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IMPROVING COMMUNITY HEALTH THROUGH
POLICY RESEARCH

HEALTHIMPACT ASSESSMENT: DEVELOPMENT OF A FULL- SERVICE GROCERY STORE WITHIN A FOOD DESERT



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Using the methods of a Health Impact Assessment, this report is intended to determine potential intended and unintended health-related consequences

which may result from the development of a full-service grocery store within a federally designated food desert in Indianapolis, Indiana.

ABSTRACT

INTRODUCTION The food retail environment of a community – the array of grocery stores, small markets, restaurants, farmers’ markets, etc. – plays an important role in determining health status. Low-income individuals, in particular, face challenges purchasing fruits, vegetables and other nutritious foods. These foods are simply not available within the neighborhood, the quality is poor, and/or the price is exorbitant. This Health Impact Assessment (HIA) examines the potential health implications of the development of a grocery store within a federally designated food desert on the northeast side of Indianapolis, Indiana.

An HIA follows a systematic approach which includes accessing several data sources, using analytic methods, and gathering stakeholder input to determine both the intended and unintended health impacts of a proposed policy or project. This information is then analyzed to make recommendations to manage these potential effects.

This HIA was conducted to study the health and social impacts of introducing a full-service grocery store into a food desert, an area with limited access to groceries. The goal was to determine whether the development of a grocery store will impact the economic, social, and health-related well-being of residents. This six month project was a partnership between the IU Richard M Fairbanks School of Public Health at IUPUI (FSPH) and the Marion County Public Health Department (MCPHD), both located in Indianapolis, Indiana. Funding for the project was awarded through a grant program managed by the Indiana Minority Health Coalition (IMHC) as a component of their State Master Research Plan.

PROJECT DESCRIPTION

For residents to maintain a healthy diet, healthy food must be affordable, available, inviting, and reasonably convenient. This is especially true for residents of socially and economically distressed neighborhoods. Over the past several decades, the grocery industry has consolidated stores, resulting in supercenters and discount stores which are typically located outside the urban core of cities. At the same time, alternative sources of fresh food, such as farmers’ market produce stands and community-supported agriculture programs, have also extended outside of the urban core. Without these retailers, communities are deprived of the health benefits of fresh foods. Recognizing that good health comes not just from receiving quality medical care, but also from healthy living, this project aims to identify the relationship between ready access to a grocery store and the likelihood

residents would eat a nutritious diet, consequently decreasing the potential of developing chronic disease [1].

To determine the potential health impacts of a grocery store in the Meadows neighborhood, this HIA was initiated in November 2012. Interviews with key stakeholders residing in or working on behalf of the Meadows’ neighborhoods were conducted during November and December 2012. Researchers also participated in a neighborhood meeting and interviewed leaders of a nearby community that succeeded in securing a full-scale grocery store where one had not existed for several years. In January 2013, a Scoping Workshop was held with a group of stakeholders to seek preliminary input on the proposed scope of the project. Five study questions were outlined as key investigative areas, and are as follows:

1. Is there reasonable access to healthy foods, i.e. a blend of fresh and frozen produce, low fat dairy products, whole grains, and low fat meats, within the Meadows community?
2. Do community residents believe they have reasonable access to healthy foods in their community?
3. What is the current health status of the Meadows community population as it relates to nutrition?
4. Is there a relationship between availability of healthy foods and health outcomes such as obesity, high blood pressure, and diabetes?
5. Is there a relationship between access to healthy foods and consuming healthy foods?

These questions were each addressed through different phases within the study design.

MEADOWS COMMUNITY DESCRIPTION

The proposed full-service grocery store would be located at E. 38th Street and Meadows Drive, in Indianapolis, Indiana. This intersection falls within a neighborhood referred to as the “Meadows” by most area residents. The area sits on Indianapolis’ north-east side and is roughly defined as Fall Creek Parkway east to Sherman Drive and 38th Street north to 46th Street.

In the 1950s and 1960s, the Meadows area was a thriving place to live, work and play. It was home to one of the first premier shopping centers in Indianapolis. The Avondale Playhouse booked nationally known entertainers during the summer months. The apartments in the area were home to Indianapolis



business people and professionals, many of whom later assumed important leadership positions in the Indianapolis community. Then, in the 1970s, concentrated poverty struck urban areas nationwide. Since that time, the Meadows has been neighborhood challenged by urban decline with a concentration of poverty in five low-income apartment complexes, high crime, and the flight of quality retail businesses.

In the early 1990s, the national grocer Cub Foods chose the Meadows for a local retail outlet. This lasted only 18 months. Cub Foods had a suburban model for groceries that did not work for the Meadows population. The stores were designed to sit off the main street to serve people purchasing groceries once a week- not every day as many low-income people do. Many items were sold in bulk, the stores were very large, the carts were over-sized, and customers bagged their own groceries. This store was doomed to fail in this community.

The Meadows is still considered a distressed area with disproportionately high crime, poverty, and unemployment rates. A community economic development corporation, the Meadows Community Foundation, has been working on a three-phase redevelopment initiative in the area and has received significant funding. Phase I of the redevelopment initiative included bringing two different charter schools to the Meadows, which have been in operation for several years and are considered quite successful. Phase II included building high-end mixed-income housing and developing a community health center and YMCA in the area. Phase III includes bringing a grocery store to the area. While Phase I and II efforts have been successful, community developers believe a grocery store will provide economic opportunities in the area that do not currently exist and might encourage other businesses to come to the neighborhood.

Tax Increment Financing (TIF) has been the center of interest by residents and advocates in the Meadows, economic development city planners, and the Meadows Community Foundation. TIF is typically used to encourage investment and development within a specified geographical location. Eligible uses projects that benefit the district, including: capital project expenditures in the district; contracting for loan or grant projects through community development corporations; and infrastructure, such as sidewalks, land acquisition, clearing and improvement.

Discussions to designate a portion of the Meadows as a TIF district have been ongoing for over a year. The Meadows Community Foundation, several neighborhood associations, and other partners have worked with the City County Councilor to present a proposal to the Indianapolis Marion County City County Council. Proposal 349 was introduced October 11, 2012 and slated for a public hearing in the Metropolitan and Economic Development Committee in January 2013. During this hearing, testimony

from the United Northeast Community Development Corporation, Strategic Capital Partners, East Village Avondale/Meadows, multiple residents, and Dr. Cindy Stone of the FSPH was given, affirming support for the TIF designation, specifically the need for a grocery store in the area. The proposal was tabled and has not been reintroduced. Unless action is taken, a tabled proposal dies after six months; for TIF designation to occur, a new proposal will be required.

The Meadows has a total population of 25,356; 58% of area residents are Black or African American and 37% are White, according to the American Communities Survey of 2010 [2]. Sixteen percent of the population has not received a high school diploma, 26% has received a high school diploma, and 21% has a Bachelor's degree or higher. Unemployment is 11% as compared to seven percent for the total county. Sixteen percent of families in the Meadows live in poverty as compared to 14% in Marion County [3].

The Meadows falls within the boundaries of a United States Department of Agriculture (USDA) designated food desert, an area with little or no access to grocery stores with fresh and affordable foods necessary to maintain a healthy diet. Most residents in this area drive several miles to reach the nearest grocery store. They tend to shop for food at local gas stations, convenience stores, or pharmacies. There are potential negative health outcomes due to a lack of fresh fruits and vegetables in the diet. These food are more commonly available at grocery stores but not often sold at gas stations and convenience stores. The lack of healthy food options can lead to an increased risk for chronic diseases such as obesity, diabetes, cardiovascular disease and stroke in the Meadows.

The Indiana University Institutional Review Board granted approval for the project in November 2012. Approval was also received from the Marion County Public Health Department Research Review Committee on December 21, 2012.

HEALTH IMPACT ASSESSMENT PROCESS

Health Impact Assessments include the following six steps: screening, scoping, assessment, recommendations, reporting, and monitoring and evaluation.

Screening determines if HIA methods are necessary and will bring value to the project. If so, the assessment will proceed; if not, other options may be considered.

Scoping sets the parameters of the study, including populations that may be affected, health conditions to be considered, and methods that will be used to answer study questions.

Assessment focuses on the baseline characteristics of the study: distributing and collecting additional data needed through surveys; accessing second-hand data; and analysis to determine the health effects of the proposed project.

Recommendations suggest specific and detailed alternatives or additions to the proposed project to



diminish potential negative and maximize positive health outcomes.

Reporting is the process of sharing the proposed recommendations with key stakeholders, partners, and populations of interest.

Monitoring and **Evaluation** continues after the HIA report has been prepared and includes assessing if protocols set up in the scoping phase are followed appropriately and recommendations are being implemented in the project [4].

For this HIA, the screening step was conducted from November to December 2012; the scoping portion was conducted and completed in January of 2013. The assessment step was conducted from February to May 2013. Recommendations were completed in May of 2013. The final report was submitted on June 12, 2013 and an oral presentation presented on June 19, 2013.

STAKEHOLDER ENGAGEMENT

Ensuring that key stakeholders from the community are included in the HIA process is vital to the success

of an HIA. This HIA attempted to engage stakeholders in each step of the process. During the screening step, eight community stakeholders were identified and key informant interviews were conducted by project team members. In addition, the Oxford Neighborhood Association Meeting, with input from 30 residents, and the Indy East Food Desert Coalition Meeting were both attended. The scoping step involved six stakeholders and project team members. Assessment involved input from 344 residents throughout the Meadows area. Recommendations, reporting, and monitoring were discussed with five stakeholders and the project team.

METHODS

Data was gathered from relevant literature, key informant interviews and group input. The Nutrition Environment Assessment Survey (NEMS-S) was used to assess the quality, cost and availability of food at the area convenience stores and grocery stores outside the Meadows neighborhood. A Neighborhood Survey was developed, piloted and used to gather information from the Meadows residents. Survey data was entered using the IU Redcap system, SAS and Excel tools.

REVIEW OF RELEVANT LITERATURE

The local environment and the impact on health has been gaining interest within the public health field over the past ten years. While a more thorough review of the literature can be found in annotated bibliography form in the appendix section, this brief literature review will highlight previous findings related to grocery store availability and the health of neighborhood residents.

Obesity in the United States

Within the United States, obesity levels have tripled in the last 30 years, affecting roughly 36% of all adults. These levels differ based on the region in the US and differing races and ethnicities; with the South and the Midwest have the highest regional levels and African American women living below 130% of the federal poverty level have the highest rates, 54.7% [3]. Overall, minorities and groups with a low socioeconomic status (SES) have higher rates of obesity [3]. In addition to health concerns implicated by the increase in obesity rates, there are extremely high

economic concerns related to the obesity epidemic. There are both direct costs – including preventative, diagnostic, and treatment services for obesity and related diseases – and indirect costs, such as morbidity and mortality costs [4]. One estimate of the overall economic burden caused by obesity and its related diseases calculates the total cost at \$147 billion per year [5]. These numbers illustrate why public health professionals, and the healthcare industry, are exploring creative solutions to address the obesity epidemic.

Obesity and Health-Related Complications

Individuals with lower SES status typically have higher rates of BMI and associated chronic diseases. One study found that as weight increases the risk of diabetes increases. One study found that only eight percent of healthy-weight individuals have diabetes while 43% with obesity class 3 were diabetic [6]. Higher rates of high blood pressure and cardiovascular disease are also found within lower SES groups [7]. Higher rates of coronary heart disease (CHD) are associated with neighborhood environments, with those living in deprived neighborhoods as having higher incident rates than those living in wealthier neighborhoods [8]. These increased rates of chronic disease associated with both obesity and lower SES status have made exploring ways to decrease obesity rates among low SES people groups a priority for public health professionals [9].

African Americans have higher rates of hypertension and cardiovascular disease (CVD). Numerous research studies have attempted to determine the cause for this discrepancy and effective methods to



control hypertension and CVD in African Americans. Several studies have assessed the Dietary Approaches to Stop Hypertension (DASH) model and found it to be successful within the African American community [10]. The DASH diet is one that is rich in fruits, vegetables, and low-fat dairy foods. It has been tested in randomized, controlled trials, resulting in a 6.9 mm Hg reduction in systolic and a 3.7 mm Hg reduction in diastolic blood pressure among African Americans as compared to other types of diets and in other ethnicities [11]. This decrease was even greater among African Americans already diagnosed with hypertension [11]. Another study exploring the relationship between blood pressure and diet found that African American vegetarians had a 16% prevalence of hypertension as compared to omnivorous African Americans, 31.1% [12]. The DASH Diet receives the highest recommendation from the Centers for Disease Control and Prevention, the National Heart, Lung and Blood Institute and other leading health organizations.

Cost of Health Related Illnesses

Medical expenditures for individuals with diabetes is more than three times greater. And diabetes accounts for one in every five dollars spent on health care in the U.S. each year. Furthermore, indirect costs from diabetes include: \$5 billion due to absenteeism; reduced production at work totaling \$20.8 billion; inability to work costing \$21.6 billion; and lost productivity with early mortality accounting for \$18.5 billion. Table 1 compares the cost in the U.S. with Indiana.

“Heart disease and stroke, the first and third leading causes of death for men and women, are among the most widespread and costly health problems facing our nation today, yet they also are among the most preventable. Cardiovascular diseases, including heart disease and stroke, account for more than one-third (33.6%) of all U.S. deaths”[13].

Table 1. Direct and Indirect Cost of Nutrition Related Diseases in the U.S. and Indiana

	U.S.	Indiana
Total cost of diabetes (billion)	\$245*	\$4***
Cost of direct medical care (billion)	\$176*	
Cost of reduced productivity (billion)	\$69*	
Average medical cost person with diabetes	\$11,744*	
Average medical cost per person without diabetes mellitus	\$2,935*	
Largest component of direct costs inpatient hospital care	50%*	
Length of hospital stay with diabetes (days)	4.8*	4.9***
Direct and indirect costs of treating heart disease (billion)	\$190.3**	\$4****
Direct and indirect costs of treating strokes (billion)	\$34.3**	\$8.4****
Direct and indirect costs of treating hypertension (billion)	\$50.6**	

Source: *American Diabetes Association, 2011; **American Heart Association, 2012; ***Thomaskutty, & Dwivedi, 2011; ****ISDH

2003

As the U.S. population ages, the economic impact of cardiovascular disease will increase. Overall, death rates for CVD’s have decreased in recent decades, however, rates for incidence and death continue to be high, particularly among members of certain racial and ethnic groups, individuals with low socioeconomic status, and those living in the southeastern US. For example, age-adjusted death rates for cardiovascular disease are 37% higher among African Americans than among Whites [13]. Hypertension ranks as one of the top ten most costly conditions among adult men and women over 18 years old. In 2009, direct medical costs for hypertension were \$47.5 billion with almost half for medication [14].

Summary of the Cost of Heart Disease, Stroke and Hypertension[17,18]

- More than one in three (83 million) U.S. adults currently live with one or more types of cardiovascular disease.
- Treatment of cardiovascular diseases accounts for about one of every six dollars spent on healthcare.
 - An estimated 935,000 heart attacks and 795,000 strokes occur each year.
 - Nearly 68 million adults have high blood pressure; approximately half do not have the condition controlled.
 - Roughly 71 million adults have high cholesterol (i.e., high levels of low-density lipoprotein cholesterol); nearly two out of three do not have the condition controlled.
- Roughly 56.5 million adults have hypertension.

Obesity and Environmental Factors

Obesity and associated chronic conditions may be reduced through various approaches. Previous findings attributed 20% of an individual’s health status to genetics, 10% to health care, and 70% to individual behavior, social and environmental factors. Taking a systems-level approach can make a large impact on population health [15]. Working to include environmental factors can ensure that those with the lowest health status have the same access to positive individual health behavior changes, such as access to public parks, grocery stores with healthy food options, and walkable neighborhoods.

The presence of grocery stores is conducive to healthy behaviors. “The presence of at least one healthy grocery store option in low-income neighborhoods is associated with a reduction in BMI/obesity risk relative to no food outlets” [16]. A separate study found that the presence of supermarkets is associated with a lower prevalence of obesity and overweight sta-



tus in neighborhood residents, while the presence of convenience stores is associated with a higher prevalence of obesity and overweight status [17]. Further research has found that each additional grocery store within a 2-km area is “associated with a reduced odds for obesity (OR 0.93, 95% CI 0.88-0.99) ... and convenience store (OR 1.01, 95% CI 1.00 – 1.02) access [was] predictive of greater obesity odds” [18].

People who live in areas identified as food deserts have several increased risk factors as compared to those who do not. One in four citizens in a food desert is less likely to have a healthy diet that meets the daily recommended allowance of fruit and vegetable intake [19]. Additionally, citizens of food deserts are more likely to be obese and to have chronic diseases related to risk factors, including diabetes and high blood pressure [19]. Several studies use the Retail Food Environment Index (RFEI), creating a score for an area based on the ratio between fast food and convenience stores compared to supermarkets and grocery stores. It has been determined that a high RFEI increases the odds of a resident being obese, even when controlling for variables such as “age, sex, education level, and neighborhood SES” [20]. Residents living in an area with the lowest RFEI index category had statistically significantly lower odds of being obese when compared with residents in the higher RFEI index category (OR = 0.75, 95% CI 0.59 – 0.95) [20].

It could be argued that people with a low SES status would not be able to afford, and therefore support, local grocery stores. However, one pilot study found that demand for fresh fruits and vegetables in a low SES community was high enough to cover costs and turn a profit within a convenience store and the demand increased as a greater quantity and variety of produce was introduced [21]. Other studies have found that citizens of food deserts want access to reasonably priced fresh fruits and vegetables and often adopt strategies to add these foods to their diets by shopping at several different grocery stores. However, as members of food deserts are frequently low-income, travel can be limited and impede their ability to ‘grocery store hop’ [22]. Additionally, citizens of neighborhoods with at least two stores carrying five or more types of green leafy vegetables consumed an average of 0.17 more servings of these vegetables, suggesting that access to healthy food options does increase the consumption of these foods [23]. Other studies have found that women with limited access to healthy foods are forced to change their eating behaviors to less healthy options, though they know that the foods selected are unhealthy [24]. Additional research has shown that living in low-income neighborhoods is associated with decreased consumption of fruits, vegetables, and fish, and increased consumption of meat, even after adjustment for individual-level income. This suggests that those with the means to purchase more expensive

and higher-quality foods are influenced by their readily available food options [25].

Additional Benefits of Grocery Stores

Increasing access to healthy foods is the obvious benefit to the existence of a grocery store in a neighborhood. However, there are other non-health specific benefits, particularly in a low-income neighborhood. Grocery stores opened within food deserts in Pennsylvania created 5,000 jobs, most of which were filled by neighborhood residents [26]. Additionally, houses located within a quarter to a half mile radius of a new grocery store saw property values increase by four to seven percent, with greater increases found in the lowest-valued neighborhoods [22]. Finally, the overall employment rate in these neighborhoods increased at a rate faster than that of the rest of the city, showing a positive impact on the economic activity within these areas [26].

Convenience Stores and Food Deserts

What food deserts lack in healthy food, they often make up for with a higher than average number of convenience stores and fast food restaurants. Unfortunately, the highest obesity levels are found in these neighborhoods, with roughly 32-40% of adults found to be obese and 73-78% found to be overweight in neighborhoods with only convenience stores [1]. Two additional studies found that predominantly African American (>75%) census tracts had no supermarkets or grocery stores compared to racially mixed, predominantly white, or predominantly Hispanic census tracts [27, 28]. Other studies confirm the research, finding that communities with a higher percentage of African American citizens have less access to supermarkets or grocery stores [29] and convenience stores stock a smaller range of healthy food options including low-fat dairy, fresh fruits and vegetables, and lean meats [29]. Other studies have shown that low-income African American neighborhoods have more liquor stores and convenience stores when compared with racially mixed and higher income neighborhoods [30, 31].

THE NUTRITION ENVIRONMENT MEASUREMENT SURVEY TOOL (NEMS-S)

In order to determine if healthy food options exist in the region, a literature review was conducted to identify the availability of neighborhood assessment tools. The Nutritional Environment Measurement Survey NEMS-S has been successfully used on numerous assessments and has a high rate of inter-rater reliability (0.84-1.00) and test-retest reliability (0.73-1.00). The tool measures retail food stores for the availability of healthy options, price, and quality. Ten categories are evaluated in the tool, such as fruits, vegetables, ground beef, and milk. NEMS-S was found to illustrate significant differences across store types. Differences are also measured within neighborhoods with varying



socioeconomic status [32].

Upon selection of the NEMS-S tool, screeners were required to complete roughly 20 hours of training via online modules and fieldwork to become certified NEMS-S raters. Three members of the MCPHD and FSPH research team completed this certification and conducted the environmental scan.

Selection of Convenience and Grocery Stores to Be Assessed

The NEMS-S protocols provide explicit instructions on how to identify and code grocery and convenience stores in an area. These protocols include accessing a list of all stores licensed in Marion County. This information was provided by the MCPHD. The three zip codes in a one-mile radius were selected (46205, 46218 and 46226) and each of the addresses for convenience and grocery stores were checked to determine if they fell into the assessment region. After completing this search, 11 convenience stores and no grocery stores were identified.

Once the stores were identified and coded to remove identifying information, the entire region was traversed by vehicle to see if any of the stores had closed, moved, or changed names. The neighborhood was also examined to determine if additional stores had opened and could be categorized as grocery or convenience stores. Upon completing this step, the total sample size of convenience stores remained at 11; however, one convenience store on the list was no longer in business and a new store in another location had opened. Additionally, several stores had changed names. Appropriate changes were made to the NEMS-S enumeration and coding documents to ensure these changes did not affect the coding of the stores.

For the purposes of this study, items considered healthy food by the NEMS-S were used as indicators for healthy food purchasing. A full list of these 24 items is found in the Neighborhood Survey.

NEIGHBORHOOD SURVEY METHODS

Neighborhood residents and key stakeholders were asked about their food purchasing patterns, how often they eat fast food, and if they feel they have adequate access to healthy foods within their neighborhood (see Appendix A). The survey was developed by partners at the MCPHD, the FSPH, and given to key members of the Avondale-Meadows community for input. It was piloted with several groups not involved in the HIA project work, then presented to

faculty at the FSPH to ensure the questions accurately addressed the study questions and did not contain biases unknown to the study investigators.

The sampling method was a convenience sample, as partners from the MCPHD and FSPH reached out to personal contacts within the area to recruit survey participants living in the designated one-mile radius of the proposed location of the grocery store. MPH students, along with project partners, were trained on survey dissemination, given a script to follow, and paired in teams of two.

Each survey participant was asked if he/she lived within a 1-mile radius of E. 38th Street and Meadows Drive (a map with the radius marked on it was provided to survey participants before completing the survey; see Appendix B). Individual surveys were delivered verbally and group interview participants were given a copy of the survey while the investigator read the questions aloud to the group as a guided survey response. This was done to ensure that all participants in the survey heard and understood the same survey instrument.

The findings from this survey will be used to detect the exposure of neighborhood residents to healthy food options and the outcome of the purchasing of certain foods considered healthy. Exposure status was coded into two levels: high and low access to locations that have healthy food options. Exposure status was based on personal reports of where and how often residents shop for groceries since a full-service grocery store is not available within their area.

Secondary data extrapolation was done using the Marion County Health Department resident hospital discharge and emergency department encounter data. In addition, Marion County Health Department resident death certificate dataset and cause of death data was collected for the Meadows neighborhood using the 46205, 46218 and 46226 zip codes. Data was also extracted for Marion County and the Meadows using the American Communities data set from the SAVI database [33,34].

KEY INFORMANT INTERVIEWS AND GROUPS

Key informants were interviewed to gather background information about the Meadows neighborhood, their role and activities in relation to the Meadows neighborhood, and to determine their perceived value of the HIA project. The goal was to conduct three key informant interviews and attend one community meeting (see the Key informant Interview Questions in Appendix C).



RESULTS

RESULTS FROM SECONDARY DATA REVIEW

The team selected four chronic disease categories: hypertension; diabetes; ischemic heart disease and stroke; and an all-cause category for hospitalization, emergency department (ED) discharge, and mortality. Per 10,000 rates were calculated for hospitalizations and ED over the years 2009-2012, while per 100,000 rates were calculated for mortality over years 2008-2012. In each case, a rate was calculated both for Marion County and for the Meadows neighborhood, as defined by resident zip codes values 46205, 46218 and 46226.

Without exception, rates for the Meadows region are higher, in some cases more than two times higher, than the county as a whole (Tables 2 & 3). ED rates for the event-related ischemic heart disease and stroke are lowered by virtue of calculating across all ages, with the preponderance of diagnosis falling in the upper age ranges. Nonetheless, rates for Meadows residents remain higher than those for the entire county. There is a positive correlation between chronic disease and the neighborhood designation as a food desert.

Table 2. Hospitalization and ED rates for the Meadows and Marion County 2009-2011

	Hospitalization rates - Meadows	Hospitalization rates - County	ED rates - Meadows	ED rates - County
Total rates per 10,000	1277	1175	6044	4325
Diabetes	29.8	20.1	49.1	29.1
Hypertension	30.9	14.5	63.3	34.3
Ischemic Heart disease	42.7	38.0	8.9	7.9
Cerebrovascular disease	42.9	29.1	5.6	5.1

Source: Marion County Resident & Hospital Discharges, 2009-2011; Principles diagnosis; Marion County Emergency Department Encounter Data, 2009-2011, (principle diagnosis)

Table 3. Mortality Data for Meadows and Marion County for 2008-2012

Cause of Death	Meadows	Marion County
Total per 100,000	920.76	756.11
Diabetes	25.03	17.78
Hypertension	30.12	17.76
Ischemic Heart Disease	105.81	96.59
Cerebrovascular Disease	47.82	37.57

Source: Marion County Health Department Resident Death Certificate Analytic Dataset, 2008-2012, Official Cause of Death

Table 4. Average calculated cost for Meadows and Marion County of Heart Disease, Diabetes and Hypertension

	Meadows N=566 % with disease	Meadows # with disease	AHRQ MEPS av. cost per person	Meadows Av. Total Cost	Marion County N=5013 % with disease	Marion County # with disease	Marion County av. total Cost
Heart disease	6.5	37	4,043	\$149,591	7.7	386	1,560,598
Diabetes	19	108	2,173	\$234,684	14	702	1,525,446
Hypertension	41	232	858.50	\$194,172	31	1,554	1,334,109

Source: AHRQ Medical Expenditure Panel Survey 2011; Marion County Public Health Department, 2012

RESULTS OF NEMS-S SURVEY

In addition to the 11 convenience stores in the region, the top six grocery stores reported as locations the residents in the neighborhood shop were also assessed. All convenience stores were surveyed within two weeks by one rater. One of the 11 stores in the sample declined to participate, making the final sample size ten within a mile of the proposed grocery store location. Of these 10, all are rated as convenience stores. Six are gas stations (60%), one a convenience/pharmacy location (10%), and three discount stores (30%).

STATISTICS

In an effort to ascertain the availability of health foods in the study region, simple frequencies and percentages were calculated for the different food options included in the NEMS-S surveys. Each store was rated based upon the availability of healthy options and assigned a percentage identify the stores with the healthiest options. Additionally, counts of various items were tabulated among all convenience stores to determine the percentage of stores in the region carrying certain healthy food products.

After completing the surveys, it was found that neighborhood residents have little access to healthy food options within their neighborhood. Of the 30 possible items considered 'healthy' by the NEMS-S scoring system, stores stocked on average 6.1 of these items. If the store with the highest number of health options (an outlier with 21 of 30) is discarded from the sample, the average drops to 4.4 per store. Considering the stores received two of their points for stocking diet soda and 100% fruit juice, these results point to even fewer healthy food options.

As indicated, all stores stock diet sodas and 100% fruit juices. The only other item in more than 50% of all stores is low-sugar cereals, found in 8 of the 10 stores. Forty percent of stores stock low-fat muffins as an alternative to higher fat versions and 30% stock both 100% whole grain bread and baked potato chips; however, in two of the three stores, both baked chips and 100% whole grain bread are priced higher than the non-healthy alternatives. Only two stores offer skim or 1% milk, though all stores do offer 2% milk along with Vitamin D milk. None of the stores offer



ground beef, lean or regular.

Fresh product, the most commonly accepted food group for positive health outcomes, was widely absent from the neighborhood. Only one location sold fresh vegetables 5 out of 10 of those most commonly available. This store also carried 9 of 10 fresh fruits, making it the clear choice in the neighborhood for residents seeking healthy options. However, these items are sold individually (i.e., a single banana, a single apple) instead of in bags or bunches, at a higher price than one would expect to pay at a grocery store. Each of the fresh produce items in the NEMS-S survey area are sold for \$0.99 per piece. Table 5 outlines the findings from the NEMS-S survey.

Table 5. Results from NEMS-S Analysis

Healthier Item	% of Total Stores	Healthier Item	% of Total Stores	Healthier Item	% of Total Stores
Skim milk	20%	Pears	10%	Cauliflower	0%
Bananas	30%	Carrots	10%	Lean meat	0%
Apples	30%	Tomatoes	10%	Fat free/light hotdogs	10%
Oranges	20%	Sweet peppers	10%	Reduced fat frozen dinners	10%
Grapes	10%	Broccoli	0%	Low fat baked goods	40%
Cantaloupe	10%	Lettuce	10%	Diet soda	100%
Peaches	0%	Corn	0%	100% juice	100%
Strawberries	10%	Celery	0%	100% whole wheat bread	30%
Honeydew melon	10%	Cucumbers	10%	Baked chips	30%
Watermelon	10%	Cabbage	0%	Low sugar cereal	80%

As very few healthy items can be found in the 1-mile radius of the proposed grocery store, it is evident there is not reasonable access to healthy foods within the Meadows community.

RESULTS OF NEIGHBORHOOD SURVEY

Sample Size

A total of eight locations were selected to survey participants, the majority conducted at Walgreens. All surveys were entered into the Indiana University surveying software, Redcap. Data was entered into Redcap by trained partners at the MCPHD and project participants from FSPH. Pertinent data from

the neighborhood survey was extracted into Excel and uploaded into SAS 9.3 to perform statistical analysis.

A total of 344 survey responses were obtained and a check for normality was performed on age distribution, percentage of shopping trips in grocery stores stocking healthy food items, and count of healthy food items. All three tests showed data to be non-normal. Subsequently, nonparametric tests were used for pertinent statistical analyses.

The age of the survey participants ranged from 18 – 92 years of age, with a mean of 48.08 years ($SD = 18.25$). There was a higher percentage of female respondents (73.59% female compared to 26.41% male) and a slight majority had one or more children of under 18 years living within their households (55.52% compared to 44.48%). Among all participants, the mean number of fruits and vegetables purchased was 12.06 ($SD = 3.33$), with a range from 0 – 16. Similarly skewed was the percentage of grocery shopping done at locations with healthy food options, on average 90.04% of all shopping was in grocery stores with the NEMS-S-S healthy food options, with a standard deviation of 19.05.

Nearly 90% (89.94%) rely on personal vehicles to travel to their preferred grocery store; 5.03% use public transportation; 4.09% walk; and 0.95% take a taxi. More than half of the respondents felt that they were able to find and purchase all of the groceries they needed, 65.72%, 61.95% of whom travel to the store by car. Roughly one third of respondents shop once a week (30.23%) and slightly fewer less frequently (27.62%). Those who report two times per week (20.93%), three or more times per week (15.12%), or daily (2.91%) comprise the rest of the sample.

A total of 263 respondents reported shopping at full-service grocery stores with all of the NEMS-S healthy food options available at least 80% of the time, categorizing them in the ‘high’ exposure group (76.45%). The remaining 81 respondents (23.55%) fell into the ‘low’ exposure group see Table 6). The ‘high’ selection group, 219 respondents (63.66%), purchase 12 or more health options while 125 (36.43%) are in the ‘low’ selection group (see Table 6).

Table 6. Exposure and Selection Totals

	High Exposure	Low Exposure	Total
High selection	167	52	219
Low selection	96	29	125
Total	263	81	344

A logistic regression was performed between the high and low exposure groups and the high and low selection groups to calculate the odds ratio between exposure and outcome. The odds ratio is 0.97, with a 95% confidence interval of 0.58 – 1.63. This is not statistically significant. A linear regression was conducted between the healthy food percentage and the count of healthy food items purchased. The r-squared



value of this linear regression was 0.03, showing virtually no association between exposure and healthy food purchases.

A t-test was conducted between the exposure group and the total number of healthy food options purchased, as well as between the percentage of healthy food exposure and the selection group. Results of these tests indicate there is not a significant difference between exposure group status and total number of healthy food options purchased. Results for each of these tests are summarized in Tables 7 and 8.

Table 7. Results from T-Test between Exposure Group and Mean F and V Purchases

Exposure Status	N	Mean fruit & veg Purchased	Std Dev	P-Value
Exposed	263	12.18	3.25	0.57
Unexposed	81	11.88	3.60	

Table 8. Results from T-Test between Selection Group and Mean Percent of Healthy Exposure

Selection Group	N	Mean % Healthy Exposure	Std Dev	P-Value
High	217	90.27	18.20	0.77
Low	124	89.65	20.52	

To further understand the data, t-tests were conducted comparing gender and exposure to health food items to test for statistically significant difference. Separate t-tests were also conducted by gender healthy food item purchases. Results of these tests no statistically significant difference between gender and exposure ($p = 0.23$); however, there was a significant difference between gender and healthy food items purchased ($p = 0.001$), with women purchasing more of the NEMS-S healthy food items than men.

After coding results of those with children, t-tests were conducted for exposure as well as purchases. These two tests show there is not a statistically significant difference ($p = 0.70$) between those with children and those without children exposure; however, a comparison of those with or without children and the number of healthy food items purchased approaches significance ($p = 0.08$).

A logistic regression was conducted between those with or without children, gender groups, exposure status, the selection group regularly purchasing healthy food options, the presence of children in the household, and the number of times per week fast food is consumed. The results show that gender, age, and the presence of children in the household are predictive of a decrease in healthy food item purchases. These results are shown in Table 9.

Table 9. Results from Logistic Regression of Key Variables and Outcome of Healthy Food Selection

Effect	Wald Chi-Square	95% Confidence Interval
Gender: Female vs Male	6.17	1.148-3.233
Age	6.21	1.004-1.035
Kids: Yes vs No	4.07	1.016-3.112

An analysis of variance test was conducted between age group and the purchase of healthy food options. Results of these tests show there is not a statistically significant difference in the purchasing patterns across age groups ($p = 0.59$). However, when coding responses by age group, under 30 years old and over 30 years old, key differences were found. Those under 30 years of age reported eating fast food statistically significantly more often than those over 30, with a p -value of 0.0172. A difference is also found in the number of times per week individuals prepare meals at home, with a p -value of 0.0262. This difference in eating habits across the two age groups does not appear in shopping purchases, with no difference in the number of healthy foods purchased between the two age groups.

Survey respondents were asked where they purchase groceries in an average month and how long it takes to travel to the store. The top five reported grocery stores were noted in Table 10.

Table 10. Grocery Store used as reported in the Neighborhood Survey

Grocery Store	Distance (Miles)* from Survey	Minutes Driving** from Survey
Kroger (46th & Arlington)	3.71	10.3
Kroger (62nd & Keystone)	3.86	13.6
Walmart (71st & Keystone)	4.37	17.5
Aldi (54th & Keystone)	1.99	15.9
Safeway (25th & Sherman)	2.18	9.6

* Mileage calculated using MapQuest

** Average driving time self-reported by neighborhood residents

Survey respondents were also asked to identify how much they spend on household groceries in average each week. The most frequent response was \$100 or more per week, with 78% reporting \$50 or more per week. Age groups were used to adjust for household size, with younger respondents having children under 18 years old in the household.

Table 11. Weekly grocery cost reported for household, those 30 or



under, and over 30

	Less than \$50	\$50-75	\$75-100	More than \$100	No response	Totals
30 or under	11	12	27	24	3	78 (23%)
Over 30	55	75	62	71	3	266 (77%)
Totals	66 (19%)	88 (25%)	89 (26%)	95 (28%)	6 (2%)	344 (100%)

Survey respondents were asked if their grocery shopping routine would be altered if a supermarket was available within the Meadows Neighborhood. If so, they were asked to describe what would change. A total of 187 responders mentioned 292 items. These items were coded and the top ten responses are noted in Table 12.

Table 12. If a large supermarket was in the area would it change your shopping routine

Top Ten Responses	Number of Responses	Percent of 292 Responses
Shopping would be closer	61	33
I would shop there	47	25
I might shop there	41	22
I would shop more often	31	17
I would save money	22	12
I would have more selection/variety	19	10
More convenient	17	9
Would change what I purchase	11	6
Save gas	8	4
Would walk there	8	4
I would like higher quality products	8	4

Respondents were asked if they had any additional information to share: 85 people provided 148 additional comments and the top five mentioned are noted in Table 13.

Table 13. Additional comments about the need for a grocery store

Comment	Number of Responses	Percent of 148 Responses
We need a grocery store in the Meadows	79	53.4
It would be convenient and save time	11	7.4
It would improve the community	10	6.7
We would have better prices	9	6.1
I wouldn't have to travel so far	8	5.4

Additional key points:

- We have needed a grocery store for 15 years
- It would give jobs to people in the community and employ youth
- It would be very useful to have a grocery store

for people who ride the bus and need to carry a lot of bags

- I would love to not have to drive 20-30 minutes for a loaf of bread or milk

SURVEY INFORMANT AND GROUP INTERVIEWS

Eight key informant interviews were conducted. These included: a Pastor and First Lady from a local church; the Executive Director from the local Multi-Service Center; President of one of the area Neighborhood Associations; the Executive Director of the United NE Community Development Coalition; a City-County Councilor; the Vice President for Real Estate Development Strategic Capital Partners LLC; the President of the Meadows Community Foundation; and a manager with the City of Indianapolis Department of Economic Development. We also attended the Oxford Neighborhood Association meeting as part of the screening step and the assessment step.

RESULTS FROM THE KEY INFORMANT AND GROUP INTERVIEWS

The residents participating in the Meadows neighborhood association are supportive of a full service grocery store, though the geographical definition of the Meadows varied. The additional expense of gas currently required to buy groceries is another concern, however there was concern that an area grocery store would not have good quality or reasonably priced foods. Some noteworthy comments made by participants include: "The meadows is a food desert and we have obese children who are not active."; "People need to know why healthy food is important."; "To have a grocery store work in the Meadows, we must generate ground swell of demand and a strong request from the residents."; "Some young people don't know how to cook and they eat out a lot."

RESULTS FROM SCOPING WORKSHOP

The Scoping workshop was held on January 17, 2013 at the Marion County Public Health Department. Seven stakeholders and the project team attended. After an overview of the project, the discussion focused on defining the most effective pathways to the desired health outcomes and providing input on the neighborhood survey tool. The stakeholders discussed the need to have educational classes to inform neighbors how to cook and prepare healthy meals on a budget. This could include how to make 'traditional' foods in a healthier manner and how to purchase and prepare healthy foods. They also would like to have input into the foods, including the quality, which might be stocked in the grocery store.



RECOMMENDATIONS

Stakeholders met on May 23, 2013 to review the results and make recommendations on the monitoring and evaluation steps. Here are the five priority recommendations; the full list of recommendations can be found in Appendix. D.

- Approach existing food sources in the Meadows and encourage the increase of healthy foods options
- Provide nutrition and cooking education for various age groups and genders

- Support sidewalk expansion and increased transit to the area
- Share data with stakeholders and support the effort to obtain a TIF or a similar development measure
- Negotiate with the new grocery store to create the appropriate “footprint” for the Meadows area, including a pharmacy, cooking demonstrations, and labeling to identify healthy foods

REPORTING

A poster was presented at the Joseph Taylor Symposium February 27, 2013, and at the Robert Bingle Service Learning Symposium on April 30, 2013, both on the IUPUI campus in Indianapolis, IN. Assessment and result information was shared with the Stakeholders on May 23, 2013, to gain input and assistance in prioritizing the recommendations for action. A final report was sent to the Indiana Minor-

ity Health Coalition on June 12, 2013, and an oral presentation given on June 19, 2013. Key stakeholders received a written copy of the executive summary and final report. The information was posted on the project team websites and submitted to the Health Impact Project website. The project will be presented at the American Public Health Association Annual meeting in Boston, MA, in November 2013.

LIMITATIONS

Although the instrument for the neighborhood survey was reviewed multiple times by different stakeholders, it was impossible to completely address all potential limitations. The use of the radius map was an attempt to control the survey sample and focus on the area likely to have the greatest impact from the proposed grocery store; however, with multiple people distributing the surveys, there were varying levels of familiarity with the region, thus possible that people living outside of the 1-mile radius were included in the sample. It is likely this would only include a small percentage and encompass a short distance outside the targeted region. In addition, people were surveyed in the community, so home-bound or disabled individuals were not included; this population likely has their own unique needs.

Additionally, even with thorough review of literature was conducted, it was difficult to find pre-determined measures to code high to low exposure or outcome groups. The preliminary analysis on the partial data set to inform these cut-off levels, along with discussions with nutritionists, were conducted in an attempt to accurately represent exposure and outcome status. It is likely other studies could produce differing results if cut-off points were assigned at other levels.

Interview bias is possible as several different surveyors participated in the collection of the neighborhood responses. An attempt was made to control

this by training all surveyors in survey administration. It is possible that some surveyors asked questions in a different manner than others, potentially biasing the responses received.

In addition, the wording of some questions left them open to interpretation. For example, Question 3 (“Which of these items do you buy at the grocery store?”) could be interpreted as to whether the items are regularly purchased or have ever been purchased.

There is a risk for response bias based on the face-to-face format of the interviews. There is the possibility that some people participate in more than one survey with different administrators since identifying information was not obtained. However, most individuals indicated they had already participated when asked.

The data sources used for the secondary analysis had various parameters. For example some data was defined by zip code, some defined by census tracts and some geographically.

This Health Impact Assessment project is the first attempt to utilize all phases of the HIA methodology with both an academic and community partner. As such, there are several retrospective observations worth noting. As the project was concluding, it became apparent that the time spent on early phases (screening, scoping and assessment) was disproportionate to the time necessary to conduct the reporting, monitoring and evaluation phases. While informa-



tion gained from conducting eight key informant interviews was extremely valuable, the logistics of planning the appointments, conducting the sessions, documenting, and following up was time consuming. Significant effort was expended in the assessment phase to reach a statistically valid sample size for the Neighborhood Survey. As each site yielded a relatively small number of completed surveys, it took nearly six weeks to obtain the target sample. Consultation with Dr. Martin Birley provided helpful advice to allocate at least 50% of the project time to the later HIA phases. This re-allocation of time would allow more time to: engage in follow up research; data analysis; creating evaluation, feedback, and monitoring loops; and developing/implementing dissemination strategies.

As the community survey data collection was conducted, the researchers gained the sense that respondents were eager to give what was perceived as the “right” answers, even though it was explained that

all data would be anonymous and aggregated. The Neighborhood Survey instrument could be improved by asking about the purchase of unhealthy foods as well as healthy options. The wording of the first question to determine access should be reworked; anecdotal comments do not align with the overwhelmingly affirmative response to being asked if usually able to get all the groceries needed. In the Neighborhood Survey respondents were asked how they travel to the grocery store: by car, bus, walk, bike, or taxi. While the vast majority of people responded travel by car, what is not apparent is how many are driven to the store as opposed to driving themselves. Even though convenience sampling was utilized on the Neighborhood Survey, it is recognized that there may not have been adequate resources given to securing input from the most vulnerable populations, particularly those home bound. All surveying was done in community and/or public places, therefore only those with mobility had the opportunity to participate.

MONITORING AND EVALUATION

The HIA steps of monitoring and evaluation are indented to reflect on what was done in the HIA process and determine if the goals of the project were completed. This step also determines what partners will continue to monitor how HIA information is used and the actual health outcomes.

The MCPHD will follow the progress of a TIF designation by the Indianapolis-Marion City-County Council. They will monitor the efforts of the Meadows Community Foundation and Strategic Capital Partners to attract a full service grocery store. They will do periodic assessments of the health of the Meadows community to evaluate changes.

The evaluation step includes a review of each goal of the project. The project team completed all six steps of the HIA process.

A baseline assessment of the health status of the residents of the Meadows was completed, including hospitalization, ED discharge, and mortality data. The Community Health Needs Assessment data was incorporated along with data on childhood and adult obesity, chronic diseases, physical activity, food intake and smoking. The health of the Meadows residents was consistently poorer than the rest of Marion County.

Input was sought from residents and stakeholders

during each steps of the HIA process. Residents from the neighborhood association were included in the screening and scoping and participated in the survey development, discussion and recommendations, evaluation and monitoring steps. It is too early to determine if the HIA information will aid in efforts to secure a full service grocery store in the area. This will continue to be monitored.

The number of individuals trained in the HIA process increased as team members participated in a workshop conducted during the project by the FSPH Training Center. The Keynote Speaker was Dr Martin Birley, an internationally recognized HIA practitioner from London, England.

Key informant interviews were conducted with eight residents and key decision makers. A workshop was conducted with residents, key decision makers, and students. A scoping workshop was conducted in January 2013 for residents of the Meadows, key decision makers, and FSPH students.

The health profile of the Meadows community included information from the U.S. Census, American Communities Survey, SAVI database, NEMS-S measure, Neighborhood Survey and the MCPHD Community Health Needs Assessment Survey. The final report was completed for IMHC in June 2013.



DISCUSSION

As a framework for discussion, each research question will be discussed.

1. Is there reasonable access to healthy foods, i.e. a blend of fresh and frozen produce, low fat dairy products, whole grains, and low fat meats within the Meadows community?

It is clear from the results of the NEMS-S assessment that there are few healthy food options in the Meadows neighborhood. Ten of the eleven stores in the neighborhood were assessed, and of the 30 possible items considered 'healthy options' by the NEMS-S scoring system, only 6.1 of these items were stocked on average. When the store with the highest number of healthy options (an outlier with 21 of 30) was discarded from the sample, the average dropped to 4.4 items per store. Considering the minimal amount of healthy food provided, prices were noticeably higher than at full service grocery stores outside the neighborhood.

Also troubling is that all stores in the neighborhood are convenience stores—6 gas stations, 3 discount stores, and one pharmacy/convenience. Based on the Retail Food Environment Index, residents of the Meadows would most certainly be at higher risk for obesity since all the stores fall into the category of convenience and the number of supermarkets or full-service groceries in the community is zero.

The neighborhood survey illustrates that some of the most vulnerable residents might be the most at risk for obesity and related diseases. Higher age, male gender, and the presence of children in the family predicted a decrease in healthy food purchases. Additionally, individuals under 30 reported eating fast food significantly more often and preparing food at home significantly less.

Slightly more than 76% reported shopping at full-service groceries outside of the neighborhood (where all the NEMS healthy foods were available) approximately 80% of the time. To do so they had to drive or ride in a car (90% of responders), travel by bus or take a taxi. These stores are located 1.99 to 4.37 miles away and, according to the scientific literature, are not close enough to encourage higher consumption of fresh produce. Studies reviewed for this HIA associate greater consumption of vegetables with stores located one block from home [38] and decreased obesity with stores located within 2.24 miles [22].

2. Do community residents believe they have reasonable access to healthy foods in their community?

The community survey was the primary method to gauge neighborhood opinions and shopping patterns. Roughly 66% of respondents reported finding and purchasing all the groceries they need; approximately one-third (34%) reported an inability to do so. Although the survey was administered using a

convenience sample, this could possibly be indicative of the several thousand individuals in the community (pop. 25,356).

Less than half respondents, 40%, reported shopping more than once per week. It would be interesting to know how many of those trips were to a full-service grocery stores and how many were to convenience stores. Some respondents indicated they had to shop at multiple locations. The scientific literature calls this process "grocery store hopping," an adaptive behavior to acquire necessary food items.

Although most responders acknowledged that they were able to get the groceries they needed, there was strong support for a grocery store in the Meadows. More than half (54%) indicated a store in the neighborhood would change their shopping patterns. The benefits articulated were that a store located closer to home (in some cases a walkable distance would allow residents to: shop more frequently; get everything needed in one place; save money on gas or transportation; purchase more fresh items; have more variety; and have better quality food. Some responded that it would also improve the community by bringing jobs, particularly for youth, and a renewed sense of community pride. Of the 85 people responding to the open-ended question, "Is there any other information we should know?", 79 (93%) stated emphatically that a grocery store is needed in the Meadows.

The fruit and vegetable preferences articulated in the responses indicate that a healthy demand exists for fresh produce. Among all survey participants, the average number of fruits and vegetables purchased was 12.06 of the 18 choices identified on the NEMS-S survey. In addition, respondents generated a long and varied list of purchased fruit and vegetable items not included on the survey. Respondents mentioned 41 specific items 276 times, indicating a demand for these items that is primarily being met by stores outside of the Meadows neighborhood.

According to the community survey, 90% of grocery shopping is being conducted at grocery stores outside the neighborhood. In the literature, this is referred to as "neighborhood grocery leakage" or money spent for groceries outside of the neighborhood [39]. If a store was located in the Meadows, this demand could support the store and likely grow [25]. Further, if the Meadows can obtain designation as a Tax Increment Financing District, tax dollars related to that growing demand would remain in the community.

3. What is the current health status of the Meadows community population as it relates to nutrition?

The current health status of the Meadows reflects the documentation in scientific literature for a low income community located in a food desert. The all-cause mortality rate is 22% higher for the Meadows than Marion County at large. The mortality rate for



ischemic heart disease is 10% higher, cerebrovascular disease is 27% higher, diabetes is 41% higher, and hypertension is 70% higher (see Table 14).

Table 14. Mortality Rates, Meadows vs. Marion County, 2008-2012

Cause of Death*	Meadows	Marion County	Percent Change
Total (all causes)	920.76	756.11	22%
Ischemic Heart Disease	105.81	96.59	10%
Cerebrovascular Disease	47.82	37.57	27%
Diabetes	25.03	17.78	41%
Hypertension	30.12	17.76	70%

* Rates per 100,00

The all-cause hospitalization rate for the Meadows is 9% higher than Marion County at large, 12% higher for ischemic heart disease, 47% higher for cerebrovascular disease, 48% higher for diabetes, and 113% higher for hypertension (see Table 15).

Table 15. Hospitalization Rates, Meadows vs. Marion County, 2009-2011

Cause of Hospitalization	Meadows	Marion County	Percent Change
Total (all causes)	1277	1175	9%
Ischemic Heart Disease	42.7	38.0	12%
Cerebrovascular Disease	42.9	29.1	47%
Diabetes	29.8	20.1	48%
Hypertension	30.9	14.5	113%

* Rates per 100,00

Emergency department encounters for all-causes are 40% higher in the Meadows, 10% higher for cerebrovascular disease, 13% higher for ischemic heart disease, 69% higher for diabetes, and 85% higher for hypertension.

Table 16. Emergency Department Encounters

Cause of Emergency Dept Encounter	Meadows	Marion County	Percent Change
Total (all causes)	6044	4325	40%
Ischemic Heart Disease	8.9	7.9	13%
Cerebrovascular Disease	5.6	5.1	10%
Diabetes	49.1	29.1	69%
Hypertension	63.3	34.3	85%

Rates per 100,00

The costs of diseases and premature death are significant, both for the Meadows community and Marion County (see Tables 17 and 18). Society shares the burden of these costs through cost shifting in the health care system, taxation to support government-sponsored health care programs, and lost productiv-

ity for both the person directly affected as well as families and care-givers.

Table 17. Cost of Nutrition-Related Chronic Diseases in the Meadows

	Meadows N=566 % with Disease	Meadows # with Disease	AHRQ MEPS av. cost per person	Average total calculated cost
Heart Disease	6.5%	37	\$4,043	\$149,591
Diabetes	19%	108	\$2,173	\$234,684
Hypertension	41%	232	\$858.5	\$194,172
Total costs				\$578,447

Sources: AHRQ Medical Expenditure Panel Survey 2011; Marion County Public Health Department, 2012

Table 18. Cost of Nutrition-Related Chronic Diseases in Marion County.

	Marion County N=5013 % with Disease	Marion County # with Disease	AHRQ MEPS av. cost per person	Average total calculated cost
Heart Disease	7.7%	386	\$4,043	\$1,560,598
Diabetes	14%	702	\$2,173	\$1,525,446
Hypertension	31%	1,554	\$858.50	\$1,334,109
Total costs				\$4,420,153

Sources: AHRQ Medical Expenditure Panel Survey 2011; Marion County Public Health Department, 2012

- Is there a relationship between availability of healthy foods and health outcomes such as obesity, high blood pressure, and diabetes?

The literature reviewed for this HIA substantiates the relationship between poor nutrition, obesity, diabetes, and cardiovascular disease. Obesity, the precursor for many chronic illnesses, is higher in people of lower socio-economic levels, particularly African American women who live in neighborhoods with less access to healthy food [5].

Rates of diabetes increase with obesity, from 8% to 43% [8]. A study in Los Angeles found that foods necessary to maintenance diabetes are less likely to be available in African American communities [33]. A study in Harlem discovered similar results[40]. Higher rates of coronary heart disease (CHD) are associated with those living in deprived neighborhoods [10]. The DASH diet, rich in fruits, vegetables and low-fat dairy foods, has been associated with a 6.9 mm Hg reduction in systolic and a 3.7 mm Hg reduction in diastolic blood pressure among African Americans [13].

Several studies confirm that the presence of grocery stores in neighborhoods have a beneficial impact on obesity rates. Morland, et al. [21] found that “the presence of supermarkets was associated with a lower prevalence of overweight, obesity, and hypertension”, while the presence of convenience stores was associ-



ated with a higher prevalence of obesity and overweight. Zick, et al. [20] reported that the presence of one grocery store option was associated with a reduction in BMI/obesity risk compared to low-income residents living in neighborhoods with no food outlets. Finally, Bodor, et al [22] found that each additional supermarket in a respondents' neighborhood was associated with reduced odds for obesity.

Healthy eating is not the only influential factor in avoiding obesity and related chronic, potentially life threatening, conditions. Other factors, such as physical activity and avoiding tobacco use, are necessary to maintain or regain good health. However, access to healthy foods is a critical requirement for improving community health and full-service grocery stores provide this critical access.

5. Is there a relationship between access to healthy foods and consuming healthy food?

According to the literature reviewed for this HIA, this relationship does exist.

In one Detroit study, residents living in neighborhoods with no stores carrying more than five dark

green and orange vegetables consumed an average of 0.17 servings fewer per day than those living in neighborhoods where two or more stores carried five or more of these vegetables [27].

Another study found that participants with no supermarkets in a one mile radius of their home were 25% less likely to have a healthy diet using the Alternate Healthy Eating Index and 46% less likely to have a healthy diet using the Fats and Processed Meats index [1].

Bodor et al. [38] found that respondents with no fresh vegetable shelf space available within a block of their home had the lowest mean intake of vegetables (2.4 servings per day). Respondents who had up to 3 meters of fresh vegetable space within a block had a higher intake (3.3 servings) and those with more than 3 meters of shelf space within a block had the highest intake (4.5 servings).

Researchers have studied different food venues, for example small neighborhood markets vs. supermarkets, using a variety of measures but have all found similar results: access to healthy foods, especially the most perishable items such as vegetables, increases the consumption of those items.

CONCLUSION

Based on the results of this Health Impact Assessment, the presence of a grocery store in Avondale Meadows would most likely:

- Increase the frequency that residents would shop. Participants in the community survey responded vehemently that a full-service grocery is needed. Many residents said they would shop there and would shop more often. More frequent shopping translates to more opportunities to purchase perishable foods, particularly fresh vegetables and fruit.
- Increase the amount of healthy food residents would consume. Although the survey response indicated a preference for fresh fruit and vegetables, the literature review conducted for this HIA indicates that persons living in a food desert, such as the Meadows, are less likely to consume fresh fruits and vegetables. The presence of a grocery store within a mile of the shopper's home with a broad selection of produce would further increase consumption.
- Decrease the incidence of obesity, diabetes and cardiovascular disease in the Meadows community. The scientific literature reviewed for this HIA clearly associates poor diet and obesity with diabetes and cardiovascular disease.

The evidence also indicates the risk for these diseases decreases when a full service grocery store locates in a food desert area. Although other factors contribute to these conditions, such as lack of physical activity and smoking, access to healthier foods by is a critical piece of the puzzle.

- Decrease the costs of obesity, diabetes and cardiovascular disease. The direct and indirect costs of these conditions are significant. All society bears the burden of these costs through cost shifting in the health care system, taxation to support government sponsored health care programs, and lost productivity.
- Improve the economic well-being of the area. The Robert Wood Johnson Foundation found that a grocery store located in a food desert created 5,000 jobs, boosting the employment for the entire neighborhood and increased property values around the store by four to seven percent. A grocery store located in the Meadows would create jobs for neighborhood residents, (particularly young people), attract other businesses, and increase resident pride in the community.



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Neighborhood Survey

APPENDIX A

- Do you feel you are usually able to get all the groceries you need? Yes No
- During one month, where do you shop for your groceries? Include grocery and convenience stores, farmers markets, or mobile markets.

Name of Store	Location of Store	Time it takes to get to the store	How many times do you go to the store in a usual week? Circle for each one				How do you travel to the store?							
			Less than 1x	1x	2x	3 or more	Daily	Car	Bus	Walk	Bike	Taxi		

- Which of these items do you buy at the grocery store? (Please circle yes or no for each item. If the items are not available where you shop but you would like to buy them, please select "If Available")

Tomatoes	Yes	No	If Available	Apples	Yes	No	If Available
Carrots	Yes	No	If Available	Peaches	Yes	No	If Available
Lettuce	Yes	No	If Available	Oranges	Yes	No	If Available
Broccoli	Yes	No	If Available	Strawberries	Yes	No	If Available
Cucumbers	Yes	No	If Available	Whole Wheat Bread	Yes	No	If Available
Celery	Yes	No	If Available	Low Fat Muffin	Yes	No	If Available
Sweet Peppers	Yes	No	If Available	Low Fat/Skim Milk	Yes	No	If Available
Corn	Yes	No	If Available	Diet Soda	Yes	No	If Available
Grapes	Yes	No	If Available	Baked Chips	Yes	No	If Available
Watermelon	Yes	No	If Available	Lean Ground Beef	Yes	No	If Available
Cantaloupe	Yes	No	If Available	Low Fat Frozen Dinners	Yes	No	If Available
Bananas	Yes	No	If Available	Low Sugar Cereal	Yes	No	If Available

- Are there other fruits or vegetables not listed above that you usually buy? _____
- In the past 7 days, how many times did you and your household members eat fast food purchased in-store, through a drive thru, or as carryout? (Taco Bell, McDonald's, Steak N' Shake, Panera, etc)? _____
- How often do you prepare meals at home? (select the maximum) ___None, ___Weekly, ___2-3x Week, ___4-5x Week, ___Daily, ___2x Day, ___3x Day
- About how much did your family spend on groceries last week? ___Under \$50, ___\$50-75, ___\$75-100, ___More than \$100
- How do you pay for the majority of your groceries? (select one) ___Cash, ___Check, ___Credit/debit, ___Food stamps, ___WIC coupons
- If there was a large supermarket at 38th Street and Meadows Drive, would it change your food selections? Yes No
- Would a large supermarket at 38th Street and Meadows Drive change your shopping routine? Yes No
If yes, please describe how your shopping routine would change.
- In the past 12 months, please circle any of the services you or others in your household used:

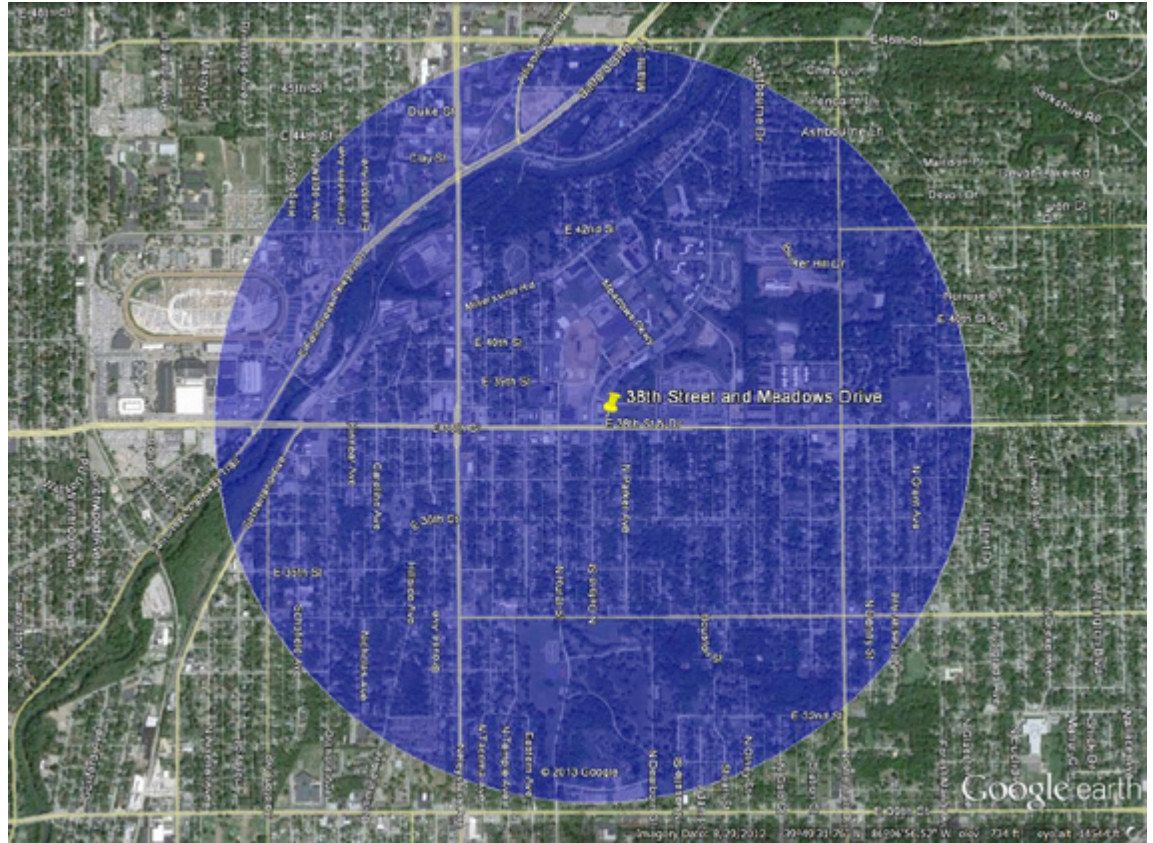
Community Kitchen	SNAP or Food Stamps	WIC Coupons	None of these options
Received food from family or friends	Received money to buy food from family or friends	Food Pantry	Prefer not to answer

- Counting yourself, how many people live in your household? ___
How many in your household are under 18 years of age? ___
- What is your gender? ___M, ___F
- Any other information you would like to share?



1 Mile Radius Map around Proposed Location of Grocery Store

APPENDIX B





Key Informant Interview Questions

We'll start the conversation with a review of the project summary.

- APPENDIX C**
1. Do you see value in conducting this project? Why or why not?
 2. What specifically do you think is missing from the current collection of information on a grocery store in the Meadows?
 3. Have you and/or your constituents already identified food access as an issue of importance or is this a newly identified potential problem?
 4. Who do you think would be interested in knowing more about the health impact of putting a grocery store in this community?
 5. What do you think are reasons that the Meadows doesn't currently have a full scale grocery store?
 6. Who are the key people who should be asked for their views on food access in this community?

The following questions are for people who live in the Meadows:

7. How do you define the geographic boundaries of the Meadows?
8. How would you generally describe the population of the Meadows?
9. Is there anything particularly unique about this community?
10. Were you aware of the Cub Foods here on Meadows Drive about 10 years ago? If so, what are your thoughts on why it didn't remain in the area?
11. Where do you shop regularly for food and where would you go to pick up a loaf of bread or gallon of milk?



**Action Recommendations from Stakeholder Meeting
May 23, 2013**

APPENDIX D

- It was suggested we continue to seek out partners to offer more healthy foods in existing stores. Acknowledged there are obstacles: refrigeration units, perceived risk of spoilage, store layout. Jobber could provide refrigerator and stock with fresh food.
- Track how healthy food items are expanded.
- Seek out a grant to have existing convenience stores add frozen foods that would eliminate the spoilage issue.
- Provide education on the risk of stroke from salt in processed food.
- Investigate establishing a farmer's market for the neighborhood
- Initiate a Health Fair especially to outreach to men perhaps with the New YMCA, barber shops, liquor stores, auto stores in the area. Teach them how to shop and prepare foods
- Consider cooking classes be located in every conceivable place for men and young people.
- Once a store is open suggest food sampling could be offered
- Other new partners to consider: Interventions could be in partnership with the Colts and Pacers, the current stroke campaign called FAST.
- Investigate further if people are consuming healthy food
- Include in the education ways to prepare food quickly and cheaply
- Explore what should be offered for people under 30?
- Partner to get more sidewalks especially on the main streets so people could increase their physical activity and get to the store
- Support expanded transit and sidewalk expansion, provide examples of partners to work with on this issue—churches, schools, Forest Manor, Indy East Food Coalition.
- Explore how do we bring low cost health foods to people over 55 on fixed incomes? The Meadows, with its multi-faceted approach, could be seen as a model: wellness center, YMCA, grocery store, schools, revitalized housing.
- Many older people don't have teeth. Some have gas shut off in the winter or summer, so don't have a working stove. If they don't have an air conditioner, they won't turn on stove in the summer. When they shop, they need to carry light bags.
- When we negotiate with the grocery store, we should explore the amenities. Recommendations:
 - They should have cooking facilities
 - Someone to help get groceries out to the car
 - Have handles on bags
 - Low fat, low sugar foods
 - Pharmacy
 - Labeling in store for healthy foods – Point Of Purchase
 - WIC is a good model- have education programs
 - Who needs the information: Share our results with Northeast Quality of Life Coalition, Food Coalition, Indy Food fund, city of Indianapolis.
 - Look for opportunities to write grant proposals.
 - Partner with programs working young families.
 - Set up programs in housing units that are required to have social services-tenant improvement services, e.g. the Phoenix.
 - Share data with stakeholders, to continue to support the need for a TIF to attract a national grocery retailer
 - Secure the “right footprint” for the neighborhood, not too huge or too small to encourage successful operations