

Walkable Access to Healthy Food in Philadelphia, 2010-2012



March 2013

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Acknowledgements

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Jonathan Sinker, MRP, conducted all the geospatial analysis for this report. Giridhar Mallya, MD, MSHP, led the study. Lisa Colby, MSW, helped organize and edit the report. Sara Solomon, MPH, RD, contributed to its conceptualization. Amanda Wagner, MCRP, MGA; Jennifer Aquilante, MPH, RD; and Clint Randall, MCP, provided helpful input.

I. Executive Summary

Context

Of the ten largest U.S. cities, Philadelphia has the highest prevalence of obesity among youth¹ and adults.² Obesity is a risk factor for a range of chronic diseases, including type two diabetes, heart disease, and stroke. Low-income residents and racial-ethnic minorities face disparate burdens from obesity-related conditions. Lack of access to healthy, affordable foods is a well-documented contributor to these disparities.³ In Philadelphia, residents of low-income neighborhoods are half as likely to have access to quality grocery stores as residents of high-income neighborhoods.⁴

Through *Get Healthy Philly*, the Philadelphia Department of Public Health and its partners have implemented a variety of strategies since 2010 to increase access to affordable, nutritious foods in low-income neighborhoods, including expansions in farmers' markets, Philly Food Bucks (a SNAP bonus incentive program), and the Healthy Corner Store Initiative. (Visit www.phila.gov/gethealthyphilly for details.) Furthermore, the Pennsylvania Fresh Food Financing Initiative has significantly expanded access to supermarkets in the city over the last five years, and numerous other public and private sector efforts have boosted healthy food availability.

Approach

In this report, we assess and graphically depict walkable access to healthy food retailers in Philadelphia for 2010 and 2012. (Walkable access reflects food retailers within 0.5 miles or closer, depending on the retailer type.) We focus additional attention on low-income neighborhoods in which residents may have the fewest resources to purchase healthy foods and/or to travel to distant retailers. (Low-income neighborhoods are those in which 20% or more of the households live at or below the federal poverty level.) What makes this analysis unique is that we include not just supermarkets but also smaller and seasonal food retailers, such as corner stores, convenience stores, farmers' markets, and produce carts. Based on published research, we assigned each food retailer a score and service area reflecting its relative size, operating hours, and the availability and quantity of healthy foods for purchase. (See Table 1 and *Technical Appendix* for details.)

Findings

Tables 1 and 2 depict the total number of food retailers included in the analysis in 2010 and 2012. The largest change involved corner stores and farmers' markets. The total number of corner stores in our dataset increased from 1,466 to 1,710 based on better and fuller identification of businesses, and the number of healthy corner stores increased from 13 to 618. Farmers' markets grew from 43 to 62. Based on available data, there were no significant changes in the number of supermarkets, convenience stores, and mobile produce vendors.

Table 3 describes changes in walkable access to healthy food between 2010 and 2012. **In sum, we find that approximately 61,000 fewer Philadelphians live in areas with high poverty and low-to-no walkable access to healthy food retailers. This represents a 17% decrease over 2 years.** Of the city’s 18 Planning Districts⁵, 12 saw improvements ranging from 1% to 41%. The largest improvements were seen in Lower North, Upper North, and South Philadelphia. These gains are primarily due to increases in healthy corner stores and farmers’ markets. Some of the change can be attributed to more complete identification of businesses in 2012 as compared to 2010 (corner stores).

Despite these improvements, **307,000 Philadelphians still live in neighborhoods with high poverty and low-to-no walkable access to healthy food retailers.** Three planning districts saw no change between 2010 and 2012, and three others saw small increases in the number of low-income residents with limited access to healthy foods, ranging from 1% to 7%. The largest increase was seen in West Philadelphia due to the closure of a supermarket.

In the body of the report, we present four maps each for the City of Philadelphia and its 18 Planning Districts: 1) Walkable access to healthy foods, 2010; 2) Walkable access to healthy foods, 2012; 3) Areas with low-to-no walkable access and high poverty, 2010; and 4) Areas with low-to-no walkable access and high poverty, 2012. The last map in this series highlights areas of improvement from 2010 to 2012.

Table 1: Food retailers included in this analysis and their associated food availability scores and service areas, 2010 and 2012

	2010	2012	Healthy food availability score	Service area
Supermarkets*				
TOTAL	147	144		
\$2 - \$4.99 million	22	21	25	0.5 miles
\$5 - \$9.99 million	49	46	50	0.5 miles
\$10 - \$19.99 million	34	35	100	0.5 miles
\$20 - \$39 million	31	31	200	0.5 miles
≥ \$40 million	11	11	400	0.5 miles
Convenience stores	83	83	10	0.25 miles
Corner stores				
TOTAL	1,468	1,710		
Standard corner store	1,455	1,092	2	0.1 miles
Healthy corner store	13**	477	5	0.1 miles
Enhanced healthy corner store	0	141	10	0.25 miles
Farmers’ markets	40	62	5	0.25 miles
Mobile produce vendors	104	104	2	0.1 miles

*Supermarkets are categorized by sales volume.

**40 corner stores had health-promoting changes prior to 2010, but they were not all included in this analysis because of data limitations. Our 2010 dataset contained 13 of these stores, and our 2012 dataset contained 26 of them: 21 were Healthy Corner Stores, and 5 were Enhanced Healthy Corner Stores.

Limitations

Numerous factors limit our analysis and deserve consideration. (See *Technical Appendix* for details.) First, data on food retailers may be incomplete or inaccurate, particularly for small retailers with frequent store turnover. Between 2010 and 2012, our dataset grew considerably with regard to corner stores as our identification methods improved. Second, the relative scores for different types of retailers are estimates and may not reflect actual differences in healthy food availability. Third, every type of food retailer—such as chain *superstores*—is not included in this analysis. Relatedly, this study does not account for other food access points, such as restaurants, community gardens, urban farms, emergency food sites, and institutions (e.g., hospitals or large employers with on-site cafeterias). Fourth, many people shop in stores outside of their home neighborhoods, such that walkable access is only one aspect of Philadelphians' larger access to healthy foods.

Moreover, healthy food access does not necessarily guarantee improved nutritional intake. Many other factors influence the choices of consumers⁶, including: the ubiquity of unhealthy foods and advertising for these products; the price and quality of healthy foods; consumer knowledge of healthy food preparation; social and cultural norms around nutrition; and institutional food policies in schools, afterschool programs, and workplaces. Public health agencies must address these issues while continuing to expand healthy food access.

Next steps

Because of these limitations and the intense interest of stakeholders in this issue, we hope this report generates dialogue about the best ways to measure and monitor healthy food access in Philadelphia. We already have learned of numerous ways to strengthen our approach based on feedback from partners. Accordingly, we will continue to improve the completeness and accuracy of our food retailer datasets.

Moreover, we believe that other Philadelphians will have unique insights into the strengths and shortcomings of our assessment. This includes residents living and working in Philadelphia's neighborhoods, food retailers operating small and large businesses, neighborhood associations and community development corporations promoting economic growth, and those in the non-profit and academic spheres implementing and evaluating food access initiatives.

Therefore, we ask all interested stakeholders to review these maps and send comments, ideas, and questions to foodaccessmaps@phila.gov. The full report is available at www.phila.gov/getthehealthyphilly. Online maps with data on healthy corner stores and farmers' markets are available at www.foodfitphilly.org and www.phila.gov/map.

Table 2: Food retailers included in this analysis, by planning district, 2010 and 2012

	2010							2012						
	Supermarkets	Convenience stores	Standard corner stores	Healthy corner stores	Enhanced healthy corner stores	Farmers' markets	Mobile produce vendors	Supermarkets	Convenience stores	Standard corner stores	Healthy corner stores	Enhanced healthy corner stores	Farmers' markets	Mobile produce vendors
Citywide	147	83	1455	13	0	43	104	144	83	1092	477	141	62	104
North	1	3	222	5	0	3	9	13	3	148	100	28	3	9
Lower North	12	1	119	2	0	4	5	13	1	87	21	30	8	5
South	16	5	231	0	0	2	7	16	5	177	78	8	5	7
Upper North	13	3	138	0	0	2	7	12	3	109	36	9	4	4
Lower Northeast	10	8	112	0	0	1	0	10	8	86	6	5	2	0
River Wards	6	6	64	6	0	1	1	6	6	58	33	8	1	1
Central	10	11	60	0	0	12	33	9	11	48	18	7	14	33
Lower Southwest	6	2	2	0	0	0	4	6	2	50	19	6	0	4
University/Southwest	7	7	79	0	0	5	16	7	7	52	21	15	8	16
Lower Northwest	5	4	7	0	0	3	1	5	4	5	1	0	4	1
North Delaware	6	14	51	0	0	0	0	6	14	43	12	3	0	0
Central Northeast	7	8	24	0	0	0	0	7	8	20	5	2	0	0
Lower South	0	0	65	0	0	0	1	0	0	2	0	0	0	1
Upper Far Northeast	5	4	23	0	0	0	0	5	4	22	1	0	0	0
Lower Far Northeast	6	4	10	0	0	0	0	6	4	10	60	0	0	0
West Park	4	1	34	0	0	1	5	4	1	20	10	2	2	5
Upper Northwest	11	1	75	0	0	7	3	10	1	57	18	3	8	3
West	10	1	135	0	0	2	12	9	1	98	38	15	3	12

*40 corner stores had health-promoting changes prior to 2010, but they were not all included in this analysis because of data limitations. Our 2010 dataset contained 13 of these stores, and our 2012 dataset contained 26 of them: 21 were Healthy Corner Stores, and 5 were Enhanced Healthy Corner Stores.

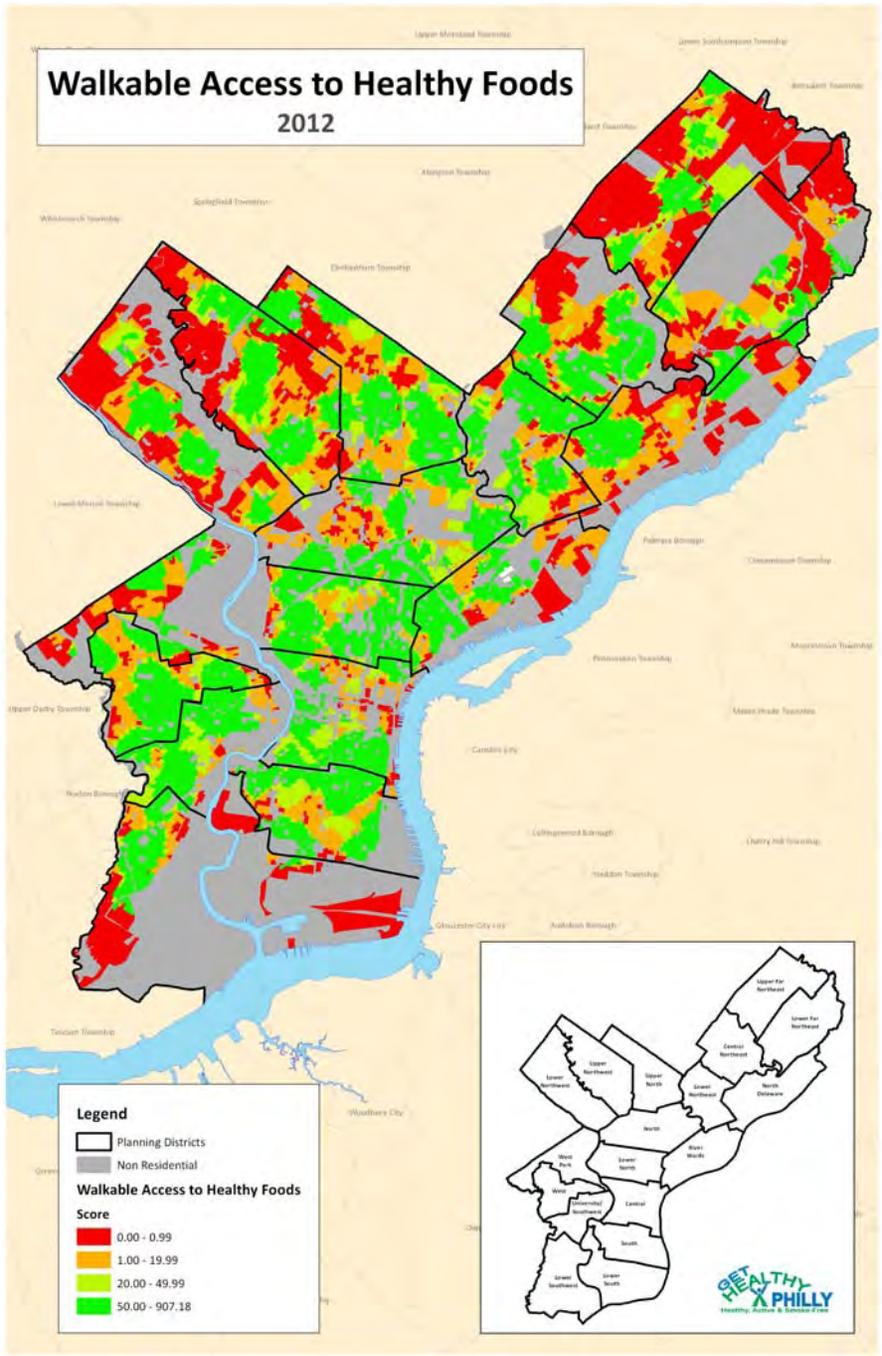
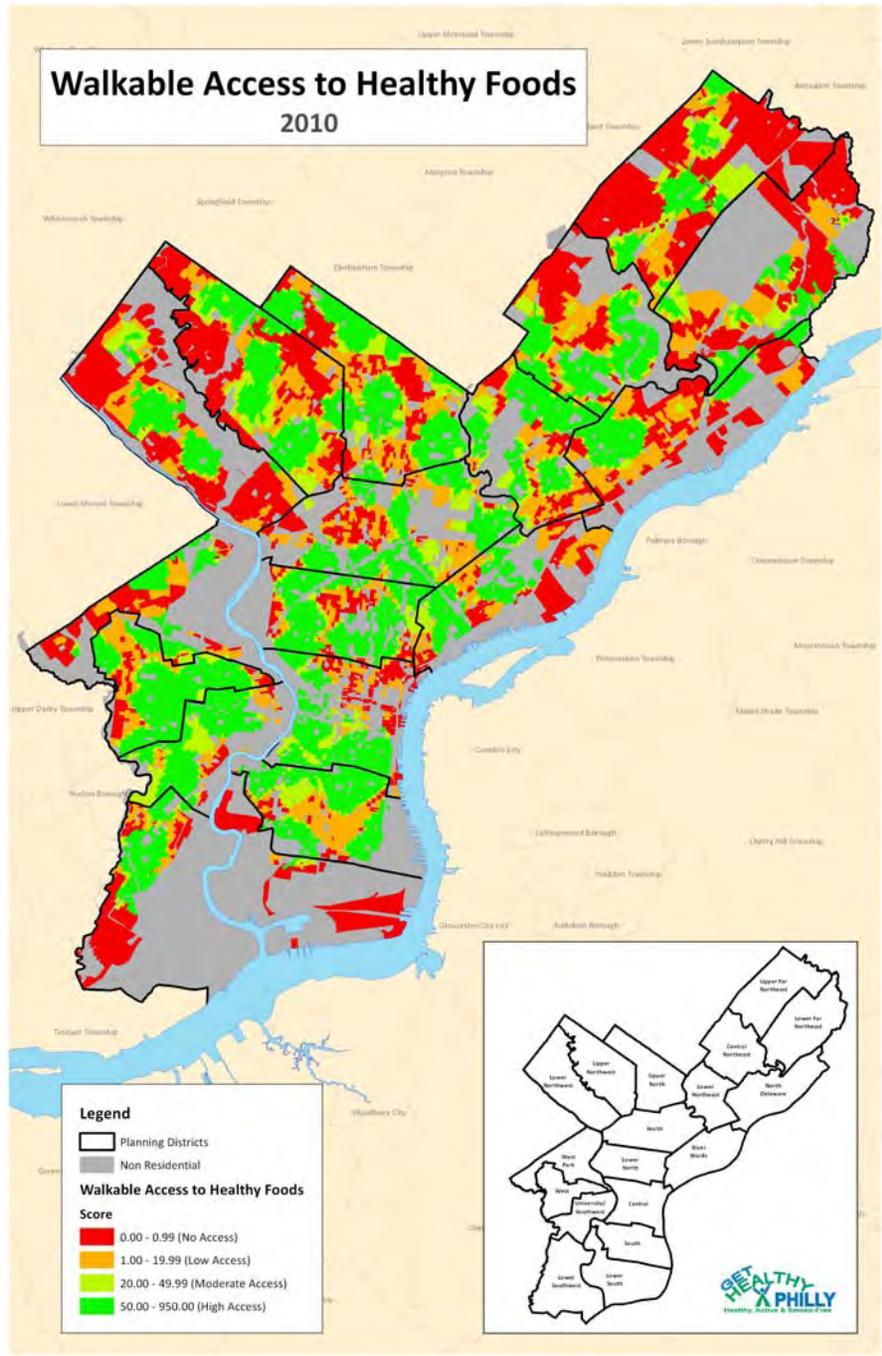
Table 3: Low to no walkable access to healthy food and high poverty, 2010 and 2012

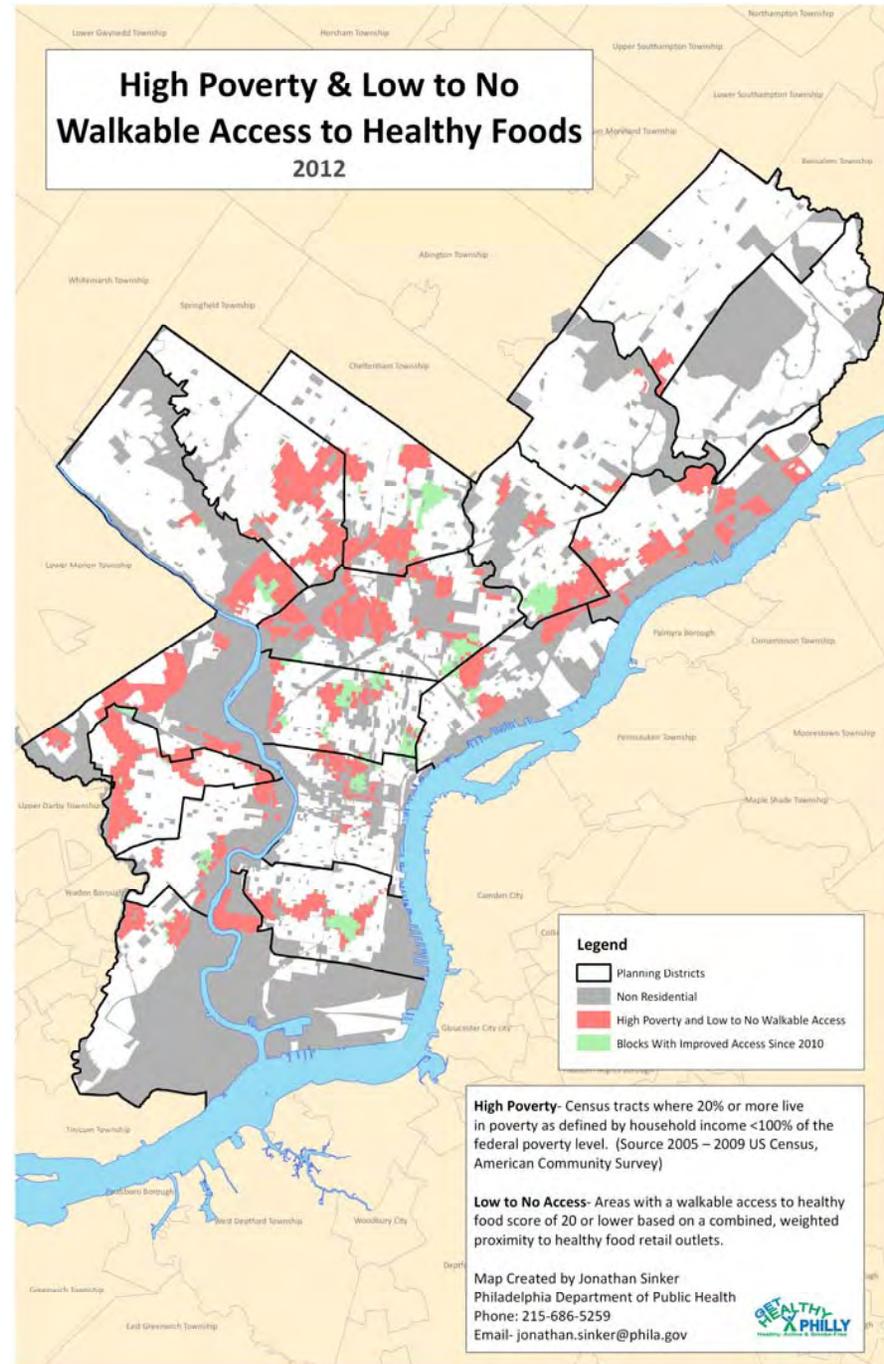
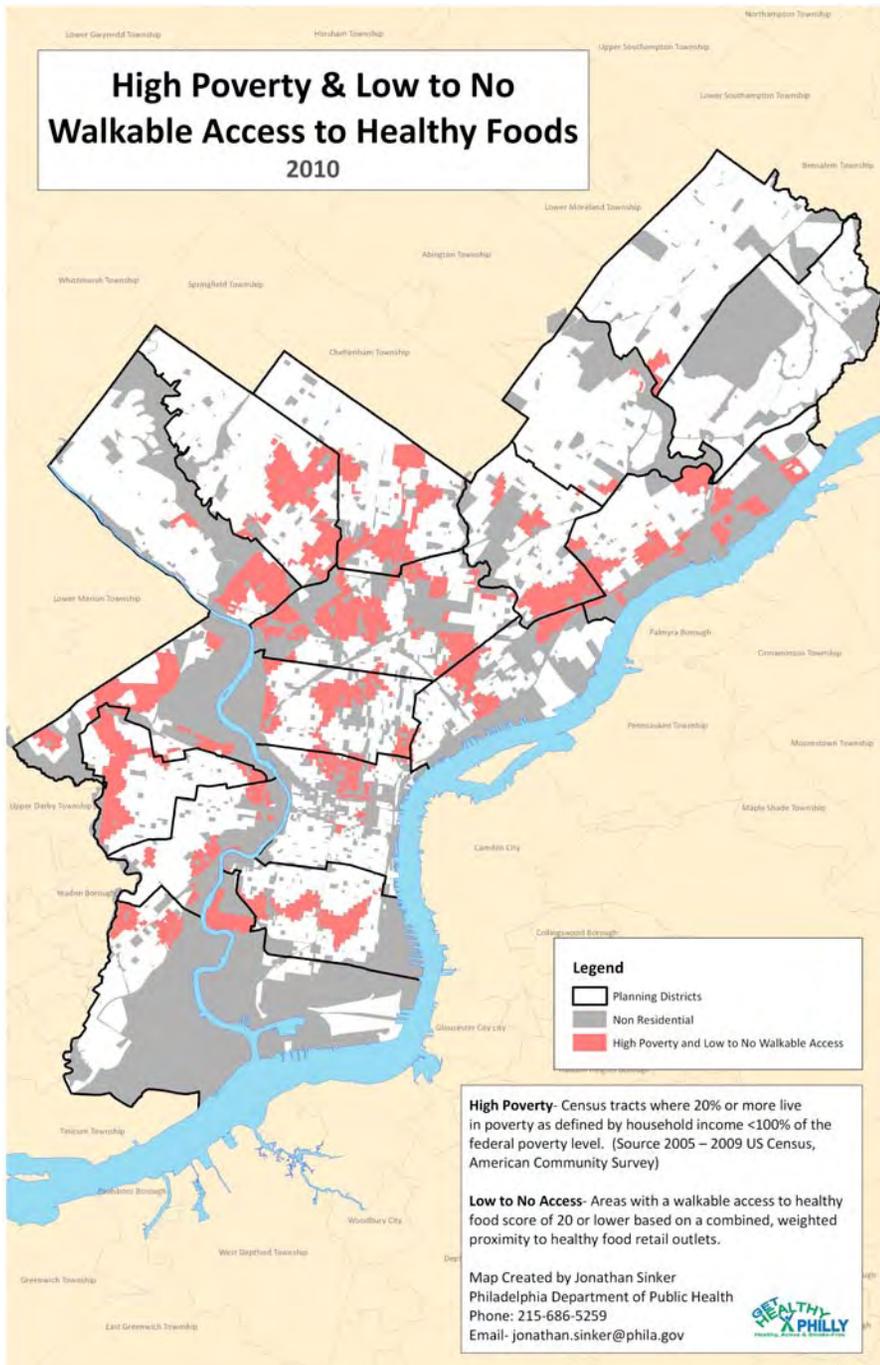
	2010					2012					2010 vs. 2012	
	Total population	Low to no access (LNA)	High poverty (HP)	Low to no access and high poverty (LNA-HP)	% LNA-HP	Total population	Low to no access (LNA)	High poverty (HP)	Low to no access and high poverty (LNA-HP)	% LNA-HP	Change in LNA-HP	% change in LNA-HP
Citywide	1,526,006	682,558	860,910	367,772	24.1%	1,526,006	611,121	860,910	306,803	20.1%	-60,969	-16.6%
North	137,849	49,067	137,904	49,067	35.6%	137,849	35,901	137,904	35,901	26.0%	-13,166	-26.8%
Lower North	95,777	30,075	95,777	30,075	31.4%	95,777	17,820	95,777	17,820	18.6%	-12,255	-40.7%
South	132,904	52,142	93,522	38,537	29.0%	132,904	40,870	93,522	27,538	20.7%	-10,999	-28.5%
Upper North	144,381	66,062	71,582	35,515	24.6%	144,381	58,169	71,582	24,715	17.1%	-10,800	-30.4%
Lower Northeast	100,232	44,277	61,239	26,788	26.7%	100,232	37,409	61,239	20,611	20.6%	-6,177	-23.1%
River Wards	68,489	34,606	37,386	20,863	30.5%	68,489	29,010	37,386	17,040	24.9%	-3,823	-18.3%
Central	117,132	29,127	37,591	15,567	13.3%	117,132	22,768	37,591	12,759	10.9%	-2,808	-18.0%
Lower Southwest	42,087	18,611	24,403	12,607	30.0%	42,087	16,937	24,403	11,155	26.5%	-1,452	-11.5%
University/ Southwest	81,145	15,697	76,592	15,693	19.3%	81,145	14,296	76,592	14,292	17.6%	-1,401	-8.9%
Lower Northwest	50,799	33,332	6,035	4,831	9.5%	50,799	29,376	6,035	4,329	8.5%	-502	-10.4%
North Delaware	100,631	67,936	35,622	27,574	27.4%	100,631	66,903	35,622	27,373	27.2%	-201	-0.7%
Central Northeast	78,266	34,223	11,197	3,223	4.1%	78,266	32,939	11,197	3,083	3.9%	-140	-4.3%
Lower South	5,180	3,898	0	0	0.0%	5,180	3,898	0	0	0.0%	0	0.0%
Upper Far Northeast	66,605	48,501	8,478	3,020	4.5%	66,605	48,184	8,478	3,020	4.5%	0	0.0%
Lower Far Northeast	70,340	48,122	0	0	0.0%	70,340	47,066	0	0	0.0%	0	0.0%
West Park	43,454	29,593	28,581	22,564	51.9%	43,454	29,734	28,581	22,705	52.3%	141	0.6%
Upper Northwest	85,093	44,381	43,035	30,217	35.5%	85,093	44,919	43,035	30,755	36.1%	538	1.8%
West	105,642	32,908	91,966	31,629	29.9%	105,642	34,922	91,966	33,705	31.9%	2,076	6.6%

Definitions (see Technical Appendix for details)

Low to no walkable access: *Low access* refers to an area, for example, without a small supermarket within 0.5 miles. *No access* refers to an area without even a corner store within 2 blocks. **High poverty:** Census tracts (as per 2010 U.S. Census boundaries) in which 20% or more of the households lived below 100% of the Federal Poverty Level (based on 2005-2009 American Community Survey of the U.S. Census).

II. City Wide Maps

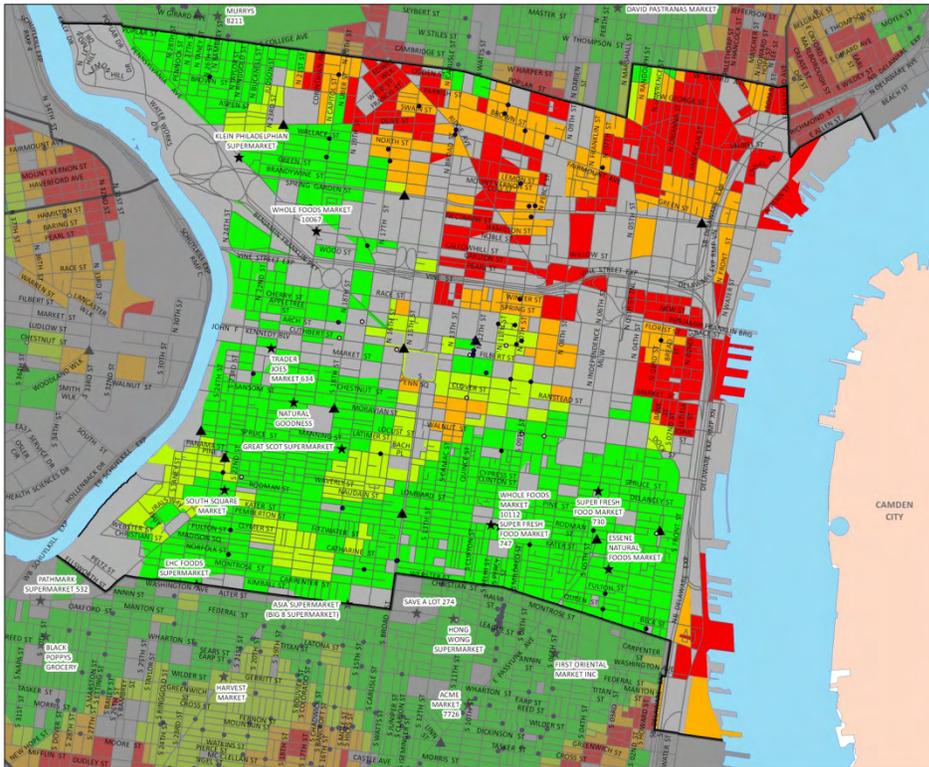




III. Planning District Maps

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Central



Walkable Access to Healthy Food PLANNING DISTRICT-CENTRAL 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

Walkable Access to Healthy Foods

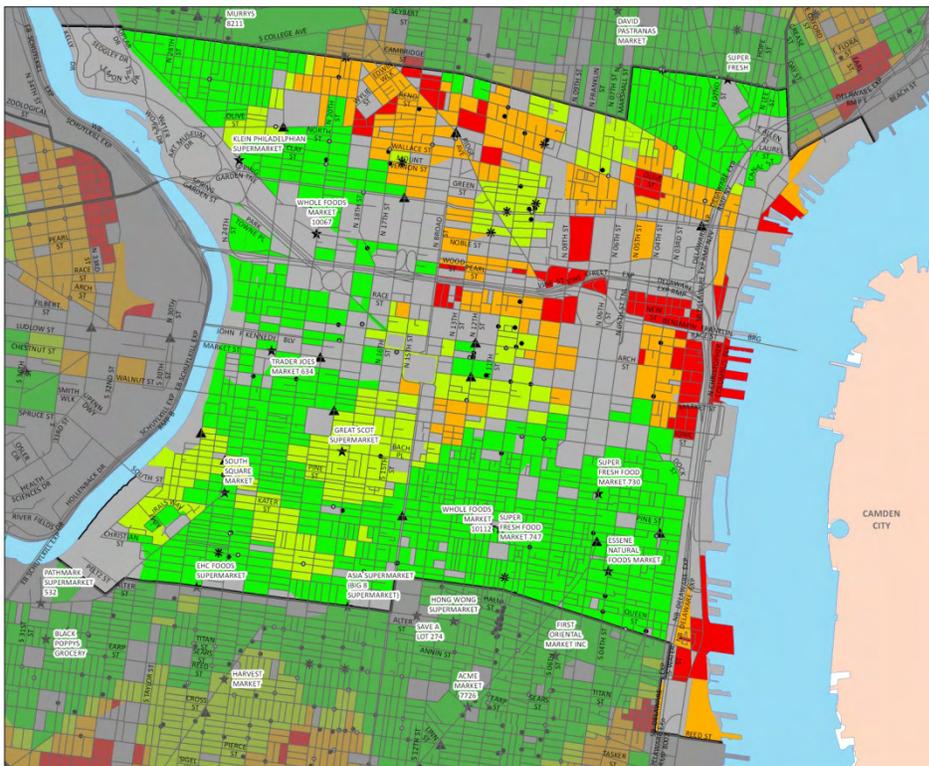
Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212

0 0.2 0.4 0.8 Miles



Walkable Access to Healthy Food PLANNING DISTRICT-CENTRAL 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ◻ Enhanced Healthy Corner Store (Score = 10)
- ◻ Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- ▲ Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food

Score

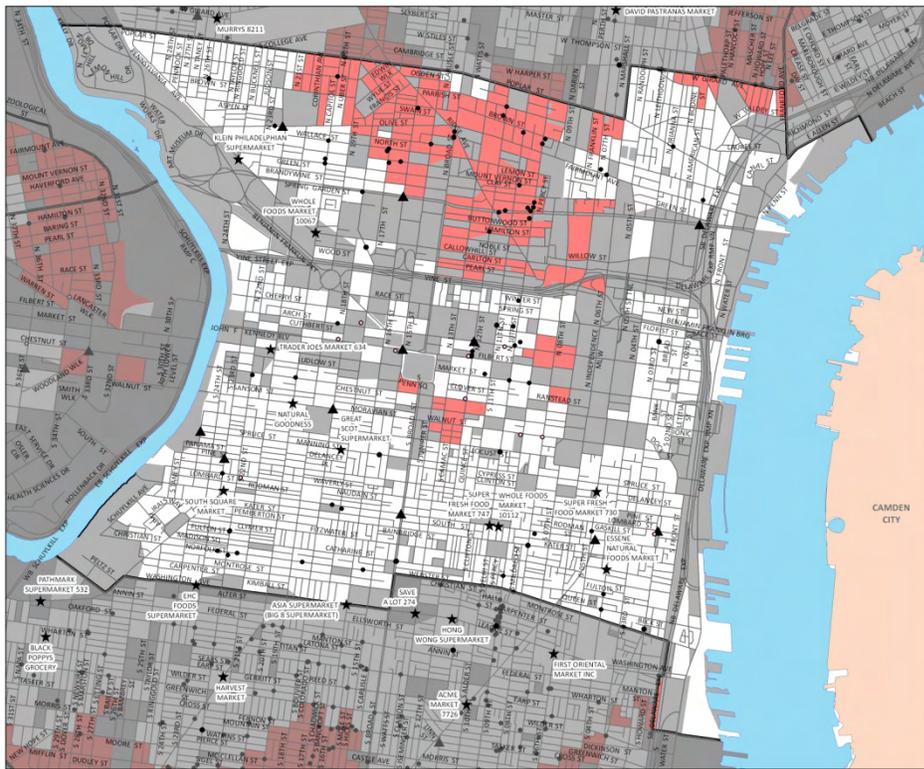
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Area of Study

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0 0.225 0.45 0.9 Miles

Central



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT-CENTRAL 2010



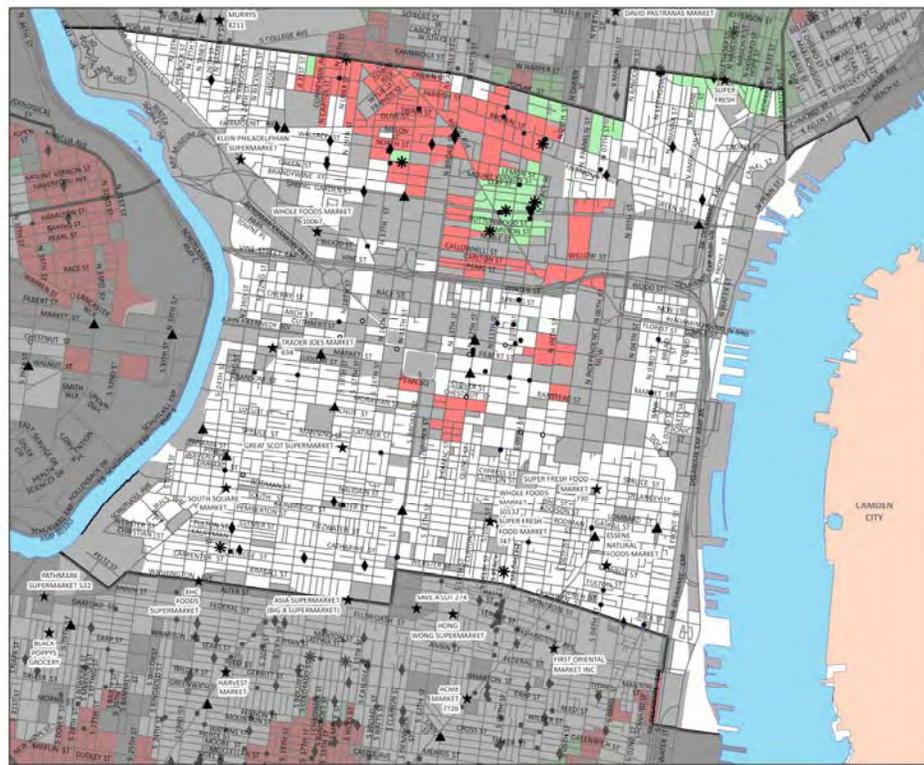
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/26/2012
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212

0 0.2 0.4 0.8 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT-CENTRAL 2012



High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

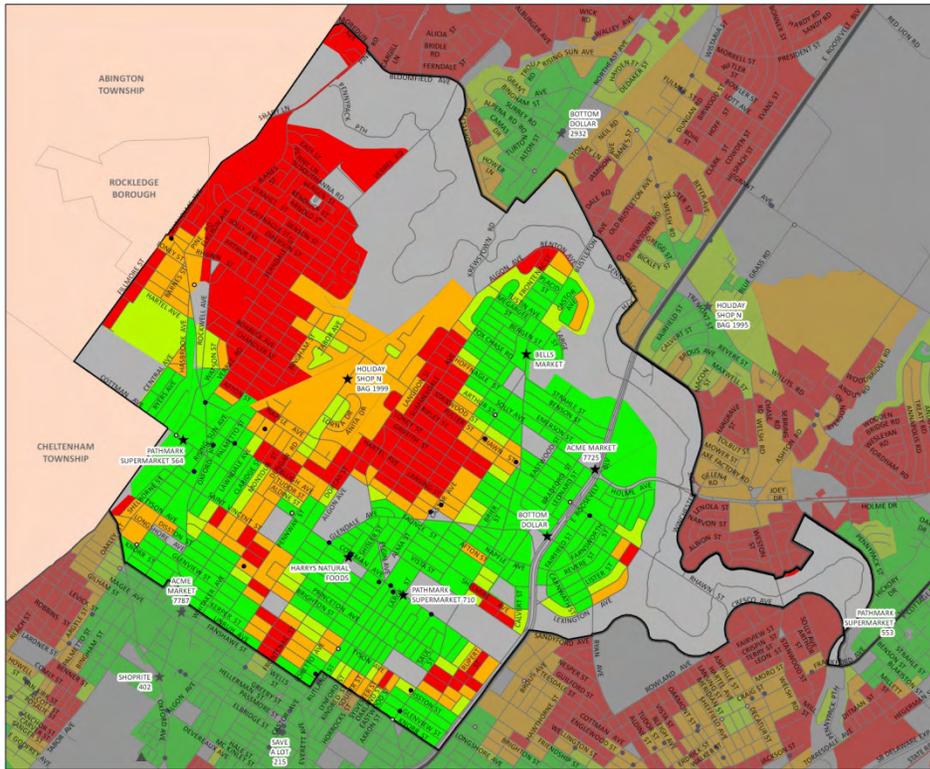
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0 0.2 0.4 0.8 Miles

Central Northeast



Walkable Access to Healthy Food PLANNING DISTRICT - CENTRAL NORTHEAST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

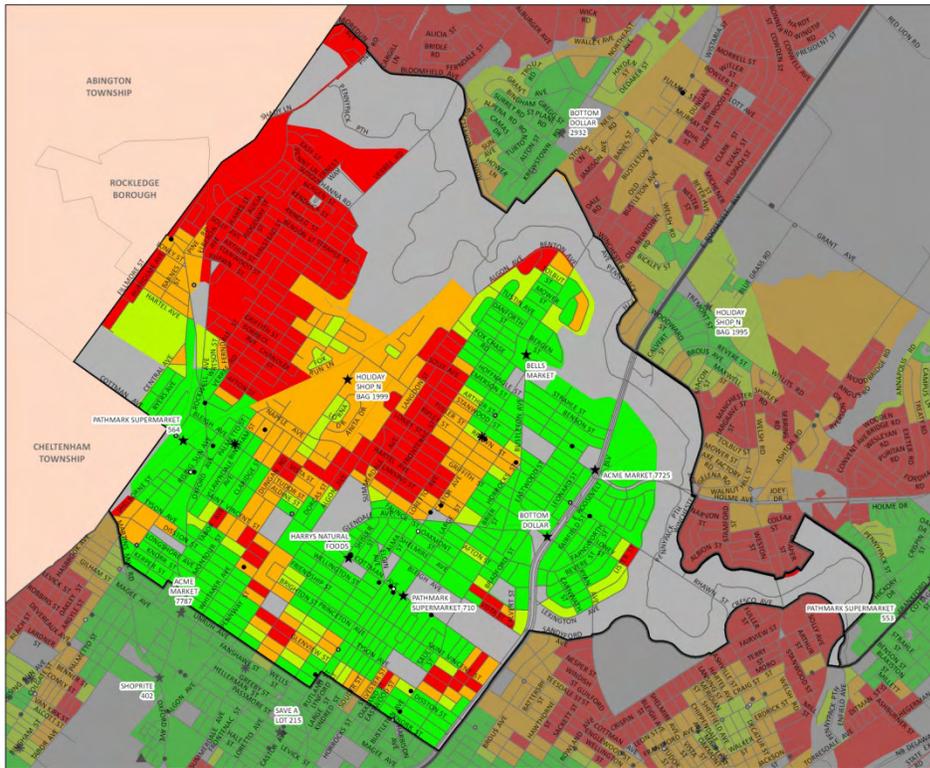
Walkable Access to Healthy Foods Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.275 0.55 1.1 Miles



Walkable Access to Healthy Food PLANNING DISTRICT - CENTRAL NORTHEAST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ✱ Enhanced Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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 Email: jonathan.sinker@phila.gov
 Phone: 215-686-5212

0 0.275 0.55 1.1 Miles

Central Northeast



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - CENTRAL NORTHEAST
2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential
- High Poverty and Low to No Walkable Access

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

Area of Study



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Phone: 215-686-5212

0 0.275 0.55 1.1 Miles



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - CENTRAL NORTHEAST
2012

Legend

- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- ★ Enhanced Healthy Corner Store (Score = 10)
- ◆ Healthy Corner Store (Score = 5)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- ★ Supermarket (Score Range = 10 to 400)
- Non Residential
- High Poverty and Low to No Walkable Access
- Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

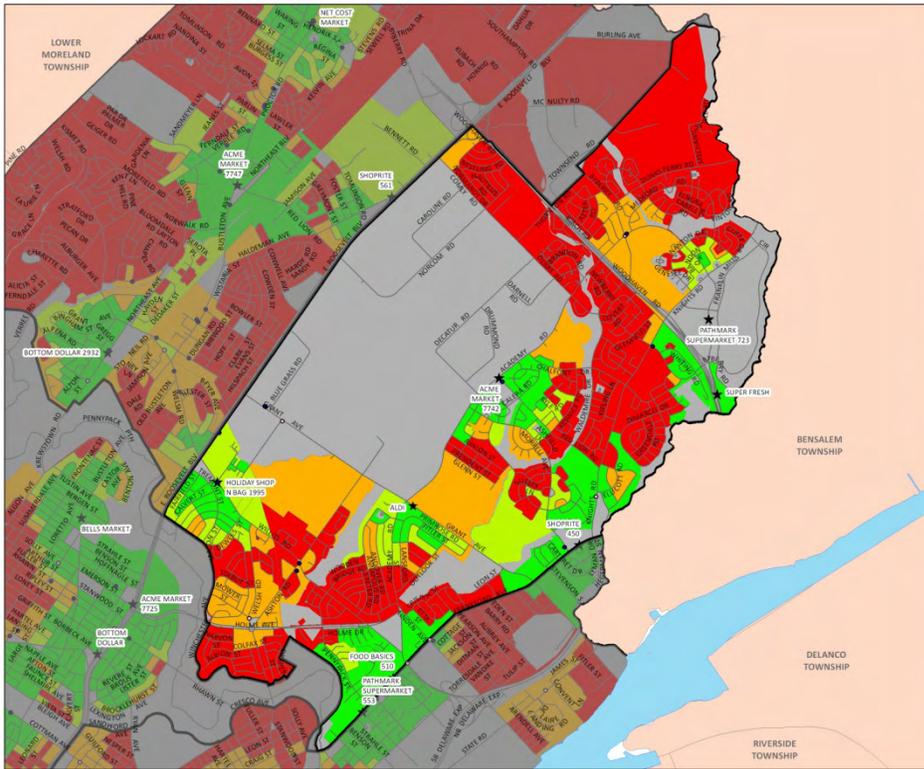
Area of Study



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Email: jonathan.sinker@phila.gov
Phone: 215-686-5212

0 0.275 0.55 1.1 Miles

Lower Far Northeast



Walkable Access to Healthy Food PLANNING DISTRICT -LOWER FAR NORTHEAST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

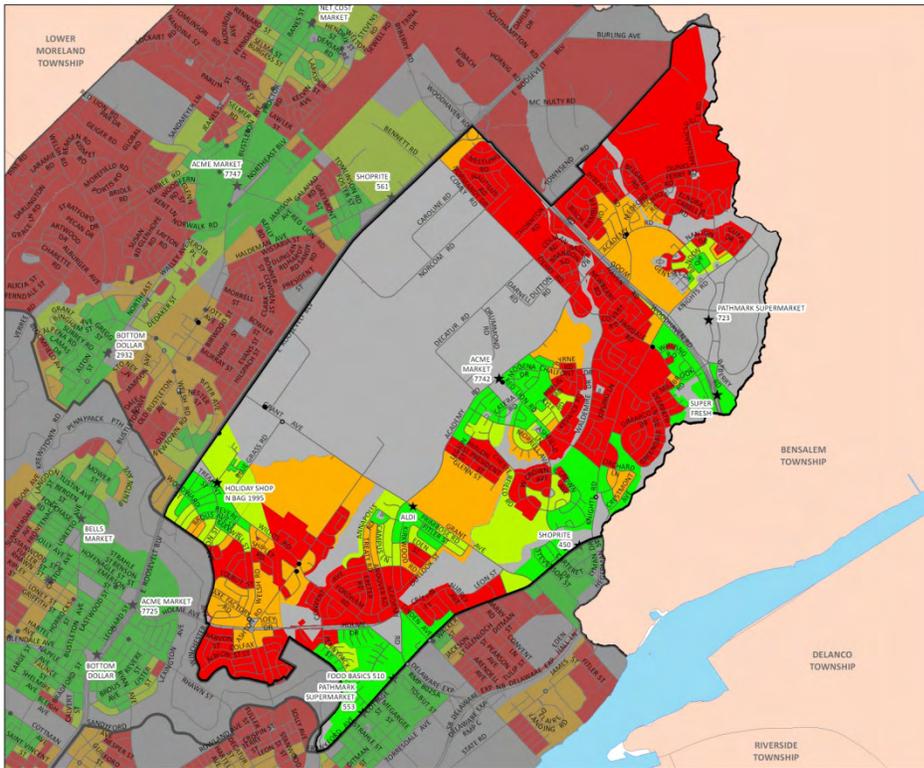
Walkable Access to Healthy Foods Score

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- 50.00 - 950.00 (High Access)



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 Email: jonathan.sinker@phila.gov
 Phone: 215-686-5212

0 0.375 0.75 1.5 Miles



Walkable Access to Healthy Food PLANNING DISTRICT -LOWER FAR NORTHEAST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ◻ Enhanced Healthy Corner Store (Score =10)
- ◻ Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ▲ Farmers Markets (Score =5)
- Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food Score

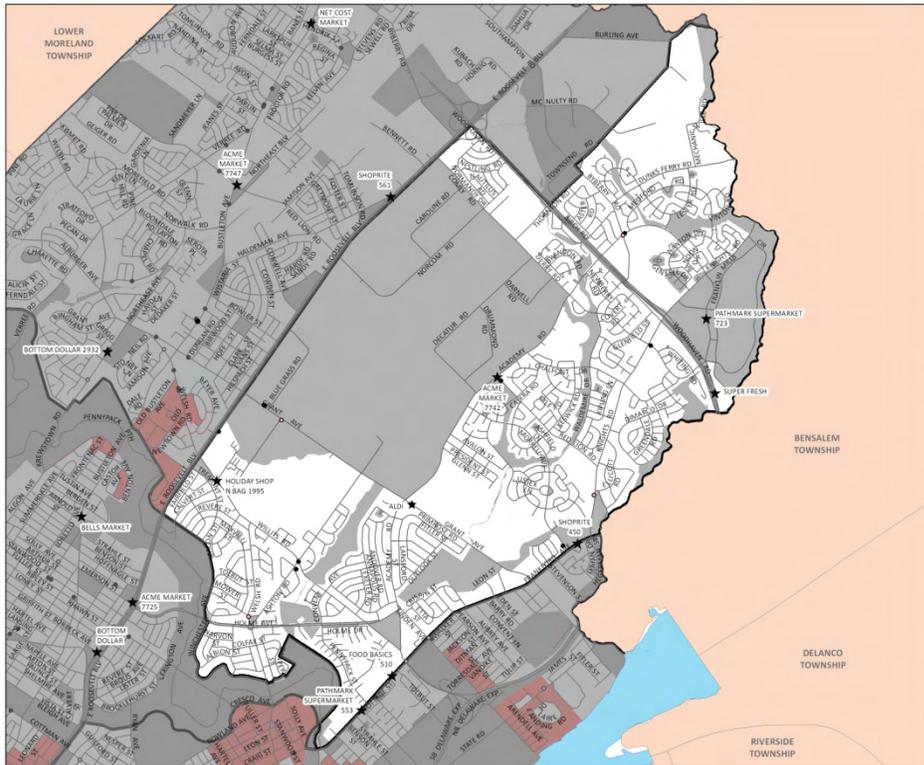
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0 0.375 0.75 1.5 Miles

Lower Far Northeast



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER FAR NORTHEAST 2010



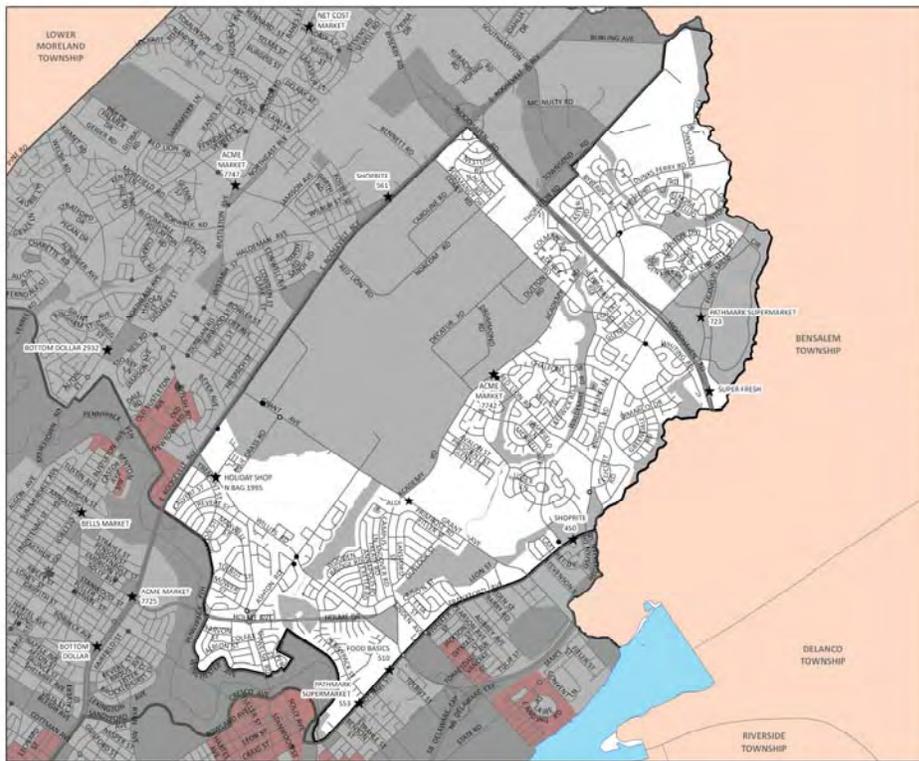
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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Phone: 215-686-5212

0 0.375 0.75 1.5 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER FAR NORTHEAST 2012



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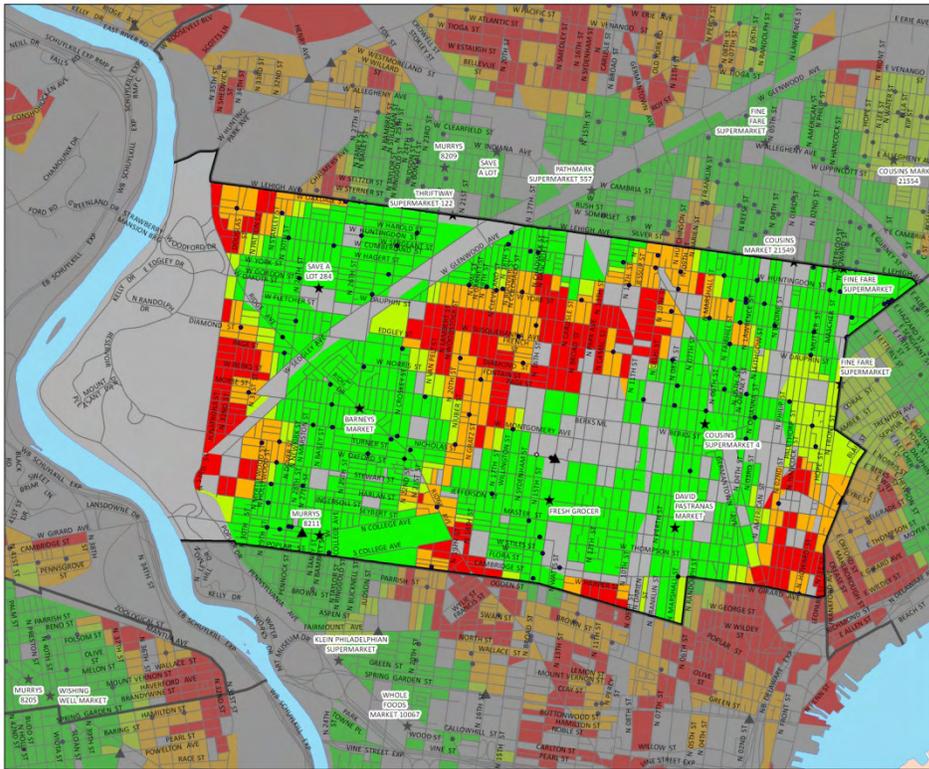
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0 0.375 0.75 1.5 Miles

Lower North



Walkable Access to Healthy Food PLANNING DISTRICT-LOWER NORTH 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ◻ Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

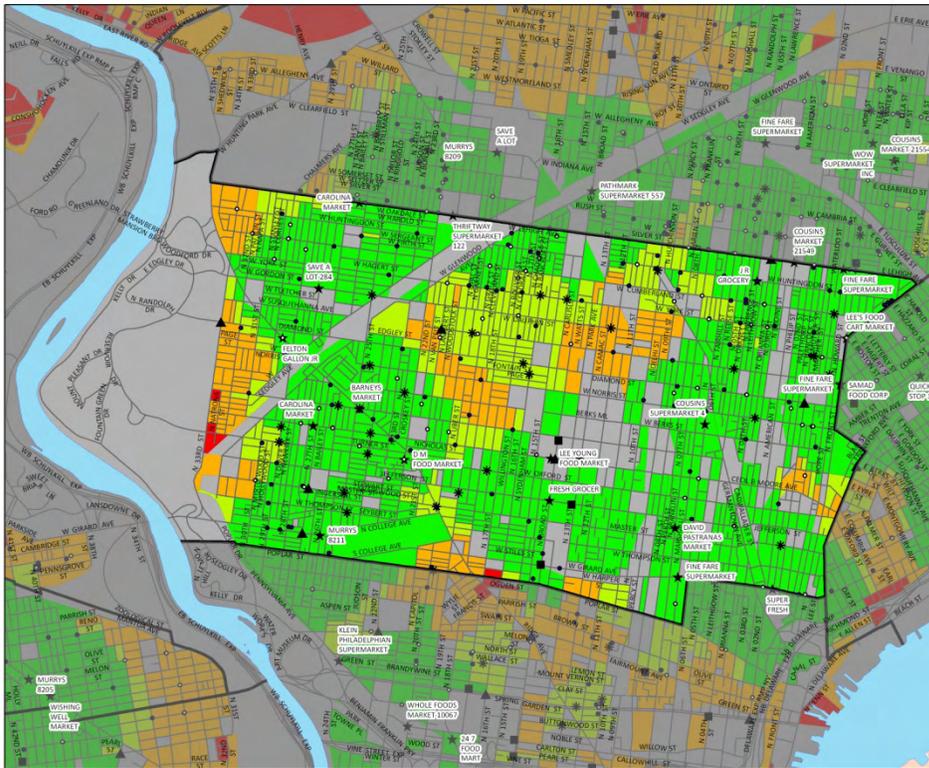
**Walkable Access to Healthy Foods
Score**

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212

0 0.25 0.45 0.9 Miles



Walkable Access to Healthy Food PLANNING DISTRICT-LOWER NORTH 2012

Legend

- ★ Supermarkets (Score Range= 10 to 400)
- Corner Stores (Score = 2)
- ◻ Enhanced Healthy Corner Store (Score =10)
- ◻ Healthy Corner Store (Score = 5)
- ◻ Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ▲ Farmers Markets (Score =5)
- ◻ Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

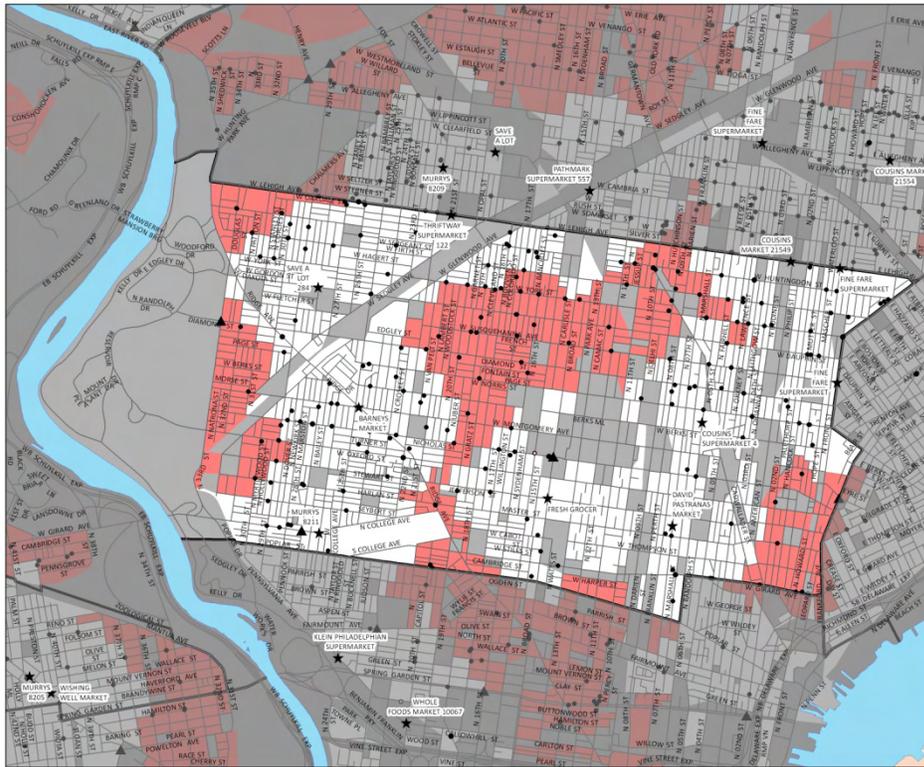
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
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Phone: 215-686-5212

0 0.25 0.5 1 Miles

Lower North



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT-LOWER NORTH
2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - ◻ Chain Convenience Stores (Score =10)
 - Produce Carts (Score = 2)
 - ▲ Farmer Markets (Score = 5)
 - Non Residential
 - High Poverty and Low to No Walkable Access

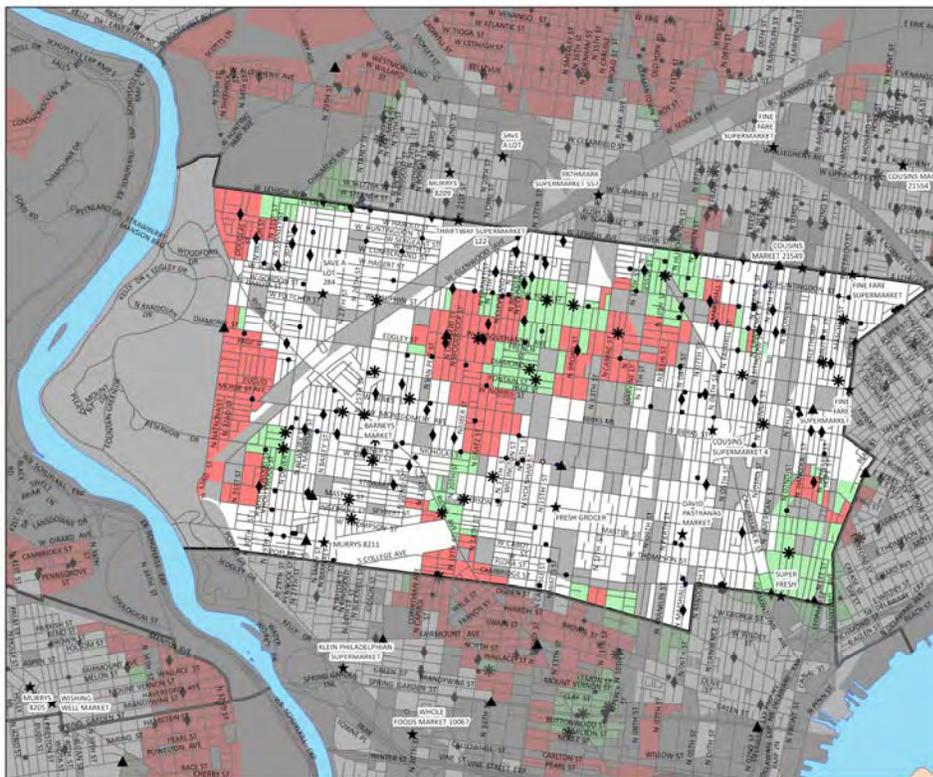
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.25 0.5 1 Miles



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT-LOWER NORTH
2012

- Legend**
- Corner Stores (Score = 2)
 - ◻ Chain Convenience Stores (Score =10)
 - ★ Enhanced Healthy Corner Store (Score=10)
 - ★ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
 - Produce Carts (Score = 2)
 - ★ Supermarket (Score Range=10 to 400)
 - Non Residential
 - High Poverty and Low to No Walkable Access
 - Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

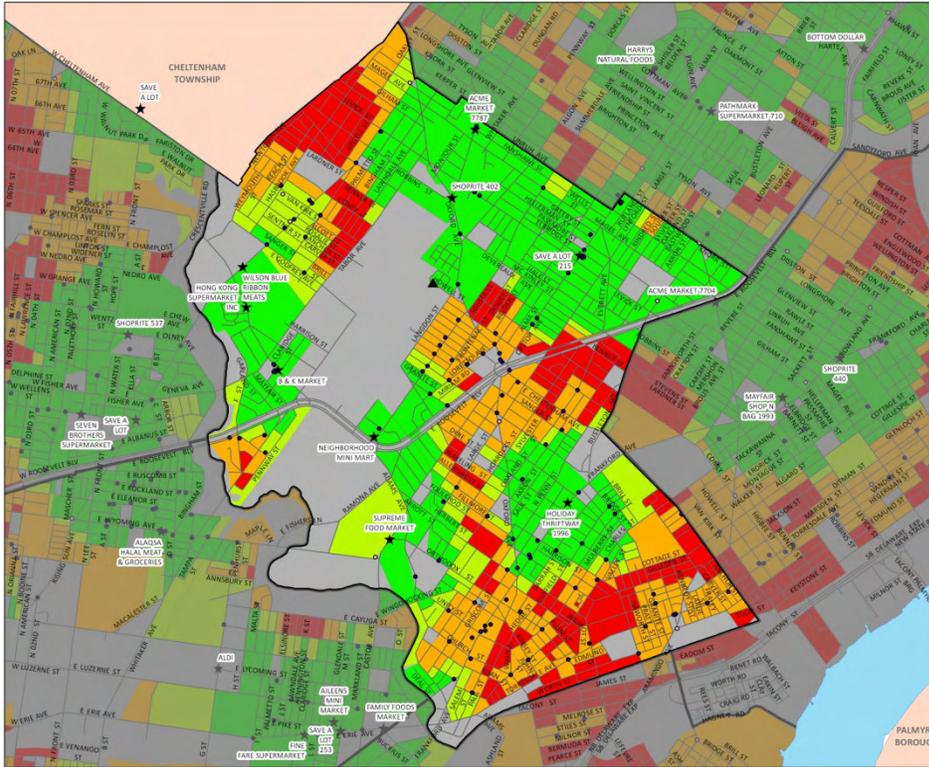
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.25 0.5 1 Miles

Lower Northeast



Walkable Access to Healthy Food PLANNING DISTRICT-LOWER NORTHEAST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Produce Carts (Score = 2)
- Farmer Markets (Score = 5)
- Non Residential

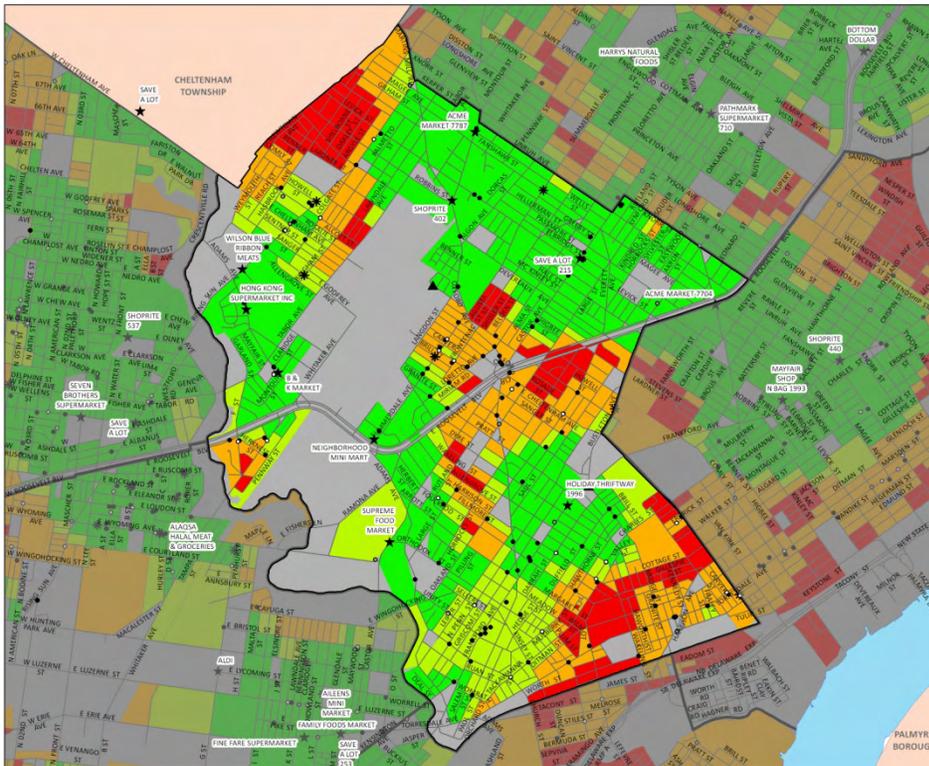
Walkable Access to Healthy Foods Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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 Phone: 215-686-5212

0 0.25 0.5 1 Miles



Walkable Access to Healthy Food PLANNING DISTRICT-LOWER NORTHEAST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ◻ Enhanced Healthy Corner Store (Score = 10)
- ◻ Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food Score

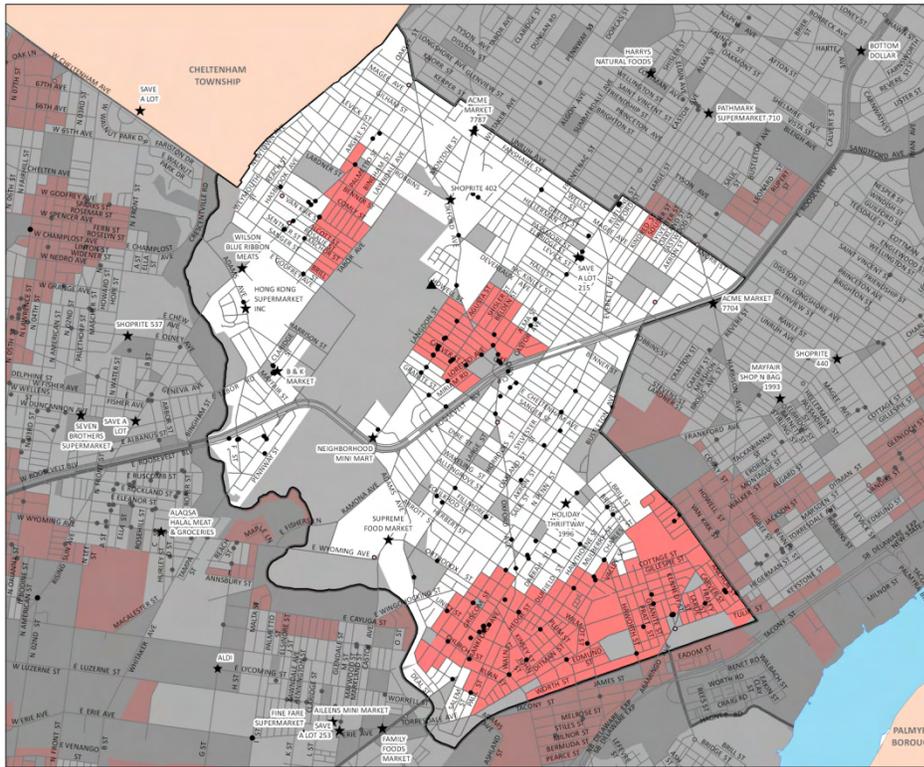
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



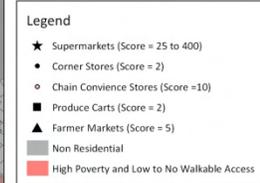
Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
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 Phone: 215-686-5212

0 0.275 0.55 1.1 Miles

Lower Northeast

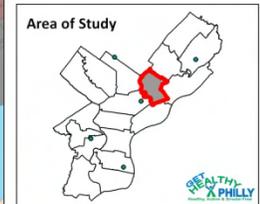


High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER NORTHEAST 2010



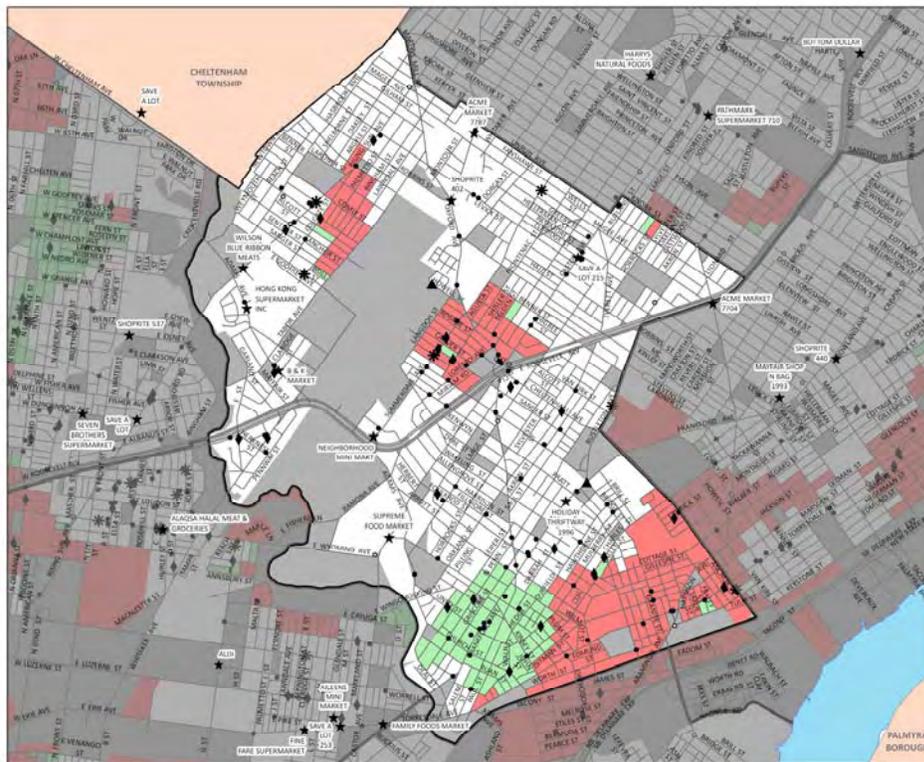
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.25 0.5 1 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER NORTHEAST 2012



High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

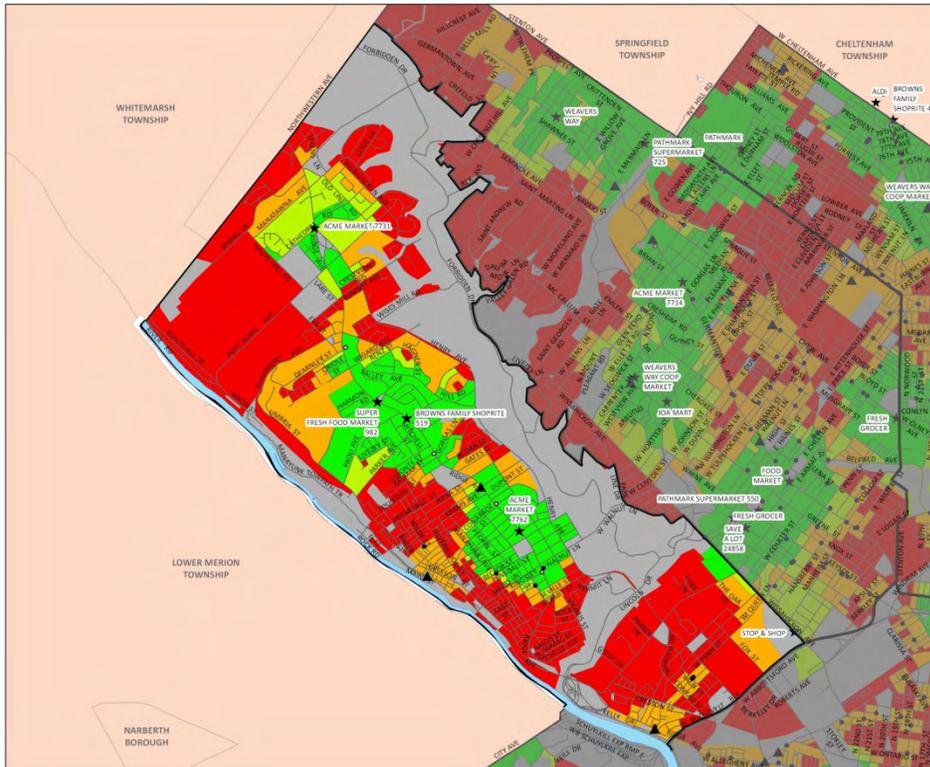
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.25 0.5 1 Miles

Lower Northwest



Walkable Access to Healthy Food PLANNING DISTRICT - LOWER NORTHWEST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

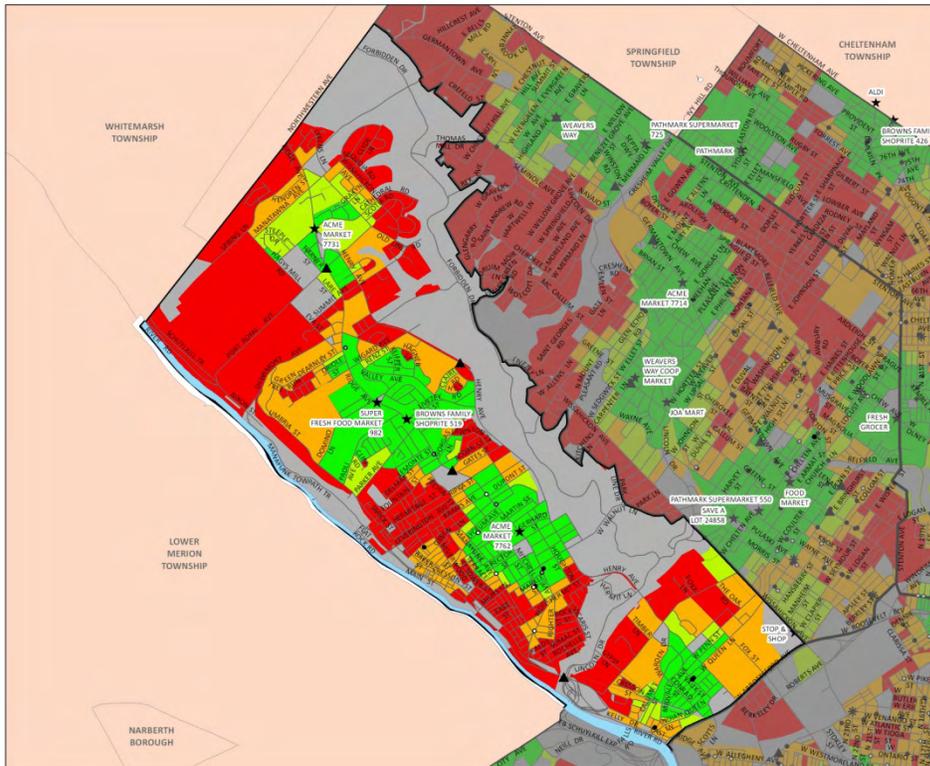
**Walkable Access to Healthy Foods
Score**

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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 Phone: 215-686-5212

0 0.375 0.75 1.5 Miles



Walkable Access to Healthy Food PLANNING DISTRICT - LOWER NORTHWEST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ✱ Enhanced Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

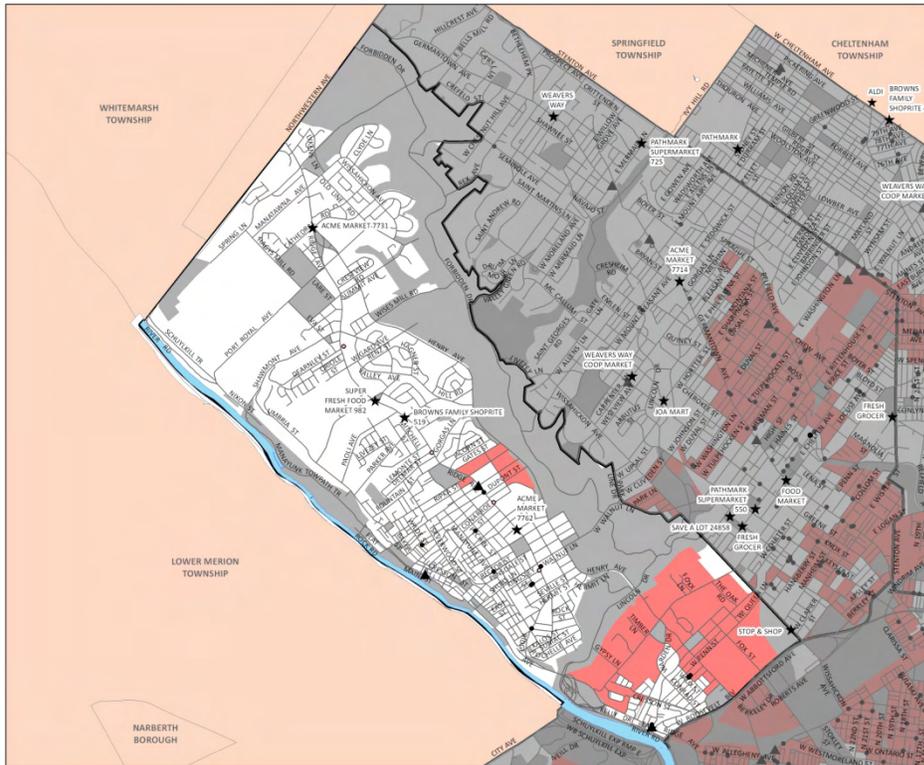
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
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 Phone: 215-686-5212

0 0.4 0.8 1.6 Miles

Lower Northwest



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER NORTHWEST 2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - Produce Carts (Score = 2)
 - ▲ Farmer Markets (Score = 5)
 - Non Residential
 - High Poverty and Low to No Walkable Access

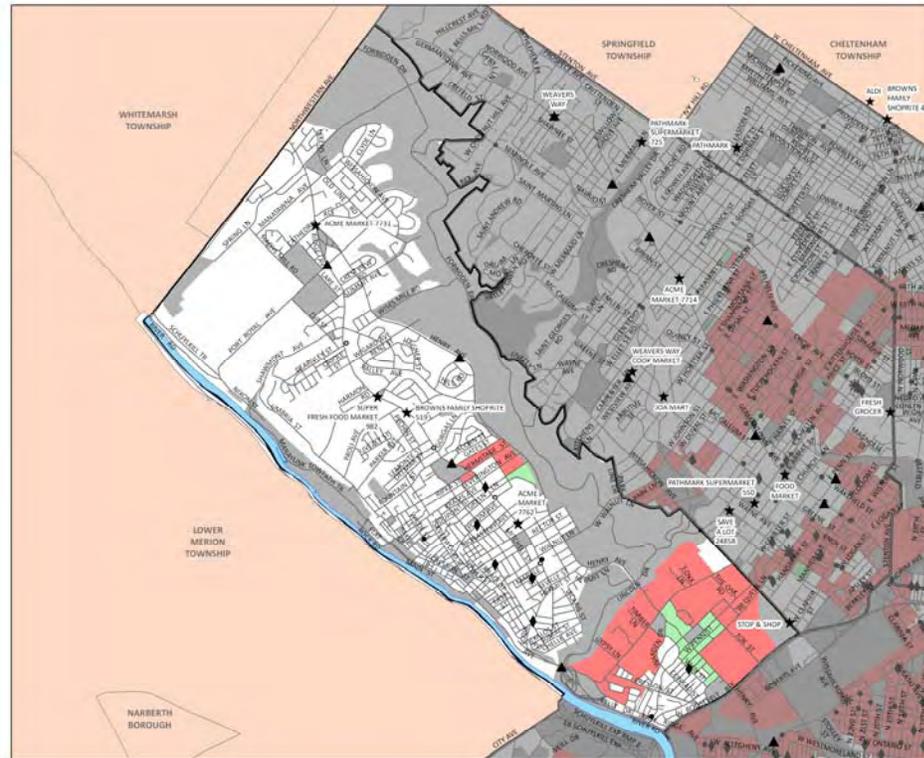
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.375 0.75 1.5 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER NORTHWEST 2012

- Legend**
- Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - ★ Enhanced Healthy Corner Store (Score=10)
 - ◆ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
 - Produce Carts (Score = 2)
 - ★ Supermarket (Score Range=10 to 400)
 - Non Residential
 - High Poverty and Low to No Walkable Access
 - Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

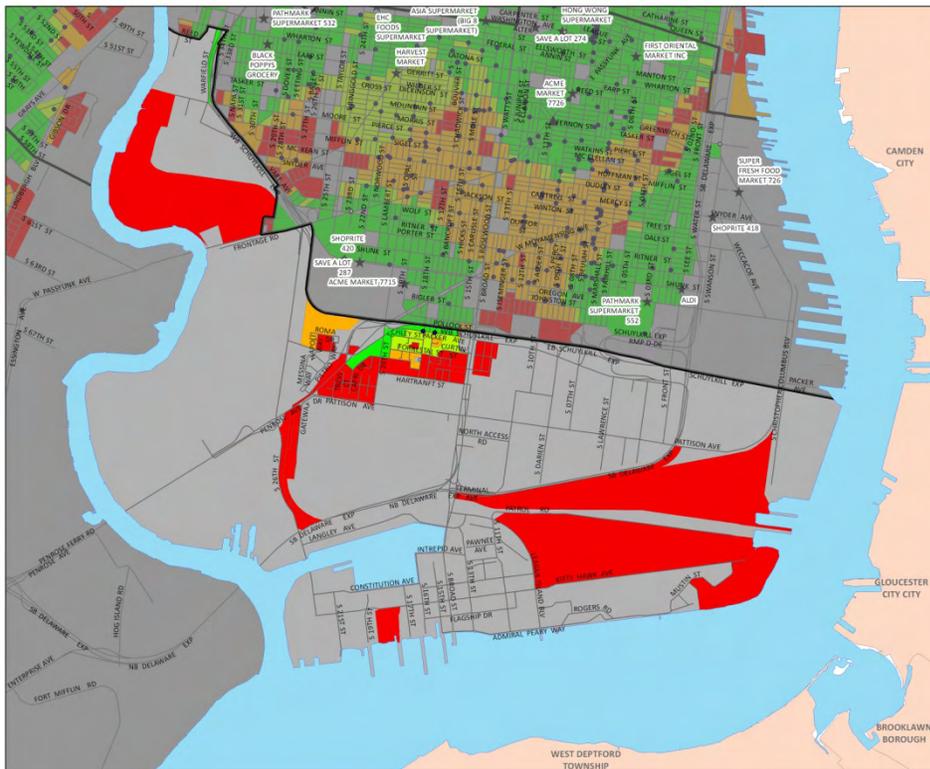
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.375 0.75 1.5 Miles

Lower South



Walkable Access to Healthy Food PLANNING DISTRICT-LOWER SOUTH 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

Walkable Access to Healthy Foods

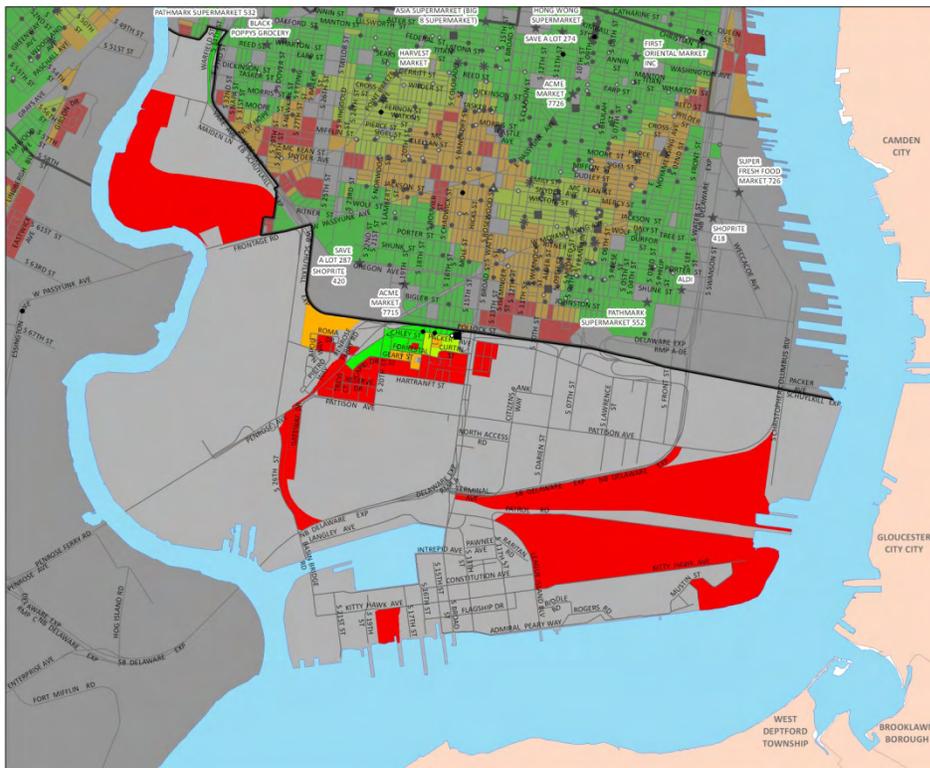
Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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 Phone: 215-686-5212

0 0.3 0.6 1.2 Miles



Walkable Access to Healthy Food PLANNING DISTRICT-LOWER SOUTH 2012

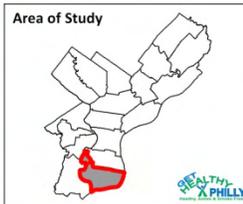
Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ✳ Enhanced Healthy Corner Store (Score =10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- ▲ Farmers Markets (Score =5)
- Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food

Score

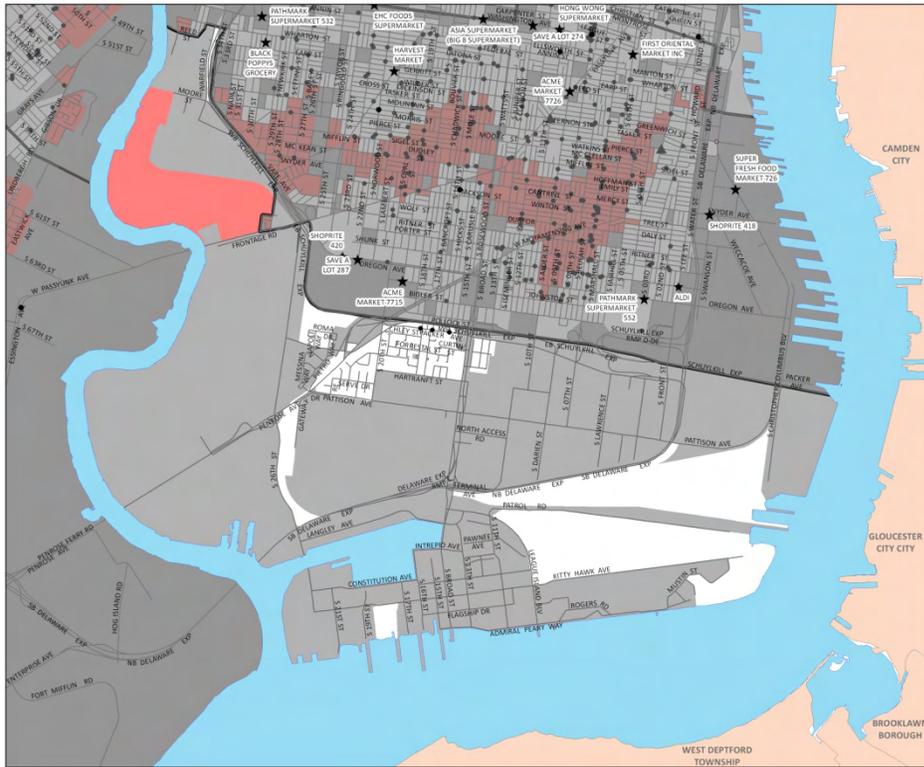
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.3 0.6 1.2 Miles

Lower South



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER SOUTH 2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - ◻ Chain Convenience Stores (Score =10)
 - Produce Carts (Score = 2)
 - ▲ Farmer Markets (Score = 5)
 - ◻ Non Residential
 - High Poverty and Low to No Walkable Access

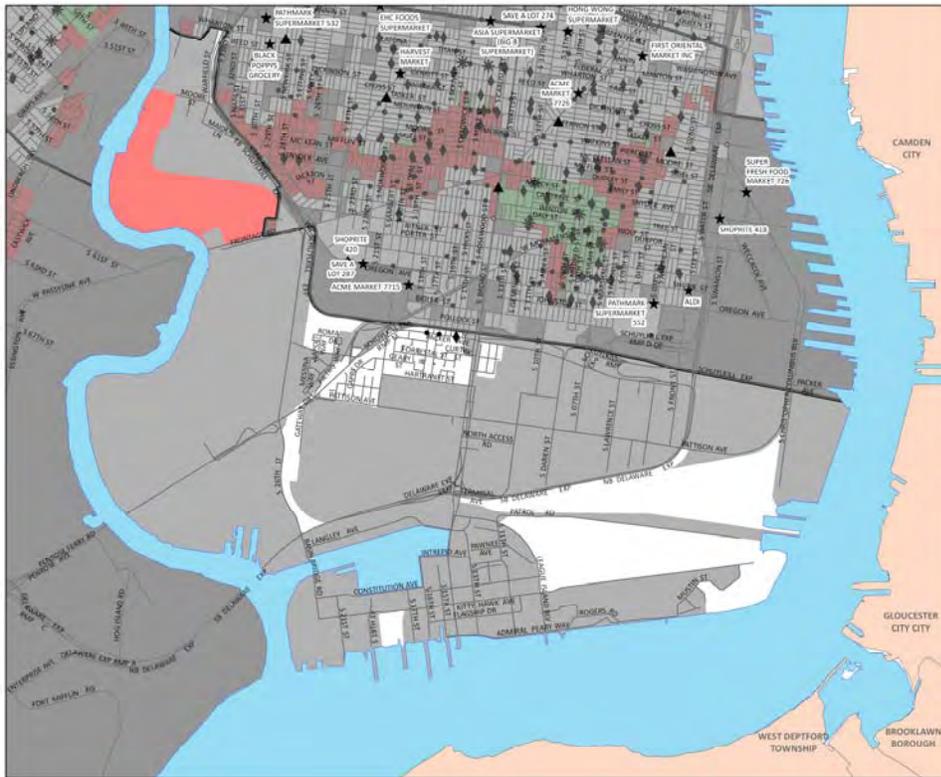
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Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.3 0.6 1.2 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - LOWER SOUTH 2012

- Legend**
- Corner Stores (Score = 2)
 - ◻ Chain Convenience Stores (Score =10)
 - ★ Enhanced Healthy Corner Store (Score=10)
 - ◆ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
 - Produce Carts (Score = 2)
 - ★ Supermarket (Score Range=10 to 400)
 - ◻ Non Residential
 - High Poverty and Low to No Walkable Access
 - Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

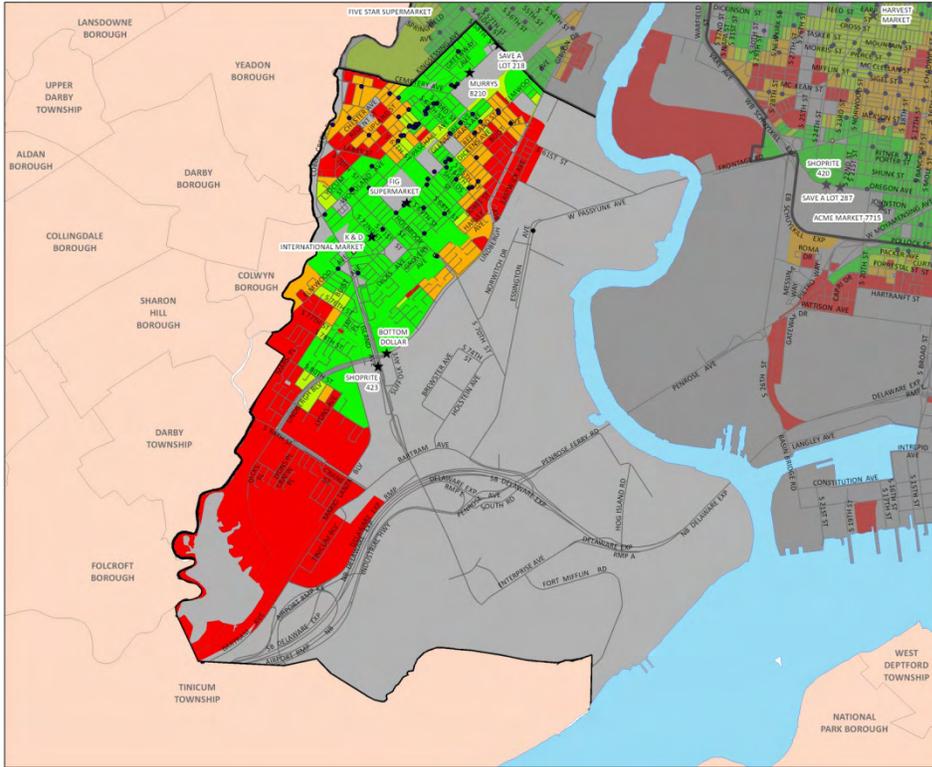
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.3 0.6 1.2 Miles

Lower Southwest



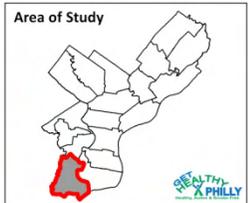
Walkable Access to Healthy Food PLANNING DISTRICT-LOWER SOUTHWEST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- Produce Carts (Score = 2)
- ▲ Farmers Markets (Score = 5)
- Non Residential

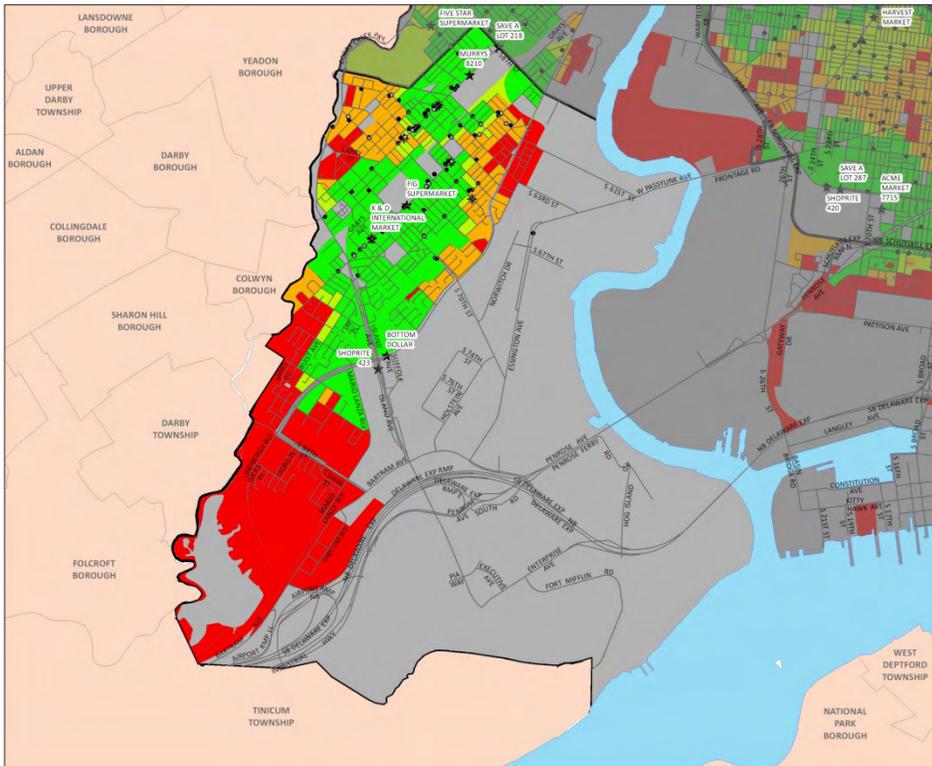
**Walkable Access to Healthy Foods
Score**

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.325 0.65 1.3 Miles



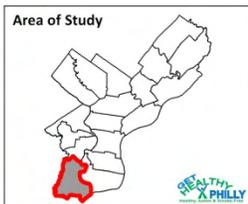
Walkable Access to Healthy Food PLANNING DISTRICT-LOWER SOUTHWEST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ⊛ Enhanced Healthy Corner Store (Score =10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- ▲ Farmers Markets (Score =5)
- Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

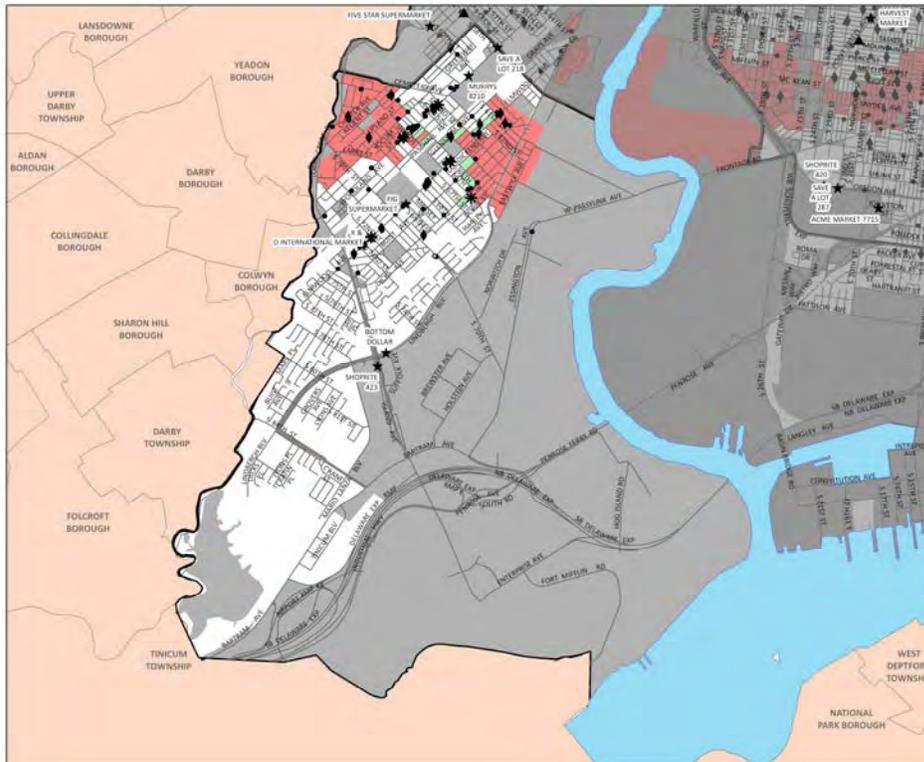
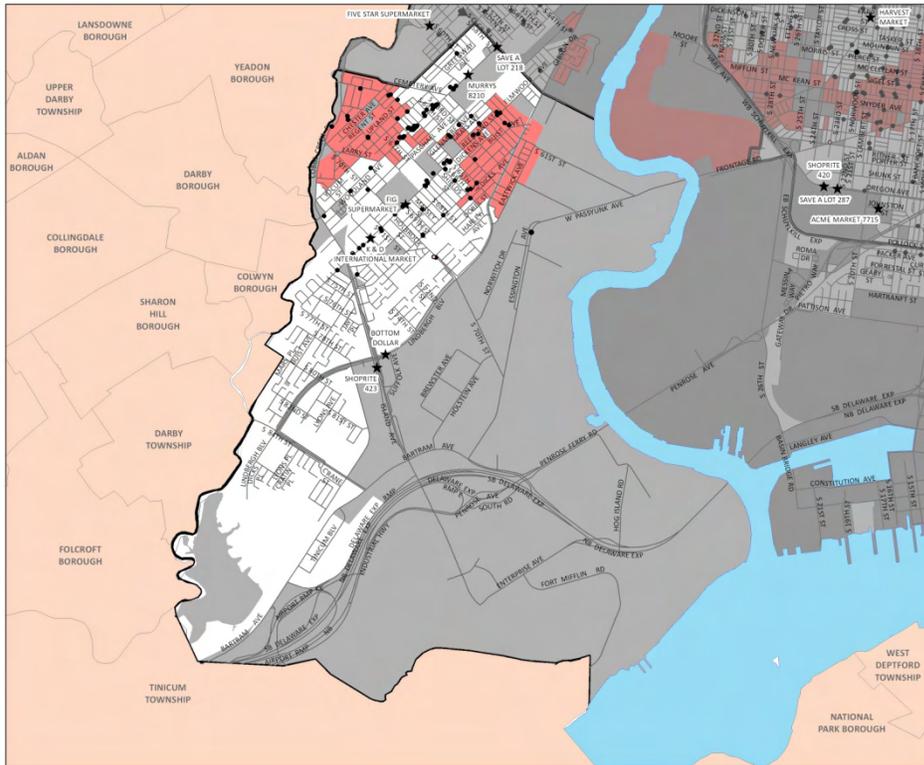
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



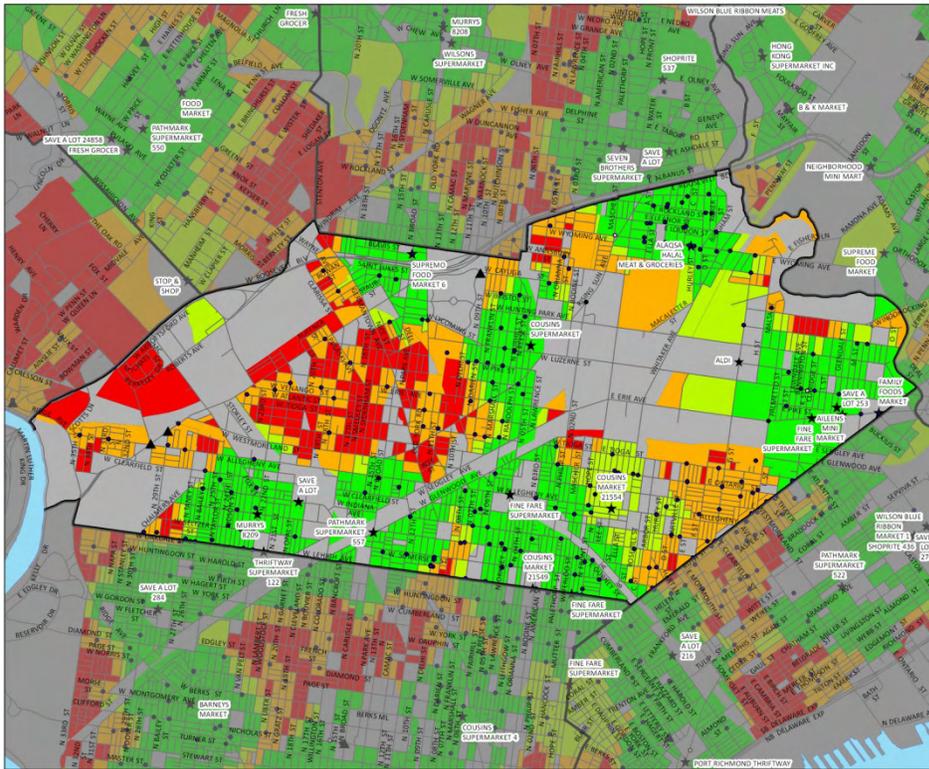
Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
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 Phone: 215-686-5212

0 0.325 0.65 1.3 Miles

Lower Southwest



North



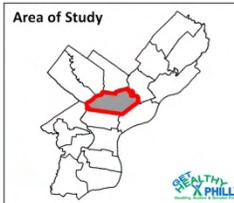
Walkable Access to Healthy Food PLANNING DISTRICT-NORTH 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

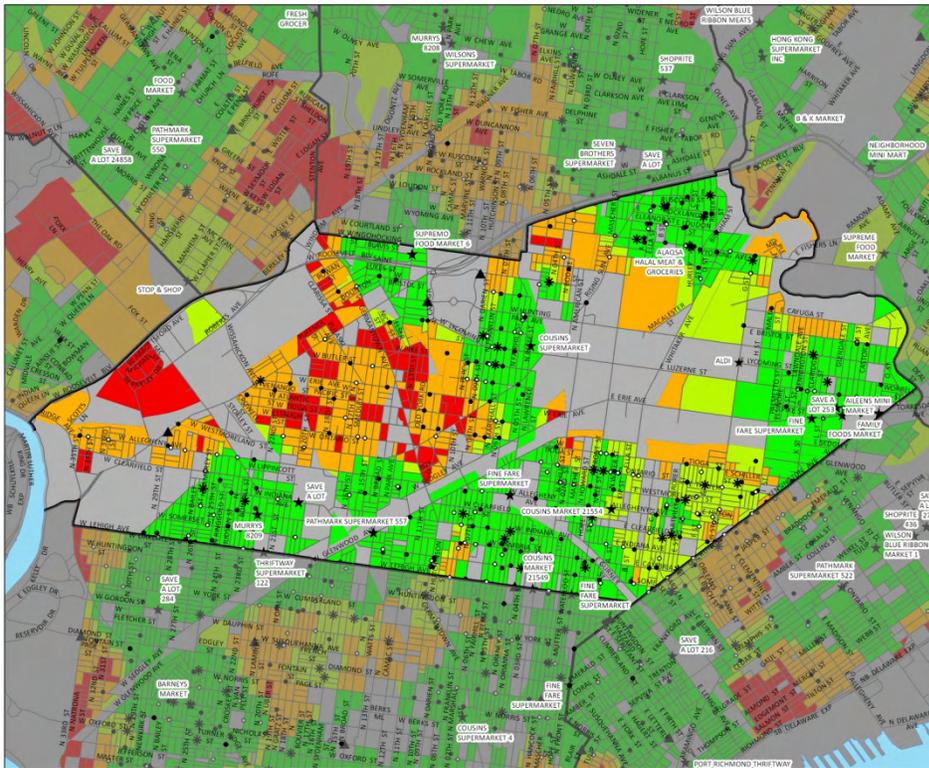
**Walkable Access to Healthy Foods
Score**

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- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.3 0.6 1.2 Miles



Walkable Access to Healthy Food PLANNING DISTRICT-NORTH 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ★ Enhanced Healthy Corner Store (Score = 10)
- ◻ Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- ▲ Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

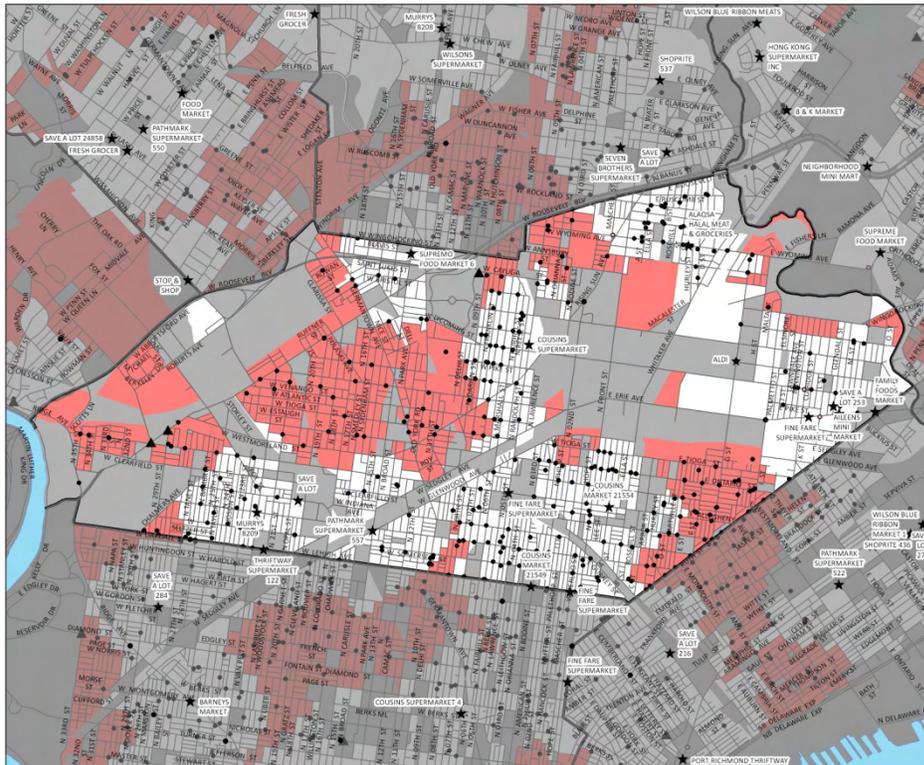
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- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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Phone: 215-686-5212

0 0.3 0.6 1.2 Miles

North



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT-NORTH 2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - ◻ Chain Convenience Stores (Score =10)
 - ▲ Produce Carts (Score = 2)
 - ◆ Farmer Markets (Score = 5)
 - Non Residential
 - High Poverty and Low to No Walkable Access

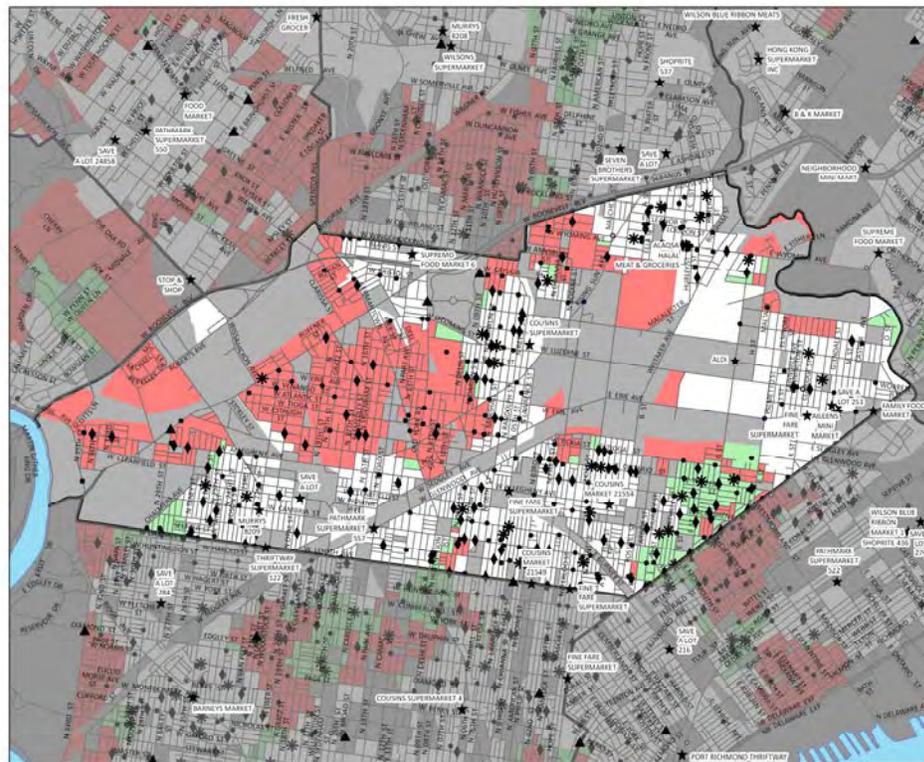
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.3 0.6 1.2 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT-NORTH 2012

- Legend**
- Corner Stores (Score = 2)
 - ◻ Chain Convenience Stores (Score =10)
 - ◆ Enhanced Healthy Corner Store (Score=10)
 - ◆ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
 - ▲ Produce Carts (Score = 2)
 - ★ Supermarket (Score Range=10 to 400)
 - Non Residential
 - High Poverty and Low to No Walkable Access
 - Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

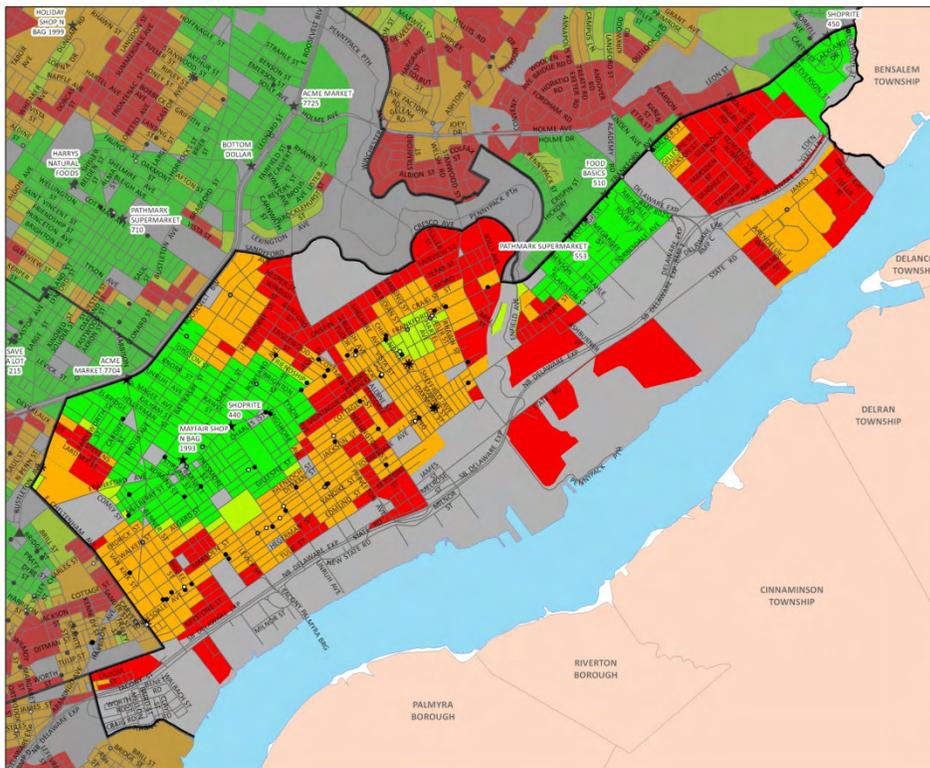
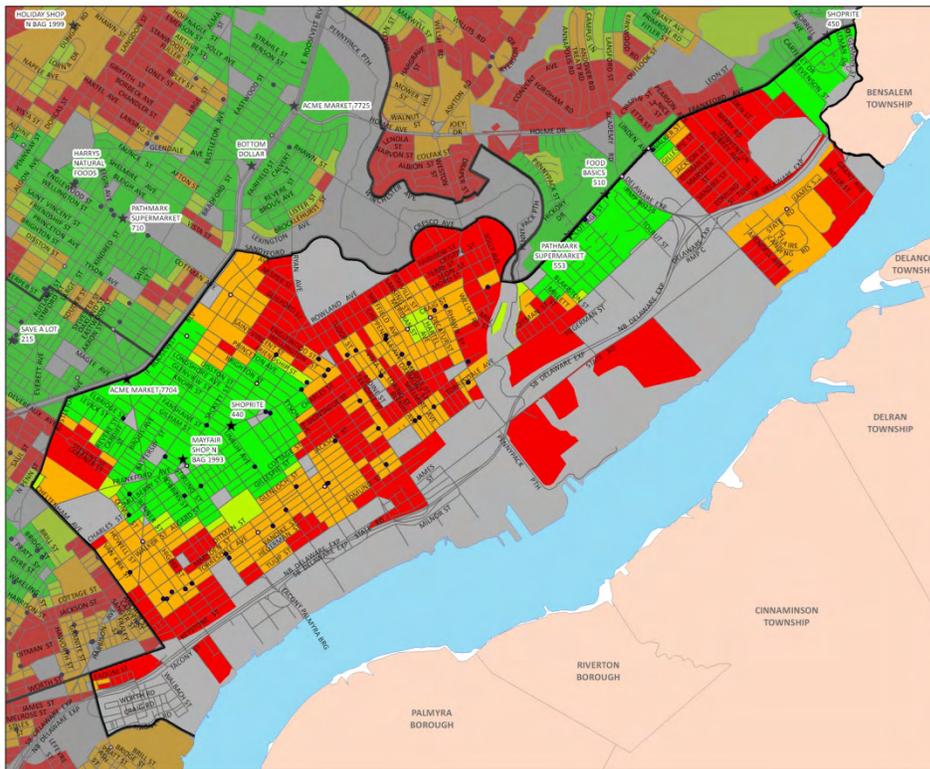
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



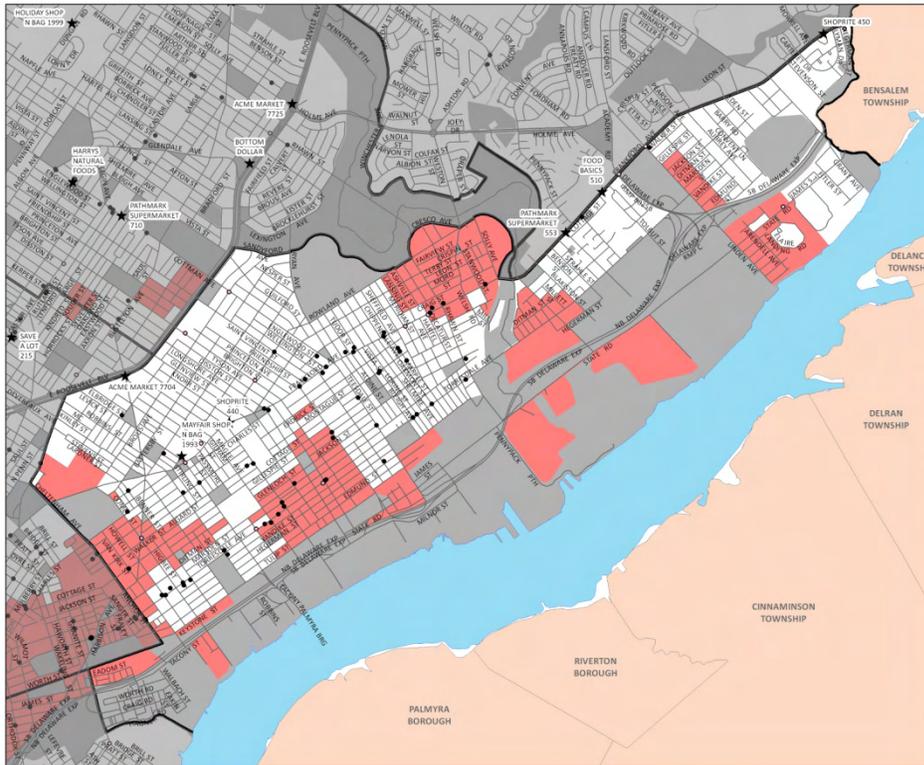
Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/26/2012
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Phone: 215-686-5212

0 0.3 0.6 1.2 Miles

North Delaware



North Delaware



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT-NORTH DELAWARE 2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - Produce Carts (Score = 2)
 - ▲ Farmer Markets (Score = 5)
 - Non Residential
 - High Poverty and Low to No Walkable Access

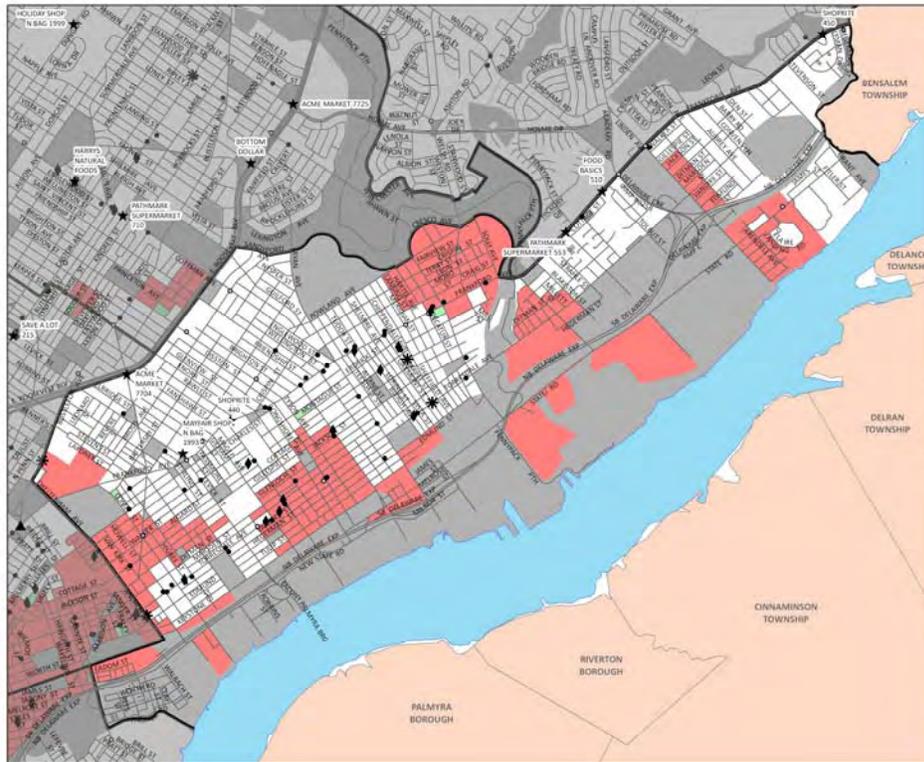
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/26/2012
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212

0 0.3 0.6 1.2 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT-NORTH DELAWARE 2012

- Legend**
- Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - ★ Enhanced Healthy Corner Store (Score=10)
 - ◆ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
 - Produce Carts (Score = 2)
 - ★ Supermarket (Score Range=10 to 400)
 - Non Residential
 - High Poverty and Low to No Walkable Access
 - Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source: 2005 – 2009 US Census, American Community Survey)

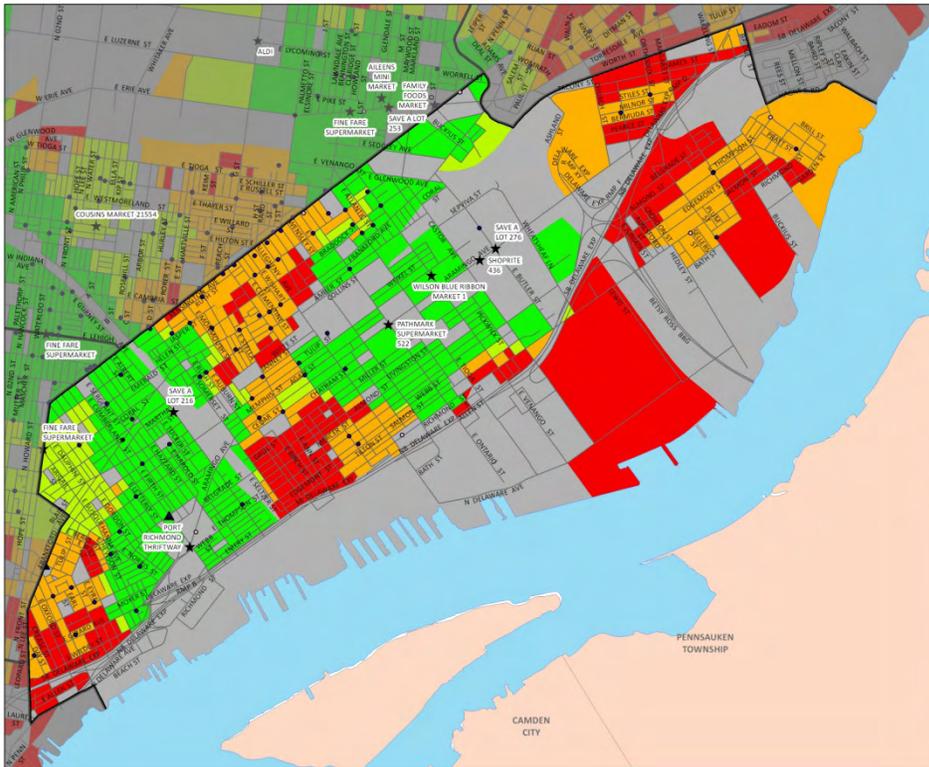
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.3 0.6 1.2 Miles

River Wards



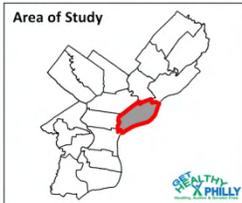
Walkable Access to Healthy Food PLANNING DISTRICT- RIVER WARDS 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ▲ Produce Carts (Score = 2)
- ◆ Farmer Markets (Score = 5)
- Non Residential

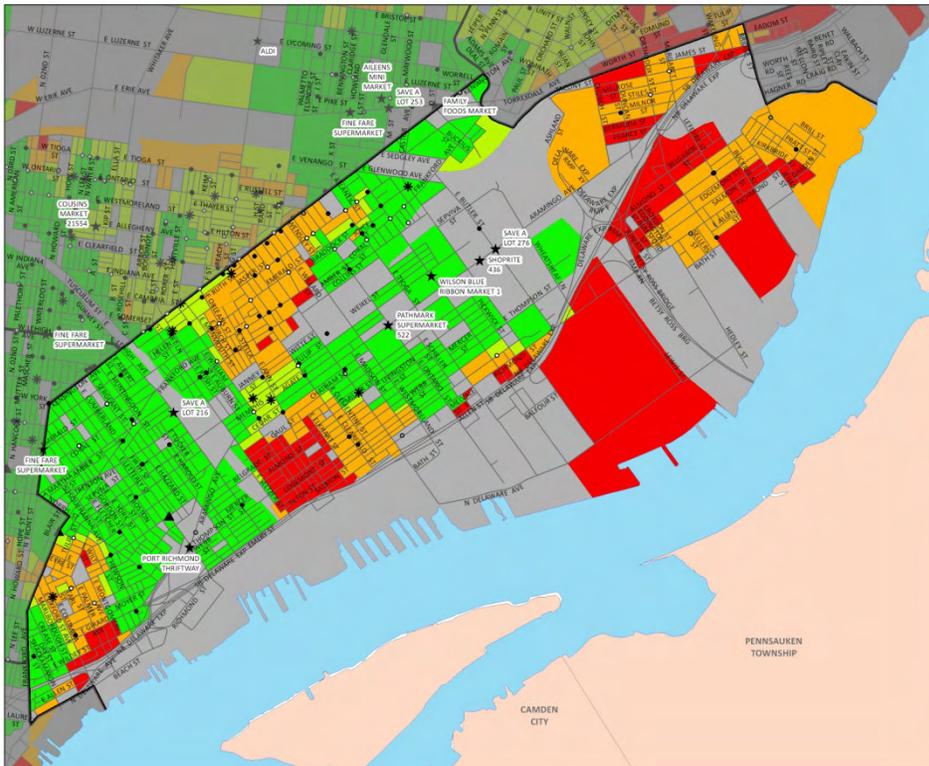
**Walkable Access to Healthy Foods
Score**

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.225 0.45 0.9 Miles



Walkable Access to Healthy Food PLANNING DISTRICT- RIVER WARDS 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ◻ Enhanced Healthy Corner Store (Score =10)
- ◻ Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ▲ Farmers Markets (Score =5)
- ▲ Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

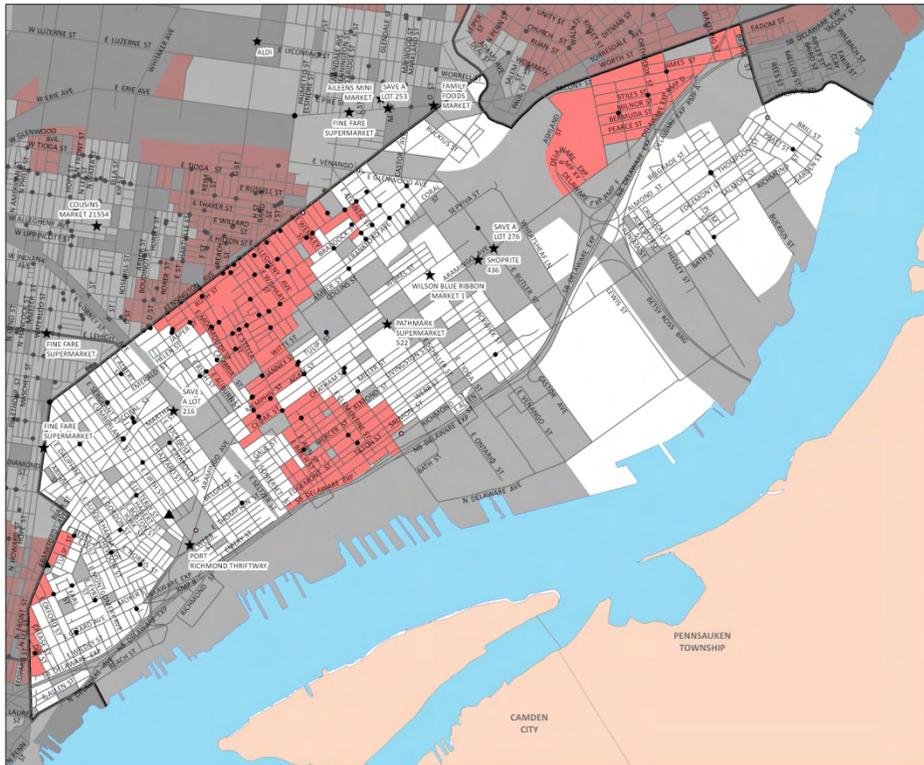
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.25 0.5 1 Miles

River Wards



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - RIVER WARDS
2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - Produce Carts (Score = 2)
 - ▲ Farmer Markets (Score = 5)
 - Non Residential
 - High Poverty and Low to No Walkable Access

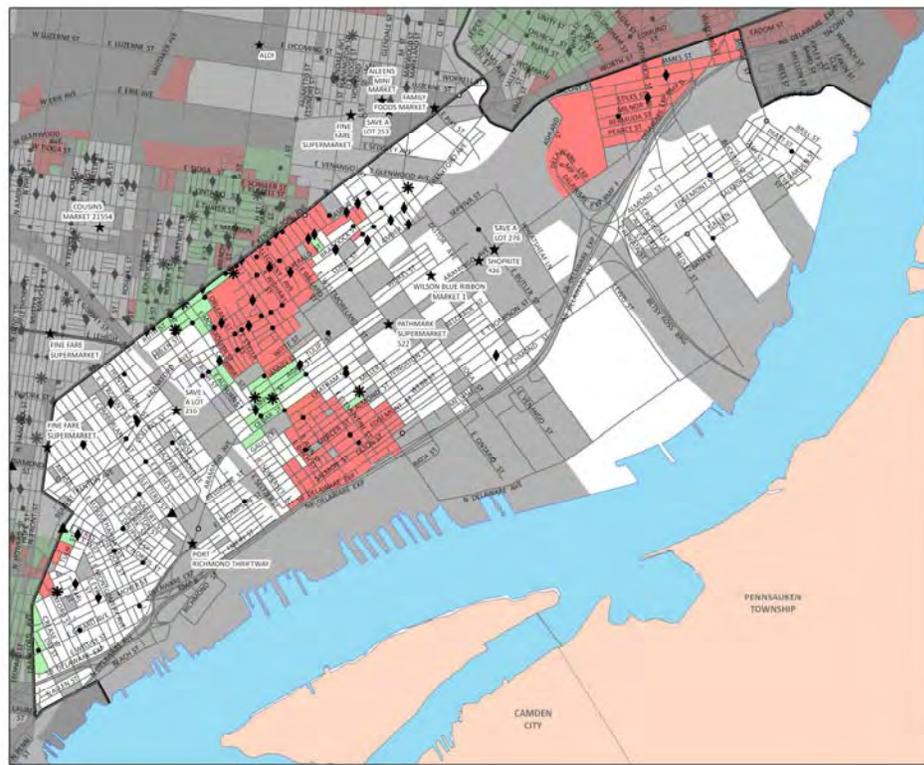
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Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.25 0.5 1 Miles



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - RIVER WARDS
2012

- Legend**
- Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - ★ Enhanced Healthy Corner Store (Score=10)
 - ◆ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
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High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

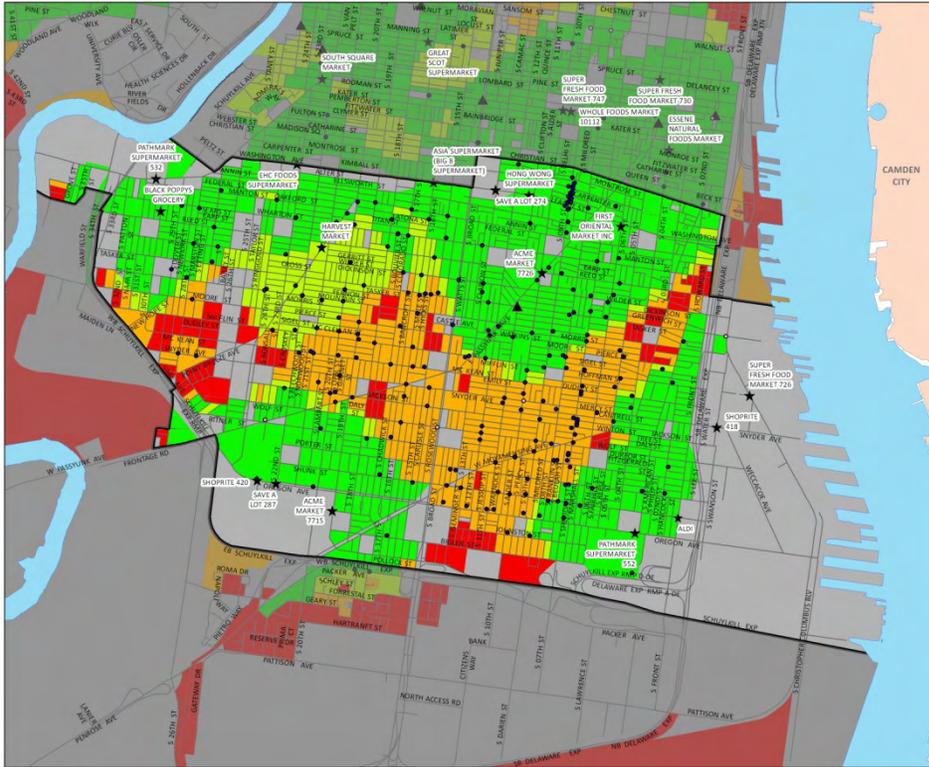
Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.25 0.5 1 Miles

South



Walkable Access to Healthy Food PLANNING DISTRICT - SOUTH 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

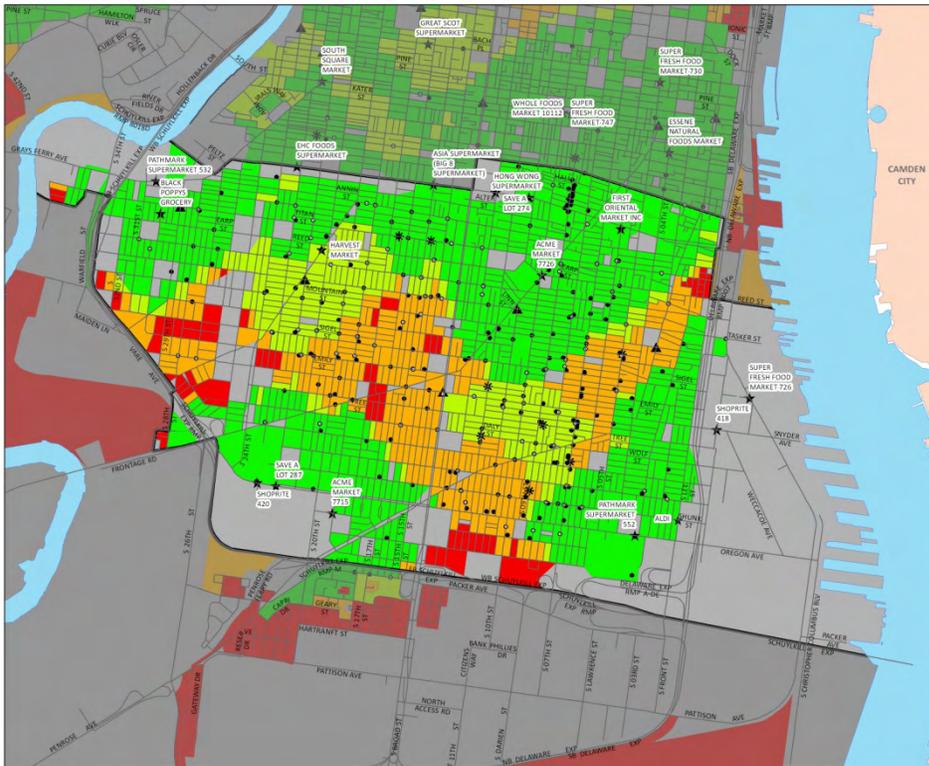
**Walkable Access to Healthy Foods
Score**

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



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0 0.225 0.45 0.9 Miles



Walkable Access to Healthy Food PLANNING DISTRICT - SOUTH 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ⊛ Enhanced Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

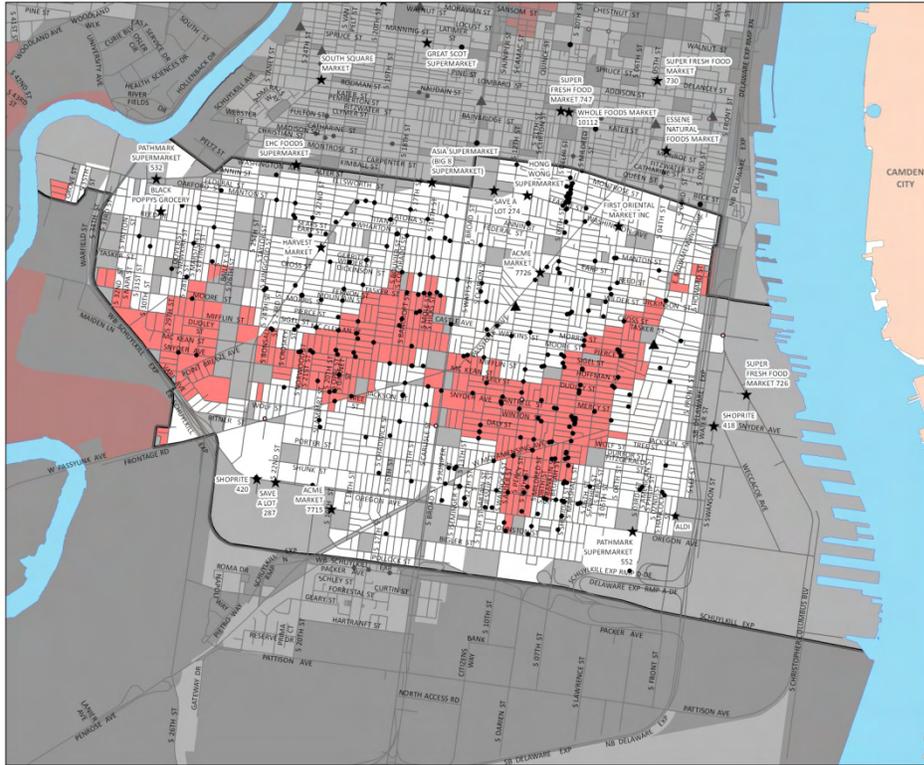
- 0.00 - 0.99 (No Access)
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- 50.00 - 950.00 (High Access)



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0 0.25 0.5 1 Miles

South



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - SOUTH
2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ▲ Produce Carts (Score = 2)
- ◆ Farmer Markets (Score = 5)
- Non Residential
- High Poverty and Low to No Walkable Access

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Area of Study



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High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - SOUTH
2012

Legend

- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ★ Enhanced Healthy Corner Store (Score=10)
- ◆ Healthy Corner Store (Score=5)
- ▲ Farmers Markets (Score = 5)
- ▲ Produce Carts (Score = 2)
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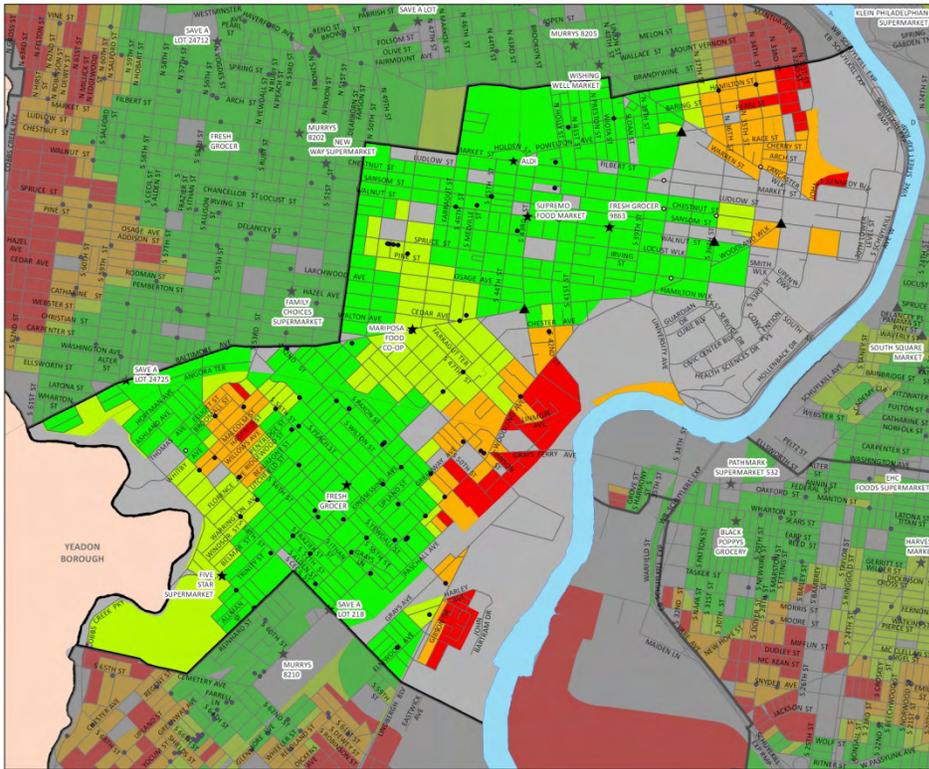
Area of Study



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University Southwest

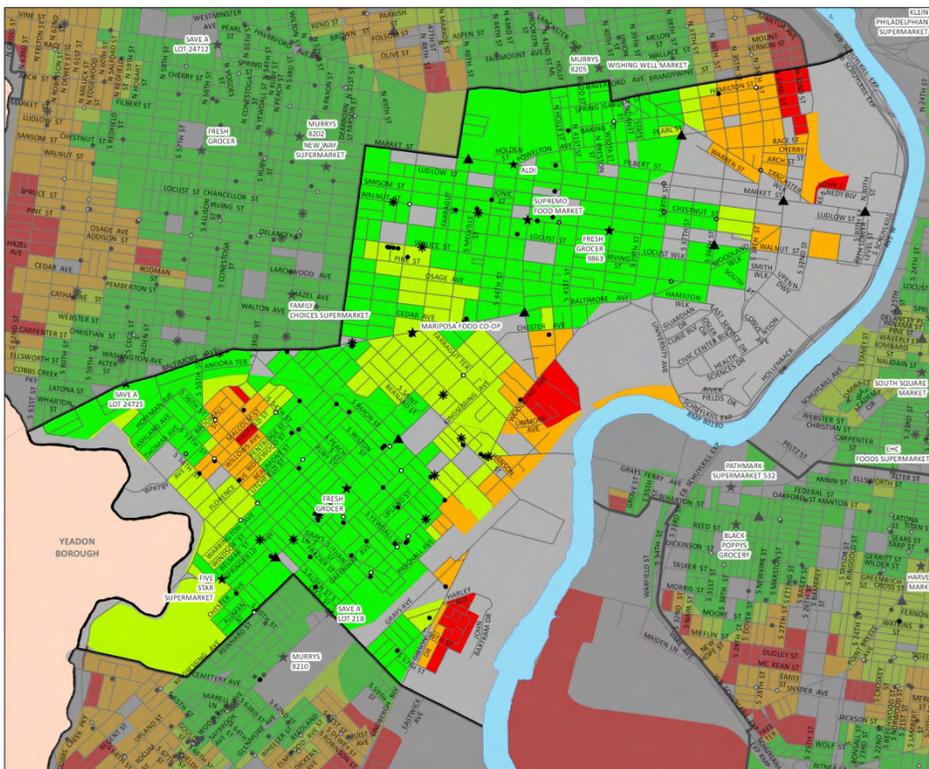


Walkable Access to Healthy Food

PLANNING DISTRICT- UNIVERSITY/ SOUTHWEST
2010



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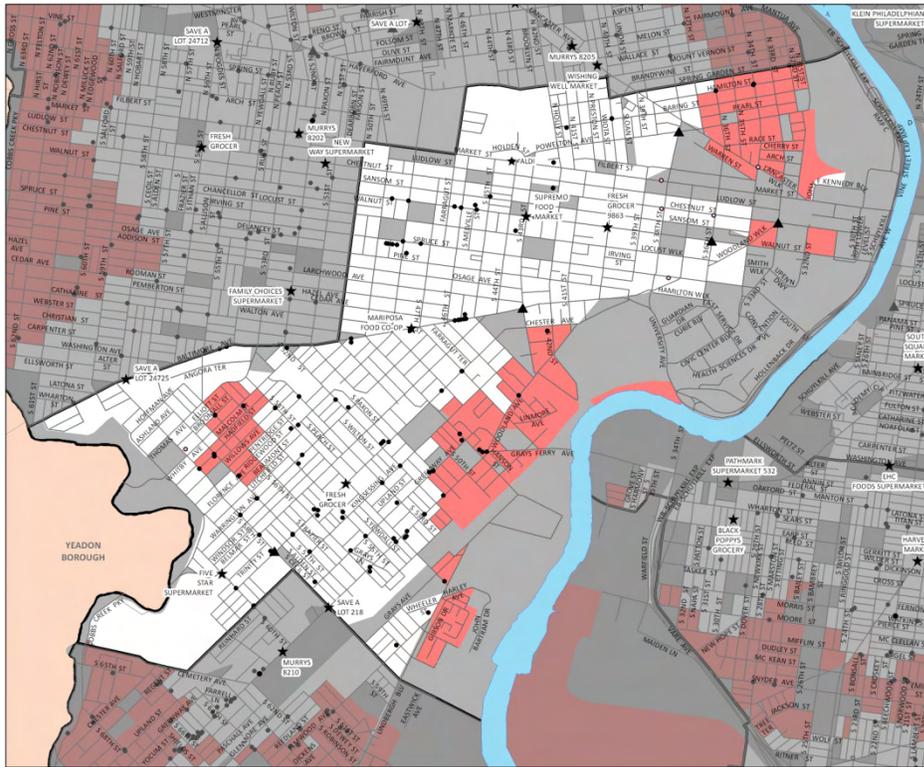
Walkable Access to Healthy Food

PLANNING DISTRICT- UNIVERSITY/ SOUTHWEST
2012



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University Southwest



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT- UNIVERSITY/ SOUTHWEST 2010

- Legend**
- ★ Supermarkets (Score = 25 to 400)
 - Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - ▲ Produce Carts (Score = 2)
 - ◆ Farmer Markets (Score = 5)
 - Non Residential
 - High Poverty and Low to No Walkable Access

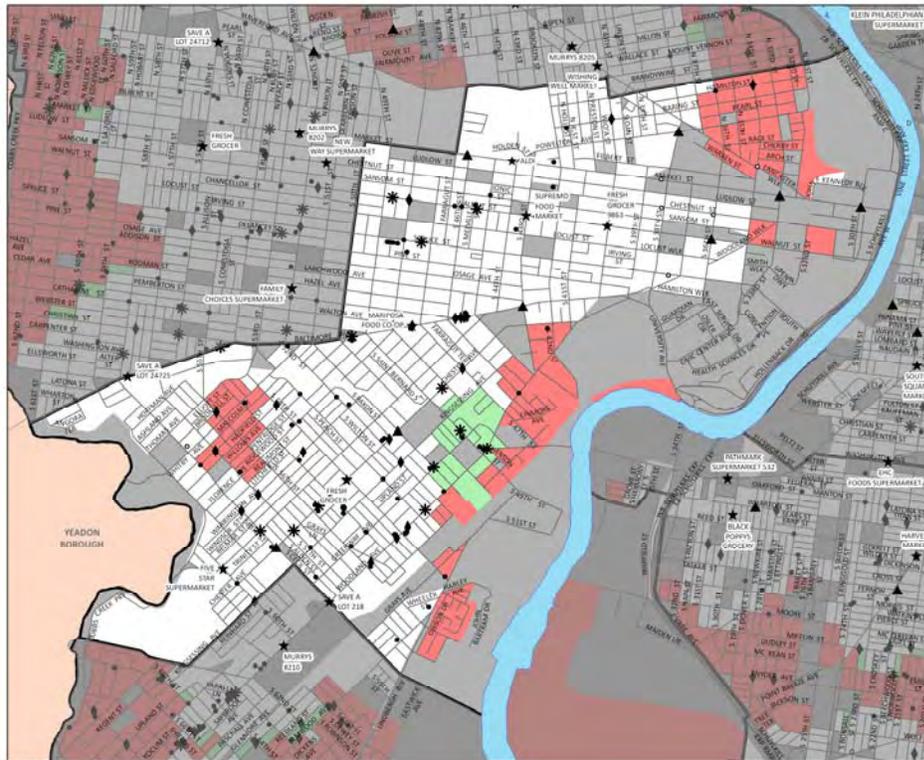
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0 0.2 0.4 0.8 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT- UNIVERSITY/ SOUTHWEST 2012

- Legend**
- Corner Stores (Score = 2)
 - Chain Convenience Stores (Score =10)
 - ◆ Enhanced Healthy Corner Store (Score=10)
 - ◆ Healthy Corner Store (Score=5)
 - ▲ Farmers Markets (Score =5)
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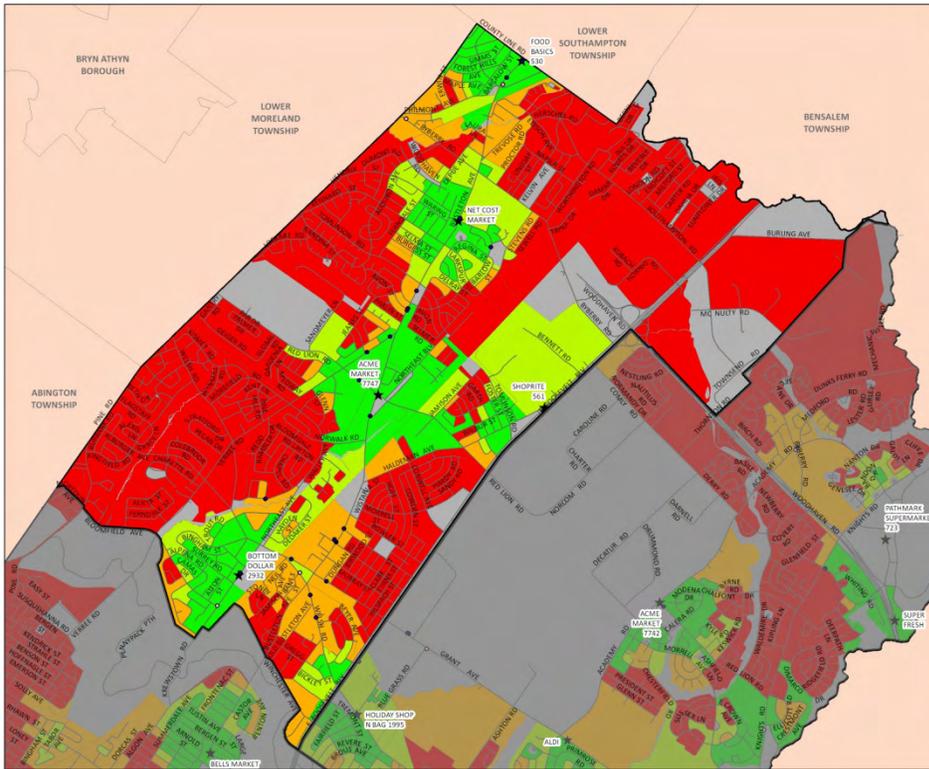
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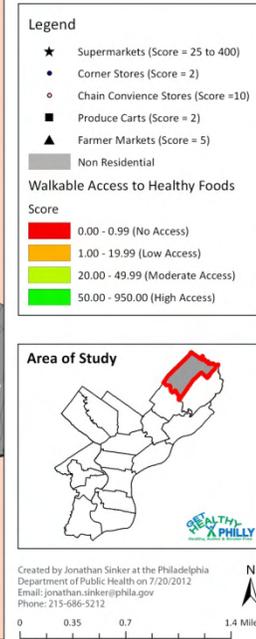
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0 0.2 0.4 0.8 Miles

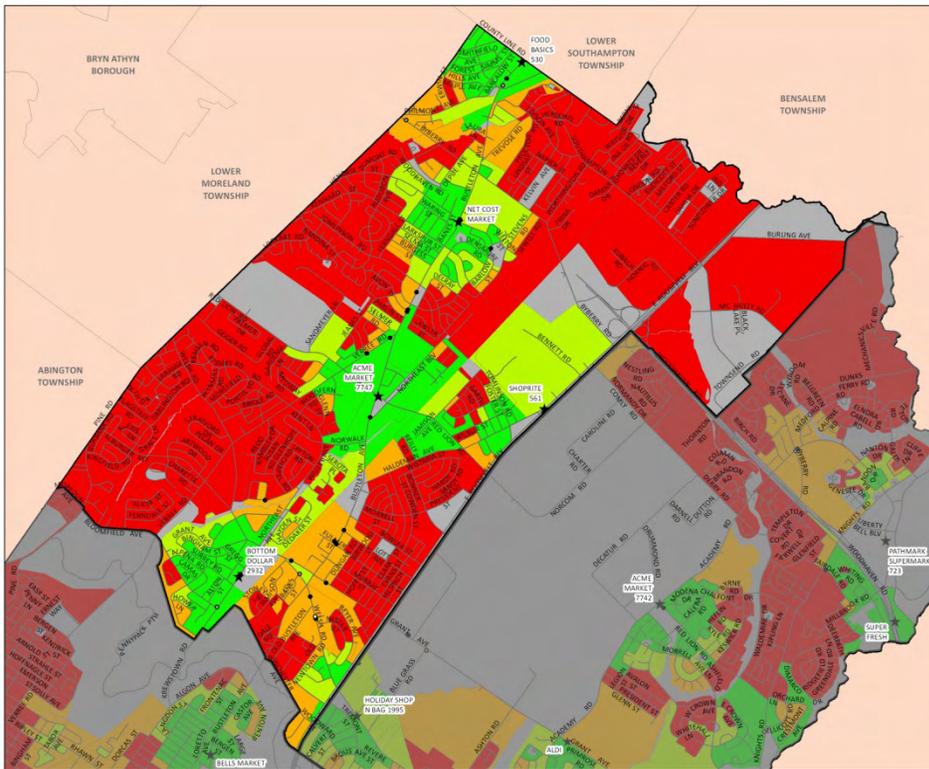
Upper Far Northeast



Walkable Access to Healthy Food PLANNING DISTRICT - UPPER FAR NORTHEAST 2010



Walkable Access to Healthy Food PLANNING DISTRICT - UPPER FAR NORTHEAST 2012



Upper Far Northeast

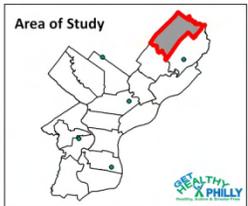


High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - UPPER FAR NORTHEAST 2010



High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.



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0 0.35 0.7 1.4 Miles



High Poverty and Low to No Access to Healthy Foods PLANNING DISTRICT - UPPER FAR NORTHEAST 2012



High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

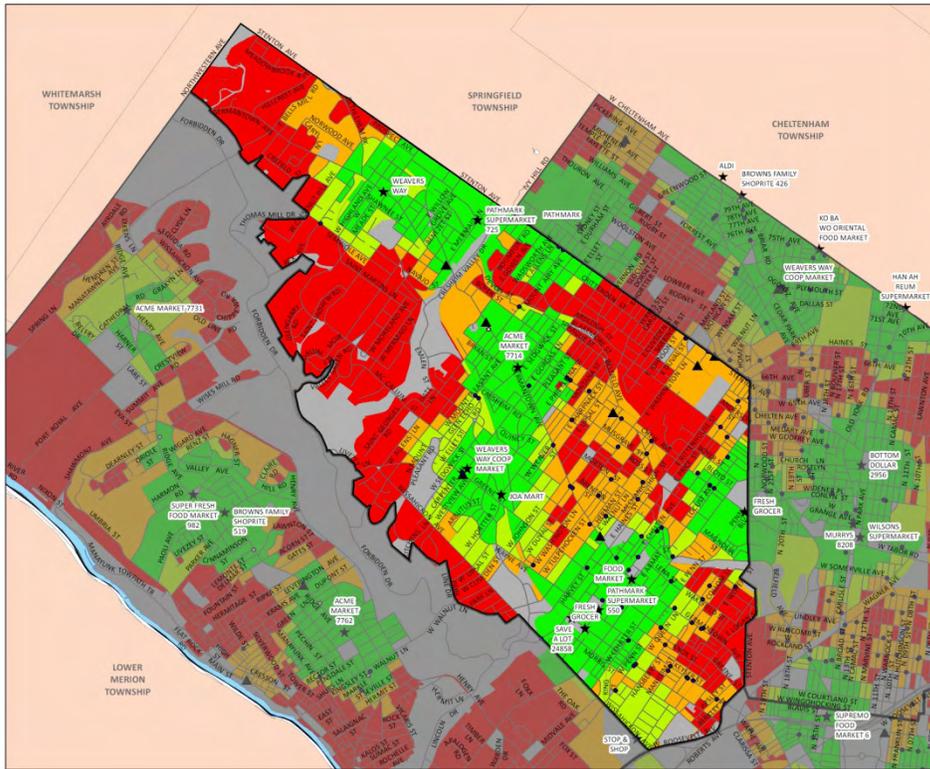
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0 0.35 0.7 1.4 Miles

Upper Northwest



Walkable Access to Healthy Food PLANNING DISTRICT - UPPER NORTHWEST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

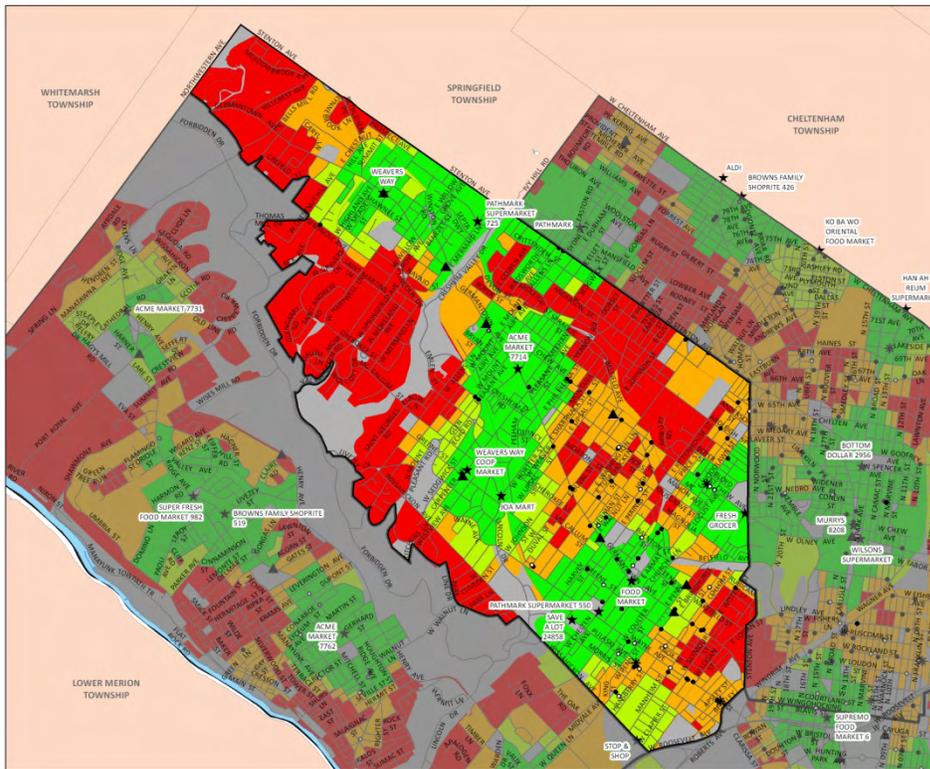
Walkable Access to Healthy Foods Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

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0 0.35 0.7 1.4 Miles



Walkable Access to Healthy Food PLANNING DISTRICT - UPPER NORTHWEST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ⊛ Enhanced Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food Score

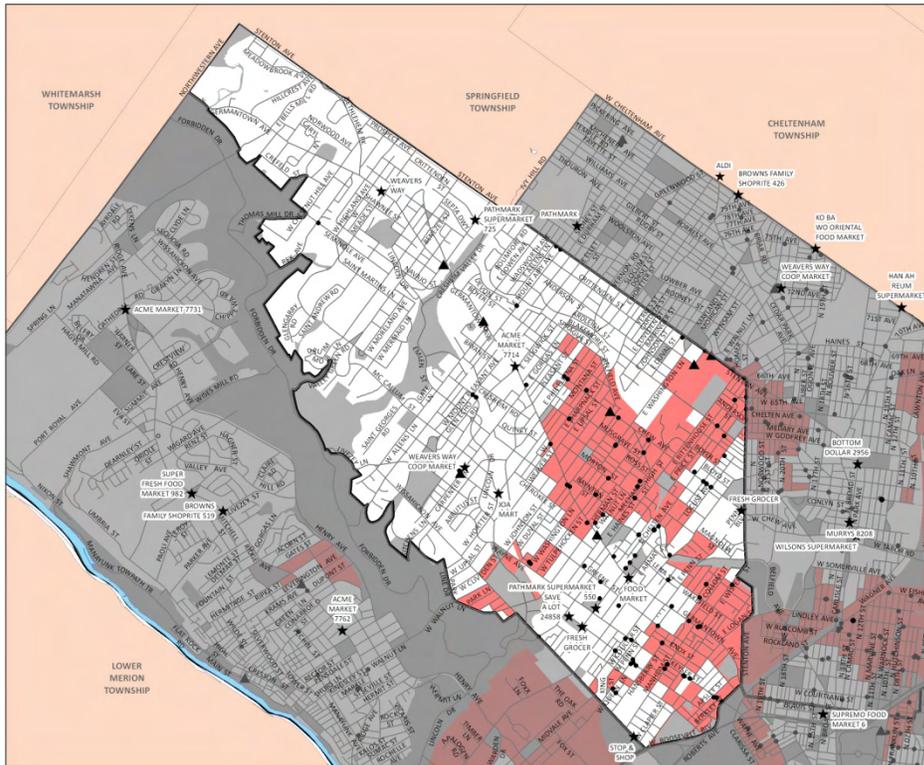
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

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0 0.375 0.75 1.5 Miles

Upper Northwest



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - UPPER NORTHWEST
2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential
- High Poverty and Low to No Walkable Access

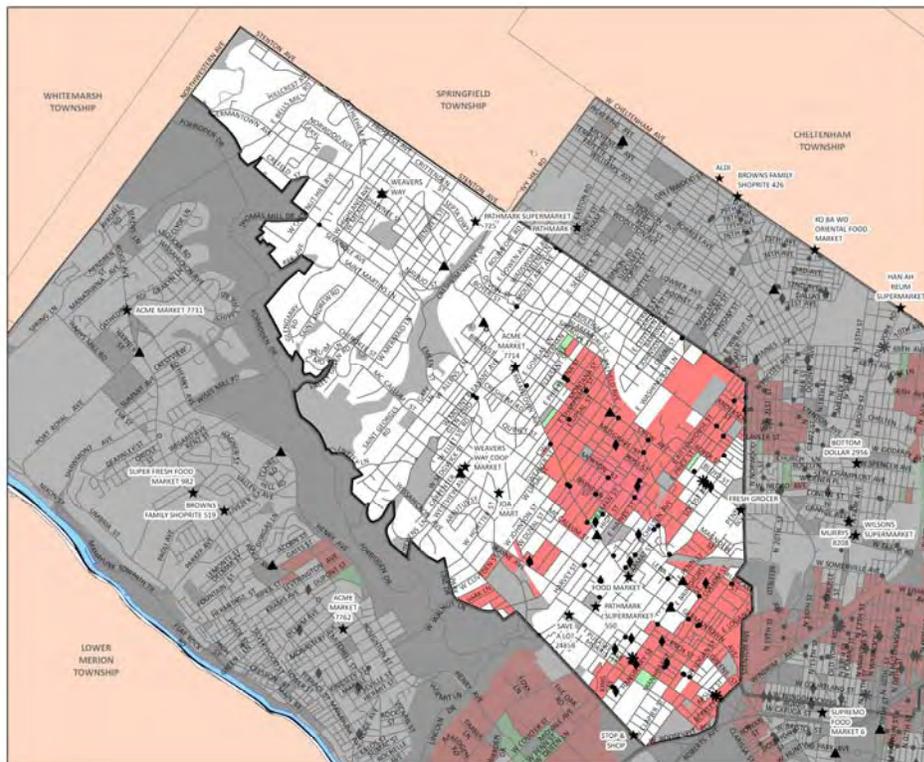
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Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

Area of Study



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High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - UPPER NORTHWEST
2012

Legend

- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- ★ Enhanced Healthy Corner Store (Score=10)
- ◆ Healthy Corner Store (Score=5)
- ▲ Farmers Markets (Score =5)
- Produce Carts (Score = 2)
- ★ Supermarket (Score Range=10 to 400)
- Non Residential
- High Poverty and Low to No Walkable Access
- Blocks With Improved Access Since 2010

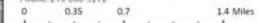
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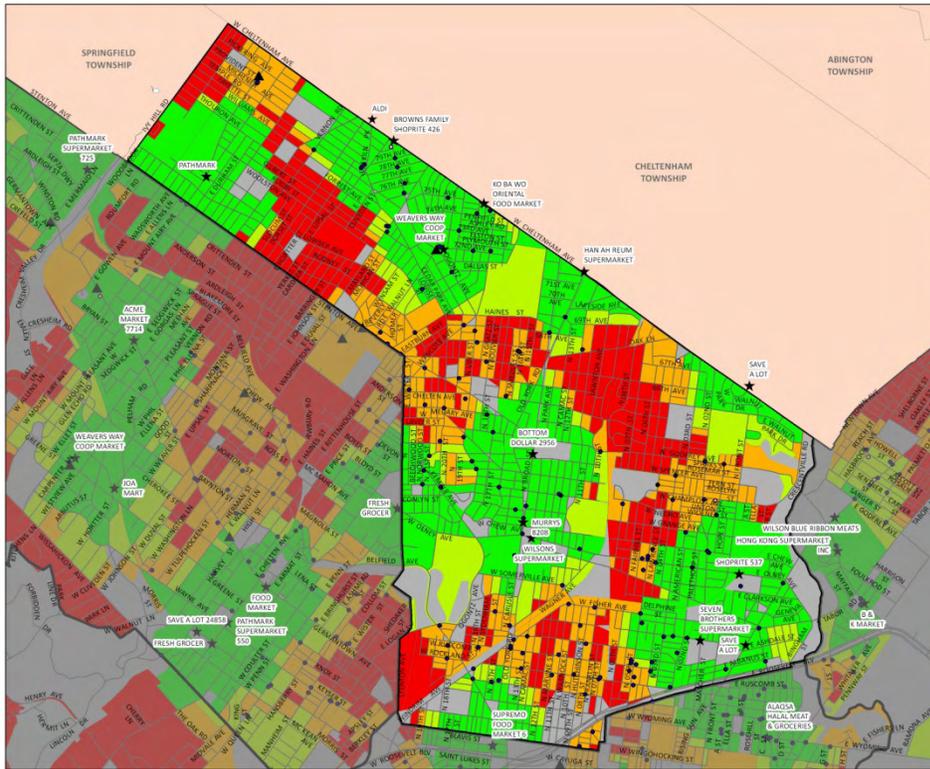
Area of Study



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Phone: 215-686-5212



Upper North



Walkable Access to Healthy Food PLANNING DISTRICT-UPPER NORTH 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- Produce Carts (Score = 2)
- ▲ Farmers Markets (Score = 5)
- Non Residential

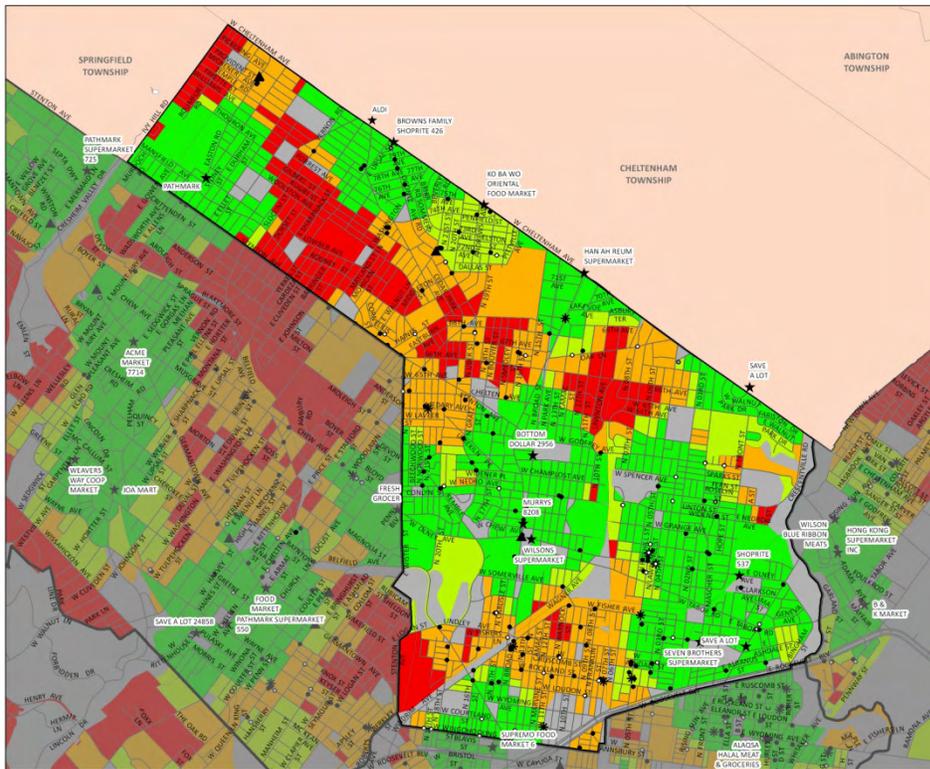
Walkable Access to Healthy Foods Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

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0 0.3 0.6 1.2 Miles



Walkable Access to Healthy Food PLANNING DISTRICT-UPPER NORTH 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ★ Enhanced Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food Score

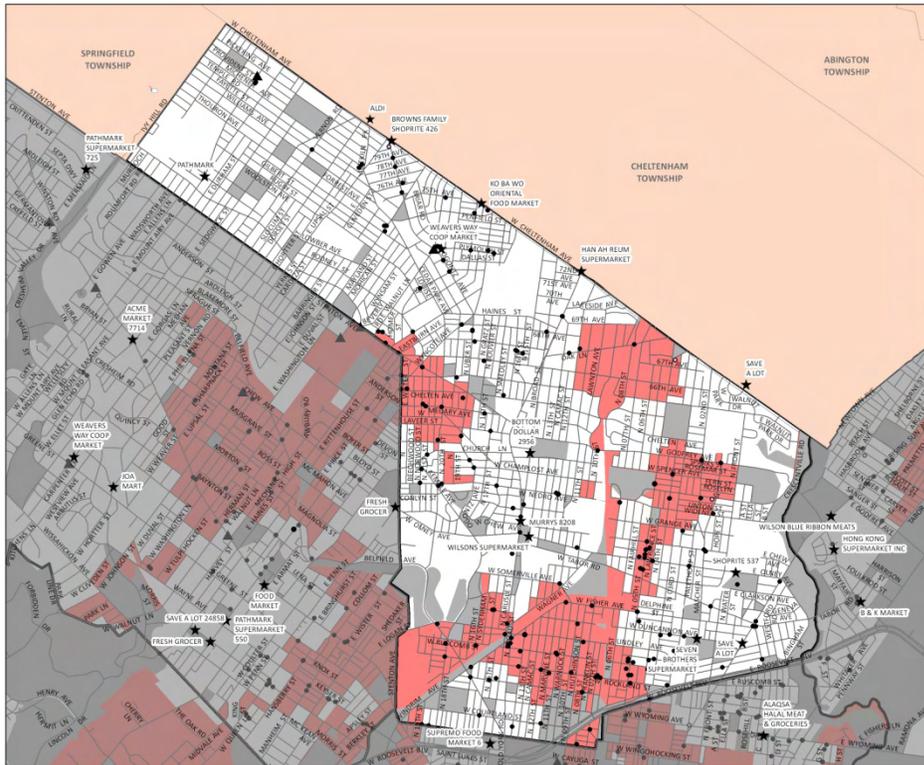
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

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0 0.325 0.65 1.3 Miles

Upper North



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - UPPER NORTH

2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- ◻ Non Residential
- High Poverty and Low to No Walkable Access

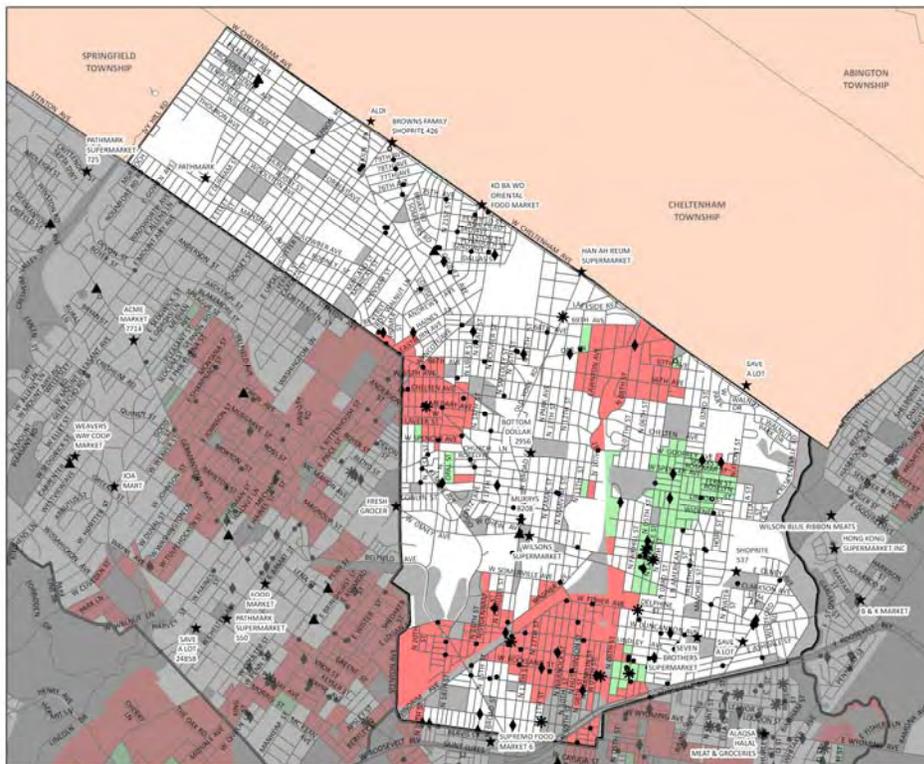
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Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

Area of Study



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High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - UPPER NORTH

2012

Legend

- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score =10)
- ★ Enhanced Healthy Corner Store (Score=10)
- ◆ Healthy Corner Store (Score=5)
- ▲ Farmers Markets (Score =5)
- Produce Carts (Score = 2)
- ★ Supermarket (Score Range=10 to 400)
- ◻ Non Residential
- High Poverty and Low to No Walkable Access
- Blocks With Improved Access Since 2010

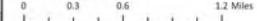
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Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

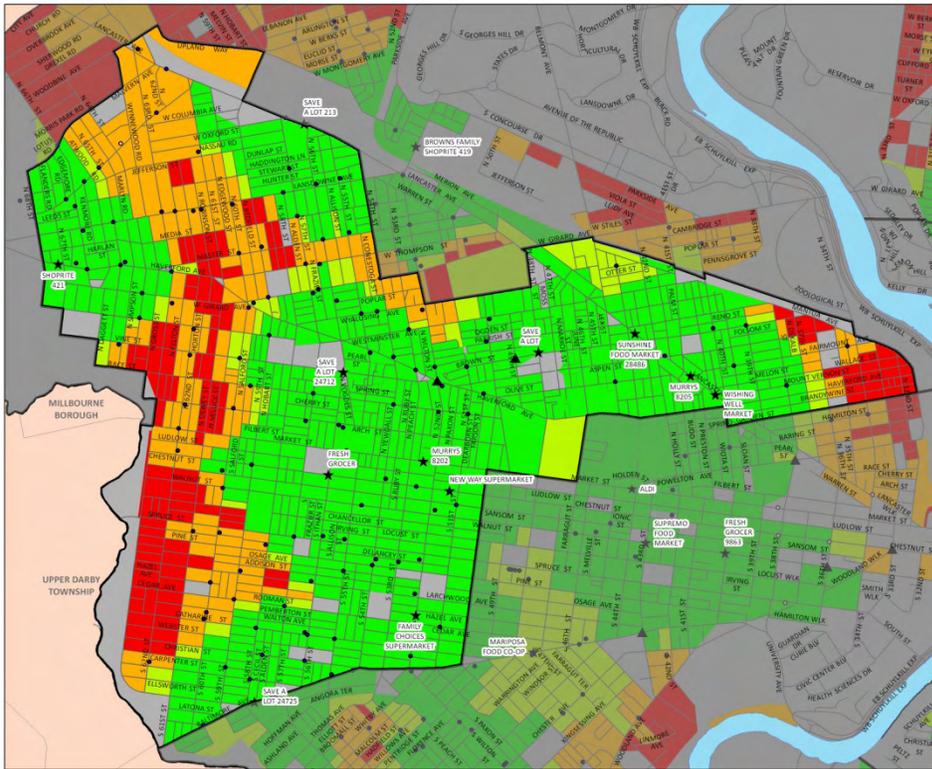
Area of Study



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West



Walkable Access to Healthy Food PLANNING DISTRICT - WEST 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

Walkable Access to Healthy Foods

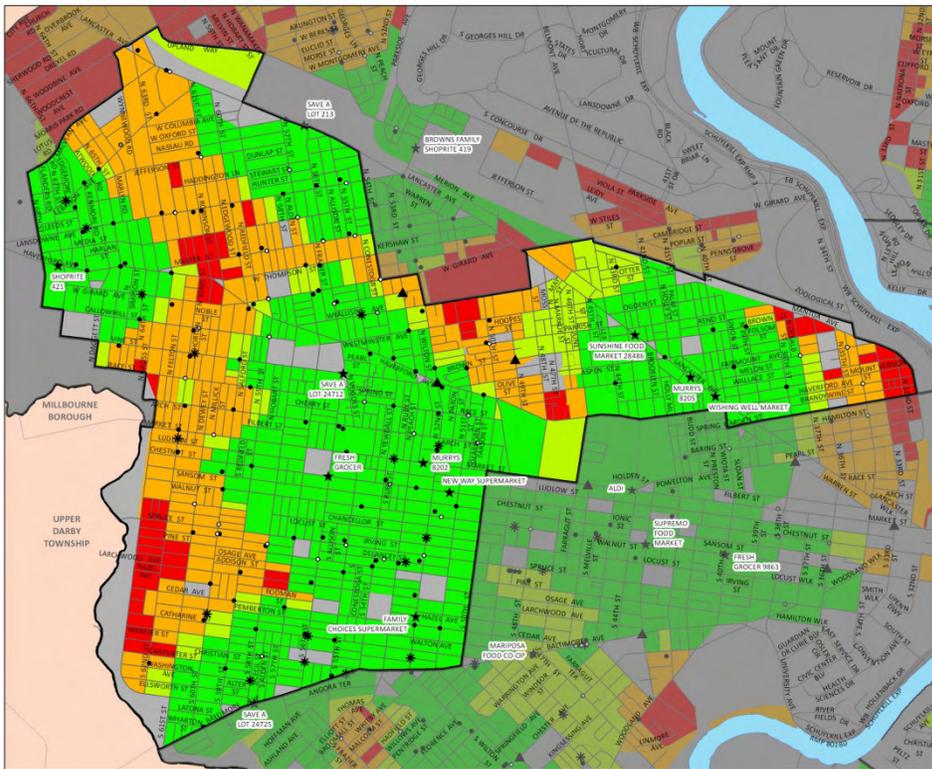
Score

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

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0 0.2 0.4 0.8 Miles



Walkable Access to Healthy Food PLANNING DISTRICT - WEST 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ★ Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- ▲ Produce Carts (Score = 2)
- Non Residential

Walkable Access to Healthy Food

Score

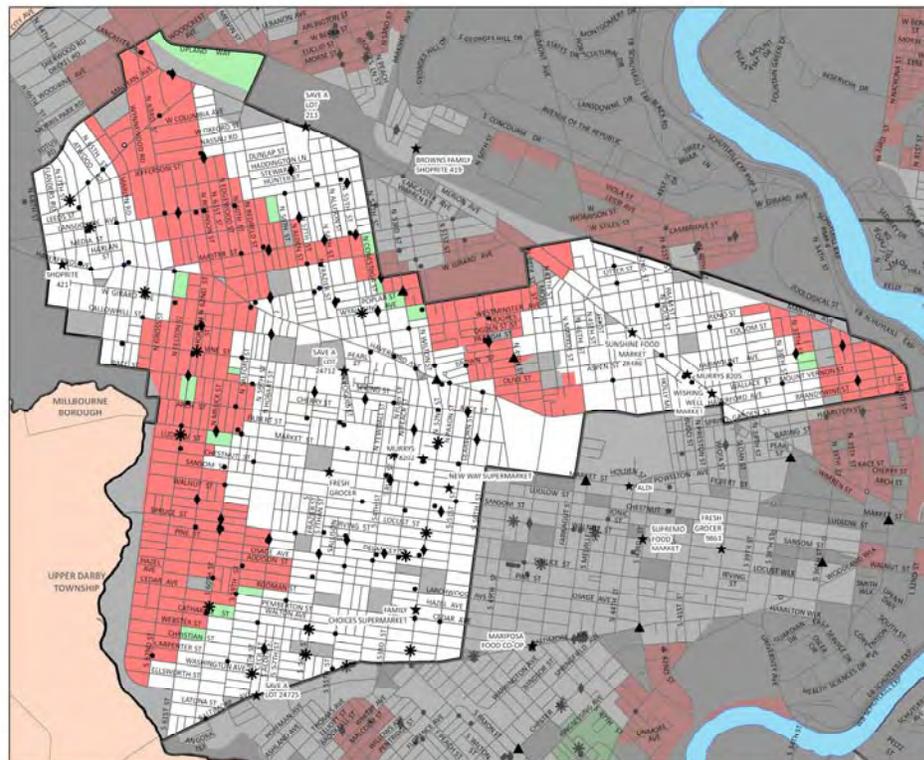
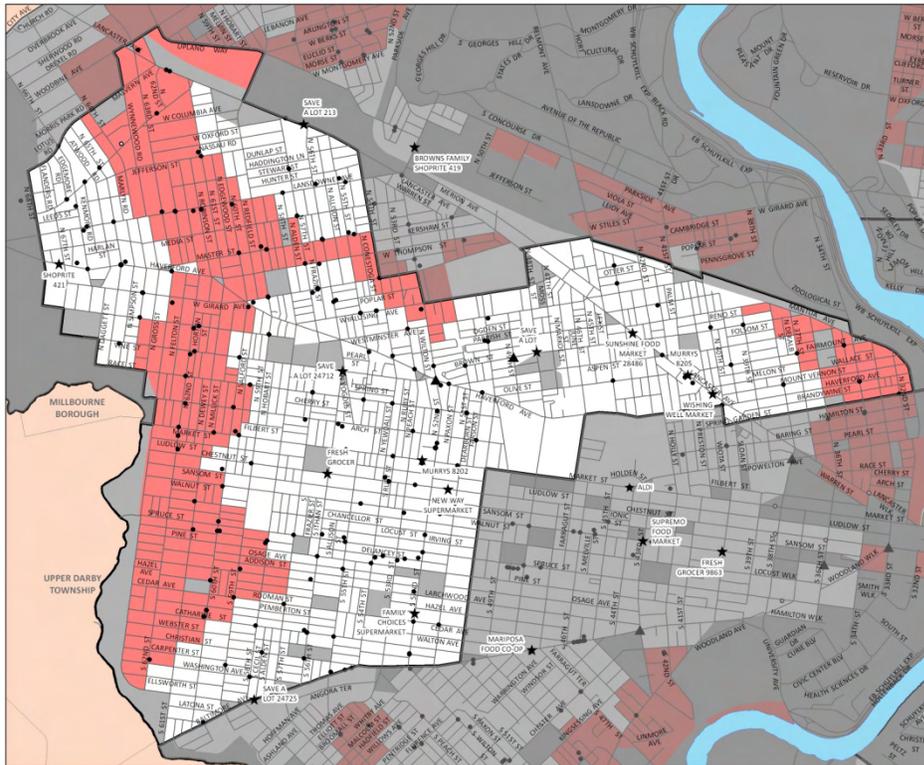
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- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)

Area of Study

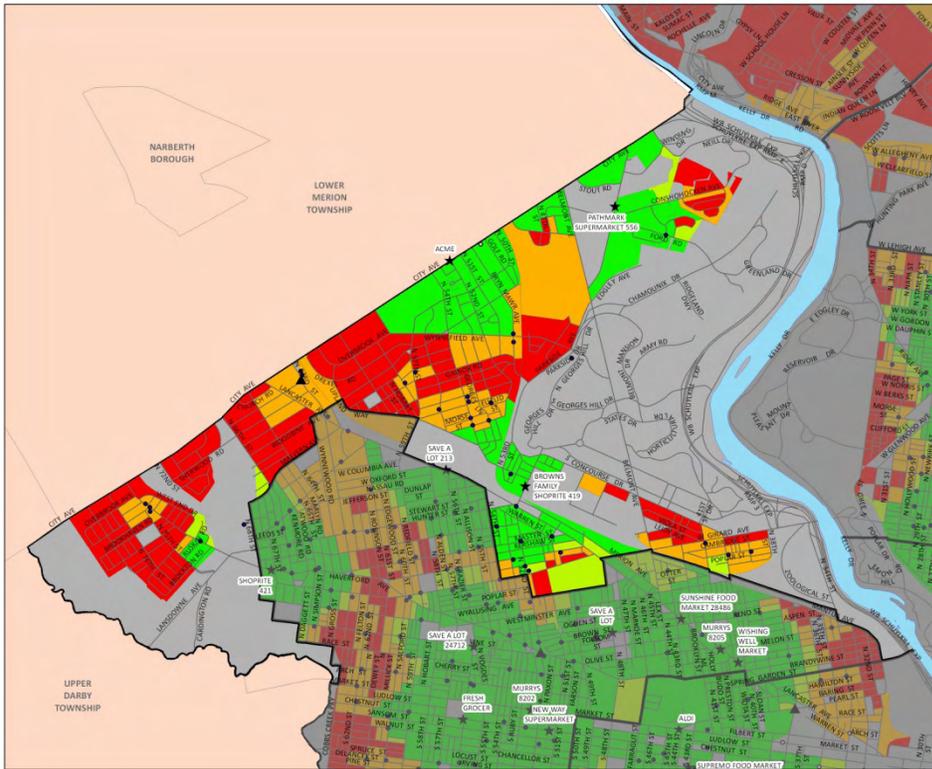
Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212

0 0.2 0.4 0.8 Miles

West



West Park



Walkable Access to Healthy Food PLANNING DISTRICT - WEST PARK 2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential

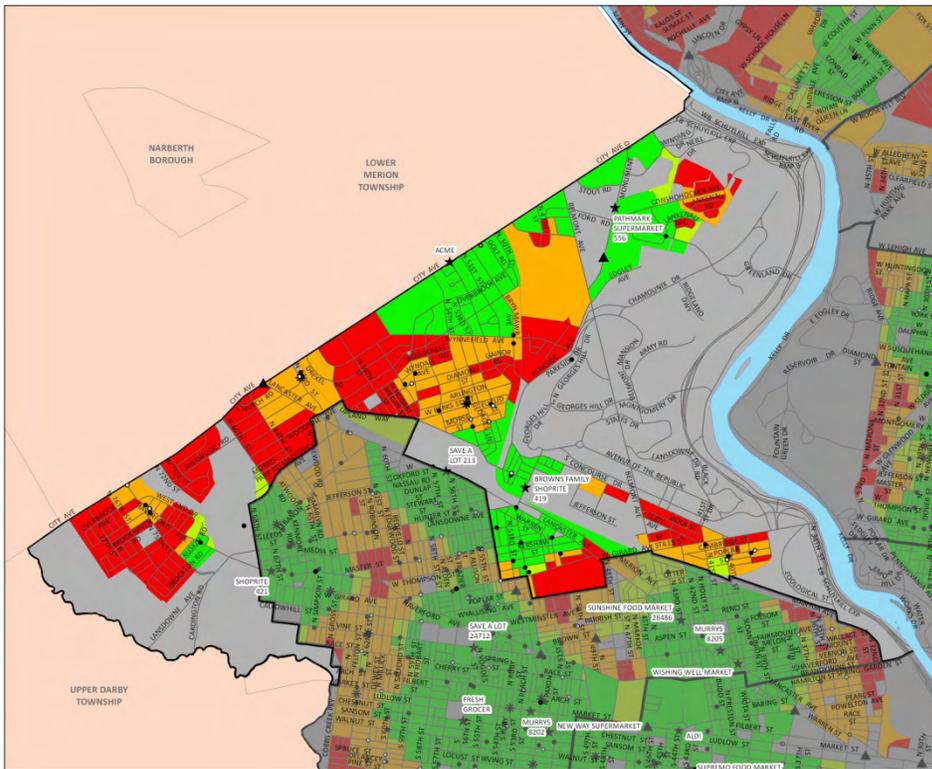
**Walkable Access to Healthy Foods
Score**

- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
 Email: jonathan.sinker@phila.gov
 Phone: 215-686-5212

0 0.3 0.6 1.2 Miles



Walkable Access to Healthy Food PLANNING DISTRICT - WEST PARK 2012

Legend

- ★ Supermarkets (Score Range= 25 to 400)
- Corner Stores (Score = 2)
- ★ Enhanced Healthy Corner Store (Score = 10)
- Healthy Corner Store (Score = 5)
- Corner Stores (Score = 2)
- ◻ Chain Convenience Stores (Score = 10)
- ▲ Farmers Markets (Score = 5)
- ▲ Produce Carts (Score = 2)
- Non Residential

**Walkable Access to Healthy Food
Score**

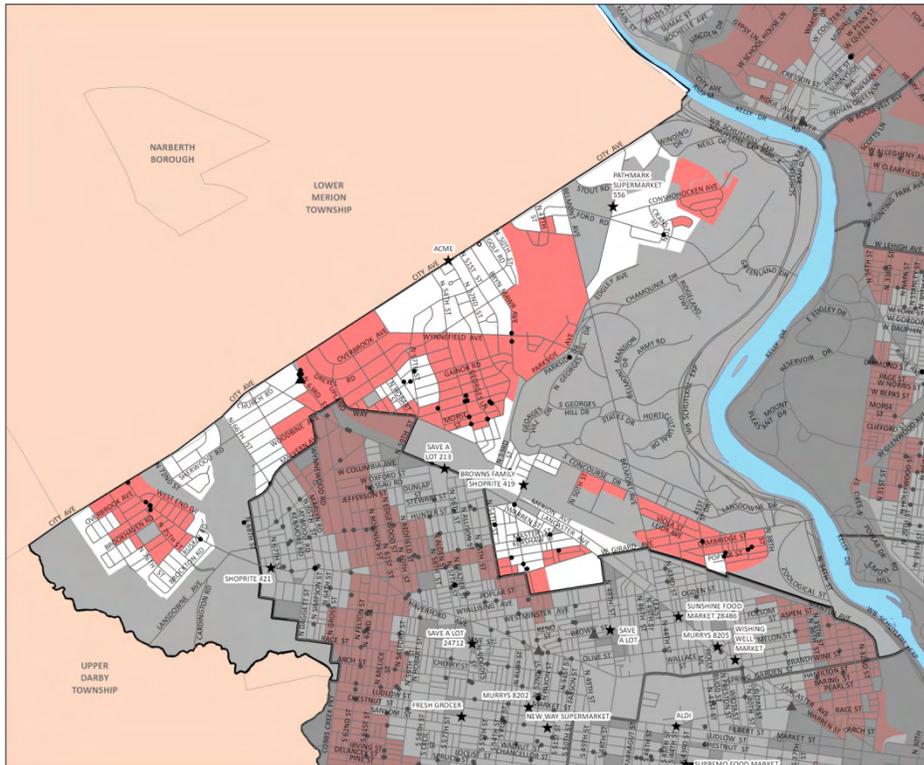
- 0.00 - 0.99 (No Access)
- 1.00 - 19.99 (Low Access)
- 20.00 - 49.99 (Moderate Access)
- 50.00 - 950.00 (High Access)



Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/20/2012
 Email: jonathan.sinker@phila.gov
 Phone: 215-686-5212

0 0.3 0.6 1.2 Miles

West Park



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - WEST PARK
2010

Legend

- ★ Supermarkets (Score = 25 to 400)
- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- Produce Carts (Score = 2)
- ▲ Farmer Markets (Score = 5)
- Non Residential
- High Poverty and Low to No Walkable Access

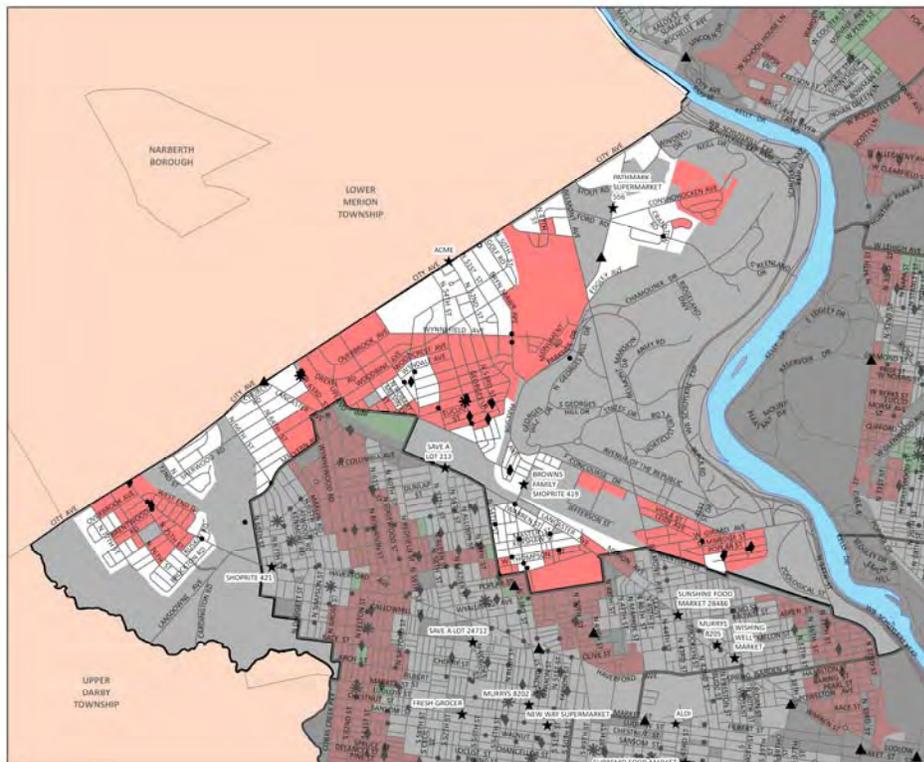
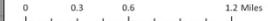
High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

Area of Study



Created by Jonathan Sinker at the Philadelphia Department of Public Health on 7/26/2012
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212



High Poverty and Low to No Access to Healthy Foods

PLANNING DISTRICT - WEST PARK
2012

Legend

- Corner Stores (Score = 2)
- Chain Convenience Stores (Score =10)
- ★ Enhanced Healthy Corner Store (Score=10)
- ◆ Healthy Corner Store (Score=5)
- ▲ Farmers Markets (Score =5)
- Produce Carts (Score = 2)
- ★ Supermarket (Score Range=10 to 400)
- Non Residential
- High Poverty and Low to No Walkable Access
- Blocks With Improved Access Since 2010

High Poverty: Census tracts where 20% or more live in poverty as defined by household income <100% of the federal poverty level. (Source 2005 – 2009 US Census, American Community Survey)

Low to No Access: Areas with a walkable access to healthy food score of 20 or lower based on a combined, weighted proximity to healthy food retail outlets.

Area of Study



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Email: jonathan.sinker@phila.gov
Phone: 215-686-5212



IV. Technical Appendix

A. Data sources, definitions, and limitations

1. Supermarkets

Supermarket data for Philadelphia County and the surrounding counties (Delaware, Chester, Bucks, and Montgomery) for 2010 were purchased from the Environmental Systems Research Institute, Inc. (ESRI), which receives its data from Infogroup USA; and for 2011 from Nielsen-Trade Dimensions. These datasets came with the street address, sales volume, North American Industry Codes (NAIC), Standard Industrial Classification (SIC), number of employees, square footage of the store, and a franchise code.

Supermarkets were identified by SIC 5411-05 and an annual sales \$2 million or higher (as per the Food Marketing Institute⁷). We excluded supermarkets that were also in our corner store dataset. We included supermarkets within a half-mile of Philadelphia to account for border-crossing. We conducted local verification of this list through Google searches, online media announcements of supermarket openings and closings, and reviews with colleagues in the Philadelphia City Planning Commission. This was particularly important in capturing changes between 2010 and 2012 and identifying local supermarkets missing from proprietary databases.

Supermarkets were classified by their annual sales volume into 5 categories. The median sales volume for Philadelphia supermarkets was \$10 million.

- \$2 – \$4.99 million in annual sales
- \$5 - \$9.99 million in annual sales
- \$10 - \$19.99 million in annual sales
- \$20 - \$39.99 million in annual sales
- \geq \$40 million in annual sales

Of note, these datasets did not include *superstores*, such as Walmart and Target, many of which sell groceries. In total, there are approximately 15 *superstores* in Philadelphia; however, many of these stores are located outside of the urban core, limiting their accessibility via foot.

2. Convenience Stores

Convenience store data for Philadelphia County and the surrounding counties (Delaware, Chester, Bucks, and Montgomery) for 2010 were purchased from the Environmental Systems Research Institute, Inc. (ESRI), which receives its data from Infogroup USA. Convenience stores were identified by SIC 5411-03. Non-chain stores and those that sold gas were excluded. For 2012 locations, we used Google searches to identify convenience store openings and closings since 2010.

3. Corner Stores

Corner stores were defined, generally, as retailers having less than 2,000 square feet, four or fewer aisles, 1 cash register, and food as its primary product. To identify corner stores for this study, we started with a 2010 list of Philadelphia retailers participating in the Women, Infants and Children (WIC) nutrition program and the Supplemental Nutrition Assistance Program (SNAP) as supplied by the Food Trust. Approximately 2,700 stores were in this dataset, which included data on store size/type (supermarket, medium grocery, small or convenience store, etc.). Based on this dataset, staff from The Food Trust narrowed down the list to approximately 1,500 stores that met the corner store criteria described above. Once these stores were identified, a team of 3 staff completed *street canvassing*, traveling block-by-block on foot and by car to determine whether listed stores met the corner store criteria and to identify unlisted corner stores. While the recruitment efforts were citywide, we targeted 25 zip codes for intervention based on poverty and obesity rates. These on-the-ground assessments began in 2010 and continued through 2012, adding corner stores to the dataset over time. (Some store closures were also captured.) We also added to the corner store dataset by including grocers with under \$2 million in annual sales as per 2011 Nielsen-Trade Dimensions data.

Standard corner store

A retailer having less than 2,000 square feet, four or fewer aisles, 1 cash register, and food as its primary product.

Healthy corner stores

As part of the *Get Healthy Philly* initiative beginning in 2010, The Food Trust and the Philadelphia Department of Public Health developed a city-wide network of over 600 corner stores to improve healthy food access in low-income communities. In exchange for a \$100 annual incentive, each corner store in the network added a minimum of four new products with at least two healthy products in at least two food categories including: fruits and vegetables, low-fat dairy, lean meats and whole grains. Through the Healthy Corner Store Initiative, stores in the network received marketing materials to encourage customers to make healthy choices and at least one individualized training session on healthy food procurement and marketing. All stores automatically became members of the Philadelphia Healthy Corner Store Network and were eligible for the next level of engagement.

Enhanced healthy corner stores

Based on owner commitment and store capacity, a subset of healthy corner stores received infrastructural changes such as shelving and small refrigeration units to help stock and display fresh produce and other healthy products. These investments ranged from \$1,000 to \$5,000. The store owners received additional training on selling healthy products and business management to ensure changes are sustainable and easy to maintain by store staff over the long term. These changes resulted in increased inventory of fresh fruits and vegetables and therefore more availability. For more information on healthy corner stores, visit:

<http://www.foodfitphilly.org/eat-healthy/healthy-corner-stores>.

4. Mobile Produce Vendors

The Division of Environmental Health Services (EHS) of the Philadelphia Department of Public Health licenses and inspects food service establishments in Philadelphia. In 2010, we extracted mobile produce vendors from the EHS food retailer database by searching for mobile retailers and for the terms *produce*, *fruit*, and *vegetable* in the business name; and also by hand-searching the list of mobile retailers. Because of data limitations, mobile produce vendor locations were not fully re-assessed for 2012.

Some of the identified retailers may sell items other than produce. This list, by definition, does not include unlicensed produce vendors, which are not uncommon in low-income neighborhoods and take the form of people selling fruits and vegetables from the backs of trucks.

5. Farmers' Markets

According to the United States Department of Agriculture, farmers' markets are a shared space, usually outdoors, where farmers meet regularly to sell locally-grown fresh fruits, vegetables, and other farm products directly to customers. Most farmers' markets in Philadelphia are operated by one of two organizations dedicated to increasing access to healthy foods—The Food Trust and Farm to City. There are, however, over 15 other organizations that operate markets in Philadelphia. Our list of markets does not include markets operating as part of special events or on a one-time basis.

Most of the markets are open one day per week between the months of May and October. Currently, five markets are open 2 to 3 days per week; one indoor market is open 6 days per week year-round, and six outdoor markets are open year-round.

6. Demographic data

Non-residential areas were defined as census blocks with a population of zero (based on the 2010 U.S. Census) and the Fairmount Park boundary layer as maintained by the City of Philadelphia. While some populations do live in census blocks within Fairmount Park, the population density is extremely low and was considered non-residential for this study.

High poverty areas were defined as census tracts (as per 2010 U.S. Census boundaries) in which 20% or more of the households lived below 100% of the Federal Poverty Level (based on 2005-2009 American Community Survey of the U.S. Census).

B. Methodology

The purpose of this study was to develop a quantitative measure of walkable access to healthy foods and identify census blocks that have low to no walkable access to healthy foods and high poverty.

To accomplish this goal, we pursued the following steps: 1) establishing a scoring system for retailers reflecting the relative availability and quantity of healthy foods for sale by retailer type, 2) determining a service area within which people would walk to shop at these retailers, 3) creating spatial walksheds reflecting these scores and service areas, 4) calculating food access scores for each city block using map algebra and zonal statistics, 5) categorizing citywide food access scores into meaningful categories, and 6) spatially identifying blocks with low to no access to healthy foods and high poverty.

Step 1: Establishing a scoring system

Most geospatial studies of food access focus on supermarkets and do not include smaller retailers, such as corner stores. Among retailers, supermarkets do provide the largest variety and quantity of healthy foods and, arguably, the most competitive prices. In addition, data on supermarkets are relatively easy to obtain, including sales volume data that allow for categorization and comparison. As described above, local public health agencies are in a unique position to obtain data on other food retail sources from municipal, state, and federal administrative datasets; through partnerships with local organizations that operate or coordinate seasonal retailers, such as farmers' markets; and via street canvassing.

While data on the location of a range of food retailers may be available, scores reflecting the relative availability and quantity of healthy foods in these retailers are even more challenging to obtain. We derived scores for Philadelphia retailers based on two studies (Farley et al, 2009; and Rose et al, 2009)^{8,9} that compared healthy food availability/quantity across a variety of food retailers. Both of these studies assessed shelf length devoted to fruits and vegetables. While this is a strong, replicable indicator of availability and quantity, it is not inclusive of other healthy foods and beverages, such as low-fat dairy and whole grains. Plus, it does not measure quality or variety. However, studies that did assess the availability of healthy products other than produce did not assess quantity, limiting their utility in our analysis.

Table 4 describes the assessments, locations, sample sizes, and scores for the two studies of interest. For purposes of normalization, we used a score of 100 for supermarkets in these two published studies and then calculated scores for other retailers based on their proportionate shelf length devoted to healthy foods. For example, if supermarkets had an average of 116 feet of healthy food shelf space and small food stores had 7 feet, the normalized score for small food stores would be: $(7 \times 100)/116 = 6$. The table below also includes a column with scores for retailers in our local analysis. We assigned scores to Philadelphia retailers based on normalized scores from the two published studies and a series of assumptions described below.

For Philadelphia supermarkets, we assigned a score of 100 to those with annual sales volumes of \$10 - \$19.99 million; the median sales volume for supermarkets in Philadelphia was \$10.4 million. We then assigned scores to other supermarkets based on their relative sales volumes. For example, a supermarket with annual sales of \$5.2 million (half the median) was assigned a score of 50.

Table 4: Healthy food availability/quantity by food retailer type

Study	Farley et al, 2009	Rose et al, 2009	Current study
Assessment tool	Shelf length	Shelf length	N/A
Healthy foods	Fruits and vegetables (fresh, frozen, canned)	Fruits and vegetables (fresh, frozen, canned)	Interested in fruits, vegetables, low-fat dairy and meats, whole grains, low sodium items, water
Location	Los Angeles, CA; Southeastern Louisiana	New Orleans, LA	Philadelphia, PA
Sample size	419 retailers	90 retailers	N/A
	Healthy food availability/quantity scores*	Healthy food availability/quantity scores*	Healthy food availability/quantity scores
Supermarket ¹	100	100	
\$2 - \$4.99 million			25
\$5 - \$9.99 million			50
\$10 - \$19.99 million			100**
\$20 - \$39 million			200
≥ \$40 million			400
Mid-sized food store ²	21	16	
Convenience store ³	1	4	10
Corner store or small food store ⁴	6	10	2
Healthy corner store	--	--	5
Enhanced healthy corner store	--	--	10
Farmers' market	--	--	5
Mobile produce vendor	--	--	2

*Scores normalized by assigning supermarkets a score of 100 and then calculating scores for other retailers based on their proportionate shelf length devoted to healthy foods. For example, if supermarkets had an average of 116 feet of healthy food shelf space and small food stores had 7 feet, the normalized score for small food stores would be: $(7 \times 100)/116 = 6$.

**The median sales volume for supermarkets in Philadelphia was \$10.4 million, so supermarkets with annual sales volumes of \$10 - \$19.99 million were assigned a score of 100 for standardization purposes.

¹Farley et al defined a supermarket as an independent or chain store in which the primary items sold are foods and beverages and that has four or more cash registers. Rose et al defined it by a North American Classification System (NAICS) code in the InfoUSA dataset.

²Farley et al defined a mid-sized store as an independent or chain store in which the primary items sold are foods and beverages and that has 2,152 square feet or more of sales space and three or fewer cash registers. Rose et al did not define it in the cited paper; however, another paper from 2009 authored by Rose and studying food availability in New Orleans defined it as a food retailer with \$1 - \$5 million in annual sales.

³Farley et al defined a convenience store as one of a chain of stores that sells foods/beverages and nonfood items (e.g., magazines, products for automobiles), including gasoline, and that has three or fewer cash registers. Rose et al did not define it in the cited paper; however, another paper from 2009 authored by Rose and studying food availability in New Orleans defined it as one among a group of stores, including gas stations, chain convenience stores, and drug stores.

⁴Farley et al defined a small food store as an independent (non-chain) store in which the primary items sold are foods and beverages and that has less than 2,152 square feet of sales space. Rose et al did not define it in the cited paper; however, another paper from 2009 authored by Rose and studying food availability in New Orleans defined it as a food retailer with <\$1 million in annual sales. In Philadelphia, we defined it as a retailer having less than 2,000 square feet, four or fewer aisles, 1 cash register, and food as its primary product.

In the two cited studies, *convenience stores* scored between 1 and 4 (compared to 100 for supermarkets) for fruit and vegetable availability/quantity. Both studies included gas stations in this category, likely driving down the healthy food score. The two cited studies also assessed *mid-sized food stores*, which comprised chain or independent stores primarily selling foods and beverages with sales volumes lower than supermarkets. These stores scored between 16 and 21 (compared to 100 for supermarkets) for fruit and vegetable availability/quantity. For our local analysis, we defined convenience stores as small chain stores—such as WaWa and 7-

Eleven—primarily selling foods and beverages. Gas stations were not included. Therefore, we used a score of 10 (compared to 100 for supermarkets), which split the difference between the scores for *mid-sized food stores* and *convenience stores* as defined in the two cited studies.

In the two published studies, corner stores scored between 6 and 10 (compared to 100 for supermarkets) for fruit and vegetable availability/quantity. For our local analysis, we decreased the relative score for corner stores to 2 (compared to 100 for supermarkets) based on the following factors:^{10,11,12,13} a) customer purchases in corner stores, to a greater degree than in supermarkets and mid-sized food stores, are for unhealthy items, b) the ratio of unhealthy to healthy foods is higher in corner stores than in other retailers, and c) the quality of produce is highly variable in corner stores. At the time of this study, we did not have data available to us on the Healthy Corner Store Initiative’s impact on the nutrition environment and consumer purchases. Therefore, we estimated the effects of the intervention. We assumed that healthy corner stores would have half the healthy food availability/quantity of convenience stores, such as Wawa; and that enhanced healthy corner stores—those provided refrigeration and/or shelving units—would have the same healthy food availability/quantity of convenience stores, such as Wawa. These estimates can be adjusted once our healthy corner store evaluation is complete.

For farmers’ markets, we assumed that the majority of products sold are healthy; most operate 1 -2 days per week for 6 months of the year; and annual sales are approximately \$50,000.¹⁴ Notably, we did not account for the variability in size, hours of operation, and sales, as those data were not readily available to us. For purposes of comparison, if a healthy corner store has annual sales of \$1 million¹⁵ and 5% of sales are of healthy products, that equals \$50,000. Therefore, we assigned farmers’ markets a score of 5 (the same score as a healthy corner store). For mobile produce vendors, sales data were not readily available. Because of their small size and limited reach but nearly exclusive sales of produce, we assigned them a score of 2, equal to that of a corner store.

Step 2: Determining service areas

Next, we sought to determine reasonable distances that people would walk to shop at different types of retailers. We reviewed other food access studies¹⁶ and identified service areas for supermarkets, which generally ranged from 0.5 to 1 mile for urban areas. We settled on 0.5 miles, erring toward the lower end of the range, as most studies accounted for people travelling to supermarkets by foot, car, and public transportation. In this analysis, we were interested in people travelling by foot. Based on this supermarket service area of 0.5 miles, we assigned service areas for other retailers (Table

Table 5: Service areas by food retailer

Retailer type	Service area (miles)
Supermarket	0.5
Convenience store	0.25
Corner store	0.1
Healthy corner store	0.1
Enhanced healthy corner store	0.25
Farmers’ market	0.25
Mobile produce vendor	0.1

5). For smaller, less numerous retailers with a greater variety, quantity, or quality of healthy foods—such as convenience stores, enhanced healthy corner stores, and farmers’ markets—we assigned a service area of 0.25 miles or approximately 5 city blocks. For smaller, more numerous retailers with a limited array of healthy foods—such as corner stores and mobile produce vendors—we assigned a service area of 0.1 miles or approximately 2 city blocks.

Step 3: Creating spatial walksheds

A walkshed is simply a distance that can be reached on foot. We used Geographic Information System (GIS) software to create walksheds based on the service areas above. GIS has an extension to the program for modeling mobility called *network analyst*. Network analyst measures distance along roadways instead of a Euclidean distance (as the crow flies). As shown in Figure A, the ends of every possible route one-half mile from a supermarket are connected to form a polygon representing the walkshed. This particular supermarket has an annual sales volume of \$8 million, so we assigned its walkshed a score of 50.

Step 4: Calculating walkable healthy food access scores

Map algebra uses math-like expressions to add together spatial data. The syntax is similar to any algebra. In this study, we wanted to add overlapping walksheds’ scores to determine composite scores that account for access to multiple food retailers. In order to do this, we converted walkshed polygons into rasters. When a polygon is transformed into a raster, it breaks down the polygon into pixels or cells. The size of the cells can be defined by the user. In this study, we used a raster or cell size of 30 feet by 30 feet. Each one of these cells has a value that typically comes from an attribute of the polygon; in this case, we use the walkshed’s food availability/quantity score corresponding to retailer type.

Figure A: Walkshed for a supermarket

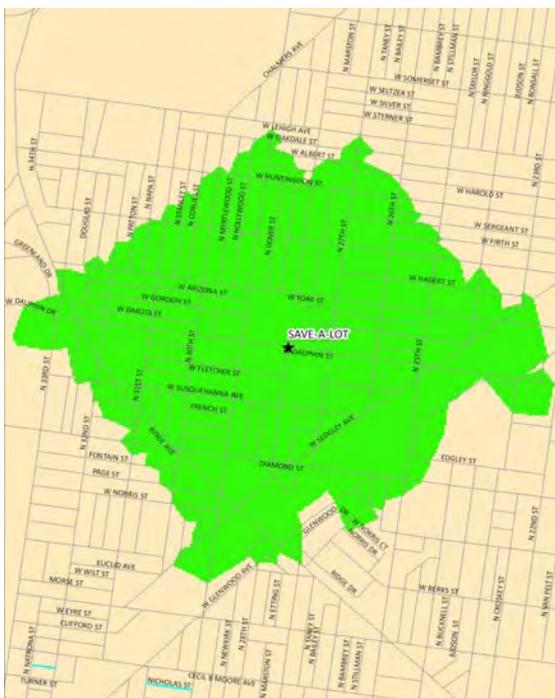


Figure B: Adding walksheds to create food access scores



The example in Figure B illustrates this concept. Here, walksheds for two supermarkets with annual sales of \$8 million each are made up of cells with a value of 50. When added together, the area of walkshed overlap is given a value of 100. To increase speed and efficiency, we created a model in *model builder* to automate the tasks. For the final model, we used a conditional statement that reclassified all null values into a value of 0. Without this step, only the areas of overlap would have been assigned scores.

In order to generate a score for each census block, the final raster scores were aggregated. To accomplish this task, we used the *zonal statistics* algorithm. This GIS tool adds up all the raster cells in the block and calculates a mean raster score. We then used this mean score as the block's *walkable healthy food access* score.

Step 5: Categorizing walkable healthy food access scores

After calculating scores for each block, we categorized them into four categories: one for no access and the remaining three approximating tertiles (Table 6). These scores also reflect somewhat intuitive neighborhood scenarios. *No access* refers to an area without even a corner store within 2 blocks. *Low access* refers to an area with up to 2 convenience stores or enhanced healthy corner stores within 2.5 blocks. *Moderate access* refers to an area with a small supermarket within 5 blocks (or 3 enhanced healthy corner stores within 2.5 blocks). *High access* refers to an area with an average-sized supermarket within 5 blocks; or 3 enhanced healthy corner stores, 1 farmers' market, 2 convenience stores, and 5 corner stores within 2.5 blocks.

Table 6: Walkable healthy food access categories

Category	Score
No access	0 – 0.99
Low access	1 – 19.99
Moderate access	20 – 49.99
High access	≥50

Step 6: Identifying areas with low-to-no access and high poverty

Lastly, we used GIS to spatially join (overlay) food access scores with poverty data (see Data sources). We selected blocks with a food access score of less than 20 and in which 20% or more of the households have incomes below the Federal Poverty Level.

V. References

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- ² U.S. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System 2010.
- ³ Booth KM, Pinkston MM, Poston WS. Obesity and the built environment. *J Acad Nutr Diet* 2005;105(5, Supplement 1):S110-17.
- ⁴ Public Health Management Corporation. Southeastern Pennsylvania Household Health Survey 2010
- ⁵ Planning districts are geographic areas made up of census tracts that the Philadelphia City Planning Commission uses to organize its demographic and socioeconomic analysis, as well as to assign jurisdictions to its community planning division staff, who work with community organizations on matters of planning and development. Generally speaking, the districts were drawn so as to reflect areas of similar physical, demographic, or socioeconomic characteristics, and/or to reflect physical boundaries such as major parks, highways, rivers, and rail lines. Each district is scheduled to be the subject of a district-wide plan which follows the goals and objectives of Philadelphia2035, the city's Comprehensive Plan. The recommendations from these district plans are intended to guide zoning changes, land use decisions, and public investments in infrastructure and facilities.
- ⁶ Institute of Medicine, *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*, Washington, D.C., 2012.
- ⁷ Food Marketing Institute. Supermarket Facts. <http://www.fmi.org/research-resources/supermarket-facts>
- ⁸ Farley TA, Rice J, Bodor JN, Cohen DA, Bluthenthal RN, Rose D, 2009. Measuring the food environment: shelf space of fruits, vegetables, and snack foods in stores. *J.Urban Health* 86, 672-682.
- ⁹ Rose D, Bodor J, Swalm C, Rice J, Farley T, Hutchinson . Deserts in New Orleans? Illustrations of Urban Food Access and Implications for Policy. Paper prepared for University of Michigan National Poverty Center/USDA Economic Research Service. February 2009.
- ¹⁰ Martin KS, Havens E, Boyle KE, Matthews G, Schilling EA, Harel O, et al., 2012. If you stock it, will they buy it? Healthy food availability and customer purchasing behaviour within corner stores in Hartford, CT, USA. *Public Health Nutr.*, 1-6.

¹¹ Borradaile KE, Sherman S, Vander Veur SS, McCoy T, Sandoval B, Nachmani J, et al., 2009. Snacking in children: the role of urban corner stores. *Pediatrics* 124, 1293-1298.

¹² D'Angelo H, Suratkar S, Song HJ, Stauffer E, Gittelsohn J, 2011. Access to food source and food source use are associated with healthy and unhealthy food-purchasing behaviours among low-income African-American adults in Baltimore City. *Public Health Nutr.* 14, 1632-1639.

¹³ Farley TA, Rice J, Bodor JN, Cohen DA, Bluthenthal RN, Rose D, 2009. Measuring the food environment: shelf space of fruits, vegetables, and snack foods in stores. *J.Urban Health* 86, 672-682.

¹⁴ USDA, Agricultural Marketing Service. *National Farmers Market Manager Survey 2006*. May 2009.

¹⁵ Rose D, Bodor J, Swalm C, Rice J, Farley T, Hutchinson . Deserts in New Orleans? Illustrations of Urban Food Access and Implications for Policy. Paper prepared for University of Michigan National Poverty Center/USDA Economic Research Service. February 2009

¹⁶ USDA, Economic Research Service. *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences*. June 2009.