of \$242 per month, of which 76% was paid by WIC and

SNAP benefits. SNAP recipients, regardless of their WIC status, were more likely to shop in stores located in neighborhoods with a lower median household income, a larger percent of households living in poverty, higher unemployment, a larger proportion of minorities, and where English is not spoken in the home.

These store location socio-demographic trends are consistent with differences in income thresholds of the SNAP and WIC programs and the income differences between the two participant groups. The mean socio-demographic characteristics of the store locations shopped differed from national demographic averages.

The store locations are located within areas with a higher median household income, lower rates of poverty higher levels of high school education obtained, lower rates of English not spoken in the home, and lower percent Hispanic and Black minorities.

Results of the general linear model estimations and the predicted mean percent of total grocery spending by category and subcategory, controlling for a state of purchase and store level socio-demographic show distinct trends and differences in purchasing behavior among the four household groups. For the five food categories recommended within the USDA Nutritional Guidelines (Fruit, Vegetables, Grains, Protein and Dairy), WIC households spent a larger percentages of total food dollars (62.2%) compared to Former WIC households (49.8%), SNAP households (51.9%) and SNAP & WIC households (57%). WIC households spent a greater proportion of total food dollars within Fruits, Grains and Dairy compared to the other three groups. Former WIC households spent a greater proportion of total food dollars within Vegetables compared to the other three groups. Finally, SNAP participation (SNAP and SNAP & WIC households) was associated with a greater proportion of spending within protein compared to the other two groups. These results are shown in **Table 2**. A multiple comparison analysis of the four household groups within the five recommended food categories revealed statistically different purchasing behavior (p -value < 0.05 , complete findings shown in **Table 9**), with the exception of dairy, for which there was no significant difference in purchasing behavior among Former WIC and SNAP households.

Table 2: Mean Percent of Total Purchases by Food Category within USDA Recommended Food Groups, January – June, 2011

Predicted Mean Percent of Total Sales n = 22,452				
Category	Former WIC (SE)	WIC (SE)	SNAP (SE)	SNAP & WIC (SE)
Fruit	7.9%** (0.0008)	12.9%** (0.0011)	7.6%** (0.0008)	10.0%** (0.0011)
Vegetables	7.3%** (0.0006)	6.9%** (0.0008)	6.1%* (0.0006)	6.3%* (0.0006)
Grains	7.5%** (0.0006)	12.7%** (0.0009)	8.0%** (0.0007)	10.0%** (0.0008)
Protein	17.6%* (0.0012)	13.2%** (0.0017)	21.1%** (0.0014)	18.1%* (0.0017)
Dairy	9.4% (0.0008)	16.5%** (0.0011)	9.2% (0.0009)	12.5%** (0.001)
Total Percent of Spending within USDA Recommend Food Categories	49.8%	62.2%	51.9%	57.0%

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10. The predicted means factor for the store location socio-demographic covariates and the state of purchase. Percent of total sales represents the percent of grocery purchases (dollars).

* Predicted mean percent is significantly different from other three household groups at p <0.05

** Predicted mean percent is significantly different from other three household groups at p <0.01

There were a number of trends within food subcategories that account for differences in spending among the four household groups within the five USDA recommended food categories. Among WIC households and SNAP & WIC households, the key differences in spending occurred within Fresh, Dried or Frozen Fruit, 100% Fruit Juice, Cereals and Milk, compared to the other three groups (detail of subcategory purchases in **Table 3**). SNAP household spending within Protein was concentrated within Meat, Poultry and Eggs.

Table 3: Mean Percent of Total Purchases by Food Category and Subcategory within USDA Recommended Food Groups, January – June, 2011

Predicted Mean Percent of Total Sales n = 22,452				
Category	Former WIC	WIC	SNAP	SNAP & WIC
Fruit	7.9%**	12.9%**	7.6%**	10.0%**
Fresh, Dried, Frozen Fruit	5.1%**	7.2%**	4.2%**	5.4%**
100% Fruit Juice	2.4%**	5.4%**	2.9%**	4.1%**
Fruit - Other	0.4%	0.4%	0.4%	0.4%
Vegetables	7.3%**	6.9%**	6.1%*	6.3%*
Dark Green Vegetables	1.1%**	0.9%**	0.8%	0.8%
Red and Orange Vegetables	1.5%**	1.3%**	1.1%	1.1%
Beans and Peas (Legumes)	0.2%	0.2%	0.2%	0.2%
Starchy Vegetables	0.9%	0.8%**	1.0%*	0.9%
Other Vegetables	3.6%	3.6%	3.0%**	3.2%**
Grains	7.5%**	12.7%**	8.0%**	10.0%**
Grains and Rice	0.5%*	0.5%*	0.6%	0.6%
Bread, Crackers, Pasta	5.5%	6.1%**	5.4%	5.8%**
Cereals and Oatmeal	1.5%**	6.1%**	1.9%**	3.6%**
Protein	17.6%*	13.2%**	21.1%**	18.1%*
Seafood	2.8%*	1.7%**	3.4%*	2.5%**
Meat, poultry, eggs	14.6%**	11.3%**	17.5%**	15.4%**
Nuts, seeds, soy products	0.3%**	0.2%	0.2%	0.2%
Other protein	0.01%	0.01%	0.03%	0.03%
Dairy	9.4%	16.5%**	9.2%	12.5%**
Milk, soy beverages	2.5%*	9.3%**	2.7%*	5.4%**
Yogurts and Cheese	5.4%**	6.0%**	5.1%**	5.8%**
Creamers/sour cream/cream cheese	1.5%*	1.1%**	1.5%	1.4%

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10. The predicted means factor for the store location socio-demographic covariates and the state of purchase. Percent of total sales represents the percent of grocery purchases (dollars).

* Predicted mean percent is significantly different from other three household groups at $p < 0.05$

** Predicted mean percent is significantly different from other three household groups at $p < 0.01$

Purchase trends within discretionary food categories (Oils, Snack Foods, Desserts & Sweets, Other Grocery and Beverages) showed opposite trends among the four household groups (**Table 4**). WIC households spent a smaller proportion of their total food dollars within all discretionary food categories compared to the other three groups. The sum of percent spending in all discretionary food categories was 35.9% of total purchases for Former WIC households, 27.2% for WIC households, 40.4% for SNAP households and 35.1% for SNAP

& WIC households. SNAP participation (SNAP households and SNAP & WIC households) spent a higher percent of total food purchases within Snack Foods, Other Grocery and Beverages compared to Former WIC and WIC households. With the exception of spending within Oils, the proportion of spending within each discretionary category among the four groups are statistically different (p -value < 0.05) based on multiple comparisons (shown in **Table 9**).

Table 4: Mean Percent of Total Purchases by Food Category within Discretionary Food Categories, January – June, 2011

Predicted Mean Percent of Total Sales n = 22,452				
Category	Former WIC (SE)	WIC (SE)	SNAP (SE)	SNAP & WIC (SE)
Oils	1.3% (0.0002)	0.9%** (0.0003)	1.3% (0.0002)	1.1%** (0.0003)
Snack Foods	3.4%** (0.0004)	2.4%** (0.0005)	4.2%** (0.0004)	3.6%** (0.0005)
Ready Made Meals	10.5%** (0.0009)	6.9%** (0.0013)	11.0%** (0.0011)	9.2%** (0.0013)
Dessert & Sweets	10.1%* (0.0011)	7.5%** (0.0014)	11.2%** (0.0011)	9.6%* (0.0014)
Other Grocery	5.8%* (0.0005)	5.4%** (0.0007)	6.4%** (0.0005)	6.0%* (0.0007)
Beverages	4.9%** (0.0006)	4.0%** (0.0008)	6.3%** (0.0007)	5.7%** (0.0008)
Total Percent of Spending within Discretionary Food Categories	35.9%	27.2%	40.4%	35.1%

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10. The predicted means factor for the store location socio-demographic covariates and the state of purchase. Percent of total sales represents the percent of grocery purchases (dollars).

* Predicted mean percent is significantly different from other three household groups at $p < 0.05$

** Predicted mean percent is significantly different from other three household groups at $p < 0.01$

The subcategory level analysis within discretionary foods identified specific differences in spending among the four groups (**Table 5**). Within Ready Made Meals, SNAP participating households (SNAP and SNAP & WIC) spent a higher percent of total purchases (4.7% and 4%, respectively) within Frozen Meals compared to Former WIC (3%) and WIC households (2.2%). The percentage spending within Frozen Meals is significantly different among the four household groups (p -value < 0.001) based on multiple comparisons. Former WIC households spent a higher percent of total purchases within Deli Foods or Prepared Foods

(5.7%) compared to WIC, SNAP and SNAP & WIC households (3.5%, 3.7% and 3.2%, respectively).

Former WIC household spending within Prepared Foods is statistically different from the other three groups (p -value < 0.001). SNAP participating households also spent a higher percent of total purchases on beverages with added sugar (4.3% among SNAP households and 3.8% among SNAP & WIC households) compared to Former WIC and SNAP & WIC Households. The percent spent within sugar-sweetened beverages among the four groups are significantly different from one another based on multiple comparisons (p -value < 0.001)

Table 5: Mean Percent of Total Purchases by Food Category and Subcategory within Discretionary Food Categories, January – June, 2011

Predicted Mean Percent of Total Sales n = 22,452				
Category	Former WIC	WIC	SNAP	SNAP & WIC
Oils	1.3%	0.9%**	1.3%	1.1%**
Butter, margarine, lard	0.8%	0.6%**	0.8%	0.7%**
Oils and Vinegars	0.5%	0.3%*	0.5%	0.4%*
Ready Made Meals	10.5%**	6.9%**	11.0%**	9.2%**
Frozen foods, meals	3.0%**	2.2%**	4.7%**	4.0%**
Deli foods/food service	5.7%**	3.5%	3.7%	3.2%**
Other RMM	1.8%**	1.3%**	2.5%**	2.0%**
Other Grocery	5.8%**	5.4%**	6.4%**	6.0%**
Baking Supplies	1.6%	1.6%	1.8%	1.7%
Soups, Sauces and Gravies	1.2%**	0.8%**	1.3%**	1.1%**
Condiments and Dressings	1.3%*	0.9%**	1.5%**	1.3%*
Other, Grocery	1.7%	2.1%**	1.7%	1.9%**
Beverages	4.9%**	4.0%**	6.3%**	5.7%**
Water	0.8%*	0.7%*	0.9%	0.9%
Non-water beverages, added sweetener	2.7%**	2.3%**	4.3%**	3.8%**
Non-water beverages, unsweetened	1.4%**	0.9%	1.1%**	0.9%

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Appendix A. Discretionary food categories Snack Foods and Desserts & Sweets are not included in this table because there are no subcategories. The predicted means factor for the store location socio-demographic covariates and the state of purchase. Percent of total sales represents the percent of grocery purchases (dollars).

* Predicted mean percent is significantly different from other three household groups at $p < 0.05$

** Predicted mean percent is significantly different from other three household groups at $p < 0.01$

Finally, the spending within non-food items was higher among Former WIC households compared to the three other groups based on proportion of total spending (**Table 6**). Spending within Alcohol and Tobacco was very low for all four household groups, 1% or less of total spending, but Former WIC household percent

of purchases within Alcohol and Tobacco was double that of WIC, SNAP and SNAP & WIC households (1% versus 0.5%, p-value <0.001). Proportion of spending within non-food items was also significantly higher among Former WIC households compared to the other three groups. Former WIC households spent 13.3% of total purchases on non-food items, compared to 10.1% for WIC households, 7.2% for SNAP households and 7.4% among SNAP & WIC households. Percent spending on non-food items is not significantly different among SNAP and SNAP & WIC households, though there is a significant difference in percent spending among Former WIC and WIC households compared to other groups.

Table 6: Mean Percent of Total Purchases by Food Category and Subcategory within Non-Food Items, January – June, 2011

Predicted Mean Percent of Total Sales n = 22,452				
Category	Former WIC (SE)	WIC (SE)	SNAP (SE)	SNAP & WIC (SE)
Alcohol	0.6%** (0.0003)	0.4%* (0.0004)	0.2% (0.0003)	0.3% (0.0004)
Tobacco	0.4%** (0.0002)	0.2%* (0.0003)	0.2% (0.0002)	0.2% (0.0003)
Home and Beauty	13.3%** (0.0012)	10.1%** (0.0016)	7.2% (0.0013)	7.4% (0.0015)

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10. The predicted means factor for the store location socio-demographic covariates and the state of purchase. Percent of total sales represents the percent of grocery purchases (dollars).

* Predicted mean percent is significantly different from other three household groups at p <0.05
 ** Predicted mean percent is significantly different from other three household groups at p <0.01

Each of the general linear models resulted in fairly low, though significant, adjusted r-square values (**Table 7**).

The variability in purchase behavior accounted for in each of the statistical models was largest within Fruits (adjusted r-square = 0.08), Grains (0.11), Dairy (0.14), and Home & Beauty (0.07) categories. Within subcategories, variability in purchase behavior accounted for in each of the statistical models was largest within 100% Juice (0.09), Cereals & Oatmeal (0.17) and Milk (0.24).

Several sensitivity analyses to test robustness of findings were completed, including testing alternative threshold levels (e.g., median monthly spending) and estimation of multivariate linear models. Findings

remained consistent across all approaches. Diagnostic tests of the general linear models revealed no outliers or influential observations within the sample.

Table 7: R-Squares of General Linear Models, January – June, 2011

Predicted Mean Percent of Total Sales n = 22,452			
Category	R-Square	Subcategory	R-Square
Fruit	0.084	Fresh, Dried, Frozen Fruit	0.038
		100% Juice	0.090
		Fruit - Other	0.001
Vegetables	0.023	Dark Green Vegetables	0.014
		Red and Orange Vegetables	0.018
		Beans and Peas (Legumes)	0.003
		Starchy Vegetables	0.004
		Other Vegetables	0.016
Grains	0.115	Grains and Rice	0.006
		Bread, Crackers, Pasta	0.007
		Cereals and Oatmeal	0.174
Protein	0.058	Seafood	0.013
		Meat, poultry, eggs	0.051
		Nuts, seeds, soy products	0.005
		Other protein	0.007
Dairy	0.144	Milk, soy beverages	0.241
		Yogurts and Cheese	0.007
		Creamers, sour cream, cream cheese	0.011
Oils	0.007	Butter, margarine, lard	0.007
		Oils and Vinegars	0.003
Snack Foods	0.035		
Ready Made Meals	0.030	Frozen foods, meals	0.044
		Deli foods/food service	0.025
		Other RMM	0.030
Dessert & Sweets	0.028		
Other Grocery	0.011	Baking Supplies	0.003
		Soups, Sauces and Gravies	0.017
		Condiments and Dressings	0.017
		Other, Grocery	0.009
Beverages	0.030	Water	0.004
		Non-water beverages, added sweetener	0.045
		Non-water beverages, unsweetened	0.007
Alcohol & Tobacco	0.022	Alcohol	0.027
		Tobacco	0.004
Home and Beauty	0.074		

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10. All models are statistically significant, *F* statistic p-value < 0.01.

To provide a more meaningful example of the WIC program effect and differences among household groups, if SNAP households spent the same proportion of their grocery purchases on the WIC-targeted food categories as WIC households, it could result in the additional monthly purchase of three pounds of apples (\$9.10), one pound of broccoli crowns (\$1.69), four loaves of bread (\$7.85), and four cartons of milk (\$12.38) per household (based on applying mean percent of purchases to the mean monthly spending, \$171.90 among SNAP households, and calculating the difference). Such a shift could also reduce purchases of discretionary foods equivalent to one family size bag of potato chips (\$2.91), two large frozen pizzas (\$6.73), seven candy bars (\$6.97), and four liters of soda (\$3.53) per household per month. Funds spent on protein might also be reduced, though some studies have noted SNAP participants place greater emphasis on meat than non-participants.⁵¹ The shift in purchase behavior may seem small at a household and monthly level, but extrapolated to all SNAP households nationally, it represents a significant reduction in annual spending. If all SNAP households (estimated using 21.1M population, and \$171.90 spending in groceries per month) spent the same proportion of their grocery purchases as WIC households, it would result in an estimated reduction of \$737.5M (95% CI: \$794.6-\$687.5M) on Snack Foods, a reduction of \$1.764B (95% CI: \$1.952-\$1.657B) on Desserts & Sweets, a reduction of \$898.6M (95% CI: \$970.6-\$818.2M) on SSBs, and a reduction of \$1.103B (95% CI: \$1.197-\$1.038B) on Frozen Meals. It also represents an increase in annual spending within the USDA recommended food categories, including an increase of \$2.301B (95% CI: \$2.202-\$2.496B) on Fruits and Fruit Juices, an increase of \$427.6M (95% CI: \$341.8-\$527.9M) on Vegetables, an increase of \$1.985B (95% CI: \$1.892-\$2.144B) on Grains, and an increase of \$3.132B (95% CI: \$3.054-\$3.210B) on Dairy products.

Discussion

Discussion of Findings

Participation in food assistance and nutrition programs is associated with grocery store purchasing behavior of low-income households with children. Participation in the WIC program is predictive of a greater proportion of monthly grocery expenditures within categories that correspond to the five food groups

recommended by the USDA, particularly within Fruits, Grains and Dairy. These food categories also correspond to the prescribed WIC food package, which demonstrates the effectiveness of the WIC program design in encouraging purchases within recommended categories. Within WIC program targeted sub categories (Fruits, 100% Juice, Cereals and Milk), the WIC program effect was even greater compared to non-WIC household groups. SNAP & WIC households showed similar purchasing trends as WIC households, but to a lesser degree.

In contrast, SNAP households spent a smaller percent of their food dollars within the five recommended food categories, and a larger proportion of spending within discretionary categories compared to other household groups. Higher proportions of SNAP household spending within discretionary categories was concentrated within Snack Foods, Desserts & Sweets, Frozen Meals and SSBs, which tend to be comprised of calorie dense foods with limited nutrient content, and high levels of fats, sugar and sodium. Among WIC households, spending within discretionary food categories was a lower percent of spending compared to all other groups. The WIC effect seen within the five recommended categories for SNAP & WIC households diminishes for discretionary categories. SNAP & WIC household purchasing behavior for WIC-targeted food categories was similar to WIC households, but within discretionary food categories their spending was more similar to SNAP households. These findings suggest the WIC program design may reduce purchases of less healthy, discretionary foods, but only for non-SNAP households. Greater freedoms in purchase decisions allowed within the SNAP program design are associated with the purchase of less healthy, less nutritious food categories and subcategories.

The existing restrictions present with the SNAP and WIC programs for the purchase of Tobacco, Alcohol, Ready Made Meals and Home and Beauty items appear to be effective. SNAP and WIC participation (WIC, SNAP and SNAP & WIC households) is associated with lower spending as a proportion of grocery expenditures on these products compared to former WIC households. This association demonstrates that existing restrictions within the SNAP program influence spending behavior.

One key USDA concern regarding SNAP purchase restrictions is that the effect of restrictions on purchases with personal funds is unknown, and a spending restriction may simply shift the purchase of less healthy foods from SNAP dollars to personal funds⁵⁰ resulting in no nutritional or health benefit. This concern does not appear to bear out in these data. In fact, a prescriptive benefit appears to influence purchases with personal funds as well, shifting a greater proportion of total grocery spending to the recommended food categories. On average, 29% and 18% of grocery spending for WIC and SNAP & WIC households, respectively, comes from WIC benefits, though spending on WIC-targeted subcategories¹ totals 37.5% and 27.4%, respectively, of monthly grocery spending. These findings suggest that limits on SNAP spending could have a positive effect on purchasing behavior, shifting all food dollars (SNAP dollars and personal dollars) spent away from discretionary, less nutritious foods and toward prescribed, nutrient-rich food groups.

The general linear models developed for each of the categories did not account for all the variation in purchase behavior within the sample population and resulted in low, but significant, r-square values. Given the covariates included in the model, the limits of the available data and the heterogeneity of the population studied, even a low r-square value is meaningful at a population level. Additionally, the r-square values for WIC targeted categories 100% Juice, Cereals and Milk were much larger than other categories studied. Within recommended food categories the WIC program design is influential and accounts for a notable amount of variation among the four groups.

Limitations

This study is not without limitations. Individual or household demographic information is not included, and are not adjusted for within this analysis. The income thresholds for participation in the SNAP program and WIC program will limit the variability of household income, but characteristics such as household structure (i.e., single versus two parent households), number of children in household, and ethnicity or race cannot be

¹ WIC targeted subcategories included in calculation include fruits, 100% juice, vegetables, grains/rice, cereals & oatmeal, Milk or soy substitute, and other grocery (peanut butter). Breads, crackers and pasta subcategory is not included in the calculation.

factored. Given the lack of household level demographic information, it is unknown to what degree any differences in household composition account for differences in mean percent spending within groups. For example, the mean percent spending within milk may differ based on the ages of the children in the household or the number of children. SNAP and Former WIC households may have lower percent spending in milk because there are older children in the home; alternatively, young children likely consume less milk per serving compared to an older child. It is unknown to what degree the findings are biased and in which direction. Store-level socio-demographics have been substituted as a proxy for household demographics, though household differences may remain unaccounted for within the models.

Furthermore, store loyalty cards are used as a proxy for households and may not represent all household grocery purchases (if the loyalty card is not used in every purchase) or it may represent multiple households. Monthly spending thresholds are applied and outlier loyalty cards have been removed to limit the number of these households in the sample. Other nutrition assistance programs, such as the WIC farmer's market program, are not reflected in these data. As a result, WIC-associated fruit and vegetable percent of total spending may be underestimated. Additionally, this analysis is limited to purchases within a single supermarket chain in several Northeastern states and may not consider all household food purchases and is not representative of all low-income households in the US or the states represented in this analysis. Studies of nutrition assistance benefit redemption report 84% of SNAP benefits are spent in supermarkets or supercenters.⁵² Assuming the household doesn't shop at multiple chains, the analysis should account for the majority of household food purchases. SNAP household findings are also limited to households with young children and are not representative of the broader SNAP population including SNAP households with older children, households with no children and the elderly.

The exclusion of infant formula and baby foods may bias the predicted mean percentage spend among WIC households and SNAP & WIC households upwards, and overstate the differences among the groups. Infant Formula and Baby Foods, when included, increases the mean total monthly spending approximately twenty dollars, and Infant Formula and Baby Foods represent 0.8% of former WIC purchases, 14% of WIC

purchases, 1.3% of SNAP purchases, and 10.4% of SNAP & WIC purchases. Given the percent Infant Formula and Baby Foods make up of total monthly purchases, all other category percentages decrease slightly. The inclusion of Infant Formula and Baby Foods, however, did not affect overall findings and the significant differences within multiple comparisons of categories among the four household groups (with the exception of vegetable percent spending between WIC households and SNAP households and beverage percent spending between Former WIC households and SNAP & WIC households, though there were significant differences in SSB percent spending among the four household groups).

The findings presented represent household purchases only, and do not reflect consumption patterns. While it is likely purchasing trends are indicative of consumption behavior, overall consumption or diet quality cannot be determined. Finally, this analysis is limited to spending during the first six months of 2011, and seasonal variation in purchasing behavior is not accounted for within this study.

Implications

These findings suggest that prescriptive designs for food assistance programs influence participants purchasing behavior, steering purchases towards recommended foods. A prescriptive benefit design does not eliminate the purchase of discretionary foods, but it may reduce or limit the proportion of grocery expenditure on these foods relative to recommended alternatives. Restricting the purchase of specific foods within the SNAP program could have a significant impact on purchase behavior and, likely, food consumption.

The policy dialogue regarding the benefit design of SNAP has centered on the question of individual choice, the adequate level of paternalism, and healthfulness of food spending. Despite concern over paternalism within SNAP, there is no discussion of or concern for the existing paternalism within WIC. Additionally, no comparisons of the two programs are made. Given the similarities of the participating populations of these programs and program missions, more comparisons of the program structures and outcomes should be

included in the discussion. Central to that discussion should be how to achieve the program's mission of increased access to a healthful diet.

The current health trends in our country cannot be ignored, particularly for this low-income, vulnerable population. Low-income individuals and families are more likely to be overweight or obese (particularly among women),⁵³ have higher prevalence of chronic conditions⁵⁴ and have limited resources, through access to healthy foods and medical care, for prevention and treatment. The differences in program outcomes on nutrient intake, weight status and the contribution SNAP may have on participating household health must be discussed and considered in the decision making process. Limiting SNAP households from purchasing unhealthy foods with SNAP funds is not the panacea, but policies that contribute to health outcomes should be carefully examined from a public health perspective. Considering the SNAP program serves over 40 million individuals and 21 million households,⁷ there is a significant public health benefit within reach.

Table 8: Mean Percent of Total Purchases by Food Category and Subcategory, January – June, 2011

Predicted Mean Percent of Total Sales				
n = 22,452				
Category	Former WIC	WIC	SNAP	SNAP & WIC
Fruit	7.9%	12.9%	7.6%	10.0%
Fresh Dried, Frozen Fruit	5.1%	7.2%	4.2%	5.4%
Fruit Juices	2.4%	5.4%	2.9%	4.1%
Fruit - Other	0.4%	0.4%	0.4%	0.4%
Vegetables	7.3%	6.9%	6.1%	6.3%
Dark Green Vegetables	1.1%	0.9%	0.8%	0.8%
Red and Orange Vegetables	1.5%	1.3%	1.1%	1.1%
Beans and Peas (Legumes)	0.2%	0.2%	0.2%	0.2%
Starchy Vegetables	0.9%	0.8%	1.0%	0.9%
Other Vegetables	3.6%	3.6%	3.0%	3.2%
Grains	7.5%	12.7%	8.0%	10.0%
Grains and Rice	0.5%	0.5%	0.6%	0.6%
Bread, Crackers, Pasta	5.5%	6.1%	5.4%	5.8%
Cereals and Oatmeal	1.5%	6.1%	1.9%	3.6%
Protein	17.6%	13.2%	21.1%	18.1%
Seafood	2.8%	1.7%	3.4%	2.5%
Meat, poultry, eggs	14.6%	11.3%	17.5%	15.4%
Nuts, seeds, soy products	0.3%	0.2%	0.2%	0.2%
Other protein	0.01%	0.01%	0.03%	0.03%
Dairy	9.4%	16.5%	9.2%	12.5%
Milk, soy beverages	2.5%	9.3%	2.7%	5.4%
Yogurts and Cheese	5.4%	6.0%	5.1%	5.8%
Creamers/sour cream/cream cheese	1.5%	1.1%	1.5%	1.4%
Oils	1.3%	0.9%	1.3%	1.1%
Butter, margarine, lard	0.8%	0.6%	0.8%	0.7%
Oils and Vinegars	0.5%	0.3%	0.5%	0.4%
Snack Foods	3.4%	2.4%	4.2%	3.6%
Ready Made Meals	10.5%	6.9%	11.0%	9.2%
Frozen foods, meals	3.0%	2.2%	4.7%	4.0%
Deli foods/food service	5.7%	3.5%	3.7%	3.2%
Other RMM	1.8%	1.3%	2.5%	2.0%
Dessert & Sweets	10.1%	7.5%	11.2%	9.6%
Other Grocery	5.8%	5.4%	6.4%	6.0%
Baking Supplies	1.6%	1.6%	1.8%	1.7%
Soups, Sauces and Gravies	1.2%	0.8%	1.3%	1.1%
Condiments and Dressings	1.3%	0.9%	1.5%	1.3%
Other, Grocery	1.7%	2.1%	1.7%	1.9%
Beverages	4.9%	4.0%	6.3%	5.7%
Water	0.8%	0.7%	0.9%	0.9%
Non-water beverages, added sweetener	2.7%	2.3%	4.3%	3.8%
Non-water beverages, unsweetened	1.4%	0.9%	1.1%	0.9%
Alcohol & Tobacco	1.0%	0.5%	0.5%	0.5%
Alcohol	0.6%	0.4%	0.2%	0.3%
Tobacco	0.4%	0.2%	0.2%	0.2%
Home and Beauty	13.3%	10.1%	7.2%	7.4%

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10.

Table 9: Multiple Comparisons of Percent of Purchases by Group, January – June, 2011

	Predicted Monthly Percent of Purchases				Multiple comparisons					
	n = 22,408				(Bonferroni corrected p-values)					
	Group 1: Former WIC	Group 2: WIC	Group 3: SNAP	Group 4: SNAP & WIC	1 vs 2	1 vs 3	1 vs 4	2 vs 3	2 vs 4	3 vs 4
Fruit	7.9%	12.9%	7.6%	10.0%	<.0001	0.0045	<.0001	<.0001	<.0001	<.0001
Vegetables	7.3%	6.9%	6.1%	6.3%	<.0001	<.0001	<.0001	<.0001	<.0001	0.0127
Grains	7.5%	12.7%	8.0%	10.0%	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Protein	17.6%	13.2%	21.1%	18.1%	<.0001	<.0001	0.0126	<.0001	<.0001	<.0001
Dairy	9.4%	16.5%	9.2%	12.5%	<.0001	0.0995	<.0001	<.0001	<.0001	<.0001
Oils	1.3%	0.9%	1.3%	1.1%	<.0001	0.989	<.0001	<.0001	<.0001	<.0001
Snack Foods	3.4%	2.4%	4.2%	3.6%	<.0001	<.0001	0.0052	<.0001	<.0001	<.0001
RMM	10.5%	6.9%	11.0%	9.2%	<.0001	0.0003	<.0001	<.0001	<.0001	<.0001
Dessert/Sweets	10.1%	7.5%	11.2%	9.6%	<.0001	<.0001	0.0169	<.0001	<.0001	<.0001
Other Grocery	5.8%	5.4%	6.4%	6.0%	<.0001	<.0001	0.0113	<.0001	<.0001	0.0002
Beverages	4.9%	4.0%	6.3%	5.7%	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Alcohol/Tobacco	1.0%	0.5%	0.5%	0.5%	<.0001	<.0001	<.0001	0.2032	0.6235	0.4504
Home and Beauty	13.3%	10.1%	7.2%	7.4%	<.0001	<.0001	<.0001	<.0001	<.0001	0.3927

Note: Categories are defined based on classification of department, category and subcategory listed with each UPC number. Additional detail for each category can be found in Table 10.

Table 10: List of Grocery Categories, Subcategories and Comments

Categories	Comments
Fruits	
Fresh, dried and frozen fruit	Does not include fruit with syrup or processed fruit
Fruit Juices	100% fruit juices
Other Fruits	Includes applesauce
Vegetables	
Dark Green	E.g., Kale, chard, spinach
Red and Orange	E.g., Tomatoes, carrots, orange squash
Beans and Peas (Legumes)	Does not include green peas or green beans
Starchy Vegetables	Includes corn and green peas
Other Vegetables	Includes iceberg lettuce, green beans, onions, salsa
Grains	
Grains and Rice	Includes quinoa, bulgur
Bread, Crackers, Pasta	Includes bagels
Cereals and Oatmeal	Excludes snack bars
Protein	
Seafood	Fish, shellfish
Meat, poultry, eggs	All red meat, white meat, packaged deli meats
Nuts, seeds, soy products	Soy products include meat alternatives
Other protein	Includes combinations of proteins (e.g. fish and meat)
Dairy	
Milk, soy beverages	Includes flavored milks; soy beverages are limited to milk substitutes
Yogurts and Cheese	Excludes frozen yogurt dessert products and cheese substitutes
Creamers/sour cream/cream cheese	Includes egg-nogs, creamers
Oils	
Butter, margarine, lard	Excludes all oil types
Oils and Vinegars	Vinegars cannot be separated from oil at a subcategory level
Snack Foods	
Includes granola bars, snack bars, chips, dips	
Ready-made-meals	
Frozen Foods	Includes frozen meals, frozen toaster items
Deli/food service	Includes foods available for consumption within store
Other	Toaster items, not frozen
Dessert and Sweets	
Includes frozen desserts, hot cocoa mixes, gum, candy, puddings	
Other Grocery	
Baking Supplies	E.g., Flours, mixes, baking items
Soups, Sauces and Gravies	Includes mixes and ready-made items, marinades
Condiments and Dressings	Includes relish, dressings for salads or in cooking
Other	Includes peanut butter, jelly, coffee, tea
Beverages	
Water	Includes sparkling, unsweetened waters
Non-water, added sweetener	Includes beverages with added sugars and diet sweeteners
Non water beverages, no added sugars	Diet beverages
Alcohol and Tobacco	
Alcohol	Includes alcohol mixers
Tobacco	Includes smokeless tobacco
Home and Beauty	
Includes non-food items, pet food, diapers	
Note: Infant formula and baby food excluded from the analysis.	

References

1. Vilsack T. USDA Accomplishments 2009-2011, Food and Nutrition. United States Department of Agriculture, 2011.
2. Supplemental Nutrition Assistance Program (SNAP), Putting Healthy Food within Reach. United States Department of Agriculture, Food and Nutrition Service, 2008.
3. Eligible Food Items. USDA, Food and Nutrition Service; 2012 [March 1, 2012]; Available from: <http://www.fns.usda.gov/snap/retailers/eligible.htm>.
4. Food and Nutrition Service. Supplemental Nutrition Assistance Program: A Short History of SNAP. United States Department of Agriculture; 2011 [updated October 13, 2011November 12, 2011]; Available from: <http://www.fns.usda.gov/snap/rules/Legislation/about.htm>.
5. Food and Nutrition Service. From Food Stamps to the Supplemental Nutrition Assistance Program: Legislative Timeline. United States Department of Agriculture; 2011 [November 12, 2011]; Available from: <http://www.fns.usda.gov/snap/rules/Legislation/timeline.pdf>.
6. Food and Nutrition Service. Supplemental Nutrition Assistance Program: Eligibility. United States Department of Agriculture; 2011 [updated October 13, 2011November 12, 2011]; Available from: http://www.fns.usda.gov/snap/applicant_recipients/eligibility.htm.
7. Food and Nutrition Service. Supplemental Nutrition Assistance Program Program Data. United States Department of Agriculture; 2011 [updated April 2, 2012April 13, 2012]; Available from: <http://www.fns.usda.gov/pd/snapmain.htm>.
8. Food and Nutrition Service. Supplemental Nutrition Assistance Program: Eligible Food Items. United States Department of Agriculture; 2011 [updated October 12, 2011November 12, 2012]; Available from: <http://www.fns.usda.gov/snap/retailers/eligible.htm>.
9. Food and Nutrition Service. IMPLICATIONS OF RESTRICTING THE USE OF FOOD STAMP BENEFITS – SUMMARY. United States Department of Agriculture, 2007 March 1, 2007. Report No.
10. Office of Research and Analysis. Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program, Final Report. USDA, 2011 February, 2011. Report No.
11. Oliveira V, Racine E, Olmsted J, Ghelfi L. The WIC Program: Background, Trends, and Issues. Economic Research Service, 2002 Contract No.: 27.
12. Food and Nutrition Service. WIC At A Glance. United States Department of Agriculture; 2011 [November 28, 2011]; Available from: <http://www.fns.usda.gov/wic/aboutwic/wicataglance.htm>.
13. Food and Nutrition Service. WIC Eligibility Requirements. United States Department of Agriculture; 2011 [November 28, 2011]; Available from: <http://www.fns.usda.gov/wic/howtoapply/eligibilityrequirements.htm>.
14. Food and Nutrition Service. WIC Food Packages Policy Options Study. United States Department of Agriculture, 2011 Contract No.: WIC 11 FOOD.
15. Food and Nutrition Service. WIC EBT Activity - September 2011. United States Department of Agriculture; 2011 [November 28, 2011]; Available from: <http://www.fns.usda.gov/wic/EBT/EBTActivityMap.pdf>.
16. Food and Nutrition Service. WIC Program Monthly Data. United States Department of Agriculture; 2011 [updated April 2, 2012April 13, 2012]; Available from: <http://www.fns.usda.gov/pd/wicmain.htm>.
17. Office of Research and Analysis. WIC ELIGIBLES AND COVERAGE – 1994 TO 2007: ESTIMATES OF THE POPULATION OF WOMEN, INFANTS, AND CHILDREN ELIGIBLE FOR WIC BENEFITS. Food and Nutrition Service, 2009.
18. Rose D, Habicht JP, Devaney B. Household participation in the Food Stamp and WIC programs increases the nutrient intakes of preschool children. *The Journal of nutrition*. 1998;128(3):548-55. Epub 1998/04/04.
19. Ralston K. Nutrition and Health Characteristics of Low-Income Populations: Usual Nutrient Intakes. Washington, DC: Economic Research Service, USDA, 2005 February 2005. Report No.: 796-2.
20. Yen ST. The effects of SNAP and WIC programs on nutrient intakes of children. *Food Policy*. 2010;35(6):576.

21. Mendoza JA, Drewnowski A, Cheadle A, Christakis DA. Dietary energy density is associated with selected predictors of obesity in U.S. Children. *The Journal of nutrition*. 2006;136(5):1318-22. Epub 2006/04/15.
22. Dinour LM, Bergen D, Yeh MC. The food insecurity-obesity paradox: a review of the literature and the role food stamps may play. *Journal of the American Dietetic Association*. 2007;107(11):1952-61. Epub 2007/10/30.
23. Gibson D. Food stamp program participation is positively related to obesity in low income women. *The Journal of nutrition*. 2003;133(7):2225-31. Epub 2003/07/04.
24. Meyerhoefer CD. Does Participation in the Food Stamp Program Increase the Prevalence of Obesity and Health Care Spending? *American journal of agricultural economics*. 2008;90(2):287.
25. Robinson CA. Household Food Stamp Program Participation and Childhood Obesity. *Journal of agricultural and resource economics*. 2011;36(1):1.
26. Ver Ploeg M, Mancino L, Lin BH, Wang CY. The vanishing weight gap: trends in obesity among adult food stamp participants (US) (1976-2002). *Economics and human biology*. 2007;5(1):20-36. Epub 2006/11/23.
27. Schmeiser MD. The impact of long-term participation in the supplemental nutrition assistance program on child obesity. *Health economics*. 2012;21(4):386-404. Epub 2011/02/10.
28. Nutritional status of children participating in the special supplemental nutrition program for women, infants, and children- United States, 1988-1991. Centers for Disease Control and Prevention, 1996 Contract No.: 3.
29. Burstein N, Fox MK, Hiller JB, Kornfeld R, Lam K, Price C. WIC General Analysis Project, Profile of WIC Children. Cambridge, MA: Abt Associates, 2000.
30. Cole N, USDA, FNS. The prevalence of overweight among WIC children. Alexandria, VA: United States Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, 2001 Contract No.: WIC-01-PCOM.
31. Rose D, Bodor JN, Chilton M. Has the WIC incentive to formula-feed led to an increase in overweight children? *The Journal of nutrition*. 2006;136(4):1086-90. Epub 2006/03/22.
32. Yen ST. Food Stamp Program Participation and Food Insecurity: An Instrumental Variables Approach. *American journal of agricultural economics*. 2008;90(1):117.
33. Metallinos Katsaras E. A Longitudinal Study of WIC Participation on Household Food Insecurity. *Maternal and child health journal*. 2011;15(5):627.
34. Wilde P, Ranney C. THE MONTHLY FOOD STAMP CYCLE: SHOPPING FREQUENCY AND FOOD INTAKE DECISIONS IN AN ENDOGENOUS SWITCHING REGRESSION FRAMEWORK. *Amer J Agr Econ*. 2000;82:4.
35. Hastings J, Wastington E. THE FIRST OF THE MONTH EFFECT: CONSUMER BEHAVIOR AND STORE RESPONSES. NBER, 2000 Contract No.: 14578.
36. Wilde P, Ranney C. A Monthly Cycle in Food Expenditure and Intake by Participants in the U.S. Food Stamp Program. Institute for Research on Poverty, 1998 Contract No.: 1163-98.
37. Kirlin J. Feasibility Study of Capturing Food Data at Checkout. United States Department of Agriculture, 1999.
38. Wiig K, Smith C. The art of grocery shopping on a food stamp budget: factors influencing the food choices of low-income women as they try to make ends meet. *Public health nutrition*. 2009;12(10):1726-34. Epub 2008/12/11.
39. Arcia G, Crouch L, Kulka R. Impact of the WIC Program on Food Expenditures. *American journal of agricultural economics*. 1990;72(1):9.
40. McGeehan P. US rejects mayor's plan to ban use of food stamps to buy soda. *New York Times*. 2011 August 20, 2011;Sect. A15.
41. Hernandez D. Soda Consumption Among Food Insecure Households with Children: A Call to Restructure Food Assistance Policy. *Journal of Applied Research on Children: Informing Policy for Children at Risk*. 2012;3(1).
42. Just D, Mansino L, Wansink B. Could Behavioral Economics Help Improve Diet Quality for Nutrition Assistance Program Participants? United States Department of Agriculture, 2007 Contract No.: 43.

43. Andreyeva T, Long MW, Brownell KD. The impact of food prices on consumption: a systematic review of research on the price elasticity of demand for food. *American journal of public health*. 2010;100(2):216-22. Epub 2009/12/19.
44. Alston JM, Mullally C, Sumner D, Townsend M, Vosti S. Likely effects on obesity from proposed changes to the US food stamp program. *Food Policy*. 2009;34:9.
45. Farley T, Daines R. No food stamps for sodas. *New York Times*. 2010 October 7, 2010.
46. Berg J. Food Stamps Soda Ban: The Wrong Way to Fight Obesity Huff Post New York [Internet]. 2010.
47. McGuire S. U.S. Department of Agriculture and U.S. Department of Health and Human Services, *Dietary Guidelines for Americans, 2010*. 7th Edition, Washington, DC: U.S. Government Printing Office, January 2011. *Adv Nutr*. 2011;2(3):293-4. Epub 2012/02/15.
48. Gladson. Nutritional Database. 2011; Available from: <http://www.gladson.com/SERVICES/NutritionDatabase/tabid/89/Default.aspx>.
49. US Census Bureau. 2010 Census Summary. December, 2011.
50. Implications of Restricting the Use of Food Stamp Benefits. United States Department of Agriculture, Food and Nutrition Service, March 1, 2007.
51. Dammann KW, Smith C. Factors affecting low-income women's food choices and the perceived impact of dietary intake and socioeconomic status on their health and weight. *Journal of nutrition education and behavior*. 2009;41(4):242-53. Epub 2009/06/11.
52. Castner L, Henke J. *Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program*. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis, 2011.
53. Ogdon C, Lamb M, Carroll M, Flegal K. Obesity and Socioeconomic Status in Adults: United States, 2005–2008. 2010.
54. Healthways Well-Being Index [database on the Internet]. 2010. Available from: <http://www.gallup.com/poll/145868/chronic-health-conditions-prevalent-2010-2009.aspx>.