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Healthy Food Availability in Hartford's Corner Stores: WIC Authorization Matters

Erin Katherine Havens

University of Connecticut Health Center

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Healthy Food Availability in Hartford's Corner Stores: WIC Authorization Matters

Erin Katherine Havens

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Healthy Food Availability in Hartford's Corner Stores: WIC Authorization Matters

Presented by

Erin Katherine Havens, M.P.A.

Major Advisor: _____
Ann M. Ferris, Ph.D, RD

Associate Advisor: _____
Katie S. Martin, Ph.D.

Associate Advisor: _____
Robert H. Aseltine, Jr., Ph.D.

University of Connecticut

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TABLE OF CONTENTS

LIST OF TABLES	v
ABSTRACT	vi
1.0 INTRODUCTION AND LITERATURE REVIEW	1
2.0 RESEARCH METHODOLOGY	9
2.1 Sample	9
2.2 Data Collection and Healthy Food Availability Measures	10
2.3 Data Analysis	12
3.0 RESULTS	15
3.1 Store Characteristics and Neighborhood Demographics	15
3.2 Healthy Food Availability by Demographics and Store Size	16
3.3 Comparing Healthy Food Availability by WIC Status (RQ-1)	18
3.4 Policy Change and the Marginal Effect of WIC Certification (RQ-2)	19
3.5 Policy Change and Healthy Food Availability among WIC Stores	20
4.0 IMPLICATIONS FOR PUBLIC HEALTH POLICY AND PRACTICE	24
4.1 WIC Stores: A Local Option for Healthy Food Availability	24
4.2 WIC: An Incentive to Carry Healthy Food	26
4.3 Collaborating with WIC Vendors	27
4.4 An Important Caveat	28
5.0 CONCLUSION	30
5.1 Study Limitations	30
5.2 Future Research	31
APPENDIX A: TABLES	32
APPENDIX B: HARTFORD HEALTHY FOOD INVENTORY	46
REFERENCES	55

LIST OF TABLES

TABLE 1	Revised Food Package and Minimum Inventory Requirements	33
TABLE 2	Neighborhood Characteristics, Demographics and Store Size by WIC certification	34
TABLE 3	WIC Certified Stores: Store Characteristics and Demographics	35
TABLE 4	WIC certification and variety of recommended foods	36
TABLE 5	WIC authorization and availability of specific recommended foods	37
TABLE 6	Percent of stores with food item by WIC authorization	38
TABLE 7	Marginal effect of WIC certification on healthy food availability after implementation of the WIC policy change	39
TABLE 8	Returns to WIC authorization on variety and proportion of healthy foods before and after the WIC Changes	40
TABLE 9	WIC Corner Stores: Healthy food available before and after the WIC food package changes	41
TABLE 10	WIC Corner Stores: Mean healthy food availability before and after the WIC changes	42
TABLE 11	WIC Corner Stores: Availability of specific recommended foods before and after the WIC Changes	43
TABLE 12	WIC Corner Stores: Variety and proportion of healthy foods before and after the WIC Changes	44

Abstract

Diet is an important modifiable risk factor for obesity and related chronic diseases which are disproportionately high among low-income and racial/ethnic minority populations. A growing field of research has documented inequalities by race and income in neighborhood access to foods recommended for a healthy diet. In October 2009, the revised food package for the Supplemental Nutrition Program for Women, Infants and Children (WIC) took effect, requiring certified stores to stock fresh produce, whole grain products and other foods consistent with national dietary recommendations. This project examined 1) differences in healthy food availability (HFA) between WIC-certified and non-certified corner stores and 2) the impact of federal changes to the WIC program on HFA in corner stores. Four rounds of food inventories were completed in 52 corner stores in Hartford, CT between January 2009 and January 2010 to measure the effect of the policy change. Analyses included chi-square, t-tests, and multivariate regression models. Participation of store owners as WIC vendors positively predicts HFA in Hartford's corner stores. Compared to non-certified stores, WIC certified stores stocked a wider variety of revised food package foods, a higher proportion of reduced-fat milk, a greater variety of produce and were more likely to carry whole grain bread than non-WIC stores. The strength of WIC-certification as a positive predictor of HFA increased following the WIC policy changes. These findings have potential implications for intervention planning in Hartford and reflect the importance of including WIC as a variable in future food environment studies.

Healthy Food Availability in Hartford's Corner Stores: WIC Authorization Matters

1.0 INTRODUCTION AND LITERATURE REVIEW

Diet is a modifiable risk factor for leading health concerns in the United States such as diabetes, cardiovascular disease, cancer and obesity.¹ To reduce risk for these chronic diseases and obesity, nutrition education programs and campaigns have focused on providing information about benefits and risks related to food consumption to encourage changes in eating behavior. Although nutrition education has become increasingly common, obesity and diet-related conditions remain at epidemic levels particularly among low-income and racial and ethnic minority families.²⁻⁶ The traditional focus of public health programs on behavior change as a means to address health disparities among low-income and racial and ethnic-minority populations has fallen short in reversing the obesity epidemic and high prevalence of related chronic diseases. Patterns of diet quality tend to be worse for racial and ethnic minority groups, especially Black Americans, compared to whites. Poor diet quality patterns observed among these groups include consuming more total fat, saturated fat and sodium but less whole grains, fruits and vegetables.⁷

The persistence of high risk levels among low-income and racial and ethnic minorities who often receive nutrition education raises questions about the impact of the environment on an individual's ability to maintain a healthful diet. With increasing frequency, public health researchers and practitioners are looking for the causes of poor health outcomes and potential remedies using an ecological approach.⁸ The ecological model views health as a result of the interdependence between an individual and their surrounding ecosystem of family, community and culture.⁹ From this perspective, health

is considered a function of a person and of the environments in which they live.¹⁰ Therefore, changing a person's environment will likely change their behavior.⁸ By considering the complex interrelationships between individual factors, social environment factors, the built environment, and the macro-level environment of public and corporate policies,¹¹⁻¹² new avenues to reduce health disparities can be identified and tested.

A growing body of research supports the hypothesis that urban, low-income residents often live in an environment that is not conducive to healthful dietary decisions.¹² Literature exploring the role of the neighborhood environment on diet quality, obesity and related chronic diseases documents disparities in the types of food stores available and the quality of foods that are stocked in stores. Full-size supermarkets are less prevalent in predominantly Black American, racially mixed¹³⁻¹⁷ and low-income^{14,17-19} neighborhoods compared to higher-income and white neighborhoods. Comparing neighborhoods by race, Black neighborhoods have about half the number of supermarkets within a five minute walking distance as white neighborhoods.²⁰ Even when comparing economically-disadvantaged neighborhoods by race, Black residents in Detroit on average lived 1.1 miles further away from supermarkets than white residents.¹⁹ Controlling for alternative food sources and individual characteristics, living near supermarkets is associated with a lower prevalence of obesity and overweight.²¹ Similarly populations living near supermarkets consume healthier diets regardless of race. This pattern holds true even though supermarkets located in census tracts with predominantly Black residents generally carry fewer healthy food options than supermarkets in other neighborhoods.²² The association between supermarket access and

diet quality is often greater among Black Americans. Adjusting for education and income, a sample of Black Americans living near supermarkets in North Carolina, Mississippi, Maryland and Minnesota consumed more produce than those not living in a census tract with at least one supermarket.¹⁶ Also, for Black American adolescents compared to white or Hispanic adolescents, the inverse association between body mass index (BMI) and supermarket availability is three times higher according to a study using national panel data.²³ Documented associations between the lack of supermarket access, the prevalence of chronic disease risk factors and their disproportionate impact on Black Americans has led to advocacy efforts focused on locating supermarkets in predominantly Black neighborhoods as a strategy for reducing the health disparities experienced by within the population.^{19, 23}

According to a number of studies, urban households often face hurdles accessing supermarkets which in turn may lead to inadequate diet quality and increased risk of chronic diseases. In a representative sample of 330 low-income households in Hartford, over half (55%) did not own a car, and 25% of households went to large supermarkets only once per month.²⁴ Possibly an effect of the opportunity cost of time, the absence of a nearby supermarket has also been associated with higher BMIs among children with mother's who work full-time, especially compared to children with mother's who are not employed.²³ Consistent with these results, focus group respondents from another study indicated that they often forego healthier foods, such as fruits and vegetables, because they run out at home and cannot get back to the supermarket to buy more.²⁵

The issue of food access at the neighborhood level is more complex than just the availability of proximity of residents to supermarkets. Although supermarkets in urban

areas are less accessible from low-income, predominantly Black and racially-mixed neighborhoods; smaller stores are more prevalent than in higher income neighborhoods^{17,20,26-28} and white neighborhoods.^{14-15, 17,20, 28} This high prevalence of small food stores has led researchers to explore the contribution that corner stores make to food availability. Among studies measuring the types of foods carried in corner stores, availability of whole grain products, lean ground beef, and low-fat cheese is limited.²⁹ For example, corner stores in East Harlem's low-income, predominantly Black neighborhoods often do not stock foods important to managing and preventing diabetes such as high-fiber bread, low-carbohydrate bread, fresh fruit, green vegetables, tomatoes, and low fat milk³⁰ while corner stores in higher-income areas are more likely to carry these recommended foods. Studies in other cities have also documented poor access to produce, low-fat milk and whole grain products in corner stores.³¹⁻³⁴ Although some stores stock produce, the quality is often poor^{15, 18, 25, 26, 32} and urban residents cite poor quality as a deterrent to produce consumption.²⁵

Conversely, corner stores generally stock an abundance of energy-dense, nutrient poor snack foods,³⁵ foods frequently purchased by school-age children in the neighborhood.³⁶ Although the prevalence of corner stores is positively associated with obesity, overweight and higher BMI in several studies,^{21, 23} a positive relationship between produce shelf space in corner stores and produce consumption was found in New Orleans.³⁷ Given the ubiquity of corner stores in urban neighborhoods where accessing full-size supermarkets is often a challenge for residents, many researchers and practitioners regard corner stores as an untapped asset for improving diet quality of

residents living in urban neighborhoods, especially if they are living in a racial-minority segregated neighborhood or economically-disadvantaged neighborhood.

Since populations living in low-income and racial minority neighborhoods already frequent corner stores and at present access to recommended foods may be inadequate while unhealthy snack foods are plentiful,³⁵ added incentive exists to improve availability of healthy foods at these stores. Within the dynamic context of urban space constraints, zoning regulations and corporate practices of supermarket chains, targeting corner stores as a venue for interventions may also be a more feasible approach than focusing on attracting larger vendors. Furthermore, although full-size supermarkets offer healthy foods, research has also found that the ratio of energy-dense snack foods to produce in full-size supermarkets is greater than that of corner stores and medium-sized grocers and only exceeded by convenience stores.³³

Despite corner stores poor reputation for stocking healthy foods, a national information clearinghouse, the Healthy Corner Stores Network and multiple city-based initiatives are underway to transform corner stores into neighborhood resources for quality diets rather than obstacles. One example, launched by the Hartford Food System in 2006 focuses on the plentiful supply of local corner stores as potential locations for improving neighborhood access to healthier foods. Collaborating with corner store owners and the University of Connecticut's Center for Public Health and Health Policy, the Hartford Food System launched the Healthy Food Retailer Initiative with the goal of engaging corner store owners to transform at least five percent of their food inventory to healthier, staple foods. With many cities, including Hartford, contemplating or adopting

initiatives to increase healthy food options in corner stores,^{30, 38-40} understanding mechanisms for engaging store owners to stock healthier foods needs attention.

Although a handful of articles provide guidance on community based approaches,³⁸⁻⁴⁰ research inadequately addresses the role that contemporary government policy may play as a determinant of healthy food availability (HFA) within these stores. One program governed by federal and state regulations that may have a positive impact on HFA in urban corners stores is the federal Supplemental Nutrition Program for Women, Infants, and Children (WIC). Originally established as a pilot project in 1972, and fully authorized in 1974, the US Department of Agriculture administers the WIC program through federal grants to states. These grants fund supplemental nutritious foods, nutrition education and health care referrals for low-income women, infants, and children up to age 5 who are at nutritional risk.⁴¹ In FY 2009, over 9.1 million low-income women, infants, and children benefited from \$4.54 trillion dollars worth of supplemental foods.⁴² To obtain the supplemental foods at local stores, WIC participants redeem checks, vouchers, or electronic benefits transfers (“vouchers”) prescribed for specific foods. In 2008, approximately 49,000 authorized merchants could accept vouchers nationwide.⁴² including an average of 552 in CT, and 58 in the city of Hartford during 2009 (CT Department of Public Health, unpublished data). To become authorized, stores must carry a state-specified minimum inventory of food package items and be approved by the state-level administrative agency for WIC.

Store owners desiring to establish and maintain WIC authorization are subject to inspection and must maintain a mandated level of each item in stock. Recent interviews of corner store owners conducted by Dr. Katie Martin of the Center for Public Health and

Health Policy at the University of Connecticut, found that WIC certification is viewed as very important to small store owners and that losing certification can hurt their business. One owner described the importance of keeping all the WIC foods in stock in case the store gets inspected by the WIC administrative agency. “It has to be in the inventory because if someone comes and you don’t have it or it’s expired, they take your life (unpublished results).”

Since store owners view WIC authorization as important to the “life” or impacting the perceived profitability of their store and WIC authorized stores must meet minimum inventory requirements (MIR), there may be an unintended positive incentive for enticing owners of WIC authorized stores to carry a greater variety of recommended foods than those stores that are not WIC authorized. Specifically, the traditional food package included formula, iron-fortified cereals, 100% juice, cheese, milk, eggs, dried beans or peas, peanut butter, tuna fish in water and carrots. After 35 years, October 2009 marked the implementation of a “revised food package” (RFP) which expands the prior package to include produce and whole grain bread plus options for whole wheat tortillas, brown rice, corn tortillas, sardines in water and canned salmon. The revised regulations also specify that milk must be 2% or less in fat unless the participant is an infant or a medical reason exists for consuming whole milk.⁴¹ Cumulatively, these changes bring the current food package in line with national dietary recommendations. Theoretically, the regulations governing the WIC food package and vendor authorization may translate into WIC-authorized corner stores adding produce, whole grains, and low-fat dairy foods to their inventory.

Within the context of the WIC food package, the MIR and recent changes to the food package, this project contributes to filling the literature gap by examining whether federal and state WIC regulations have a positive impact on HFA in urban corners stores.

To this end, the subsequent papers respond to the three research questions:

- ❖ **Research Question 1 (RQ-1):** Do stores authorized to accept WIC vouchers have greater availability of healthy foods than those that do not accept WIC?
- ❖ **Research Question 2 (RQ-2):** Following implementation of the revised WIC food package does the marginal effect of WIC authorization increase for overall availability, produce and whole grains than prior to the policy change?
- ❖ **Research Question 3 (RQ-3):** Does healthy food availability improve in WIC authorized corner stores after the implementation of the policy changes to the WIC food package?

The remainder of this project describes the methodology (Section 2), results of the research questions (Section 3) and policy and practice implications (Section 4). All analyses for this study were conducted using data collected from corner stores in Hartford, Connecticut. Hartford is a medium-sized city with approximately 124,512 residents; of whom 31.5% live below the poverty level, 38.1% identify as Black or African American and 40.5% identify as Hispanic or Latino.⁴⁴ For these residents, just one full-size supermarket falls within city lines and lack of supermarket access is paired with high rates of obesity and chronic diseases.

2.0 METHODOLOGY

2.1 *Sample*

This analysis uses data from a broader longitudinal study conducted by the University of Connecticut's Center for Public Health and Health Policy (CPHHP) in collaboration with the Hartford Food System to help evaluate their Healthy Food Retailer Initiative (HFRI). One facet of the CPHHP evaluation project was to measure the availability, quality and promotion of healthy food in HFRI stores and control stores over a one year period and to test for significant changes. The HFRI store owners were recruited by the Hartford Food System to shift at least 5% of their junk food inventory to healthier groceries. To select control stores, a list of grocery stores in Hartford was compiled by merging marketing data from the commercial firm Dun & Bradstreet with WIC vendor lists obtained from the CT Department of Public Health. Stores exceeding \$500,000 in average annual sales or more than five employees were considered full-size supermarkets and excluded from the sampling frame. The sampling frame for the CPHHP longitudinal study included 123 grocery stores with average sales of \$207,000 and an average of 2.5 employees.

The sample size goal for measuring differences between HFRI and control stores over time was 50 stores (25 HFRI, 25 control), with four measures each over time. Oversampling to account for attrition, the CPHHP research team selected 28 stores participating in the HFRI and matched them with 28 control stores based on zip code, certification in the WIC program, and annual sales. From the Hartford Food System's list of 40 HFRI stores, four refused to participate in the study, two were planning to change ownership and were excluded, and six were not matched with a control store. From the

list of control stores matched with HFRI stores, five stores were closed, four owners refused to participate, five were gas stations or liquor stores, and five owners were not available. The unmatched HFRI stores were re-matched with remaining stores from the list of food stores in Hartford to reach a final sample of 56 stores.

Since corner stores were the unit of analysis for the WIC research questions, the inclusion criterion consisted of convenience stores and small grocery stores commonly considered “bodegas” or “corner markets.” Medium-sized chain food stores (ie: C-Town, Price Rite), typically exceeding 3,000 square feet, were excluded from the study. The analysis for research questions comparing HFA by WIC authorization (research questions 1 and 2) used the data collected from 52 corner stores with 4 observations each (n=208). Overall, the stores included for the analyses in this paper span Hartford’s geography capturing 6 zip codes, 26 census tracts and 48 block groups. Of the 52 corner stores, 26 were WIC authorized during at least one inventory in the study.

For research question 3, which compares HFA in WIC authorized stores both before and after the WIC changes, the data set was restricted to stores holding WIC authorization either for the duration of the study, both fall 2009 and winter 2010 or winter 2010. This resulted in a final sample of 24 WIC authorized stores with four observations (n=96), capturing 56% of corner stores authorized as WIC vendors in Hartford. Although the small sample size reduced the statistical power, there was adequate power for detecting many significant differences.

2.2 *Data Collection and Healthy Food Availability Measures*

The University of Connecticut Health Center Institutional Review Board approved the protocol for this study. Store owners were compensated five dollars for

each inventory completed in their store. For each of the stores, four inventories of the foods carried were collected using the Hartford Healthy Corner Store Inventory (located in Appendix B), an instrument created for this project by modifying existing instruments^{26, 44} and incorporating foods included in the revised WIC food package.⁴⁵

The instrument was piloted by two members of the research team in two urban corner markets not participating in the broader food environment study. Revisions resulting from comparing the completed inventories of both data collectors during the pilot phase led to minor adjustments in inventory format and clarifications to the data collection protocol on items such as produce quality, attractiveness of display and promotion of healthy foods. Using the revised instrument and protocol, pairs of researchers completed market inventories for each store during winter 2009, summer 2009, fall 2009 and winter 2010. All data collectors participated in were trained on the protocol. By conducting the data collection in pairs, it was possible to increase the completeness of inventories. Overall, the inter-rater reliability of the instrument ranged from 84-99% (unpublished results).

The inventory captured available healthy foods as defined by USDA dietary guidelines, American Heart Association recommendations and the WIC food package. Additional items measured produce quality, promotion of healthy and unhealthy food, length of store ownership and store size. The square footage of each store was measured with a laser distance measurer (Stanley FatMax Tru Laser). For each store, inventories were supplemented with U.S. Census data (2000) on neighborhood demographics including the percent of residents by race, ethnicity, poverty status, and lack of transportation at the census block group level.

The dependent variables measuring Healthy Food Availability (HFA) included measures of overall availability, variety and individual food items. The revised food package (RFP) measured how many of the 15 healthy foods included in the revised food package were carried in a store (on a continuous scale from 0-15) while Minimum Inventory (MIR) captured on a dichotomous scale the presence of all 10 types of foods necessary to maintain WIC authorization. The MIR items measured include reduced-fat milk, canned tuna in water, dry beans (≥ 2 varieties), 100% juice (≥ 3 varieties), eggs, cheese, peanut butter, produce (≥ 1 fruit and vegetable of acceptable quality), and whole grain bread (first ingredient). The RFP items examined include the 10 MIR items plus whole grain-high fiber bread (> 3 grams), brown rice, salmon and sardines (each canned in water), whole wheat tortillas, and corn tortillas. (Table 1 lists the food items included in the MIR and RFP). Variety of produce and the proportion of milk stocked with reduced-fat content were measured with continuous variables. Availability of individual RFP items and availability of milk with 1% or less in fat (low-fat) was measured using dichotomous variables.

2.3 *Data Analysis*

Analyses for this study were conducted using Stata, version 11. Descriptive statistics for the first two research questions were run using chi-square tests to compare WIC and non-WIC stores based on neighborhood demographics, store characteristics and the percent of stores carrying select healthy foods. Both chi-square and paired t-tests were used to compare differences among WIC stores in HFA between winter 2009 and fall 2009 and between winter 2009 and winter 2010. Regression models were then used

to test the impact of WIC authorization on healthy food availability while accounting for control variables.

To explore research question 1, using all data points, ordinary least squares (OLS) regression was used for continuous variables and logistic regression for dichotomous variables using the following equation (Equation 1) plus robust standard errors to adjust for potential heteroskedasticity:

$$HFA_t = \beta WIC_t + \beta X_t + \beta t + \epsilon_t$$

In the model, HFA_t is the dependent variable and WIC_t is the independent variable of interest with t capturing changes in HFA_t over the period of the study through dummy variables for each data collection point. When analyzing research question 1 the WIC variable allowed comparison of HFA by WIC authorization. The vector X_t captures control variables that also may influence HFA. Control variables include Black neighborhoods ($\geq 60\%$), Latino neighborhoods ($\geq 60\%$), poverty-dense neighborhoods ($\geq 30\%$) and neighborhoods with limited resident ownership of vehicles ($\geq 35\%$). Also included are dummy variables for store size using small stores as the reference group (small store= 100 – 400 ft², medium store= 400 – 800 ft², large store= 800 – 2500 ft²). When interpreting coefficients from X_t , each coefficient represents the relative contribution of a group, holding time throughout the study constant.

Equation 2 below incorporates interaction terms between WIC authorization and each inventory into the original equation. This equation (below) was used to investigate

whether the federal policy changes to the WIC food package increased the returns to WIC authorization on HFA (research question 2).

$$HFA_t = \beta WIC_t + \beta(WIC * Sum09) + \beta(WIC * Fall09) + \beta(WIC_t * Wntr10) + \beta X_t + \beta t + \epsilon_t$$

When interpreting regression results from equation 2, WIC must be interpreted as the difference of HFA between WIC and non-WIC corner stores at baseline (winter 2009). Each interaction term represents the change in the difference between WIC and non-WIC stores from winter 2010, prior to the WIC policy change, at the given point in time described in the variable name. Using this data, the difference between stores based on WIC certification at a given point in time was drawn by summing the coefficients for WIC and each interaction term to find the difference based on WIC authorization in summer 2009, fall 2009 and winter 2010.

Similar to the approach used to explore the first two research questions, research question 3 is tested using Equation 3 to conduct regression analyses with robust standard errors:

$$HFA_t = \beta Summer09 + \beta Fall2009 + \beta Winter2010 + \beta X_t + \epsilon_t.$$

The model is identical to Equation 1 with the exception of omitting the WIC variable. The variable is extraneous since the sub-sample for the analysis was narrowed to include only WIC authorized stores. Each time variable is a dummy variable for the period mentioned. The results for the time dummy variables should be interpreted as relative to the baseline period of winter 2009 whereas βX_t should be interpreted as the relative contribution of store size or demographics holding all other factors in the model constant, including time.

3. RESULTS

3.1 Store Characteristics and Neighborhood Demographics

The stores in the full sample were located in neighborhoods with high poverty rates, low vehicle ownership and predominantly Black or Latino residents (Table 2). On average, the median household income was \$21,864 and 76.9% of stores in the sample were located in poverty-dense neighborhoods (>30% of residents living below the federal poverty level). 73.1% of stores were located in neighborhoods where more than 35% of the population did not own a personal vehicle. 42.3% of stores were located in predominantly Latino neighborhoods, 25% in predominantly Black neighborhoods, 26.9% in mixed-minority neighborhoods (where a predominant Black or Latino presence does not exist but where the combined percentage of Latino and Black residents exceeds 60%) and 5.8% in neighborhoods with 40% or more white residents.

Comparing neighborhood demographics near WIC authorized stores to those near unauthorized stores, unauthorized stores had a higher proportion of residents without personal transportation (79.5 vs. 64.8%; $p=0.018$) and WIC stores were more likely to be in mixed-minority neighborhoods (39.6% vs. 27.4%, $p=0.018$). No significant differences existed for the proportion of WIC or non-WIC stores by the remaining neighborhood demographics. Store size ranged from 168 ft to 2,500 ft, with the mean size of WIC stores approximately 147 ft larger than unauthorized stores (732 ft vs. 585 sq ft; $p=0.028$). Compared to the unauthorized stores, the WIC group had a higher percentage of large stores (27.5% vs. 9.4%, $p=0.001$) and a lower percentage of small stores (26.4% vs. 41.0%, $p=0.028$).

Specific to WIC stores (Table 3), three out of four stores within the sample were located in poverty-dense neighborhoods and 71% of stores were located in neighborhoods where more than 35% of the population did not own a personal vehicle. Identifying stores based on location in a neighborhood with a racial or ethnic majority, 37.5% of stores were located in predominantly Latino neighborhoods, 25% in Black neighborhoods and 33.3% in mixed-minority neighborhood. WIC stores varied based on size and length of ownership. Store size ranged from 199 to 2,428 ft² with a mean size of 781 ft² (median: 636 ft²). Most WIC stores (45.8%) fell into the medium size category (401-800 ft²) while the remaining 29.2% were large (801-2,500 ft²) and 25% were small (<400 ft²). On average, proprietors owned their store for 9 years with just one owner acquiring his store within the last two years and 38.6% owning their store for 10 years or more.

3.2 Healthy Food Availability by Demographics and Store Size

The regression models (shown in Table 4 and V) compare HFA by WIC authorization while controlling for store size, neighborhood factors and variation of time. Holding the rest of the model constant, store size was often a predictor of greater variety and availability of most healthy foods measured. Compared to small stores, large stores carried 3.1 more revised food package items ($p<0.01$), an 11.1% higher proportion of reduced-fat milk ($p<0.01$), 12.2 more types of produce ($p<0.01$) and nearly all individual foods. Medium stores were also more likely to stock reduced-fat and low-fat milk ($p<0.01$) while carrying on average 5% more reduced-fat milk ($p<0.05$) than smaller stores. Compared to small stores, medium stores were also more likely to carry 100%

juice ($p<0.05$), dry beans ($p<0.05$) and produce ($p<0.01$) while carrying on average 1.5 more RFP items ($p<0.01$) and 3.3 more varieties of produce ($p<0.01$). However, neither large nor medium stores were more likely than small stores to carry peanut butter or whole grain tortillas and medium stores were not more likely to carry whole grain bread or brown rice compared to smaller stores.

Stores located in neighborhoods with high poverty-density, low vehicle ownership, and Black or Latino majorities were less likely than stores in other neighborhoods to carry certain healthy foods. Holding the rest of the model constant (Table 4), on average stores located in areas with low transportation ownership carried 2 less produce varieties ($p<0.05$) and were less likely to stock produce than areas with higher transportation ownership ($p<0.01$). Both poverty-dense neighborhoods and Black neighborhoods negatively predicted availability of many healthy foods. On average, poverty-dense neighborhoods carried 3.1 fewer varieties of produce ($p<0.01$) and were less likely to carry produce ($p<0.01$), low-fat milk ($p<0.05$) and whole wheat tortillas ($p<0.05$). The silver lining for poverty-dense neighborhoods was that on average, stores carried 11.5% more reduced-fat milk than neighborhoods with less poverty ($p<0.01$).

Stores located in Black neighborhoods also had less variety of healthy foods (RFP: -0.8, $p<0.05$) and were less likely to carry reduced-fat milk ($p<0.05$ and $p<0.01$), produce ($p<0.01$) and whole wheat tortillas ($p<0.05$) compared to neighborhoods with a majority of mixed minority or white residents ($>40\%$). For stores in Latino neighborhoods compared to stores in mixed-minority and other neighborhoods, the likelihood was lower for carrying produce ($p<0.05$) and peanut butter ($p<0.05$). Holding the rest of the model constant, with the exception of brown rice, stores in neither Black or

Latino neighborhoods positively predicted HFA when compared to stores in mixed minority or white (>40%) neighborhoods.

3.3 *Comparing Healthy Food Availability by WIC Status (RQ-1)*

Initial analysis of healthy food availability and WIC authorization found WIC stores were significantly more likely than non-WIC stores to carry 100% juice (100% vs. 57.1%; $p<0.001$), reduced fat milk (100% vs. 44.8%; $p<0.01$), low-fat milk (60.9% vs. 31%; $p<0.05$) and canned salmon (60.9% vs. 31%; $p<0.05$) in winter 2009 (Table 6). Nearly all stores, regardless of WIC authorization carried eggs and cheese. The variety of healthy foods where differences were positively associated with WIC authorization increased from a handful of items to include whole grain products and produce following implementation of the revised food package in October 2009. In addition to the foods significant during the prior winter, WIC stores were more likely to carry newly required healthy foods such as whole grain bread (91.7% vs. 10.7%; $p<0.001$) and at least one fresh fruit and one fresh vegetable (100% vs. 71.4%; $p<0.05$). At baseline, significant differences did not exist based on WIC authorization for whether stores carried all 10 healthy foods (13.6% vs. 10.7%) whereas in winter 2010 87.5% of WIC stores compared to just 7.1% of non-WIC stores carried all 10 foods ($p<0.001$). After the WIC changes, WIC authorized stores were also more likely to carry the optional foods brown rice (79.2% vs. 28.6%; $p<0.001$), whole wheat tortillas (33.3% vs. 0%, $p<0.001$), high fiber bread (66.7% vs. 10.7%; $p<0.01$) and an aggregate of all 15 healthy foods offered in the RFP (16.7% vs. 0%; $p<0.05$).

Since HFA has been associated with store size and neighborhood demographics in other studies, regression models were used to estimate each research question. Holding the rest of the model constant, on average WIC authorized stores carried 2.7 more revised food package items ($p<0.01$), 1.8 more types of produce ($p<0.05$) and a higher proportion of reduced fat milk ($p<0.01$) than unauthorized stores (Table 4). Compared to unauthorized stores WIC stores were also more likely to carry three original food package items: 100% juice ($p<0.01$), reduced-fat milk ($p<0.01$), low-fat milk ($p<0.01$), dry beans or peas ($p<0.05$) and peanut butter ($p<0.01$). On average, WIC stores were also more likely to stock RFP items including produce ($p<0.05$), whole grain bread ($p<0.01$), brown rice ($p<0.01$), whole wheat tortillas ($p<0.01$) and salmon canned in water ($p<0.01$). No significant differences were found based on WIC authorization for stocking eggs, cheese or canned tuna in water during the period of the study (Table 5).

3.4 Policy Change and the Marginal Effect of WIC Certification (RQ-2)

To compare healthy food availability before and after changes to the WIC food package, regression results incorporating interaction terms for WIC authorization and the four inventories are shown in Table 7 and Table 8. At the start of the study, WIC stores were more likely to carry items included in the original food package: dry beans ($p<0.01$), 100% juice ($p<0.01$), peanut butter ($p<0.01$) and reduced-fat milk ($p<0.01$). On average, prior to the policy change, WIC stores also carried 1.6 more revised food package items ($p<0.01$) and a higher proportion of reduced-fat milk ($b=14.2\%$; $p<0.01$) than non-WIC stores.

Prior to the WIC policy changes (winter 2009 and summer 2009), WIC authorization did not predict greater availability of individual healthy foods newly added to the RFP or carrying all foods in the MIR. However, after Connecticut implemented the RFP, on average WIC stores became more likely to carry new foods. In both fall 2009 and winter 2010, WIC stores were more likely to carry all MIRs and whole grain bread ($p<0.01$). The returns to WIC authorization also increased from stocking an average of 1.6 additional RFP items in winter 2009 ($p<0.01$) to 3.4 more in the fall ($p<0.05$) and 4.0 more items in winter 2010 ($p<0.01$). The marginal effect of WIC certification increased from no significant difference before the policy change to WIC stores carrying 5.0 more types of produce than non-WIC stores after implementation of the new food package ($p<0.01$).

3.5 Policy Change and Healthy Food Availability among WIC Stores (RQ-3)

Based on bivariate analyses (Table 9), following the WIC changes, the increase in WIC stores carrying all revised food package items (RFP-all) approached statistical significance. Initially, no stores carried all RFP items whereas in the fall 3 stores did and in the winter 4 stores did ($p<.1$). Although the percent of stores carrying all-RFP items was not significant, the percent of stores carrying all food items required to maintain WIC authorization (MIR-all) jumped significantly from 17.4% at baseline to 66.7% ($p<.01$) in the Fall and 87.5% one year later ($p<.01$).

Availability of specific types of healthy foods was also significantly greater for low-fat (1% or less) milk, whole grain bread, high fiber bread, whole wheat tortillas, and brown rice during at least one of the seasons following the WIC changes. Compared to

just 20.8% of stores at baseline, whole grain bread was available in 70.8% of stores in the fall ($p<.01$) and 91.7% of stores in winter 2010 ($p<.01$). Similarly, the availability of brown rice increased from 29.2% at baseline to 79.2% of stores the following winter ($p<.01$). Although only statistically significant for the winter 2010 season, whole wheat tortillas ($p<.05$) and high fiber bread ($p<.01$) increased in availability for both seasons when compared to baseline. On the other hand, low-fat milk dramatically increased in availability in the fall compared to baseline (62.5% vs. 91.7%, $p=0.05$) but the change did not remain significant in winter 2010 (70.8%, $p>.1$).

The variety of healthy foods available also increased following the WIC changes (Table 10). On average, stores carried foods in 12.5 of the 15 RFP categories in the fall ($p<.05$) and 13.2 out of 15 categories in the winter ($p<.01$), compared to 10.5 categories at baseline. For the mean variety of produce available, on average WIC stores carried 8 types at baseline, 11.5 types in the fall ($p<.01$) and 12.8 types in winter 2010 ($p<.01$). Specifically, the average variety of fresh fruits increased from 3.6 to 5.8 types in the winter ($p<.01$) while the average variety of vegetables increased to 5.9 types in the fall ($p<.05$) and 7.1 types in the winter 2010 season compared to 4.4 types at baseline ($p<.05$). In addition to produce, WIC stores also stocked a higher proportion of reduced-fat milk than at baseline, with 26.6% of the milk inventory being 2% or less at baseline, 36.5% in the fall ($p<.05$) and 39.6% in winter 2010 ($p<.01$).

To explore more robustly the impact of the WIC changes on healthy food availability while accounting for control variables, we used the third model presented for logistic regression (Table 11) and OLS regression (Table 12). Using logistic regression, in both seasons following the WIC changes, WIC stores became more likely to carry all

15 revised food package items ($p<.01$) and all 10 types of food required for the minimum inventory ($p<.01$). After implementation of the revised WIC food package, authorized stores also became significantly more likely to carry specific healthy foods (Table 11). The odds of WIC stores carrying whole grain bread ($p<.01$) and brown rice (fall, $p<.05$; winter 2010, $p<0.1$) increased during both seasons following the WIC changes when compared to baseline. We also found significantly higher odds for carrying high fiber bread (winter 2010: $p<.01$), whole wheat tortillas (winter 2010: $p<0.05$), and low-fat/fat-free milk (fall: $p<.01$) following the WIC changes. Holding time and demographic variables constant, large stores were more likely to carry low-fat milk ($p<.05$) and brown rice ($P<.01$) compared to small stores. Stores located in neighborhoods with predominantly Black residents or low car ownership were significantly less likely to carry low-fat milk ($p<.01$) compared to other neighborhoods.

Additional analysis using OLS regression on the continuous RFP variables showed that the number of foods carried from the RFP increased following the changes to the WIC food package (Table 12). On average, WIC stores carried two more healthy foods in fall and 2.7 more foods in winter 2010 than they did in winter 2009 prior to the WIC changes (Model 1, $p<0.01$). In addition to the significant increases seen for availability of healthy foods overall and individual foods, the variety of produce and the proportion of reduced-fat milk also increased significantly in WIC stores following implementation of the revised food package. On average, within WIC stores, the proportion of available reduced-fat milk to whole milk gallons increased by 9.9% in fall 2009 ($p<.05$) and 13.1% in winter 2010 ($p<0.01$) when compared to winter 2009. WIC stores also carried on average 3.4 additional produce items in the fall ($p<0.05$) and 4.8

more varieties in the winter compared to baseline ($p<.01$). For fresh fruit, stores carried an average of 1.9 ($p<0.01$) more varieties in the fall and 2.2 more varieties in the winter ($p<0.01$). Fresh vegetable availability also significantly increased by 2.7 varieties in winter 2010 ($p<0.01$), when compared to before the WIC changes. Holding other variables constant, medium sized stores had significantly greater fruit variety ($p<.01$) compared to small stores. Large stores had significantly greater overall availability of healthy items in the revised food package, minimum inventory and produce variety compared to small stores ($p<.01$).

4.0 IMPLICATIONS FOR PUBLIC HEALTH POLICY AND PRACTICE

4.1 WIC Stores: A Local Option for Healthy Food Availability

This research contributes to the literature on HFA in corner stores by examining the impact of the federal changes to the WIC food package on the urban food environment. In addition to store size and store location, participation of corner store owners as WIC vendors appears to positively predict HFA in Hartford, CT. Over the period of the study, on average WIC corner stores carried more types of RFP items, stocked a higher proportion of reduced-fat milk, and carried more varieties of produce than non-WIC stores. WIC stores were also more likely to stock many specific food items. A few examples of healthy foods more available in WIC stores than unauthorized stores included 1% or skim milk, 100% juice, several whole grain products and carrying at least one variety of acceptable quality fresh fruits and vegetables. Furthermore, following the changes to the WIC food package the gap in HFA between WIC and non-WIC corner stores increased. Within the sample for this study, Hartford WIC stores stocked a wider variety of RFP foods and produce and were more likely to carry whole grain bread than non-WIC stores. Following the changes in WIC food package policy, improvements seen among WIC certified stores included carrying a greater range of healthy foods and produce and a higher proportion of reduced-fat milk. More WIC stores also carried whole grain bread, whole grain tortillas and brown rice after the WIC changes.

The increase of healthy food observed in Hartford's WIC stores and the difference between stores based on WIC status may have positive implications for reducing health disparities within the city of Hartford and potentially other urban locations. Considering

the wealth of literature documenting the lack of healthy foods in low-income, minority neighborhoods, the findings from this project are particularly exciting. These findings can be used to help inform the design of public health interventions. To some extent, stores authorized as WIC vendors are part of an unintended but positive intervention for eliciting corner stores to carry a variety of foods which are recommended for a healthy diet. At least for the sample of stores in this study, the impact of the WIC program translates on average to a greater likelihood that produce, whole grain foods, 100% juice, low-fat milk, eggs, cheese, dry beans, canned tuna and peanut butter will be on the shelves of WIC stores, compared to non WIC stores ($p<0.001$). For less mobile Hartford residents this could translate into a convenient shopping location for recommended foods if a larger supermarket is not located within the neighborhood.

The positive change in corner stores carrying at least the 10 MIR foods is substantial compared to winter 2009. Where at baseline just 13.6% of WIC stores carried all 10 types of food in the MIR, one year later 87.5% of WIC stores carried each food. Compared to the 87.5% of WIC stores carrying all MIR foods, just 7.1% of non-WIC stores carried these foods in winter 2010 ($p<0.001$). On average, residents with a nearby WIC store can have one-stop shopping access to staple and recommended food items such as a variety of produce, 100% juice, dry beans, and brown rice, whole grain bread and tortillas, reduced-fat milk, peanut butter, eggs and canned tuna in water. Although availability of these foods does not guarantee affordability to local residents not enrolled in WIC, having healthier foods on the shelves is a step that many interventions presently aspire to achieve.³⁸⁻³⁹

4.2 *WIC: An Incentive to Carry Healthy Food*

Enticing store owners to carry new healthy foods and then promote these foods is a logistical hurdle experienced by corner store projects in locations such as Philadelphia, Baltimore, and New York City. A recent example, the 2006 Baltimore Healthy Stores Program pilot project, engaged store owners to voluntarily meet minimum standards for stocking healthy foods while allowing taste tests and promotional displays in the store. Nearly all owners met the standard for carrying one fresh fruit but 48% of the time they did not carry whole wheat or split-top bread and the frequency of stores with low-fat milk remained unchanged at 67%.³⁸ On the other hand, 100% of WIC stores in the Hartford study carried one fruit, and over 90% carried whole wheat bread. In one follow-up inventory in the Hartford study, over 90% of WIC stores carried low-fat milk.

The financial benefit of redeeming WIC vouchers appears to grant store owners enough incentive through added income to stock many recommended foods otherwise not carried by corner stores. Potentially, this change in federal policy may be yielding an unintended but positive benefit on the urban food environment that achieves more successfully what prior interventions have attempted. For those practitioners designing interventions to encourage stores to carry more items, further study of the WIC incentive structure and the specific costs and benefits experienced by store owners may aid in identifying strategies for improving HFA in corner stores that are not WIC vendors. Provided city practitioners confirm locally similar differences in HFA based on WIC authorization, a new strategy for health promotion within the neighborhood food environment could involve identifying which stores are WIC authorized and then notifying residents of local WIC vendors as potential sources of healthy foods.

4.3 *Collaborating with WIC Vendors*

Encouraging WIC vendors to maintain and maximize their healthy food supply could enhance the impact of the WIC changes on the neighborhood food environment. A unique opportunity exists to link technical assistance regarding consumer-based food promotion strategies for increasing demand with the recommended foods now carried by WIC authorized corner stores. Promoting the healthy foods now in stores through attractive posters, produce displays, taste tests, and informing neighborhood residents of nearby WIC authorized stores could increase demand for healthy foods. At the same time, technical assistance for store owners could be particularly useful for sustaining or expanding upon the supply of WIC-redeemable foods available. These activities could be allocated across local city governments, nutrition education projects, not-for-profit organizations, or advocacy groups.

The exact role of technical assistance with regard to carrying specific foods becomes clearer when discussing the degree to which WIC stores met, exceeded or fell short of inventory expectations set by the Connecticut Department of Public Health. On average, Hartford WIC stores stocked healthy foods beyond the established minimum standards and the variety of RFP foods ($p < .05$), fresh vegetables ($p < .01$) and produce overall ($p < .05$) continued to significantly increase beyond the minimum required during the period following the WIC changes (results not shown). Despite the MIR requiring just one fresh fruit and one fresh vegetable, nearly all stores exceeded this amount. Even during the winter when availability of produce would theoretically drop, the variety found in WIC stores continued to rise.

Although these findings are positive, substantial room exists for helping owners increase availability of the optional RFP foods while promoting demand for these foods among local residents. In winter 2009, on average, stores carried 13 out of 15 foods with just 4 stores carrying all RFP foods. One third (33.3%) of stores lacked whole wheat tortillas, 66.7% lacked high fiber bread, 29.2% of stores did not have low-fat milk and 60.3% of the milk inventory was whole milk.

Similar to programs already offered in select Baltimore and New York City corner stores, highlighting healthy foods now in WIC stores through attractive posters, produce displays, and taste tests could increase demand for healthy foods and improve the diets of local residents. At the same time, technical assistance for store owners could be particularly useful for sustaining or expanding upon the supply of WIC-redeemable foods available. Since all stores are not compliant with the MIR and therefore run the risk of losing the status of WIC vendor, this is a key area for intervention. Guidance should focus on clarifying MIR expectations and WIC vendor authorization standards for owners and help store owners troubleshoot challenges such as produce quality or inventory maintenance strategies.

4.4 An Important Caveat

Given the returns to WIC authorization on HFA found in this study and the prospects for continued increases, a natural conclusion for improving HFA in neighborhoods may be to pursue WIC status for neighborhood stores. One important caveat to corner store WIC status as a mechanism for improved HFA is that a State's ability to authorize WIC vendors is constrained by federal regulations. States must balance ensuring adequate access to supplemental foods with effective management and

review of vendors for compliance.⁴⁵ The national ratio of WIC vendor to participants is 1 vendor per 151 participants.⁴⁶ In recent years, the US Department of Agriculture has guided States towards this ratio as a means for controlling food costs and ensuring that a State has adequate enforcement capacity for vendor compliance inspections.⁴⁶ For Connecticut this guidance has meant shifting away from a statewide average ratio of 1 store to 51 WIC participants to a ratio of 1:106 as of April 2009. Presently, Hartford falls short of the national recommendation with a ratio of 1:106 while other cities in CT exceed the ratio (1:157 in New Haven).⁴⁶

With Connecticut and Hartford still short of the national ratio, the number of WIC vendors may continue to decrease. Further study on the distribution of WIC store locations while considering the proportion of local WIC participants, vehicle ownership, resident race and ethnicity, and existing food retail infrastructure is important for better understanding food access in urban neighborhoods. For example, as of June 2010 no WIC authorized stores were located in the Hartford neighborhood referred to as the South End. This approach is also a potential strategy for informing WIC vendor placement methods in a manner that can meet WIC participant needs while enhancing the neighborhood food environment. Especially considering the existing federal constraints over the authorization of additional WIC stores, technical assistance for owners of Hartford WIC stores could play an important role in helping owners maintain compliance with WIC standards while improving their stores availability of RFP foods and consistency in which the healthy foods are in stock.

5.0 CONCLUSION

5.1 *Study Limitations*

This study included a sample of WIC certified stores in one medium-sized city. The sample selection and variation across states with regard to MIRs restricts the generalizability of these results to the sample. The use of logistic regression also did not allow detection of significance in several instances where variables dropped out of the model in the case of perfectly predicting all stores carrying the items or not carrying the items. The variable summer 2009 (Table 11) falls out of two models because it perfectly predicts not carrying the food(s) whereas the variables large store (Table V) and WIC*Winter10 (Table 7) fall out for a couple models because they perfectly predict success. Specific to the analysis conducted for research question 3, the reduced sample size may have constrained the ability to detect significant changes in the availability or variety of healthy foods. However, the sample size did allow identification of multiple significant changes.

Even with these limitations, as of October 2009 nearly all states and territories implemented the RFP which mandates a minimum inventory for produce, whole grain foods, and reduced-fat milk. Although MIRs vary across states, federal standards make it reasonable to expect on average that improvements to HFA have occurred in urban corner stores throughout the U.S. This study accounted for differences between WIC and non-WIC stores with regard to store and neighborhood demographics using multivariate regression models. Given the positive associations found for store size and neighborhood demographics in previous studies and as indicated in the significance of coefficients for large and medium-sized corner stores as well as poverty and

transportation related variables in multivariate regression models, inclusion of these variables was a necessary and important adjustment. For additional exploration on the robustness of the results presented, regression models were also run using store-fixed effects. Store-fixed effects remove observable and unobservable characteristics that remain constant for stores across time. For example, store-fixed effects can adjust for owners who are especially motivated across time to carry healthy foods or who have no interest in carrying healthy foods. Including the store-fixed effects, the standard errors decreased somewhat but similar patterns of significance to those presented in this paper were achieved.

5.2 *Further Research*

This paper explored whether corner store participation in the WIC program predicts healthy food availability in urban corner stores. The findings within this report justify further exploration of the relationship between WIC authorization and access to healthy foods. Due to the national scope of the WIC program, the positive impact of WIC authorization on HFA found in this study may be occurring in cities throughout the U.S. Although the literature on corner store environments is expanding rapidly, few studies consider or statistically control for WIC certification. Including WIC status as a determinant of HFA is a consideration that should be included in future research as both a control variable and a variable of interest. In addition, analyzing the affordability of healthy foods in corner markets with and without WIC authorization could also contribute to understanding the local food environment and clarify the potential impact that a nearby WIC authorized store may have on the capacity of local residents to purchase recommended foods.

APPENDIX A

Tables

TABLE 1: Revised Food Package and Minimum Inventory Requirements^a

Food Items	Minimum Inventory Foods	Revised Food Package Foods
Tuna, canned in water	X	X
Milk (must carry $\leq 2\%$ fat)	X	X
Cheese	X	X
Eggs	X	X
Peanut butter	X	X
Dry beans or peas	X	X
100% juice	X	X
Fruits (at least one fresh)	X	X
Vegetables (at least one fresh)	X	X
Bread, whole grain	X	X
Salmon, canned in water		X
Sardines, canned in water		X
Tortillas, corn		X
Tortillas, whole wheat		X
Bread, whole grain and high fiber		X

^aInfant formula, infant cereal and cereal are excluded from the analysis.

TABLE 2: Neighborhood Characteristics, Demographics and Store Size by WIC status
(% of stores)

	Overall	WIC	Non-WIC	p
Characteristics				
Poverty dense	76.9	71.4	81.2	0.097
Lack transportation	73.1	64.8	79.5	0.018
Neighborhood Race/Ethnicity				
Latino neighborhood	42.3	35.2	47.9	0.066
Black neighborhood	25.0	25.3	24.8	0.936
Mixed Minority	26.9	39.6	27.4	0.018
White (>40%)	5.8	4.4	6.8	0.454
Total:	100.0	104.5	106.9	
Store Size				
Small 168-400 sq ft	34.6	26.4	41.0	0.028
Medium 401-800 sq ft	48.1	46.2	49.6	0.624
Large <801-2,500 sq ft	17.3	27.5	9.4	0.001
Total:	100.0	100.1	100.0	

TABLE 3: WIC Authorized Stores: Store Characteristics and Neighborhood Demographics

Mean Demographics by Store Location (%)		% of Stores by Neighborhood Demographics	
Below FPL ^a	36.7	Poverty Dense ^b	75.0
No vehicle	40.3	Limited Transportation ($\geq 35\%$)	70.8
Latino	51.7	Latino neighborhood	37.5
Black	33.1	Black neighborhood	25.0
White	10.4	Mixed-minority neighborhood	33.3
Other race	4.8	No predominant race	4.2
Store Size % (n)		Store Ownership	
Small (168-400 ft)	25 (6)	<2 years	1.1
Medium (401-800 ft)	45.8 (11)	6-9 years	33.6
Large (801-2,500 ft)	29.2 (7)	10-15 years	30.3
		16-26 years	8.6
^a Federal poverty line (FPL). ^b Poverty dense is where $\geq 30\%$ of population lives below FPL.			

TABLE 4: WIC authorization and variety of recommended foods
OLS Regression beta coef. (RSE)

Independent Variables	Revised Food Package	Proportion of Milk Reduced-Fat	Produce Variety
WIC Authorization	2.707*** (0.287)	0.173*** (0.025)	1.831** (0.721)
Medium Store	1.472*** (0.330)	0.050** (0.024)	3.330*** (0.616)
Large Store	3.077*** (0.448)	0.111*** (0.029)	12.20*** (1.575)
Low Personal Transportation	-0.400 (0.436)	0.009 (0.034)	-1.957** (0.905)
Poverty-Dense Neighborhood	0.0466 (0.427)	0.115*** (0.044)	-3.07*** (0.916)
Black Neighborhood	-0.847** (0.326)	-0.029 (0.033)	-0.659 (0.949)
Latino Neighborhood	-0.450 (0.311)	0.004 (0.026)	-0.814 (0.845)
Observations	208	208	208
R-squared	0.543	0.359	0.516
Model includes constant and time dummy variables. Results not shown. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses			

TABLE 5: WIC authorization and availability of specific recommended foods
Logistic Regression beta coef (RSE) ^a

VARIABLES	Dry Beans ≥2 types	Reduced -Fat Milk	100% Juice ≥3 types	Peanut Butter	Low-Fat Milk	Minimum Produce	Whole Grain Bread	Brown Rice	Whole Wheat Tortilla	Salmon
WIC										
Authorization	3.367** (1.565)	3.575*** (0.774)	4.263*** (1.053)	1.832*** (0.613)	1.451*** (0.379)	1.406** (0.595)	2.345*** (0.503)	1.294*** (0.360)	3.142*** (1.087)	1.633*** (0.339)
Medium Store	2.320** (0.961)	1.468*** (0.453)	1.043** (0.443)	0.275 (0.530)	1.394*** (0.369)	1.830*** (0.552)	0.298 (0.380)	0.625 (0.462)	0.378 (0.823)	0.658* (0.358)
Large Store	^b ^b	3.245*** (0.961)	1.969** (0.842)	1.751 (1.078)	2.203*** (0.534)	^b ^b	1.574** (0.643)	2.212*** (0.622)	0.249 (0.894)	1.647*** (0.517)
Low Personal Transportation	2.583** (1.018)	-0.679 (0.761)	0.267 (0.781)	0.266 (0.894)	-0.647 (0.558)	-5.469*** (1.255)	-0.262 (0.523)	0.445 (0.550)	-1.354* (0.746)	0.356 (0.501)
Poverty-Dense Neighborhood	0.795 (0.938)	0.788 (0.821)	0.00175 (0.784)	0.109 (0.967)	1.438** (0.655)	-4.991*** (1.193)	0.0364 (0.583)	1.579*** (0.604)	-2.262** (0.906)	0.126 (0.493)
Black Neighborhood	-1.201* (0.693)	-1.210** (0.578)	0.391 (0.560)	-2.206* (1.145)	1.424*** (0.523)	-3.478*** (0.902)	1.002* (0.521)	1.760*** (0.523)	-2.270** (1.127)	-0.629 (0.448)
Latino Neighborhood	0.444 (0.721)	-0.224 (0.457)	-0.280 (0.491)	-2.851** (1.123)	0.0163 (0.388)	-1.781** (0.822)	-0.329 (0.474)	0.485 (0.469)	-1.242 (0.772)	-0.458 (0.376)
Observations	172	208	206	208	208	172	208	208	156	208
Pseudo R	0.361	0.380	0.347	0.227	0.268	0.342	0.347	0.261	0.366	0.184

***p<0.01; **p<.05, * p<.10. ^a Robust standard errors in parentheses

Logistic regression models include constant and time dummy variables. Results not shown. Foods with p>0.05: tuna, cheese, and eggs.

^b Variable(s) perfectly predicted success or failure of HFA. Variable(s) fell out of the model due to collinearity.

TABLE 6: Percent of stores with food item by WIC authorization

Food Item	Winter 2009			Winter 2010		
	Non-WIC	WIC	p	Non-WIC	WIC	p
100% Juice (3+)	57.1	100.0	***	46.4	100.0	***
Dry bean (2)	82.8	100.0	NS	82.1	100.0	NS
Tuna, canned in water	86.2	87.0	NS	96.4	100.0	NS
Peanut butter	82.8	100.0	NS	78.6	100.0	** ^a
Eggs	96.6	91.3	NS	92.9	100.0	NS
Cheese	100.0	95.7	NS	89.3	100.0	NS
Milk, 2% or less	44.8	100.0	***	50.0	91.7	***
Milk, 1% or fat free	31.0	60.9	*	28.6	70.8	**
Produce Minimum	75.9	78.3	NS	71.4	100.0	** ^a
Whole grain bread	10.3	17.4	NS	10.7	91.7	***
High fiber bread	10.3	17.4	NS	10.7	66.7	***
Brown Rice	17.2	30.4	NS	28.6	79.2	***
Whole wheat tortilla	0.0	4.3	NS	0.0	33.3	*** ^a
Corn tortilla	31.0	47.8	NS	46.4	58.3	NS
Salmon, canned in water	31.0	60.9	* ^a	32.1	83.3	***
Minimum inventory (all 10)	10.7	13.6	NS	7.1	87.5	***
Revised food package (all 15)	0.0	0.0	n/a	0.0	16.7	* ^a

^a Two-sided fisher's exact test. ***p<0.001 **p<0.01 *p<0.05

TABLE 7: Marginal effect of WIC certification on healthy food availability after implementation of the WIC policy change

Logistic Regression; beta coef (RSE)

VARIABLES	Minimum Inventory (10 foods)	Low-Fat Milk	Fruit & Veg (fresh)	Whole Grain Bread	Brown Rice
WIC	-0.733 (0.976)	0.906 (0.682)	-0.376 (0.894)	-0.012 (0.924)	0.445 (0.741)
WIC*Summer	0.803 (1.548)	-0.781 (0.922)	1.289 (1.304)	-0.624 (1.295)	-0.300 (1.019)
WIC*Fall	3.997*** (1.379)	2.568** (1.125)	3.125* (1.802)	3.599*** (1.295)	1.448 (1.073)
WIC*Winter10	5.376*** (1.437)	0.930 (1.022)	^a ^a	4.756*** (1.380)	1.844* (1.023)
Observations	206	208	155	208	208

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Logistic Regression models included control variables, time dummies and constant. (Results not shown).

^a Variable(s) perfectly predicted success or failure of HFA. Variable(s) fell out of the model due to collinearity. Model not appropriate for whole wheat tortilla.

Not significant: tuna, eggs, cheese, salmon; S: High fiber bread;

TABLE 8: Returns to WIC authorization on variety and proportion of healthy foods before and after the WIC Changes

OLS Regression, beta coef (RSE)

VARIABLES	Revised Food Package	Produce Variety	Proportion of Healthier Milk
WIC (at Baseline)	1.624*** (0.441)	-0.122 (1.351)	0.142*** (0.041)
WIC*Summer	0.0300 (0.629)	-0.182 (1.864)	-0.0441 (0.059)
WIC*Fall	1.777** (0.703)	2.660 (1.930)	0.083 (0.056)
WIC*Winter 2010	2.404*** (0.724)	5.106*** (1.826)	0.080 (0.066)
Medium Store	1.476*** (0.307)	3.333*** (0.584)	0.0500** (0.0236)
Large Store	3.063*** (0.449)	12.15*** (1.568)	0.110*** (0.0287)
Low Personal Transportation	-0.558 (0.427)	-2.268** (0.913)	0.00141 (0.0335)
Poverty-Dense Neighborhood	0.001 (0.420)	-3.163*** (0.917)	0.113** (0.0444)
Black Neighborhood	-0.864*** (0.313)	-0.693 (0.937)	-0.0301 (0.0322)
Latino Neighborhood	-0.489 (0.297)	-0.898 (0.824)	0.00167 (0.0260)
Observations	208	208	208
R-squared	0.578	0.542	0.377

*p<0.1 **p<0.05 ***p<0.01. RSE: Robust standard error.

Models run with constant and time dummy variables. (Results not shown).

Interaction terms should be interpreted relative to baseline as the change in the marginal returns.

TABLE 9: WIC Corner Stores: Healthy food available before and after the WIC food package changes
Chi-square tests, % of stores (n)

	Pre-Implementation	Post-Implementation	
Food Items	Winter 2009	Fall 2009	Winter 2010
Revised food package-all 15	0.0 (0)	12.5 (3)	16.7 (4)*
Minimum inventory-all 10	17.4 (4)	66.7 (16)***	87.5 (21)***
Low-fat milk (1% or less fat)	62.5 (15)	91.7 (22)**	70.8 (17)
Whole grain bread	20.8 (5)	70.8 (17)***	91.7 (22)***
High fiber bread (>3 grams)	20.8 (5)	37.5 (9)	66.7 (16)***
Tortilla, whole wheat	4.2 (1)	20.8 (5)	33.3 (8)**
Brown rice	29.2 (7)	58.3 (14)**	79.2 (19)***

***p<.01; **p<.05; *p<.1

Results shown for chi-square significance tests for Winter 2009 vs. Fall 2009 and Winter 2009 vs. Winter 2010.

TABLE 10: WIC Corner Stores: Mean healthy food availability before and after the WIC changes
Paired-ttest, mean (SE)

Food Items	Pre-WIC Changes		Post-WIC Changes	
	Winter 2009	Fall 2009	Winter 2010	
Revised food package	10.54 (0.33)	12.50 (0.36)***	13.21 (0.27)***	
Minimum Inventory	8.74 (1.01)	9.48(0.16)**	9.87 (0.09)***	
Produce	8.00 (1.45)	11.42 (1.40)***	12.83 (1.35)***	
Fruit	3.58 (0.66)	5.50 (0.60)***	5.75 (0.64)***	
Vegetables	4.42 (0.87)	5.92 (0.87)**	7.08 (0.78)***	
Proportion milk $\leq 2\%$	26.61(3.34)	36.54% (3.32)**	39.61% (3.64)***	
***p<.01, **p<.05 *p<.1 SE = standard error mean				
Results from paired-ttests for Winter 2009 vs. Fall 2009; Winter 2009 vs. Winter 2010.				

TABLE 11: WIC Corner Stores: Availability of specific recommended foods before and after the WIC Changes
Logistic Regression, beta coef (RSE)

IV	(1) Revised Package (all)	(2) Minimum Inventory (all)	(3) Low-Fat Milk	(4) brown rice	(5) whole wheat tortilla	(6) high fiber bread	(7) whole grain bread
Summer 2009	^a	-0.87	0	0	^a	-0.72	0
	^a	(0.96)	(0.76)	(0.63)	^a	(0.93)	(0.77)
Fall 2009	16.32***	2.52***	2.71***	1.47**	2.05	1.02	2.45***
	(0.77)	(0.73)	(0.99)	(0.75)	(1.39)	(0.75)	(0.72)
Winter 2010	16.72***	3.87***	0.58	2.63***	2.83**	2.52***	4.04***
	(0.76)	(0.87)	(0.82)	(0.71)	(1.39)	(0.78)	(0.95)
Medium Store	-1.36	-0.47	1.06	0.82	-0.029	1.02	-0.41
	(0.98)	(0.62)	(0.81)	(0.65)	(0.88)	(0.68)	(0.55)
Large Store	0.49	0.56	1.68**	2.12***	-0.02	1.26*	0.26
	(1.28)	(0.73)	(0.76)	(0.80)	(0.89)	(0.76)	(0.71)
Lack vehicle (>35%)	0.53	-1.04	-	1.24	-1.67**	-1.43*	-0.91
	(1.01)	(0.83)	(1.57)	(0.88)	(0.80)	(0.73)	(0.77)
Poverty dense (>30%)	-1.43	0.24	1.34	-1.18	2.24**	0.25	0.082
	(0.97)	(0.99)	(1.30)	(0.94)	(0.96)	(0.77)	(0.89)
Black (60%)	^a	-0.35	-	0.96	-2.08*	1.37*	0.81
	^a	(0.77)	(0.91)	(0.68)	(1.22)	(0.71)	(0.73)
Latino (60%)	-0.98	-0.70	0.27	-0.046	-0.98	-0.58	-0.24
	(0.96)	(0.71)	(0.75)	(0.61)	(0.75)	(0.66)	(0.64)
Observations	54	95	96	96	72	96	96
Pseudo R	0.248	0.406	0.353	0.244	0.241	0.281	0.357

*** p<0.01, ** p<0.05, * p<0.1. RSE = Robust standard errors. Constant included in model. Results not shown. ^a Variable(s) perfectly predicted success or failure for carrying healthy food. Variable(s) fell out of the model due to collinearity.

TABLE 12: WIC Corner Stores: Variety and proportion of healthy foods before and after the WIC Changes
OLS Regression, beta coef. (RSE)

Indep Variables	(1) RFP Variety	(2) MIR Variety	(3) Produce Variety	(4) Vegetable Variety	(5) Fruit Variety	(6) Proportion Lower-fat Milk
Summer 2009	0.0833 (0.394)	0.103 (0.240)	1.460 (1.574)	0.708 (0.990)	0.750 (0.735)	-0.014 (0.043)
Fall 2009	1.960*** (0.459)	0.937*** (0.260)	3.417** (1.604)	1.542 (1.001)	1.917*** (0.705)	0.0992** (0.047)
Winter 2010	2.667*** (0.374)	1.228*** (0.228)	4.833*** (1.566)	2.667*** (0.960)	2.167*** (0.714)	0.131*** (0.050)
Medium Store	0.212 (0.369)	0.332 (0.229)	2.654** (1.057)	1.157* (0.678)	1.523*** (0.502)	-0.014 (0.039)
Large Store	1.288*** (0.414)	0.641*** (0.242)	11.407*** (1.799)	6.154*** (1.138)	5.255*** (0.789)	0.038 (0.059)
Poverty Dense	0.511 (0.469)	0.167 (0.256)	2.671* (1.446)	0.304 (0.809)	2.344*** (0.665)	-0.040 (0.0574)
Lack Transportation	-0.871 (0.424)	-0.375* (0.214)	-0.951 (1.372)	-0.359 (0.809)	-0.617 (0.652)	-0.061 (0.049)
Black Neighborhood	-1.00** (0.390)	-0.0943 (0.201)	0.489 (1.567)	0.142 (1.004)	0.322 (0.689)	-0.023 (0.045)
Latino Neighborhood	-0.258 (0.347)	-0.156 (0.187)	-0.210 (1.382)	-0.278 (0.824)	0.045 (0.644)	0.004 (0.036)
Constant	10.65*** (0.469)	8.488*** (0.327)	2.083 (1.545)	2.218** (1.013)	-0.065 (0.680)	0.341*** (0.053)
Observations	96	95	96	96	96	96
R-squared	0.501	0.406	0.494	0.412	0.529	0.212
RSE=robust standard errors *** p<0.01, ** p<0.05, * p<0.1						

APPENDIX B

Hartford Healthy Food Inventory Instrument

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

A. STORE INFORMATION

- 1) Store Name: _____
- 2) Store Address: _____
- 3) Coder Name: _____
- 4) Date of Inventory (Month/Day/Year): _____
- 5) Start Time: _____
- 6) End Time: _____
- 7) Inventory Status (circle one)
- | | |
|----------------------------|--------------------------------|
| A Completed | B Partial |
| C Denied/Owner not present | D Denied/store revoked consent |
| E Store not found | F Store closed |

Complete #8-10 after inventory is complete.

- 8) Census Tract (Source: US Census): _____
- 9) Store Sales (Source: Dun & Bradstreet): _____
- 10) Participation in Healthy Food Retailer program: **Yes No Don't Know**
- 11) WIC Vendor? **Yes No Don't Know** (Data source: CT Department of Public Health)

B. STORE EXTERIOR

12) Rate the amount of advertising/promotion of food and beverages on the storefront (windows, doors, walls, awning, etc). Definitions for healthy and unhealthy include:

- **Healthy Foods** are fruits and vegetables, whole grains, beans, nuts and seeds, non-fat and low-fat milk products, and lean meat, poultry, and fish. Healthy foods include minimal or no added fat, sugars or sweeteners. Unsweetened black coffee is included.
- **Unhealthy foods** are high calorie, low nutrient foods and beverages that include liquor, soft drinks and sweet desserts and highly sugared cereals, chips and other salty snacks, most solid fats, fried foods and other foods with high amounts of sugar, fat and/or sodium.

12-a. Unhealthy foods	
1	no advertising
2	a little <25%
3	moderate 25-50%
4	"in Your Face" (a lot) >50%

12-b. Healthy Foods	
1	no advertising
2	a little <25%
3	moderate 25-50%
4	"in Your Face" (a lot) >50%

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

12-c) Circle the number of advertisements/promotional images for healthy food options (including the HFRP).

0 1 2 3 4 5+

13) If store sells alcohol, is more than 1/3 of total window area covered by advertising? (circle one)

Yes=1 No=0 N/A=99 --Not applicable-store does not sell alcohol

14) Circle the number of advertisements/promotional images displayed for cigarettes or tobacco products? **0 1 2 3 4 5+**

15) Is more than 25% of total window area covered by tobacco advertising? **Yes No**

16) On the store exterior, is "We Accept WIC," "We Accept EBT/Food stamps" or similar signage displayed? **Yes=1 N=0**

C. STORE INTERIOR

17) Store Size (square footage using Laser measure) **a)** Measure 1: _____ **b)** Measure 2: _____

18) Rate your overall impression of the promotion of healthy foods and beverages inside the store. Be sure to look at the counters, walls and any floor or shelf displays, including sales promotions. Promotion includes healthy foods proximity to check out area, store placement, displays and any ads or marketing materials. Promotion does not measure quality of produce items.

Promotion of healthy foods in the store interior (circle one):

1	it has no promotion	is free from any promotion of healthy foods or beverages
2	is discrete (a little)	has some promotion in the store
3	is moderate	has promotion at the counter and in other areas of store
4	is "In Your Face" (a lot)	has promotion almost everywhere

19) Are WIC signs or EBT/Food Stamps signs displayed in the store? **Yes No**

20) Selling of unhealthy foods and beverages at the check out counter. This includes the point of purchase area (ie: items on, below or above the checkout counter). Circle "1" for yes if the item is present or "0" for no if the item is not.

Presence of unhealthy food near the checkout counter:

Ice cream	1 –Yes	0 –No
Candy	1 –Yes	0 –No
Soda or Energy Drinks	1 –Yes	0 –No
Juice Drinks (<100% juice)	1 –Yes	0 –No
Chips	1 –Yes	0 –No

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

21) Selling of **healthy** foods and beverages at the check out counter. This includes the point of purchase area (ie: items on, above or below the checkout counter). Circle "1" for yes if item is present.

Presence of Healthy food near the checkout counter:

Snack foods

Granola bar (whole grain, >2 g fiber, <14g sugar per serving)	1 –Yes	0 –No
Nuts	1 –Yes	0 –No
Seeds	1 –Yes	0 –No
Baked Chips	1 –Yes	0 –No
Pretzels	1 –Yes	0 –No
Reduced Fat Chips	1 –Yes	0 --No
100 Calorie Snack Packs	1 –Yes	0 --No

Fruit

Fresh Fruit	1 –Yes	0 –No
Fruit Cup/Cocktail	1 –Yes	0 –No
Applesauce	1 –Yes	0 –No

Drinks

100% Juice	1 –Yes	0 –No
Bottled Water	1 –Yes	0 –No
Milk (1%, 2% or skim only)	1 –Yes	0 –No

Other

Yogurt	1 –Yes	0 –No
String Cheese	1 –Yes	0 –No

D. PRODUCE

22) Is produce sold? (Circle one) 1 –Yes 0 – No If yes, continue. **If no →Skip to Section E.**

23) Are there any health promotion items around the fruit and vegetable display?
1 – Yes 0 – No 9 – Don't Know

24) Overall, how appealing is the display of produce? (Circle one):

Very Unappealing	Unappealing	Neutral	Appealing	Very Appealing
(dirty, unorganized, poor storage))		containers)	(clean, organized, nice	

25) Complete the inventory of produce items. Directions: Exclude any foods that are cooked/prepared in the store (ie: fried plantains, collard greens). When you locate a fruit or vegetable check to see if it is on the pre-defined list. If the produce item is present, circle "1" for yes. If available produce is not listed, add that item to the "write in" section under the applicable category. If produce is not available in its whole form but is packaged raw and pre-cut, mark 1 in the availability column and N/A for quality. Then add a note in the comments section indicating the item and that it was pre-cut. For all available produce, rate quality using the produce quality rating scale. If quality cannot be determined, circle N/A and using the comments box indicate the item and why quality could not be determined.

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

Produce Quality Rating Scale. (Rate each available produce item).	
N/A	Not applicable or available
1	All or most of fruit/vegetable is of poor quality (brown, bruised, overripe, wilted, moist);
2	Mixed quality; more poor than good
3	Mixed quality; more good than poor
4	All or most of fruit is of good quality (very fresh, no soft spots, excellent color)

25-a. FRESH FRUIT INVENTORY						
FRUIT	AVAILABLE	QUALITY (Poor Good)				
Apples	1 –Yes	N/A	1	2	3	4
Bananas	1 –Yes	N/A	1	2	3	4
Cantaloupes	1 –Yes	N/A	1	2	3	4
Grapes	1 –Yes	N/A	1	2	3	4
Honeydew Melon	1 –Yes	N/A	1	2	3	4
Kiwi	1 –Yes	N/A	1	2	3	4
Limes	1 –Yes	N/A	1	2	3	4
Mango	1 –Yes	N/A	1	2	3	4
Orange	1 –Yes	N/A	1	2	3	4
Peaches	1 –Yes	N/A	1	2	3	4
Papayas	1 –Yes	N/A	1	2	3	4
Pears	1 –Yes	N/A	1	2	3	4
Pineapple	1 –Yes	N/A	1	2	3	4
Plantains	1 –Yes	N/A				
Plums	1 –Yes	N/A	1	2	3	4
Strawberries	1 –Yes	N/A	1	2	3	4
Watermelon	1 –Yes	N/A	1	2	3	4
WRITE IN FRUIT		QUALITY (Poor Good)				
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4

25-b. FRESH VEGETABLE INVENTORY						
VEGETABLE	AVAILABLE	QUALITY (Poor Good)				
Avocado	1 –Yes	N/A	1	2	3	4
Broccoli	1 –Yes	N/A	1	2	3	4
Calabaza	1 –Yes	N/A	1	2	3	4
Cabbage	1 –Yes	N/A	1	2	3	4
Carrots	1 –Yes	N/A	1	2	3	4
Celery	1 –Yes	N/A	1	2	3	4
Collard Greens/Dark leafy greens	1 –Yes	N/A	1	2	3	4
Corn	1 –Yes	N/A	1	2	3	4
Cucumbers	1 –Yes	N/A	1	2	3	4
Green Beans	1 –Yes	N/A	1	2	3	4
Lettuce	1 –Yes	N/A	1	2	3	4
Peas	1 –Yes	N/A	1	2	3	4
Onions	1 –Yes	N/A	1	2	3	4
Peppers, Red	1 –Yes	N/A	1	2	3	4
Peppers, Green	1 –Yes	N/A	1	2	3	4
Potatoes (any)	1 –Yes	N/A	1	2	3	4
Spinach	1 –Yes	N/A	1	2	3	4
Tomatoes	1 –Yes	N/A	1	2	3	4
WRITE IN VEGETABLES		QUALITY (Poor Good)				
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4
		N/A	1	2	3	4

Comments:

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

E. CANNED or DRIED FRUITS AND VEGETABLES

26) Complete the inventory of canned fruits and canned vegetables.

Directions: Record all canned fruits or vegetables available in the store. When you locate a canned fruit/vegetable, circle "1" for yes if the item is listed. If the fruit/vegetable is not listed, write in the available item under the relevant write in section. For each available canned fruit, indicate whether the fruit is packed in any of the following: its own juice, 100% fruit juice/concentrate or light syrup. Circle "1" for yes or "0" for no.

26-a. CANNED FRUIT INVENTORY		
FRUIT	AVAILABLE	HEALTHIER <i>Packed in own juice; 100% fruit juice</i>
Apples	1 –Yes	1 –Yes 0 –No
Applesauce	1 –Yes	N/A
Guava	1 –Yes	1 –Yes 0 –No
Mandarin Oranges	1 –Yes	1 –Yes 0 –No
Mango	1 –Yes	1 –Yes 0 –No
Mixed fruit	1 –Yes	1 –Yes 0 –No
Peaches	1 –Yes	1 –Yes 0 –No
Pears	1 –Yes	1 –Yes 0 –No
Pineapple	1 –Yes	1 –Yes 0 –No
Raisins	1 –Yes	N/A
WRITE IN OTHER CANNED/DRIED FRUITS AVAILABLE		
		1 –Yes 0 –No
		1 –Yes 0 –No
		1 –Yes 0 –No
		1 –Yes 0 –No
		1 –Yes 0 –No
		1 –Yes 0 –No
		1 –Yes 0 –No
		1 –Yes 0 –No

26-b. CANNED VEGETABLE INVENTORY	
VEGETABLE <i>Exclude: pickled vegetables, olives, salsas and condiments.</i>	AVAILABLE
Beets	1 –Yes
Carrots	1 –Yes
Corn	1 –Yes
Green Beans	1 –Yes
Mixed Vegetables	1 –Yes
Peas	1 –Yes
Peas and Carrots	1 –Yes
Pigeon Peas	1 –Yes
Spinach	1 –Yes
Tomatoes	1 –Yes
WRITE IN OTHER VEGETABLES AVAIL.	

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

F. OTHER CANNED GOODS

Directions: Indicate whether the item is available by circling "1" for yes or "0" for no. If yes, circle the relevant response for the additional details category.

CANNED/JARRED FOOD	AVAILABLE	ADDITIONAL DETAILS
27) Canned Beans	1 –Yes 0 –No	How many types of beans? 1 2 3 4 5+
28) 100% Juice ≥ 36 oz <i>Check coolers for juice & 100% concentrate.</i>	1 –Yes 0 –No	Are there 3 or more flavors? 1 –Yes 0 –No
29) Chunk Light Tuna or Albacore	1 –Yes 0 –No	In water? 1 –Yes 0 –No
CANNED/JARRED FOOD	AVAILABLE	ADDITIONAL DETAILS
30) Canned Salmon	1 –Yes 0 –No	
31) Canned Sardines	1 –Yes 0 –No	In water 1 –Yes 0 –No
32) Canned Soup	1 –Yes 0 –No	Low sodium? 1 –Yes 0 –No
33) Peanut Butter	1 –Yes 0 –No	
34) Cooking Spray	1 –Yes 0 –No	

G. DRY GOODS: Dried Beans, Grains, Cereals, Breads and Snacks

35) Dried Beans	1 –Yes	0 –No
a) If yes, circle how many types of beans:	1 2 3 4 5+	
36) Grains		
a) White Rice	1 –Yes	0 –No
b) Brown Rice	1 –Yes	0 –No
c) Barley or other whole grains	1 –Yes	0 –No
d) Oatmeal/Rolled Oats (plain)	1 –Yes	0 –No
37) Cereal	1 –Yes	0 –No
	<u>Variety of Cereals</u>	
a) Low sugar ≤ 8 g of sugar	0 1	2+
b) Low sugar & Whole grain (first ingredient) ¹	0 1	2+
c) Low Sugar & High fiber ≥ 3 g of fiber	0 1	2+
b) Low sugar, Whole grain, High Fiber	0 1	2+
38) Bread	1 –Yes	0 –No
a) Wheat bread	1 –Yes	0 –No
b) Whole grain (first ingredient)	1 –Yes	0 –No
c) High fiber > 3 g of fiber	1 –Yes	0 –No
39) Tortillas	1 –Yes	0 –No
a) Corn tortillas--no lard	1 –Yes	0 –No
b) Whole wheat (first ingredient)	1 –Yes	0 –No

¹ **Definition: Whole Grain bread or cereal.** First ingredient must be whole wheat, whole oats, whole grain corn or other whole grain.

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

40) Snacks

a) Baked Chips	1 –Yes	0 –No
b) Pretzels	1 –Yes	0 –No
c) Popcorn (kernels or no butter added)	1 –Yes	0 –No
d) Nuts	1 –Yes	0 –No
e) Seeds	1 –Yes	0 –No
f) Reduced fat chips	1–Yes	0–No
g) Granola Bars (see below)	1 –Yes	0 –No
whole grain, >2 g fiber, <14g sugar per serving		
h) 100 calorie snack packs	1 –Yes	0 –No

H. REFRIGERATOR/FREEZER SECTION: Juice, Dairy, Meat, Frozen Fruit/Vegetables

41) 100% Juice in ≤16 oz containers (check coolers & shelves)	1 –Yes	0 – No
a. Are there 3 or more flavors?	1 –Yes	0 – No

42) Milk

TYPE OF MILK--any size	AVAILABLE	WRITE IN LOWEST POSTED PRICE-- \$0.00		Quantity	
		Gallon	½ Gallon	Gallon	½ Gallon
a. Whole Milk	1 –Yes				
b. Reduced Fat Milk – 2%	1 –Yes				
c. Low Fat Milk -1%	1 –Yes				
d. Non Fat/Skim Milk -0%	1 –Yes				

43) Other Dairy

DAIRY ITEM	AVAILABLE	REGULAR	REDUCED/LOW FAT	FAT FREE
a. Yogurt	1 –Yes	1 –Yes 0 –No	1 –Yes 0 –No	1 –Yes 0 –No
b. Cheese	1 –Yes	1 –Yes 0 –No	1 –Yes 0 –No	1 –Yes 0 –No
c. Eggs	1 –Yes			

44) Meat: Chicken, Beef and Turkey (no prepared/cooked items). Be sure to check the freezer section!

MEAT	AVAILABLE	HEALTHY ALTERNATIVE		
a. Chicken	1 –Yes	Is skinless available?	1 –Yes	0 – No
b. Ground Turkey	1 –Yes	Is ≤ 10% fat available?	1 –Yes	0 – No
c. Ground Beef	1 –Yes	Is ≤ 10% fat available?	1 –Yes	0 – No

Appendix B: Hartford Healthy Corner Store Inventory (2009-2010)

45) Complete the Frozen Fruit and Frozen Vegetable Inventory.

Directions: Record all frozen fruits/vegetables available in the store. When you locate a frozen fruit/vegetable, circle “1” for yes if the item is listed. If the fruit/vegetable is not listed, write in the available item.

[illegible]

45c. Is the quality of freezer items acceptable? (ie: bags are not frozen together, freezer appears to be working properly, items are clean) **1 –Yes** **0 –No**

Freezer Scale: 1 2 3 4 5
Poor Ok Excellent

Things to remember:

Avoid missing data by checking that all questions are completed.

Double check that all entries are legible.

Thank you!

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