

Detroit Project Technical Appendix

**Companion to
Examining the Impact of Food Deserts
on Public Health in Detroit**

**Sponsored by
LaSalle Bank**

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Full Report

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Author's Comments

Examining The Impact Of Food Deserts On Public Health In Detroit assesses the link between food imbalance and the quality and length of life, and the quality and cause of death. Our premise is that the health and vitality of urban communities are block-by-block phenomena. Therefore we first measure the distance from every block in Detroit and the surrounding metropolitan area to the closest grocery store, fast food establishment, and other food venue for roughly 50,000 blocks. We consider the locations of USDA Food Stamp retailers and conduct an analysis of their distribution by specific retail category. Then we develop an empirical score to quantify the *balance* of food choice available to residents. Finally, we compare food access and food balance directly to diet-related health outcomes.

What we found is stark. Over a half million Detroit residents live in areas that have an imbalance of healthy food options. They are statistically more likely to suffer or die prematurely from a diet-related disease, holding other key factors such as income, race, and education constant. Metro Detroit residents also suffer from food imbalance.

Looking ahead, food imbalance will likely have a compounding public health effect on communities as residents age in place, and on future generations that grow up and remain in food imbalanced areas. Unless access to healthy food greatly improves, we predict that, over time, those residents will continue to have greater rates of premature illness and death from diabetes, cardiovascular diseases, cancer, hypertension, obesity, kidney failure, and other diet-related complications. Food imbalance will likely leave its mark directly on the quality, productivity, and length of life, and indirectly on health care costs, school test scores, and the economic vitality of the City and the region.

Our robust data set and scientific tools make clear that we have a big public health problem on our hands. **But what does science tell us about our ability to band together and reverse course, or to create something entirely new?**

Often, our response to public health and other socioeconomic problems is a new law or policy to steer resources in a particular direction. Such measures are needed, and important. But what can be done at the local level, to complement broader action and direct and manage change?

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Imagine that you have the potential to improve food access and public health for one of the 50,000 blocks that we studied. Maybe you're a developer, bringing a full-service grocer to that block, or a community resident, working with a convenience store owner to increase the quality and selection of fresh fruits and vegetables. Given the magnitude of food imbalance in Metro Detroit and especially the city itself, and the fact that there are thousands of blocks and thousands of people in affected areas, it would be human nature to wonder if the one project you might work on could make a meaningful difference.

Psychologically, the answer sometimes feels like no – that the problem is too large to tackle – but mathematically, the answer is always yes, at least to some degree. Illustrating the first of many steps in our process of assessing food balance and public health brings this point to life: we measure the distance from every single food venue that we know to exist to the center of every single block in our study area to identify the shortest distance to each type of food venue from each block. This involves millions of individual calculations to compute the final scores for each block. For example, just to calculate the first set of distance scores for USDA Food Stamp retailers, the program must execute over 50 million computations:

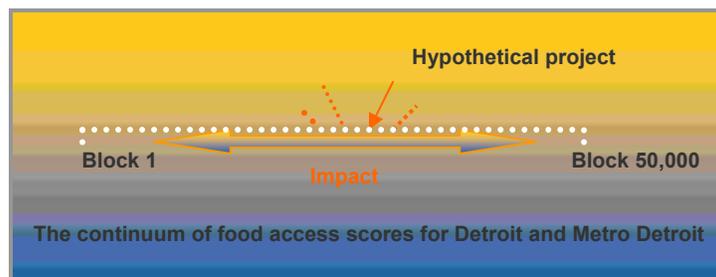


1,073 Food Stamp retail venues
X 50,000 blocks

= 53,650,000 computations

Our study is a static picture: one moment in time in the history of Detroit. Moving forward, if we are to track the impact of different types of stores opening and closing block-by-block, we must recalculate the distance and food balance scores all over again for all 50,000 blocks each time, as the scores are only meaningful in relation to one another. It's all relative. Therefore, all blocks have the potential to be affected in some way.

Clearly, the blocks closest to the one where our hypothetical project might take place – the new full-line grocer or the upgraded convenience store – have the greatest potential to improve, but only by recalculating the universe of all 50,000 blocks do we know the true level of impact. And if we intervene with a new project or program on 5 strategically placed blocks in our continuum, instead of just one random block, the ripple effect along the continuum is amplified.



If we combine blocks into Census tracts, we find that there are 200 tracts in Detroit that have Food Balance Scores of 2 or more, meaning that they are out-of-balance in terms of food access (the distance to the closest mainstream food venue is at least twice as far as the distance to the closest fringe food venue). We can pair the tract-level Food Balance Score with a wide range of variables, such as age, race, household size, car ownership, etc. Our food venue data is most valuable the lower we go down in geography: not only the block but the exact location on the block. The value comes from the data being highly accurate and not extrapolated from a more distant source. Demographic data, such as from the Census or from sources that attribute characteristics based on modeling techniques, are usually not accurate or available at the block level.

Here we show the ordering of tracts from the first tract that has a Food Balance Score of 2 or more:

Obs	Tract	Food Balance	Pop
1	538200	2.02074	2180
2	541400	2.02449	3185
3	500100	2.02719	4328
4	503400	2.02810	2837
5	540300	2.03291	4521
<hr/>			
200	520700	13.4804	1919

These 200 tracts sit on the greater continuum of tracts; that we are showing the first observation to be #1 is arbitrary. As we monitor the tracts moving forward over time, we would need to recalculate all blocks, and then all tracts, in Detroit and the outer Detroit region to measure change.

Only having enough resources to intervene with a new project on 1 block or 5 blocks might not seem like much, but, statistically, we can predict *how much* impact we can expect, turning our feelings into objective measures that can be reasonably acted upon. With the data we have assembled already, not only is it possible to quantify all the combinations of 5 blocks in the region or the city that exist but also, and more importantly, the very top combinations of 5 blocks where impact would be greatest in our desired direction: improved public health. Said another way, **we can predict the public health return on community development investment**. We can also identify the very top combinations of the 5 fringe USDA Food Stamp retailers (convenience stores, liquor and party stores, gas stations, etc.), and predict the public health benefit of upgrading those stores to the extent that they cross from a fringe location to a mainstream location. We spend considerable time in the study quantifying Years of Potential Life Lost. We can just as easily calculate a new measure: Years of Potential Life Gained from improved access to healthy food choices.

We think we're really onto something: **a new theory of change that could have very practical implications for the intersection of community development and public health and for each field separately.**

Let's look at our objective through the lens of other disciplines. If we were oceanographers interested in saving a particular type of whale, we would first need to know something about the interconnected systems of the ocean, the many species that live there, and other whales. If we were astronomers interested in the life trajectory of a particular star, we would first need to first know something about all the stars around that star, and maybe nearby planets and the galaxy. If we care about the improvement of a particular block or neighborhood in Detroit, but only know about that one block or one neighborhood, or maybe just a handful of other blocks and neighborhoods – but little about the whole system of blocks and neighborhoods – we fall far short of our task. Only by understanding the relational universe of data at very low geographies can we pinpoint the best set of intervention strategies locally. We need to know how certain blocks and neighborhoods relate to all the other blocks and neighborhoods on the continuum. They exist and function within an interdependent system of relationships. Whether in the natural world or in society, broad vision, policies, and laws are helpful and needed. Intervention or action, on the other hand – like community development and public health – are always local dynamics. The macro and micro must go together somehow. The example of data points on the continuum makes this case, but we see it, too, everywhere else. We talk about this more in the section entitled **Next Steps in Our Food Desert Work.**

As Margaret Wheatley points out in her writing, the deeper scientists probe into the nature of existence, the more they must rely on relationships. Even sub-atomic particles, she writes, do not exist alone. We can only see them in relationship to one another. Scientists call all the matter of the universe “bundles of potentiality” that could transform into something new at some point in time. This means that our reality – whether or not we live near quality grocery stores and eat well, for example, or whether or not we die prematurely from diet-related diseases – can take on many forms and directions, depending on key relationships, connections, and events.

One way to interpret this is that we don't need the majority of people signed on to a particular cause before something meaningful can happen. A handful of highly connected people and strategies – an effective web of relationships and intention – can also create positive change. In an age when most things are mass produced in a global economy, not only goods and services but also culture and concepts such as food and health, this is counter-intuitive. Yet it is mathematically true. It has potential. And notwithstanding the vast advances of society, we all still need to eat to live. A revived, shared concept of healthy, local food might bring an effective handful of highly connected and strategic people together.

On June 19th of this year, LaSalle Bank and Detroit LISC will hold a forum for about 250 people to release the study's findings and, more importantly, to identify solutions. This is certainly more than a handful of people. What is our potential to come together to



improve food access and public health for the residents of Detroit on that day and thereafter?

The built environment is affected by a myriad group of actors; even if you don't live in Detroit, or in a city, you are one of them. Identifying market as well as needs-based solutions that promote access to nutritious foods and healthy food choices will require input and support from the food desert residents themselves as well as from grocers, banks, brokers, developers, planners, health advocates, educators, government, and foundations – ultimately everyone – to achieve even a modest level of success.

Every researcher, if not everyone generally, wants to bring something new to the equation at hand. **The unique contribution of our work is our robust data set and methods that assess food access and health comprehensively for a fairly large geography, yet builds up from the block each time.** The development of the Food Balance Score and the testing of our Food Balance Theory are also unique to our group. Our Food Balance methodology is something that we are particularly excited about. As we take our work on the road, many people ask, *what is the perfect distance to a mainstream grocery store?* Our answer so far is that there isn't one – it's all relative. Some areas of New York City, for example, have a vertical sense of space and scale, yet in some of its boroughs, the environment is less dense and resources are spread out. In many locations across the country, public transit plays a role. Yet in other areas, getting to the grocery store is nearly impossible unless you have a car or can get a ride from friends. We try to dispel the myth that food deserts are solely an urban problem. They are not. Rural and suburban areas suffer as well. This is where the Food Balance Score is practical for broader policy making and resource allocation. For example, in Michigan there is an active statewide policy group concerned with food access. Could we make for them a statewide map of *grocery store distances*? Technically, yes, but it would be inappropriate and misleading. What about a statewide or national map of *Food Balance Scores*? That would not only be appropriate but probably very useful, assuming we have the resources to develop accurate data.

Unlike grocery or fringe food distances, Food Balance Scores can be compared across urban, rural, and suburban geographies simultaneously. Thus far we have found that a Food Balance Score of 2 is always undesirable; grouped together, scores of 2 or more correlate on average with worse diet-related health outcomes. A score of 1 always means the location is in balance; it is just as easy, or just as difficult, to reach a mainstream food option as it is to reach a fringe food option. The Food Balance Score is useful because it accounts for these two factors at once – mainstream and fringe – which are most meaningful in relationship to one another. Said another way, the Food Balance Score is a measure of relativity that can be isolated down to the lowest geography: the block or even the address where a particular person lives. By contrast, one distance score of .41 miles from the center of a particular block to a particular type of food venue stands alone and provides little insight by itself. We need to know more about the larger environment in which the block (or the person) functions. We are again back to relationships.

Our group is not the first to do research in this area, nor will we be the last. We acknowledge and thank the many other researchers doing work in Detroit, around the country, and around the world who came before us and helped pave a path for this study. We also wish to emphasize that we did not coin the term food desert; it originated over a decade ago with researchers in the UK studying similar issues. **LaSalle Bank's sponsorship** of our Chicago study, and now this Detroit study (including graphic design of the report, public forums, extensive coverage on CNN, etc.), helped popularize the term around the country. One of the comments that we hear repeatedly when we present our food desert findings is *How great that a bank supports this work – they made people pay attention!* We agree; our food desert work to date would have been impossible without LaSalle's generosity in sharing its expertise and resources. We talk more about LaSalle Bank's key role later in the *Acknowledgements* section.

We also would like to acknowledge and encourage those new researchers not yet on the scene. Remember that no one person or group has an inherent lock on any field of study. Whether you are a graduate student defending your thesis, a community activist who never graduated from high school, or a single mom who wants to improve the local school lunch program, the opportunity is yours to question and study your environment, and to report out and apply what you find. **This curious, creative, passionate, and intellectual freedom is a right that we all share.** Paired with greater democratization of information and data, our worlds might improve.

Finally, a few personal words to Detroit. You have hit some hard times but you are a beautiful city. Your people are warm, energetic, committed, talented, and resourceful. Together you have great potential.

We welcome your comments.

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We also acknowledge and thank **Detroit LISC** for their partnership and support, especially **Kari Sederburg**, as well as all of our other forum friends and our very fine panel:

Forum Friends

Social Compact

The Urban Institute, National Neighborhood Indicators Partnership

PolicyLink

The Food Trust

Community Food Security Coalition

United Way for Southeastern Michigan

Michigan Food Policy Council

Michigan Department of Agriculture

Detroit Renaissance

Grandmont/Rosedale Development Corporation

Detroit Community Academic Urban Research Center

Community Foundation for Southeast Michigan

W.K. Kellogg Foundation

Dept. of Health and Wellness Promotion

Fair Food Foundation

CityConnect



Forgotten Harvest
Food Gatherers
The Skillman Foundation
Michigan Department of Community Health
Gleaners Community Food Bank
Detroit Economic Growth Corporation
Knight Foundation

Panel

Mike Curis

Oran Hesterman, Ph.D.

James Johnson-Piett

Phylliss Meadows

Olga Savic

Malik Yakini

Regarding research collaborators, no single person was more supportive than **Joseph Ferrie**, professor of economics at Northwestern University. This work would have been impossible without his numerous contributions. His creative ideas, expertise with large data sets, statistical models, and mapping systems were instrumental to the rigor of the methodology and the deliverables. Research requires maintaining neutrality and objectivity – the ability to keep your space, keep going, and sometimes even laugh – even as the conditions you are studying are serious or dire, or as your computer crashes in the middle of a key calculation. Joe brought levity and lightness to the work as we slogged through the emotional heaviness of culling thousands and thousands of records of death data. Aside from being a completely brilliant scholar, he made us laugh those times we really needed to.

Kendra Schwartz, **Fawn Vigneau**, and **Jason Booza**, all from the Metropolitan Detroit Cancer Surveillance System of Wayne State University, were wonderful collaborators. Thank you for providing cancer data and helping us to obtain other needed data sets. Your insights were very helpful.

Various people and departments of the **City of Detroit** assisted us in the development of this study. Thank you for welcoming us into your city.

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Fellow researcher **Kami Pothukuchi** not only knows quite a lot about food deserts, but was tremendously thoughtful in providing one of her last copies of her very helpful Detroit food access guide. Thank you for going out of your way to inform this body of work. **Kurt Metzger** has also been a constant as well as spirited collaborator, helping fill in our blanks with his tremendous knowledge of Detroit and the region. **Barbara Isreal** was also helpful in providing linkages to her work and that of other researchers, as was **Robert J. McGranaghan**, who spent time with us in the field as we checked data. **Todd Wickstrom** and **Beth Ellis** also drove around creation with us, sharing their insights, enthusiasm, and knowledge.

We thank **Oran Hesterman** for being a regular sounding board, for his interest in our work, and for *his* work in addressing larger issues concerning food systems and how they might change for the better. We wish him well his new position leading the Fair Food Foundation as he moves on from his post at Kellogg.

And a big thank you to **Firebelly** for designing the Executive Briefing. Great job.

Finally, we thank **the people of Detroit**, for the kindness they showed during the course of our field work, and for their spirit, warmth, and determination to make a positive difference in their city. Thank you for the opportunity to do this study in your town.



Methodology

In addition to our group's personal commentary and key acknowledgements, the purpose of the Detroit Project Technical Appendix is to provide additional technical details for which we did not have room in the project's Executive Briefing. Much of what we provide here is for other researchers and students of urban planning, public health, and other disciplines. We also welcome Detroit community groups and leaders to put it to use!

Our methodology begins with a very simple premise: that the vitality and health of any urban community is a block-by-block phenomenon. When we think of concepts such as "home" and "community," we typically think of the very block where we live, and whether or not it is a well-balanced, life-supporting environment. We begin our study of food access and health outcomes at the block level for this reason. We also analyze patterns by Census tract, official Community Areas, and Zip Codes. Our research objective is to compare food access and diet-related health outcomes, holding other influencers such as income, education, and race constant to the degree possible given time and resource constraints.

After documenting neighborhood differences in the availability of grocery stores and fringe food outlets, we test the theory that a *balanced* food environment is an important determinant of community health. In other words, do food deserts (areas that cluster with no or distant grocery stores) or out-of-balance areas (food deserts with nearby concentrations of fringe food options) face nutritional challenges evident in poorer diet-related health outcomes, and do those outcomes also worsen when the food desert has high concentrations of nearby fast food alternatives?

To calculate the average distance to a food venue (such as a grocery store or fast food restaurant), we measured the distance between the geographic centers of each block and the locations of each food venue in the Detroit region. The distance from the center of each block to each food venue was calculated, using the latitude and the longitude of each food venue and of each block center. Of these distances, the minimum distance was calculated for each block, representing the distance from that block to the nearest food venue by category. For each block, a weight was created to reflect the share of the city's population living in that block.

The average distance for an area larger than a block (a tract, community area, zip code, etc.) is the weighted average of the distance from each block within that area to the nearest food venue, with greater weights given to blocks with larger numbers of residents. Therefore, we account for density, and we exclude areas with no population. The distance score, calculated in miles, is the distance the average person in that area would need to travel to reach a food venue.

To test our core theory that food venue balance matters for health outcomes, we developed a ratio score: the distance to any grocer divided by the distance to any fringe food venue. The ratio for the entire city, a ZIP Code, a Community Area, or a census



tract, is the ratio of the average distance to a grocer to the average distance to a fringe food venue, where these distances are averaged across all blocks in the areas using block-level populations as weights. So greater weight is given to blocks with larger numbers of residents.

We call this ratio the **Food Balance Score** and we call its impact the **Food Balance Effect**. These measures are unique to our group; we developed them as part of our work on food access and its impact on public health.

The Food Balance Effect	
Food Balance Score description	Examples
Far above 1: High score ("worst outcome")	Grocery store is 1 mile away, and a fast food restaurant is .5 miles away $1/.5 = 2$
Around 1: Average score ("average outcome")	Grocery store is 1 mile away and a fast food restaurant is 1 mile away $1/1 = 1$
Far below 1: Low score ("best outcome")	Grocery store is .5 mile away and a fast food restaurant is 1 mile away $.5/1 = .5$

Food venue data was collected for Detroit and the 5 counties including and surrounding Detroit. This allowed us to calculate the actual distance to the nearest food venue, rather than be constrained by artificial boundaries such as concentric rings, Community Areas, and so on, that might not reflect the realities of food purchasing. We believe the list is current (2007).

Food venue data consists of grocery stores, fast food restaurants, and other fringe locations that sell groceries. Generally, the definition of fast food is take-out or self-carry to tables within the restaurant. Primarily we focused on burger, chicken, taco, and hot dog places.

Death data was obtained for a three year period (2004, 2005, and 2006) for the entire state, and culled for the 5 counties including and surrounding Detroit. From that we culled all diet-related deaths. Cardiovascular disease rates and deaths were segregated by those that are diet-related, namely: essential hypertension, hypertensive heart disease, hypertensive renal disease, hypertensive heart and renal disease, acute myocardial infarction, subsequent myocardial infarction, certain current complications following acute myocardial infarction, other acute ischaemic heart diseases, chronic ischaemic heart disease, all cerebrovascular diseases (stroke) and arteriosclerosis. Excluded cardiovascular disease rates and deaths were acute rheumatic fever, chronic rheumatic heart diseases, and pulmonary heart disease.

The City of Detroit has 313 census-defined tracts and 11,373 census-defined blocks with non-zero populations (total population 951,270). The area of Metro Detroit (with

Detroit excluded) for which we calculated distances to food retailers has 32,419 census-defined blocks with non-zero populations (total population 2,624,204). This is slightly smaller than the whole 5 counties because of our need to draw a buffer zone. See the *Additional Maps* section.

In our analysis of the relationship between food balance and health outcomes, we used 41 Detroit community areas (total population 862,934) for all diet-related deaths and 29 Detroit community areas (total population 692,386) for all cardiovascular diet-related deaths.

In Metro Detroit (with Detroit excluded), we used 507 census tracts (total population 2,133,446) for all diet-related deaths and 289 census tracts (total population 1,285,445) for all cardiovascular diet-related deaths.

The number of places for which we calculated distances to food retailers is larger than the number for which we calculated the relationship between distances and health outcomes because we limited the analysis to places (tracts for the non-Detroit area, community areas for Detroit) that had 20 or more diet-related deaths (or 20 or more cardiovascular diet-related deaths), in order to produce more reliable estimates of Years of Potential Life Lost (YPLL).

Very detailed information was developed on distances to particular food venues, including the distribution of USDA Food Stamp Retailers, not only for Detroit, but also for Metro Detroit and other Michigan locations. Some data were sorted by majority race of the block or tract. **See Additional Tables** section for more details.

No data set can provide a complete and fully accurate picture of the locations of commercial venues across large, diverse, and dynamic urban geographies. Nonetheless, we believe that our overall patterns are accurate and that they reflect the current realities of food access in Detroit today.

From that data set we use regression analysis to compare food ratio scores and their impact on YPLL, holding education, income, and race constant. Here are the details without controls:

Community Area Level (Detroit only)								
Independent Variable	Dependent Variable							
	YPLL (diet-related)		YPLL (diet-related)		YPLL (cardiovascular)		YPLL (cardiovascular)	
	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)
Food Balance	1.54	0.84			1.71	0.88		
Mean Dist Grocer			10.29	0.90			8.19	0.85
Mean Dist Fast Food			-34.48	0.89			-19.12	0.72
Intercept	18.85	0.99	24.49	0.99	8.48	0.99		
Observations	41		41		29		29	

Tract Level (non-Detroit only)								
Independent Variable	Dependent Variable							
	YPLL (diet-related)		YPLL (diet-related)		YPLL (cardiovascular)		YPLL (cardiovascular)	
	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)
Food Balance	3.65	0.99			21.88	0.99		
Mean Dist Grocer			4.57	0.90			5.19	0.88
Mean Dist Fast Food			-17.50	0.99			-19.83	0.99
Intercept	37.20	0.99	48.01	0.99	21.88	0.99		
Observations	752							



With controls:

Community Area Level (Detroit only)			Red = Food Balance or distance coefficient goes in the "wrong" direction					
Independent variable	YPLL (diet-related)		YPLL (diet-related)		YPLL (cardiovascular)		YPLL (cardiovascular)	
	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)
Food Balance	-0.10	0.06			1.65	0.78		
Mean Dist Grocer			2.09	0.24			8.05	0.79
Mean Dist Fast Food			4.24	0.11			-27.40	0.66
Pct Black	0.09	0.97	0.08	0.96	-0.02	0.38	-0.02	0.39
Pct H.S. Education or less	0.27	0.94	0.25	0.91	0.10	0.53	0.09	0.47
Median H.H. Income								
Pct Below H.H. Inc. \$25,000	-0.03	0.22	-0.01	0.12	-0.07	0.63	-0.09	0.68
Intercept	8.71	0.94	6.81	0.63	10.68	0.98	17.24	0.95
Observations	41		41		29		29	

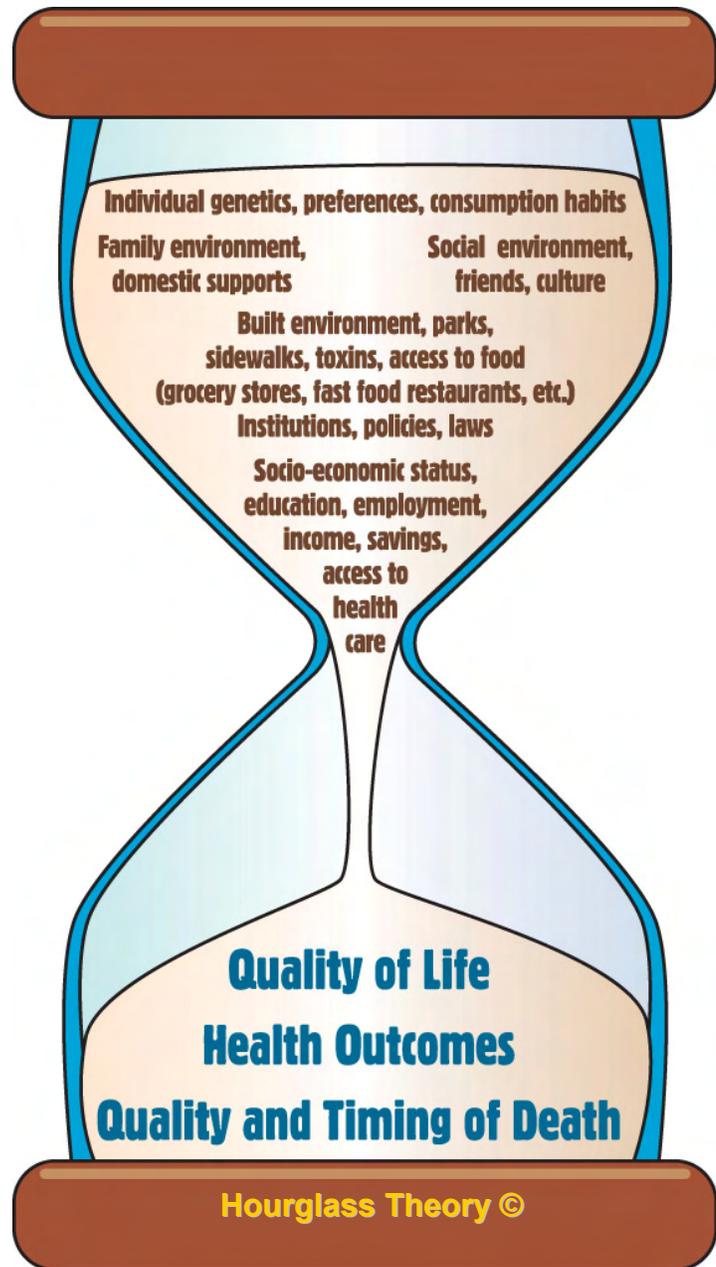
Tract Level (non-Detroit only)			Dependent Variable					
Independent variable	YPLL (diet-related)		YPLL (diet-related)		YPLL (cardiovascular)		YPLL (cardiovascular)	
	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)	beta	prob(beta≠0)
Food Balance	2.81	0.99			2.80	0.99		
Mean Dist Grocer			5.62	0.98			6.83	0.98
Mean Dist Fast Food			-	0.35			-5.85	0.74
Pct Black	0.09	0.94	0.08	0.93	0.09	0.92	0.09	0.92
Pct H.S. Education or less	0.87	0.99	0.88	0.99	0.67	0.99	0.68	0.99
Median H.H. Income	-		-		-		-	
Pct Below H.H. Inc. \$25,000	0.15	0.98	0.20	0.99	-0.12	0.95	-0.13	0.96
Intercept					16.00	0.99	19.14	0.99
Observations	425		425		246		246	



2006 driver's license data, which reports height and weight, was used to construct measures of body mass index, which is an accepted measure for obesity. BMI calculations were at the Zip Code level. There was too much noise in the data; we could not find a meaningful pattern. More work is needed here.

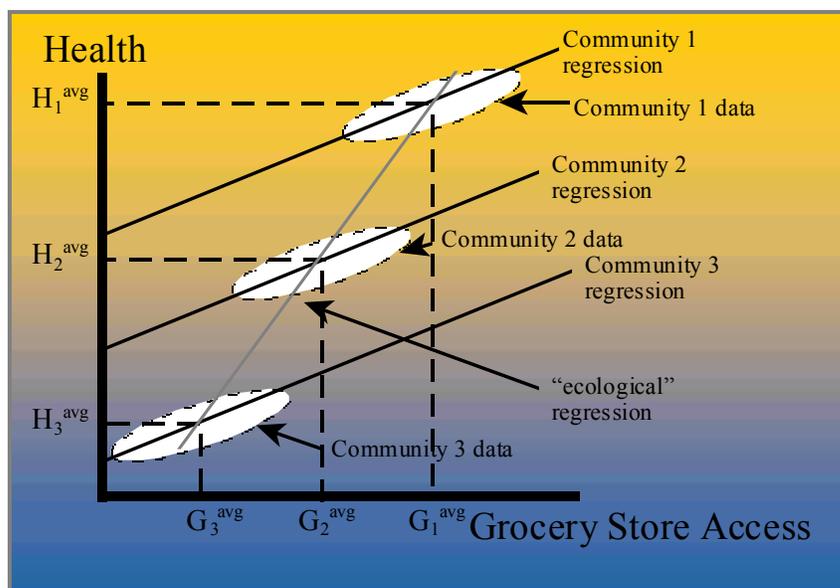
We recognize the “time factor” challenge in studying food access and health outcomes. How much time needs to pass for the lack of nutritious food access to have an effect on community health? For example, lack of adequate nutrition in childhood might not be evident until later in life. Or it could be evident in childhood obesity patterns. This is not a challenge we can control for in this study, nor do we speculate on the theoretical possibilities of time factors on health impacts, other than in our Hourglass Theory where we illustrate the many non-linear, highly dynamic influencers of community health. We believe our analysis is a valid approach. Health conditions do not develop overnight, nor do new grocery stores or fast food restaurants.

A bigger challenge in correlating neighborhood characteristics and health is that neighborhood effects are, by definition, endogenous to the compositional characteristics of neighborhoods. The project recognizes the many complex methodological challenges in isolating cause and effect and holding constant potential statistical confounders, such as income, race, genetics, culture, food preferences, and self-selection into specific types of communities. We utilize national and local best methodological practices, taking deliberate measures to maximize the robustness and accuracy of our data and models,



and exercising caution and care in stating our findings. We are particularly mindful of what has been called the “Ecological Fallacy.”

Here we present a scenario, not based on actual individual level data, but one that should be kept in mind when describing outcomes and findings. Within each community of our scenario, the relationship between access to grocery stores and health is positive (better access ► better health). The relationship is also positive across the entire population (if we pool observations from all three communities, the regression line would coincide with the Community 2 regression line).



Ecological Regression Illustration

If we only have averages by community, we could still conclude that the relationship is positive: the ecological regression line that best fits the *average* values for the three communities – (H_1^{avg}, G_1^{avg}) , (H_2^{avg}, G_2^{avg}) , (H_3^{avg}, G_3^{avg}) – slopes upward. But the relationship is stronger when we use community averages than when we use data on individuals (either analyzing all individuals pooled or analyzing individuals separately by community). This is because the communities have very different compositions (Community 1: high health/high access; Community 2: moderate health/moderate access; Community 3: low health/low access).

Based on the ecological regression, the most we can say is “communities with better average access to grocery stores have better average health” – we *cannot* say that “an individual person who has better access to grocery stores will have better health” (i.e. we need to limit our generalizations to the unit of observation – the community in this case – that we are using, and not generalize to smaller units of observation – the individual).

Therefore, while we demonstrate in this study the positive association between access to better foods and better diet-related health outcomes and conditions, particularly concerning certain diseases and races, we must set our findings in the context of the challenges and limitations of linking cause and effect and of predicting, with certainty, the exact statistical magnitude of the relationship. Nonetheless, we stand by our conclusion that food deserts – particularly those with high concentrations of fast food restaurants – pose serious health and wellness challenges to the residents who live within them and to Detroit and the region as a whole.

Additional Tables

Food Venues in Miles for Detroit by Blocks by Category

All Blocks

A. Food Stamp Convenience Stores	0.25
B. Food Stamp Liquor and Party Stores	0.37
C. Fast Food	0.38
D. Food Stamp Gas Stations	0.40
E. Food Stamp Small, Medium, or Large Grocers or Supermarkets	0.57
F. Recoded Food Stamp Pharmacies	0.74
G. Food Stamp Specialty Food	0.81
H. Recoded Food Stamp “Convenience Plus” Stores	1.04

Majority African American Blocks

A. Food Stamp Convenience Stores	0.25
B. Food Stamp Liquor and Party Stores	0.37
C. Fast Food	0.38
D. Food Stamp Gas Stations	0.40
E. Food Stamp Small, Medium, or Large Grocers or Supermarkets	0.56
F. Recoded Food Stamp Pharmacies	0.75
G. Food Stamp Specialty Food	0.84
H. Recoded Food Stamp “Convenience Plus” Stores	1.10

Majority Latino Blocks

A. Food Stamp Convenience Stores	0.17
B. Food Stamp Liquor and Party Stores	0.25
D. Food Stamp Gas Stations	0.33
E. Food Stamp Small, Medium, or Large Grocers or Supermarkets	0.41
F. Recoded Food Stamp Pharmacies	0.46
G. Food Stamp Specialty Food	0.45
H. Recoded Food Stamp “Convenience Plus” Stores	0.35

Majority White Blocks

A. Food Stamp Convenience Stores	0.25
B. Food Stamp Liquor and Party Stores	0.42
C. Fast Food	0.42
D. Food Stamp Gas Stations	0.37
E. Food Stamp Small, Medium, or Large Grocers or Supermarkets	0.75
F. Recoded Food Stamp Pharmacies	0.80
G. Food Stamp Specialty Food	0.64
H. Recoded Food Stamp “Convenience Plus” Stores	0.65

Majority Diverse Blocks

A. Food Stamp Convenience Stores	0.25
B. Food Stamp Liquor and Party Stores	0.37
C. Fast Food	0.39
D. Food Stamp Gas Stations	0.35
E. Food Stamp Small, Medium, or Large Grocers or Supermarkets	0.61
F. Recoded Food Stamp Pharmacies	0.61
G. Food Stamp Specialty Food	0.56
H. Recoded Food Stamp “Convenience Plus” Stores	0.89

Food Venues in Miles for Metro Detroit by County by Tract by Category

Average Distance By Tract To:	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Any Food Stamp Retailer	0.35	0.50	0.43	2.11	0.99	0.68
Recoded Food Stamp Liquor and Party Stores	0.86	1.35	1.03	4.91	2.66	2.26
All "Convenience Stores"	0.58	0.91	0.69	3.77	1.38	1.64
Food Stamp Gas Stations	1.02	1.66	1.62	3.96	2.41	3.87
Food Stamp Specialty Food	1.19	1.59	1.47	6.64	2.84	2.37
Food Stamp Supermarkets	0.79	1.01	0.90	3.26	1.43	1.19
Food Stamp Median or Small Grocery Stores	1.63	2.24	1.77	3.25	2.53	2.65
Food Stamp Pharmacies	0.81	0.89	0.80	6.68	2.19	0.98
Fast Food (NOT all fringe)	0.49	0.61	0.52	2.64	1.05	0.67

Average Distance By Race To Any Food Stamp Venue By Tract	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White	0.49	0.51	0.44	2.11	1.14	0.71
Majority African American	0.22	0.26	0.30	--	0.51	0.50
Majority Latino	0.14	--	--	--	--	--
Majority Diverse	0.36	0.76	--	--	0.51	0.48

Average Distance By Tract To Food Stamp Convenience Stores	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	0.91	0.95	0.71	4.79	1.65	1.76
Majority Black Tract	0.25	0.31	0.31	--	0.52	1.14
Majority Latino Tract	0.17	--	--	--	--	--
No Majority Race – Diverse	0.65	1.66	--	--	0.53	1.56

Average Distance By Tract To Food Stamp Liquor and Party Stores	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	1.35	1.40	1.04	4.91	2.93	2.40
Majority Black Tract	0.38	0.48	0.36	--	2.96	1.21
Majority Latino Tract	0.30	--	--	--	--	--
No Majority Race – Diverse	0.87	2.10	--	--	1.10	1.83

Average Distance By Tract To All "Convenience" Stores (includes liquor)	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	0.90	0.94	0.69	3.77	1.65	1.75
Majority Black Tract	0.25	0.31	0.31	--	0.52	0.95
Majority Latino Tract	0.17	--	--	--	--	--
No Majority Race – Diverse	0.65	1.67	--	--	0.53	1.23



Average Distance By Tract To Food Stamp Gas Stations	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	1.65	1.72	1.62	3.96	2.52	4.28
Majority Black Tract	0.41	0.51	1.05	--	2.56	1.29
Majority Latino Tract	0.33	--	--	--	--	--
No Majority Race – Diverse	1.07	2.87	--	--	1.74	1.56

Average Distance By Tract To Food Stamp Specialty Food	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	1.55	1.60	1.46	6.64	3.05	2.37
Black Tract	0.86	1.19	3.35	--	3.07	2.60
Majority Latino Tract	0.45	--	--	--	--	--
No Majority Race – Diverse	1.04	2.26	--	--	1.61	1.73

Average Distance By Tract To Food Stamp Supermarkets	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	1.02	1.03	0.90	3.26	1.57	1.23
Majority Black Tract	0.57	0.75	1.00	--	0.86	0.97
Majority Latino Tract	0.41	--	--	--	--	--
No Majority Race – Diverse	0.72	0.99	--	--	1.14	0.90



Average Distance By Tract To Food Stamp Median or Small Grocery Stores	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	2.18	2.27	1.78	3.25	2.70	2.74
Majority Black Tract	1.12	1.54	0.67	--	2.40	1.98
Majority Latino Tract	0.35	--	--	--	--	--
No Majority Race – Diverse	1.62	3.46	--	--	1.70	2.54

Average Distance By Tract To Food Stamp Pharmacies	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	0.88	0.88	0.80	6.68	2.22	1.00
Majority Black Tract	0.76	0.93	1.04	--	2.81	0.91
Majority Latino Tract	0.46	--	--	--	--	--
No Majority Race – Diverse	0.82	1.33	--	--	1.63	0.67

Average Distance By Tract To Fast Food (NOT all fringe)	Wayne	Wayne Minus Detroit	Macomb	Monroe	Washtenaw	Oakland
Majority White Tract	0.60	0.61	0.52	2.64	1.15	0.71
Majority Black Tract	0.39	0.58	0.66	--	0.57	0.48
Majority Latino Tract	0.25	--	--	--	--	--
No Majority Race – Diverse	0.41	0.44	--	--	0.88	0.47



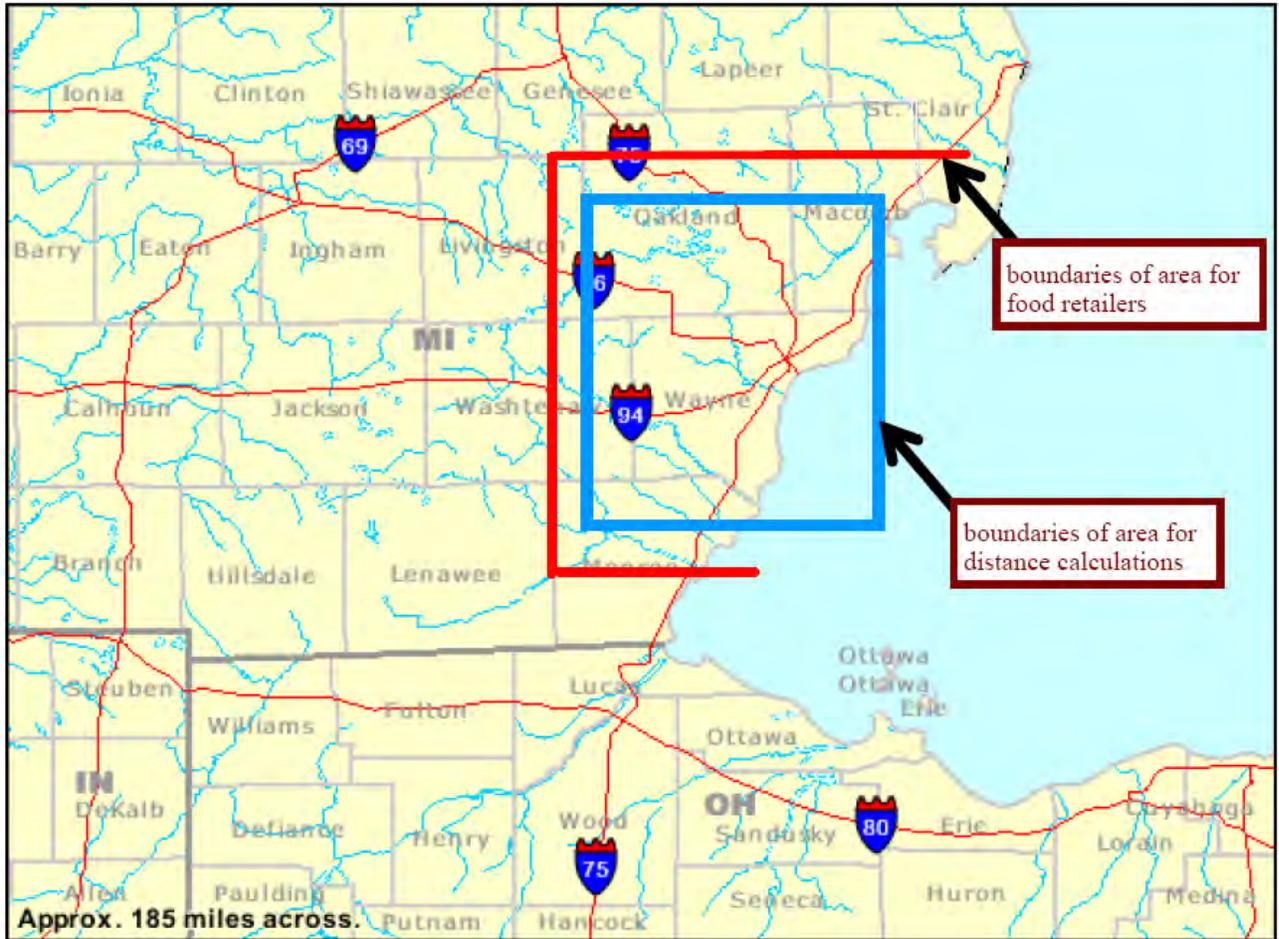
Percent cut-offs for Tracts

	All	Detroit	Non-Detroit
Obs	1.00	1.00	1.00
W_P0	0.00	0.00	0.00
W_P25	37.66	0.00	87.18
W_P33	68.97	0.00	91.30
W_P50	88.51	2.86	96.20
W_P67	94.39	8.05	100.00
W_P75	95.49	13.85	100.00
W_P100	99.01	100.00	100.00
B_P0	0.99	0.00	0.00
B_P25	4.51	86.15	0.00
B_P33	5.61	91.95	0.00
B_P50	11.49	97.14	3.80
B_P67	31.03	100.00	8.70
B_P75	62.34	100.00	12.82
B_P100	100.00	100.00	100.00
H_P0	0.00	0.00	0.00
H_P25	1.01	0.00	0.00
H_P33	1.18	0.00	0.00
H_P50	1.56	0.00	0.00
H_P67	2.07	0.00	1.52
H_P75	2.46	1.25	2.55
H_P100	77.14	100.00	100.00

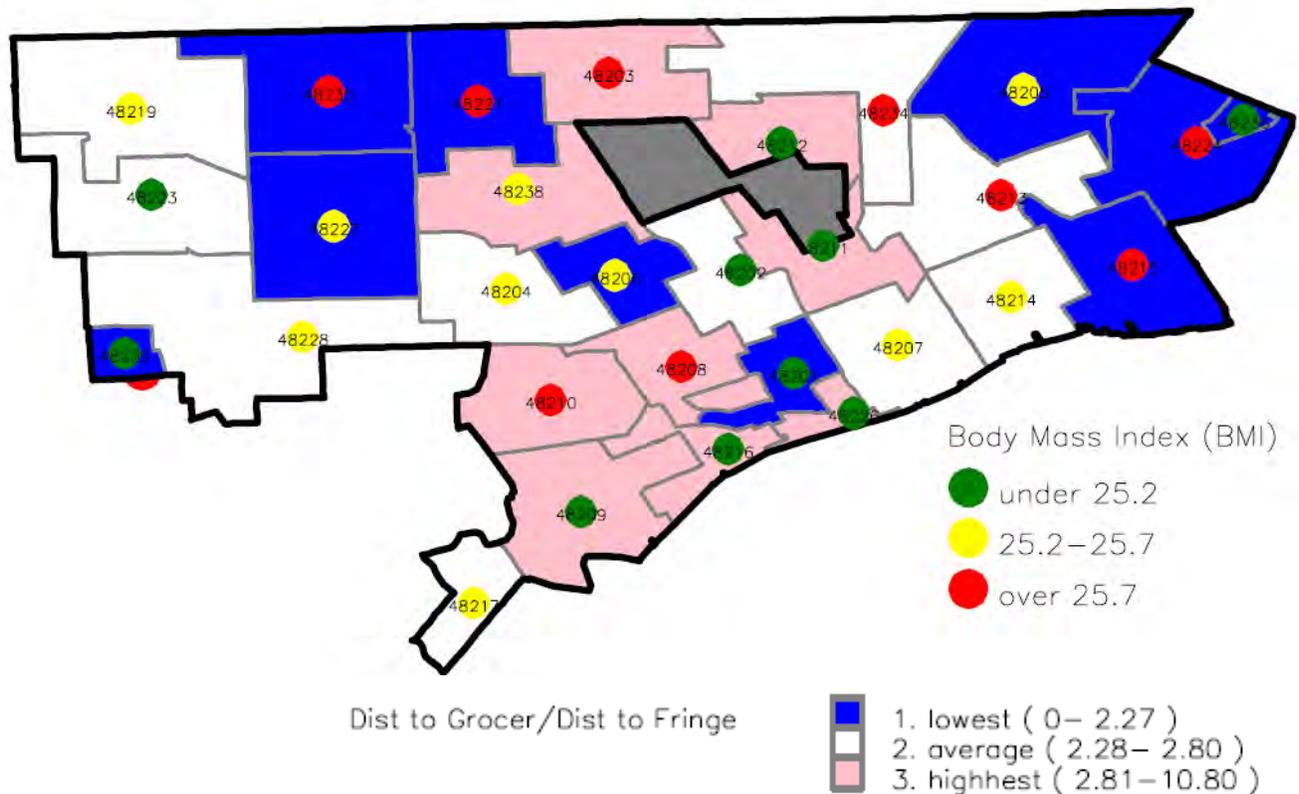
Additional Maps

In this section we provide two additional maps. During this project we created dozens of maps that require a bit more work to finish, but ones we hope to eventually release.

Below is the map of the project buffer zone as described in the methodology.



Next is an example of what can be created with the body mass index scores. Please keep in mind that more work needs to be done to the BMI data set. We are not yet confident in the data but show it for illustration purposes only.



Next Steps in our Food Desert Work

Here are some of our ideas about new projects that we would like to embark on once funding is secured.

1. **A predictive and applied analysis of the best impact strategies** in Detroit for food access, food balance, and public health. As discussed in the *Author's Comments*, by using statistical methods we can identify optimal blocks and tracts where new grocery stores and fringe store improvements can make a meaningful difference. We can then effectively track change and intervention strategies moving forward. The same analysis can be done for Chicago. Of course, we can do this work in other locations, too, but we already have the necessary data assembled to do this work in these two cities and are ready to proceed.

2. Additional qualitative and quantitative analysis of how food deserts and food imbalance impact **women and children**. We have known for a long time that diet equals health, but recent research being conducted by medical scientists around the world goes farther, suggesting that child-bearing women who have low or no access to quality, nutritious foods have a greater propensity to pass on diet-related diseases and conditions to their offspring. This might be one reason why we see adult level diabetes increasingly affecting children. We like to believe in America that a motivated child can overcome all odds. But what if you have these health traits passed on before birth, ingest high levels of fat and sugar but low levels of nutritious foods, and grow up sick as well as poor? In those cases, it's typically harder to develop your full mental and physical capability. It's harder to pay attention in school and ultimately to graduate. It's harder to find a job and become gainfully employed. In many respects, the deck is stacked against you from the beginning. We need to know more.
3. An analysis of the **distribution of USDA Food Stamp dollars** in Detroit and metro Detroit. How much are recipients spending in different kinds of stores and what are they buying?
4. Field checks and recoding, if necessary, of **Food Stamp Retail patterns** in Metro Detroit and other locations such as Flint, Grand Rapids, and other Michigan cities. We would also like to conduct an updated Chicago area analysis that identifies USDA food stamp retailers, and accounts for them in the Food Balance score, similar to the analysis for Detroit. We would like to do this for the 6 county area of Metro Chicago and other parts of the state. We have already acquired and geocoded the data for all of Michigan and Illinois.
5. The development of a quantitative **instrument for identifying and tracking mainstream and fringe food purchasing locations**, paired with local workshops and training on how to do community-based food assessments. These workshops would be geared to local grassroots organizations around the country.
6. Food Balance scores at the block level **paired with individual level patient data from health care providers**, using strict data protection systems and controls. This will help us further quantify the impact that food imbalance has on health care costs as well as have more precision in our overall methodology.
7. **A rural food balance analysis** for an entire state or region. Food deserts and the issue of food balance are not solely an urban problem; rural areas suffer as well and are likely to require different improvement strategies. Ultimately, we would like to develop a **food balance data set and map for an entire state**.
8. Food balance research in **other locations**. Inquiries have been coming in from other parts of the country. We hope to hear from you.

9. Additional data cleaning and analysis for the **body mass index** for Detroit and the region. We could have a very useful dataset on our hands, but need to conduct more analysis to find out. The data set had a number of problems and was very difficult to geocode (thank you again to Joseph Ferrie especially and also Jason Booza for your help). We would also like to acquire BMI data for Metro Chicago at a lower geography for further analysis.
10. **A food desert section on our website**, with support from a sponsor or group of sponsors. We hear that our studies and periodic briefings are useful and of interest to students, other researchers, community organizations, government, and the general public, but developing these additional briefings and managing them on a website take time and resources.
11. **Market studies and strategies** that identify sustainable opportunities for grocers using “below the radar” data and information. We have a strong foundation in market analysis and we hear from private sector actors that such a public study would be useful.
12. **Undocumented Mexican location patterns** and adjustments in the data to reflect these realities insofar as they concern untapped buying power (market opportunities) and public health concerns (community needs).
13. Working in partnership with the **Metropolitan Detroit Cancer Surveillance System of Wayne State University**, we would like to select a random sample of USDA Food Stamp retailers and verify food availability using a grocery survey of available items for Metro Detroit. We would conduct validation tests using a randomly selected sample and a previously validated questionnaire (such as the NEMS-S or the Cheatle method). We would then repeat the analysis but add in food pantries to the food balance equation and we would test its usefulness and appropriateness in the equation. We would then expand the pilot to a larger sample, should the first phase of our results prove interesting and useful. The second joint project that we would like to launch involves the culling of death by cancers in Detroit and Metro Detroit that are associated with dietary factors and the mapping of incidence and mortality with food availability, using the foundational work already completed, but adding in the locations of food pantries and restaurants. We would select two areas with high and low incidence/mortality and compare them. Both projects would be published in a scientific journal to bring the Food Balance methodology and new validation measures to a broader academic audience. The food availability survey would also be useful for many other applications, including community-based assessment workshops.
14. Finally, we see the work of **Social Compact** (www.socialcompact.org) and The Urban Institute’s **National Neighborhood Indicators Partnership** (<http://www2.urban.org/nnip/>) as being important to our past, current, and future food desert studies. We encourage funders to contact them directly to learn more about their initiatives.

Additional Reading

A number of other scholars have measured food access and assessed its impact on health. The following list provides a good introduction to this growing literature, though it is by no means exhaustive.

"PATHMARK SUPERMARKET." *Journal of Housing & Community Development* 63, no. 4 (Jul/Aug, 2006): 22-23.

Though in recent years parts of Harlem have experienced a well-publicized renaissance, much of the upper Manhattan neighborhood remains intensely poor. In East Harlem, the area north of 96th street and east of Fifth Avenue, the median household income in 2000 was \$21,500 a year, barely over half the city's overall median income. Since the Pathmark opened, it has become the anchor for an \$85 million commercial/retail complex called Harlem Center, and has drawn other retail giants to what is now a busy shopping hub on both sides of the street and stretching for several blocks. As a matter of pure business, Pathmark's bet has paid off handsomely. Six years after the store's grand opening, Pathmark's SVP for retail development, Harvey Gutman, says it remains one of the chain's highest-grossing supermarkets. Some 275 people work at the 125th Street store, 85% of which are Harlem residents

"Grocer Takes Advantage of Federal Tax Incentive, Opens Store in Milwaukee." *Milwaukee Journal Sentinel*, March 24, 2005, 3/24/2005, 2005.

Supermarkets come and supermarkets go, so it may have looked like political overkill when Gov. Jim Doyle and Mayor Tom Barrett led a delegation of state and city politicians to celebrate a new owner for a vacant grocery store on Milwaukee's industrial north side Wednesday. What drew officialdom to the former Kohl's Food Store at 4030 W. Teutonia Ave. was the novelty and sophistication that went into an inner-city investment. Lena's Food Markets, a family-owned chain of three central city groceries, employed a new-fashioned federal tax incentive to swing the \$ 3.7 million deal.

New Markets Tax Credits, as the program is called, belong to a new set of redevelopment tools for urban activists.

"Free Shuttles can Close Grocery Gap: How Inner-City Supermarkets can Turn a Profit, Improve Customers' Health." *AScribe Newswire*, 4/8/2003



Inner-city supermarkets can improve their profit margins and the health of the communities they serve by offering shoppers free transportation, according to a report released today by researchers at the UC Davis Center for Advanced Studies in Nutrition and Social Marketing. A free shuttle program also reduces shopping-cart thefts.

Block, Daniel. What Fills the Gaps in Food Deserts? Mapping Independent Groceries, Food Stamp Card Utilization and Chain Fast-Food Restaurants in the Chicago Area. Vol. 472006.

Recent research has identified the existence of “food deserts” in many urban (and rural) areas, characterized by a lack of access to chain supermarkets. With few exceptions, these studies have focused on chains rather than independent supermarkets. The Northeastern Illinois Community Food Security Assessment is a GIS and survey based study of food access in the six-county Chicago metropolitan area. Preliminary results indicate that poor and minority areas are less likely to have full-line chain supermarkets, but it does not necessarily follow that all of these communities have poor food access since many Hispanic and other ethnic communities have many stores that cater to their cuisines. More interestingly, food stamp card allocation and redemption data indicate that most poor African–American areas have much higher levels of allocation than redemption. Surrounding areas have higher redemption than allocation levels, indicating that residents are spending their food stamp money at stores in these surrounding neighborhoods. This food stamp usage data set is compared to the mix of stores in the particular neighborhoods in question.

Brown, Monique R. "Supermarket Blackout." Black Enterprise v29n12, (Jul, 1999): 81-92 (6 pages).

Generally, major supermarket chains steer clear of African American communities because they underestimate the community's potential spending power and overestimate the risks. This deficiency in black neighborhoods results in fewer employment opportunities, fewer competitively priced product choices and little access to philanthropic contributions. But you can secure more quality grocers with better products and services in your neighborhood by taking an active stance. Suggestions include: 1. Identify opportunities. 2. Join community organizations. 3. Support the stores in your community. 4. Make companies accountable.

Chung, Chanjin and Samuel L. Myers Jr. "Do the Poor Pay More for Food? an Analysis of Grocery Store Availability and Food Price Disparities." *Journal of Consumer Affairs* 33, no. 2 (Winter, 1999): 276-296.

Do the poor pay more for food? To answer this question, a study was conducted to provide an empirical analysis of grocery store access and prices across inner city and suburban communities within the Minneapolis and St. Paul metropolitan area.

Fleming, Leonard. "Supermarkets Find Inner-City Philadelphia A Tough Sell." *Philadelphia Inquirer* (5/29/2002, .

Guy, Clifford M. and Gemma David. "Measuring Physical Access to 'Healthy Foods' in Areas of Social Deprivation: A Case Study in Cardiff." *International Journal of Consumer Studies* 28, no. 3 (June, 2004): 222-234.

This paper examines some characteristics of food deserts--areas of social deprivation which have poor physical access to food shopping--in a large British city, Cardiff. The stereotype of the 'food desert' is critically examined, emphasizing the importance attached by residents of such areas to easy access to food shopping, especially in multiple supermarkets. The case study of Cardiff briefly discusses the identification of potential 'food deserts', and then examines the structures of 'healthy food' availability and prices in four areas of the city (two in the inner city, two in the outer city) where physical access to large multiple supermarkets is poor. The analysis shows that the local shops in these areas cannot compete generally with large supermarkets on either availability of items or their prices, but that the local shops in the inner city areas are rather more competitive than those in the outer areas. Implications for research and policy formulation are finally discussed.

Inagami, Sanae, Deborah A. Cohen, Brian Karl Finch, and Steven M. Asch. "You are Where You Shop: Grocery Store Locations, Weight, and Neighborhoods." *American Journal of Preventive Medicine* 31, no. 1 (July, 2006): 10-17.

Background: Residents in poor neighborhoods have higher body mass index (BMI) and eat less healthfully. One possible reason might be the quality of available foods in their area. Location of grocery stores where individuals shop and its association with BMI were examined. Methods: The 2000 U.S. Census data were linked with the Los Angeles Family and Neighborhood Study (L.A.FANS) database, which consists of 2620 adults sampled from 65 neighborhoods in Los Angeles County between 2000 and 2002. In 2005, multilevel linear regressions were used to



estimate the associations between BMI and socioeconomic characteristics of grocery store locations after adjustment for individual-level factors and socioeconomic characteristics of residential neighborhoods. Results: Individuals have higher BMI if they reside in disadvantaged areas and in areas where the average person frequents grocery stores located in more disadvantaged neighborhoods. Those who own cars and travel farther to their grocery stores also have higher BMI. When controlling for grocery store census tract socioeconomic status (SES), the association between residential census tract SES and BMI becomes stronger. Conclusions: Where people shop for groceries and distance traveled to grocery stores are independently associated with BMI. Exposure to grocery store mediates and suppresses the association of residential neighborhoods with BMI and could explain why previous studies may not have found robust associations between residential neighborhood predictors and BMI. [Copyright 2006

Ingram, Bob. "Inner City Markets." *Supermarket Business* 54, no. 9 (Sep 15, 1999): 61-67 (3 pages).

Last year, Giant Food Inc. opened 2 stores in Prince Georges County, Maryland - both in mature, underserved markets - and is currently negotiating for a site in Washington itself. In November, Baltimore was the beneficiary of this strategy with the opening of a 46,445-square-foot food/drug combination store in the Edmondson Avenue Shopping Center in West Baltimore. Details of the store's layout and inventory are discussed.

———. "Urban Urgency." *Supermarket Business* v54n7, (Jul, 1999): 13-22 (5 pages).

Pathmark, which is probably the premier city supermarket operator in the country, with 20% of its stores in urban areas, opened a showcase store in the old North Philadelphia Station in early May, and ShopRite owner Bill Glazier, a Philadelphia pioneer, unveiled a stunning 65,000-square-foot store in April in the city's Port Richmond section. Even Fresh Fields has gotten into the Philadelphia act with a lollapalooza unit that has been a mainstay in the Fairmont area for several years, and it has another planned for South Street. What is happening in Philadelphia is happening in cities all over the country: Giant Food Inc. (Landover, Maryland) has gone back into Baltimore, Pathmark has opened its long-awaited store on 125th Street in East Harlem and has as many as 6 other sites either under construction or signed in New York City, Shaw's is in New Haven, Connecticut, Dominick's has a Fresh store across from the Cabrini Green public housing projects in Chicago,

Schnucks opened in North St. Louis, and Mexican operator Gigante is coming into Southern California's Hispanic communities in full force.

Janoff, Barry. "Urban Renewal." *Progressive Grocer* 78, no. 10 (Oct, 1999): 22-30 (6 pages).

Supermarkets that had thrived in metropolitan centers before succumbing to financial, political and demographic metamorphosis are returning to inner-urban areas to expand their companies and reinvigorate local communities. Two key factors are re-establishing the US' urban centers as important retail centers for the 21st century: untapped financial power and the willingness of politicians and community organizations to work with retailers to bring companies back to the inner city. A number of supermarkets that are returning to the inner city are discussed. For example, Winn-Dixie Stores is scheduled to build a Winn-Dixie Marketplace on a tract of land in the inner-city section of LaVilla in Jacksonville, Florida. Meanwhile, Pathmark Stores Inc. has placed about 20% of its stores in urban markets, and Kroger Co. of Michigan is building a store that will be the anchor of a retail strip scheduled to open on the northeast side of Detroit in mid-2000.

Jetter, Karen M. and Diana L. Cassady. "The Availability and Cost of Healthier Food Alternatives." *American Journal of Preventive Medicine* 30, no. 1 (January, 2006): 38-44.

Many people, especially low-income consumers, do not successfully follow dietary recommendations to eat more whole grains and less fat and added sugar. The food environment may have a significant impact on the choice by low-income consumers to eat healthier foods, as both the availability and price of healthier food items may limit their ability to eat a healthier diet. We investigated the cost and availability of a standard market basket of foods, and a healthier basket that included low-fat meat and dairy and whole grain products. Market-basket surveys were conducted in 25 stores in Los Angeles and Sacramento. Stores were selected from neighborhoods that were varied by income and surveyed three times from September 2003 to June 2004. The average cost of a standard market basket (based on the U.S. Department of Agriculture's Thrifty Food Plan [TFP]) and a healthier market basket was calculated from these prices and compared using a standard t -test to determine if they were significantly different from each other. The analysis was conducted in 2005. The lack of availability in small grocery stores located in low-income neighborhoods, and the higher cost of the healthier market basket may be a deterrent to eating healthier among very low-income consumers. Public policies should take the food environment into account in order to develop successful

strategics to encourage the consumption of healthier foods.[Copyright 2006 American Journal of Preventive Medicine; published by Elsevier Inc.]

King, Robert P., Ephraim S. Leibtag, and Ajay S. Behl. Supermarket Characteristics and Operating Costs in Low-Income Areas United States Department of Agriculture, 2004.

Reveals that stores serving low-income shoppers--those with high Food Stamp redemption rates--differ from other stores. Findings do not support the hypothesis that supermarkets serving low-income clientele have higher operating costs, despite having significantly different cost structures.

Larson, Tom. "Why there Will be no Chain Supermarkets in Poor Inner City Neighborhoods." California Politics & Policy 7, no. 1 (June, 2003): 22-45.

Presents an economic explanation for difficulty in providing groceries to inner city residents from full-service grocery stores; experience of South Central area, Los Angeles, California.

Lavin, Marilyn. "Supermarket Access and Consumer Well-being: The Case of Pathmark in Harlem." International Journal of Retail & Distribution Management 33, no. 5 (2005): 388-398.

This paper extends the research stream that has linked supermarket access to consumer diet by focusing on Pathmark, a supermarket chain that operates in the Harlem neighborhood of New York City. The paper examines the square footage allocated to fresh produce, fish, meats, snack foods, soft drinks and similar items in Pathmark's Harlem store, and the pricing and promotion of those various foods. It is found that the allocation of space to nutritious foods and to those with minimal nutritional value as well as the pricing and promotion of those goods at the Pathmark Harlem store is similar to that of suburban supermarkets. The debate over the second supermarket in Harlem further shows that community leaders, food activists, and neighborhood residents recognize that large chain supermarkets may be uniquely positioned to improve access to healthy foods in lower-income urban areas.

Lewis, Len. "Dangerous Perceptions." Progressive Grocer 79, no. 3 (03, 2000): 4.

Deals with the misperception of the grocery industry about the inner city areas in the United States. Myths about inner-city business; Amount of retail spending in the



inner-cities; Lesson that retailers should learn.; Deals with the misperception of the grocery industry about the inner city areas in the United States. Myths about inner-city business; Amount of retail spending in the inner-cities; Lesson that retailers should learn.

McDaniel, Andi. "Guerrilla Grocers." *Utne* no. 131 (Sep/Oct 2005, 2005): 12-13.

Discusses the absence of supermarkets in inner cities in the U.S. in 2005. Replacement of supermarkets by convenience and liquor stores; Reasons for the decision of supermarket chains not to operate in inner cities; Action taken by the California Food Policy Advocates to promote healthy food habits.

McTaggart, Jenny. "Just enough for the City." *Progressive Grocer* 85, no. 10 (Jul 1, 2006): 44-46,48.

When retailers are on the prowl for viable new markets, higher poverty and unemployment rates are not the first characteristics they look for. The supermarket industry as a whole has made significant strides in serving urban neighborhoods in recent years marking a decided turn away from a period when the trend was to flee cities. Part of the reason supermarkets have become more open to inner cities is that governments and nonprofit organizations have become more open to helping retailers deal with their challenges. In California, meanwhile, several independents, such as Bill MacAloney's Jax Markets, have discovered the value of inner-city customers. One of Food Lion's urban success stories is a unit in Durham, NC, which it opened in Apr 2004. The major key to success in Durham and other urban locations is the fact that the communities want the stores there.

———. "The Path Less Retailed." *Progressive Grocer* 84, no. 5 (Apr 1, 2005): 26-28,30-32.

Inner-city markets present challenges that many supermarket operators choose not to take on, but for Pathmark Stores, Inc, choosing the path less retailed seems to be paying dividends. In its new Harlem, NY store, which is located in the Bradhurst section, all the amenities typically found in suburban supermarkets are present -- albeit on a slightly smaller scale -- and the neighborhood shoppers have so far been showing their appreciation. The store offers the quintessential one-stop shop, inner-city style, complete with a miniature pharmacy; a branch from locally owned Carver Savings Bank; a full aisle of American Greetings card; a service desk where customers can purchase money orders, Western Union services, and lottery tickets; hot foods to go; photo processing; and even a steam machine rental service for



cleaning carpets. Pathmark maintains very high sanitation standards. Its rule is, clean first, then fill the shelves.

O'Dwyer, Lisel A. and John Coveney. "Scoping Supermarket Availability and Accessibility by Socio-Economic Status in Adelaide." *Health Promotion Journal of Australia* 17, no. 3 (Dec, 2006): 240-246.

Issue addressed: Lower socio-economic status (SES) populations are known to have poorer diets than high SES populations. We explore the extent to which factors in the built environment may contribute to this social health inequality and determine whether 'food deserts' exist in Australian cities. Methods: We use a geographic information system to measure availability and accessibility of supermarkets in four case study local government areas (LGAs). The location of supermarkets is analysed in relation to residential dwellings, car ownership and in terms of travel distance along the road network. Results: This methodology identifies differences in both availability and accessibility between and within LGAs. It shows that a local-level approach to the issue of food deserts is warranted and suggests that generalisations based on large geographic areas are unlikely to be meaningful. Conclusions: A significant number of households live in 'food deserts' in Adelaide and these can only be identified using a local-level approach. Adapted from the source document.

Pothukuchi, Kameshware. "Attracting Supermarkets to Inner-City Neighborhoods: Economic Development Outside the Box." *Economic Development Quarterly* 19, no. 3 (Aug 1, 2005): 232-244.

The paucity of accessible supermarkets is a continuing concern in inner-city communities. Based on a survey of planners in 32 communities, this article examines initiatives to encourage grocery retail investment, reasons for the existence or absence of initiatives, and factors in successful developments. This research shows that systematic, citywide grocery initiatives are rare, with such efforts limited to particular sites or developments. Reliance on private initiatives, absence of grassroots requests for action, and assignment of lower priority to grocery stores in commercial revitalization programs explain planner inaction. Successful initiatives are characterized by political leadership, competent public agency participation, and, often, partnerships with nonprofit agencies. This article also presents recommendations for community and economic development planners to increase grocery investment in underserved areas.

Pothukuchi, Kameshware 2003. "The food system in Detroit: A Handbook for local planning", Detroit: Wayne State University.

Pothukuchi, Kameshware 2004. "Community Food Assessment: A First Step in Planning for Community Food Security." *Journal of Planning Education and Research*, 23, 356

Smoyer-Tomic, Karen E., John C. Spence, and Carl Amrhein. "Food Deserts in the Prairies? Supermarket Accessibility and Neighborhood Need in Edmonton, Canada." *Professional Geographer* 58, no. 3 (08, 2006): 307-326.

The U.S. and U.K. literatures have discussed "food deserts," reflecting populated, typically urban, low-income areas with limited access to full-service supermarkets. Less is known about supermarket accessibility within Canadian cities. This article uses the minimum distance and coverage methods to determine supermarket accessibility within the city of Edmonton, Canada, with a focus on high-need and inner-city neighborhoods. The results show that for 1999 both of these areas generally had higher accessibility than the remainder of the city, but six high-need neighborhoods had poor supermarket accessibility. We conclude by examining potential reasons for differences in supermarket accessibility between Canadian, U.S., and U.K. cities. ABSTRACT FROM AUTHOR Copyright of Professional Geographer is the property of Blackwell Publishing Limited and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use. This abstract may be abridged. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material for the full abstract. (Copyright applies to all Abstracts); The U.S. and U.K. literatures have discussed "food deserts," reflecting populated, typically urban, low-income areas with limited access to full-service supermarkets. Less is known about supermarket accessibility within Canadian cities. This article uses the minimum distance and coverage methods to determine supermarket accessibility within the city of Edmonton, Canada, with a focus on high-need and inner-city neighborhoods. The results show that for 1999 both of these areas generally had higher accessibility than the remainder of the city, but six high-need neighborhoods had poor supermarket accessibility. We conclude by examining potential reasons for differences in supermarket accessibility between Canadian, U.S., and U.K. cities. ABSTRACT FROM AUTHOR Copyright of Professional Geographer is the property of Blackwell Publishing Limited and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles

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Summerour, Jenny. "Making it in the City." *Progressive Grocer* 81, no. 7 (May 1, 2002): 15-24.

Many of urban areas are experiencing steady growth in density and development, and the opportunity exists for competitive food retailers - chains and independents alike - to gain footholds and penetrate a niche that the Wal-Marts of the nation might find difficult to service. Chain retailers that have entered the inner city say their urban locations invariably are their most highly trafficked and profitable stores. Yet while the huge gap between major grocery stores and dense urban areas has closed significantly in the last decade, new trends in urban development make the inner city an even more viable market. By operating in inner cities, retailers not only reach a denser population, they also cater to a much more diverse population that more closely mirrors the future demographic makeup of America. While average household income is lower in inner cities than in many other communities, those households on average spend slightly more per month on food products than shoppers in the overall US.

Tortola, Jane Olszeski. "Urban Entrepreneurs." *Progressive Grocer* 81, no. 13 (Sep 15, 2002): 12.

Supermarkets looking to grow have recently set their sights on the inner cities, where the existence of prime real estate, redevelopment initiatives, and thousands of people all indicate that a store can be successful. Industry experts caution that operating in the inner city is no easy task. But Leonard and Donna Harris, owners of Chicago's Chatham Food Center, have proven that the benefits of operating in the inner city far outweigh the risks.

Special posting of works by Zenk et al:

Food Access Studies in Detroit: Selected Results from Research Conducted by Projects Affiliated with the Detroit Community-Academic Urban Research
(www.sph.umich.edu/urc)

Results from Research Affiliated with the Healthy Environments Partnership
(www.sph.umich.edu/hep)



Supermarket Access1

This study compared the distance to the nearest chain supermarket by neighborhood economic and racial characteristics. In 2002, we mapped all supermarkets (full-line chain grocery stores and supercenters) in the city of Detroit and within 15 miles of Detroit. The city of Detroit had only 9 supermarkets compared to 151 supermarkets in the surrounding metropolitan area (see Figure 1). Using census tracts as proxies for neighborhoods, we measured the distance to the nearest supermarket from the middle of each of the 869 neighborhoods located in Detroit and within 10 miles of Detroit. For African-American neighborhoods, the distance to the nearest supermarket increased as poverty in the neighborhood increased. For White neighborhoods, there was no difference in the distance to the nearest supermarket by poverty level of the neighborhood. Among the highest poverty neighborhoods, the nearest supermarket was approximately one mile further away, on average, in neighborhoods where African-Americans lived when compared with White neighborhoods, after accounting for differences in population density. Distance to the nearest supermarket was similar among the lowest poverty neighborhoods, regardless of the proportion of African-American residents. The findings highlight the need for more supermarkets in Detroit, especially in poor African-American neighborhoods.

Fresh Fruit and Vegetable Access2

This study compared access to fresh fruit and vegetables in four Detroit area communities: a poor African-American community (Eastside Detroit), a poor racially heterogeneous community (Southwest Detroit), a middle-income African-American community (Northwest Detroit), and a middle-income racially heterogeneous community (Southfield). We mapped and visited all food stores (except convenience stores with gasoline) located in these communities in the fall of 2002. For each store, we measured the availability (whether or not the store sold any fresh fruit or vegetables), selection (count of 80 fresh fruits and vegetables), quality (average quality score for a subset of 20 fresh fruit and vegetables based on the proportion of adequate quality items), and price (average price of a subset of 20 fresh fruit and vegetables based on the lowest cost brand and size) of fresh fruit and vegetables. Eastside Detroit had four times more liquor stores (see Figure 2) and fewer grocery stores (see Figure 3) per 100,000 residents than Southfield. Of the four communities, Northwest Detroit had the fewest grocery stores and the fewest stores selling fresh fruit and vegetables per population. The quality of fruit and vegetables was significantly lower, on average, at stores in Eastside Detroit than at stores in Southfield. Differences in the types of stores present in the communities only explained part of this quality difference. The communities did not differ in the average selection and price of fruit and vegetables at stores. Thus, residents of Eastside Detroit were asked to pay the same price for inferior quality fruit and vegetables. Increasing access to fresh fruit and vegetables in this community is a critical first step to improving dietary practices and health among residents.

Neighborhood Food Store Availability and Obesity3

This study examined availability of resources and risks in the retail food environment -- healthy foods (large grocery store) and cheap, high-calorie foods



(convenience store, liquor store) -- as two pathways by which neighborhoods may affect residents' body sizes. The study is based on a community survey of 919 African-American, Latino, and White adults ages 25 years and over living in Eastside, Southwest, and Northwest Detroit. As part of the survey, interviewers measured participants' height, weight, and waist circumference to find out whether they had an unhealthy body size (i.e., obesity, abdominal obesity). The study also used data from the 2000 U.S. Census and maps of food stores in the three communities. Living in a high-poverty (vs. low-poverty) neighborhood was associated with a 56% and two-fold increase in the risk of being obese and abdominal obesity, respectively. Grocery store availability in the neighborhood was not associated with body size. However, presence of a specialty store was associated with decreased risk of unhealthy body size. Liquor store and convenience store availability were associated with increased risk of unhealthy body size. The availability of retail outlets offering a wide selection of cheap, high-calorie foods and relatively few healthful alternatives may contribute to unhealthy body sizes among residents. Interventions and policies that both increase access to healthy foods and reduce their price are needed to address the increased risk of obesity and related chronic conditions that disproportionately affect residents of poor neighborhoods.

Results from Research Affiliated with the East Side Village Health Worker Partnership

Food Store Characteristics and Fruit and Vegetable Intake⁴

This 2001 study examined whether food store characteristics affected African-American women's fruit and vegetable intake. As part of a community survey of women living in eastside Detroit, 266 women provided the name and location of the store where they purchased the most food for themselves and their families. We asked them how they would rate the quality/selection and affordability of fresh fruit and vegetables at the store where they shopped, and as well as how often they ate fruit and vegetables. The women reported shopping at 45 different stores, 44% of which were located in the city of Detroit. Of the 183 women shopping in Detroit, 77% frequented independent grocery stores, 16% chain supermarkets, and 7% specialty or limited assortment stores. Of the 83 women shopping in the suburbs, 86% frequented supermarkets, 14% specialty or limited assortment stores, and none at independent grocery stores.

Women shopping at supermarkets and specialty stores (fruit and vegetable markets or meat markets) ate fruit and vegetables more often, on average, than women shopping at independent grocery stores. Women who were happier with the quality/selection of fresh fruit and vegetables for sale at the store where they shopped also ate fruit and vegetables more often. Perceived affordability of fresh fruit and vegetables was not related to fruit and vegetable intake. The findings suggest that the type of store to which women had access and the selection and quality of fruit and vegetables for sale affected how often they ate fruit and vegetables. Given that women are often the main household food shoppers, the stores and foods to which they have access may not only affect their personal nutrition, but also the nutrition of other household members.

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