Walkable Access to Healthy Food in Philadelphia, 2012-2014

November 2015

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***Download the maps from this report**

Acknowledgements

The Philadelphia Department of Public Health would like to acknowledge a number of individuals and organizations for contributing to this report. We thank The Food Trust (www.thefoodtrust.org) for leading many of our food access efforts, including the Healthy Corner Store Initiative and the Philly Food Bucks program.

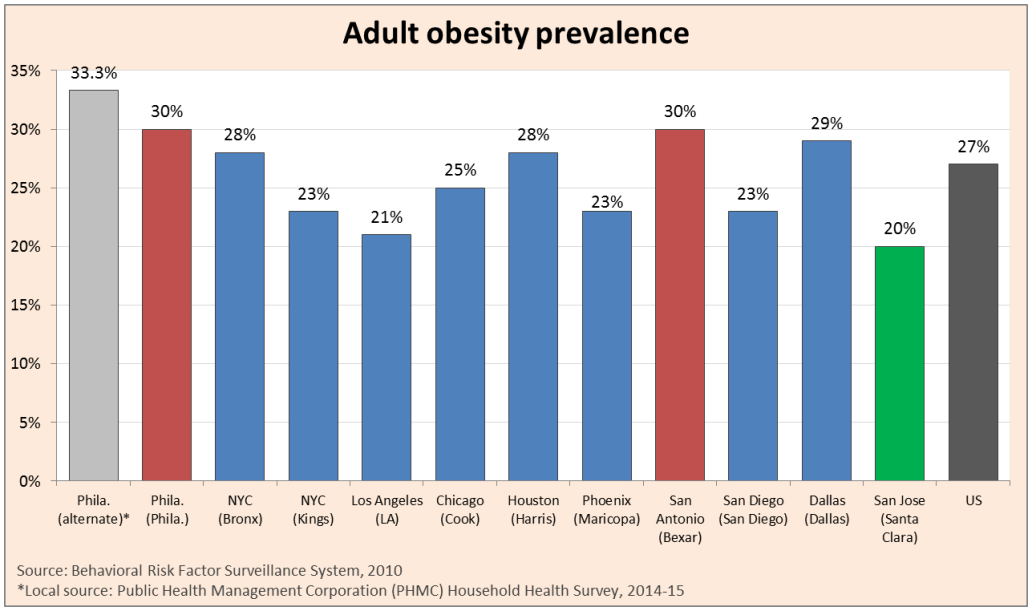
Amory Hillengas, MUSA, conducted all the geospatial analysis for this report. Giridhar Mallya, MD, MSHP, led the study. Cheryl Bettigole, MD, MPH; Amanda Wagner, MCRP, MGA; and Keith Davis, MURP, provided helpful input.

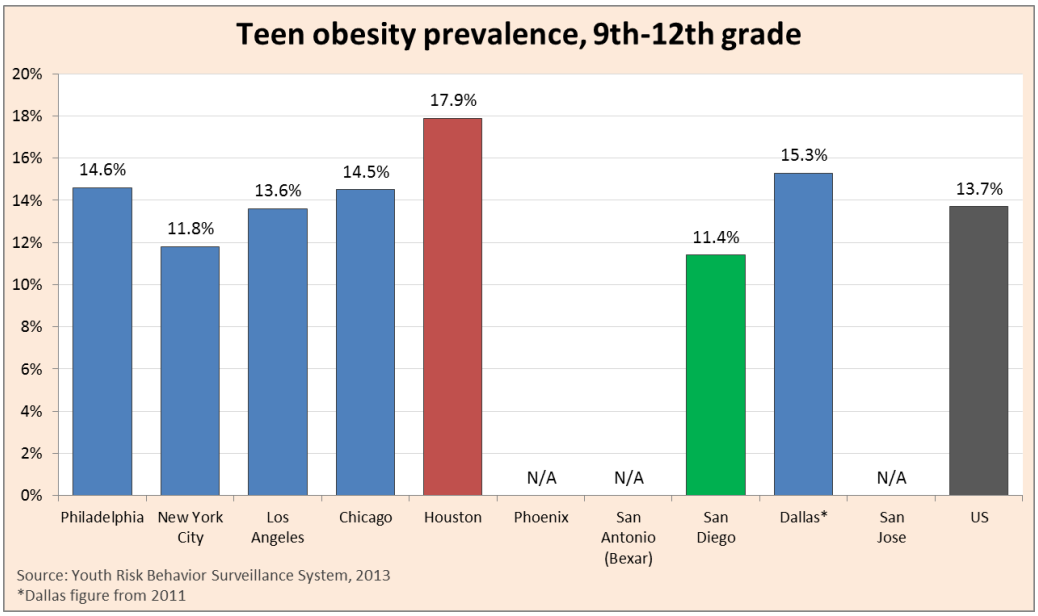
Photo: http://www.friendsofclarkpark.org/category/clark-park/farmers-market/

I. Executive Summary

Context

Of the ten largest U.S. cities, Philadelphia has the highest prevalence of obesity among adults[1] and the third highest prevalence of obesity among youth.[2] Obesity is a risk factor for a range of chronic diseases, including type 2 diabetes, heart disease, and stroke. Low-income residents and racial and 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 and Healthy Food Financing Initiative have provided financial assistance and other resources to grow more supermarkets in the city, and numerous other public and private sector efforts have boosted healthy food availability.

The Department of Public Health previously produced the report Walkable Access to Healthy Food in Philadelphia for 2010 -2012. With that serving as a baseline, this report serves as an update for 2014, allowing for comparisons between two year periods in addition to overall trends.

Approach

In this report, we assess and graphically depict walkable access to healthy food retailers in Philadelphia for 2012 and 2014. We define walkable access as food retailers within 0.5 miles or closer, depending on the retailer type. We focus additional attention on low-income neighborhoods (areas in which 20% or more of the households live at or below the federal poverty line) in which residents may have the fewest resources to purchase healthy foods and/or to travel to distant retailers. 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. Additions since the 2010 – 2012 report include big box stores, produce stores, and certified healthy corner stores. 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, 2012 and 2014. The largest changes between 2012 – 2014 involved corner stores and mobile produce vendors. The total number of corner stores in our dataset decreased from 1,710 to 1,668 and the number of mobile produce vendors decreased from 104 to 84. Chain convenience stores increased from 83 to 98. Supermarkets decreased from 144 to 133 as many have closed and more stringent categorization was implemented for this analysis (see below for details). The map in section II displays the supermarkets that have closed since 2012. Based on available data, there were no significant changes in the number of farmers' markets.

Picture: http://www.philly.com/philly/news/20150114_Bottom_Dollar_stores_now_closed.html

Table 3 describes changes in walkable access to healthy food for high poverty populations between 2012 and 2014. **In sum, we find that approximately 34,482 more Philadelphians live in areas with low-to-no walkable access to healthy food retailers and high poverty (LNA-HP). This represents an 11.2% increase over 2 years. About 1 in 4 Philadelphians live in LNA-HP areas.** Of the city's 18 Planning Districts[5], 11 were affected by this increase, ranging from 2% to 223%. The largest increases were seen in the Upper Far Northeast and the Central Northeast. Each district experienced one supermarket closing and an increase in people living in high poverty. The Central Northeast was especially affected as the number of people living in high poverty almost doubled. The following maps of these two districts, showing low to no walkable access to healthy foods and high poverty for 2012 and 2014, reveal that visually not many city blocks fall into this category. And the number of LNA-HP people in table 3 for the Central Northeast and Upper Far Northeast is relatively low - when compared to the rest of the districts. However, the percent increases are highest because those (small) values are at least doubling.

Of the remaining districts, 5 saw improvements ranging from 14% - 37% and 2 saw no change. West Park saw the most improvement primarily due to fewer people living in high poverty.

Even though some improving districts experienced supermarket closings, the combination of more corner stores (standard and healthy varieties) in addition to fewer people living in high poverty resulted in better access. The Lower Far Northeast and Lower South experienced no change in access.

Regardless of whether a district experienced a positive or negative percent change, the percentage of the population living in LNA-HP areas is indicative of pervasiveness. The top three districts with the greatest percentage of people living in these areas are the Lower North (38.8%), the Lower Southwest (36.2%), and the North (34.4%). More than half of the citywide increase in LNA-HP population occurred in the Lower North.

The demographic composition of the LNA-HP areas (red and orange blocks on the maps) reveals that there is a racial disparity involved in healthy food access: 30.1% of African Americans, 24.8% of Hispanic/Latinos, and 13.1% of Whites live in the LNA-HP blocks. Also, 25.8% of Philadelphia's children (population under 18) live in these areas. Furthermore, examining only the LNA-HP blocks revealed that, on average, they are 58.4% African American, 12.6% Hispanic/Latino, and 21.9% White.

When comparing to the baseline of 2010, there are 26,487 fewer Philadelphians living in areas with low-to-no walkable access to healthy food retailers and high poverty. This represents an overall 7.2% decrease over 4 years. So although there were significant improvements in access to healthy food from 2010-2012, the closure of numerous supermarkets between 2012 and 2014 has diminished but not eliminated those gains. Table 4 describes changes in walkable access to healthy food for high poverty populations between 2010 and 2014.

In the body of the report, we present three maps each for the City of Philadelphia and its 18 Planning Districts: 1) Walkable access to healthy foods, 2012; 2) Walkable access to healthy foods, 2014; and 3) Areas with low-to-no walkable access and high poverty, 2014. The second map in this series highlights areas of improvement from 2012-2014. All maps in this report may be downloaded from the link in the table of contents.

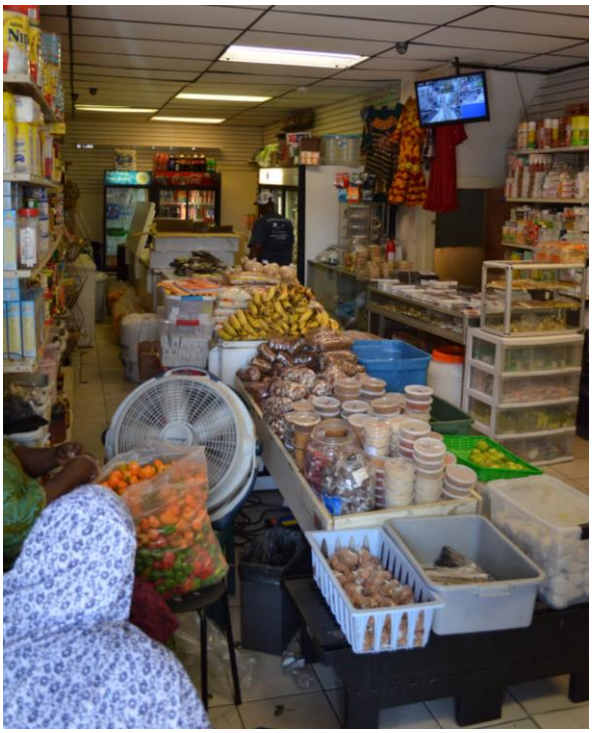
Table 1: Food retailers included in this analysis and their associated food availability scores and service areas, 2010, 2012, and 2014

	2010	2012	2014	Healthy food availability score	Service area
Supermarkets*					
TOTAL	**147**	**144**	**133**		
$2 - $4.99 million	22	21	22	25	0.5 miles
$5 - $9.99 million	49	46	41	50	0.5 miles
$10 - $19.99 million	34	35	28	100	0.5 miles
$20 - $39 million	31	31	31	200	0.5 miles
≥ $40 million	11	11	12	400	0.5 miles
Big Box stores*					
TOTAL			**14**		
$2 - $4.99 million			1	25	0.5 miles
$5 - $9.99 million			5	50	0.5 miles
$10 - $19.99 million			4	100	0.5 miles
$20 - $39 million			3	200	0.5 miles
≥ $40 million			1	400	0.5 miles
Produce stores			33	15	0.25 miles
Convenience stores	83	83	98	10	0.25 miles
Corner stores					
TOTAL	**1,468**	**1,710**	**1,668**		
Standard corner store	1,455	1,092	1,008	2	0.1 miles
Healthy corner store	13**	477	357	5	0.1 miles
Enhanced healthy corner store	0	141	285	10	0.25 miles
Certified healthy corner store			18	10	0.25 miles
Farmers' markets	40	62	64	5	0.25 miles
Mobile produce vendors	104	104	84	2	0.1 miles

*Supermarkets and big box stores are categorized by sales volume.

Limitations

Numerous factors limit our analysis and deserve consideration. (See *Technical Appendix* for details.) Data on food retailers may be incomplete or inaccurate, particularly for small retailers with frequent store turnover. The relative scores for different types of retailers are estimates and may not reflect actual differences in healthy food availability and variety. The data available combined with visual assessments only provide a best guess approach to categorizing retailers and consequently, their related score. Additionally, some types of food retailers—such as pharmacies—are not included in this analysis. 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). Also, 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.



An ethnic corner store with whole foods available

A couple of other limitations regard differences since the previous report. Supermarkets from the 2012 dataset were reevaluated which resulted in a few outcomes. One was determining that 15 had closed. Another outcome was reclassifying 6 supermarkets as corner stores based upon further reviewing the updated 2014 Nielsen data. Both clearly contributed to the decreased access seen between 2012 and 2014. We would have seen an even greater decrease without the addition of big box stores and produce stores. While the impact of these new datasets is commingled amongst the analysis, it is notable that none of the big box stores are located in LNA-HP areas. That is, these stores reside in places that are already well-served as displayed in the section III map. As for produce stores, 27 out of the 33 are within 0.25 miles of a LNA-HP block. The score assigned to a produce store, however, is 15 which makes it difficult

to see a large impact. Additionally, some select retail locations were canvassed in person, primarily in the West and Lower Southwest planning districts.

Moreover, healthy food access does not necessarily guarantee improved nutritional intake. Many other factors influence the choices consumers[6] make, 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.

Recommendations

1. **Further refine the methodology for measuring healthy food access to represent realities in Philadelphia, differences within store type, and broader stakeholder feedback.** In creating this report, we have relied on prior research to inform our decisions about how much weight to give to different types of stores (corner stores, superettes, supermarkets, etc.). In "ground-truthing" the data for the report, however, we have noted substantial differences between stores within each type. To inform future reports as well as advocacy efforts, we plan to convene stakeholders including community members, food retailers, advocacy groups, faith-based groups, neighborhood associations, community development corporations, those in the non-profit and academic spheres implementing and evaluating food access initiatives, and the planning and public health communities to discuss methodological issues in measuring access to healthy food**.**

2. Regardless of future tweaks to the methodology, we know that there has been a partial reversal of the 2010-2012 gains in food access that is significantly connected to the closure of 15 of the 144 supermarkets (soon to be more with upcoming Pathmark and Superfresh closures). The city's network of healthy corner stores and farmer's markets cannot make up for these losses. **Economic development, public health, and community-based organizations urgently need to collaboratively identify and implement innovative strategies that incentivize and attract new supermarkets and other healthy food retailers.** This is particularly true in those neighborhoods with the highest numbers of low-income residents without walkable access to healthy food: North, Lower North, and South Philadelphia. See Policy Link's "Grocery Store Attraction Strategies" (p. 27).[7]

3. **Explore other options to expand healthy food access:** Get Healthy Philly staff will conduct further analysis identifying how high poverty and low access areas overlap with zones eligible for fresh food incentives, and alternative food access points including community gardens, farms, soup kitchens and pantries.

We ask all interested stakeholders to review these maps and send comments, ideas, and questions to cheryl.bettigole@phila.gov. Any technical responses may be directed to

amory.hillengas@phila.gov. Get Healthy Philly staff members are available to discuss these findings and barriers to access. Contact us at the above address to schedule a presentation. The full report is available at www.phila.gov/gethealthyphilly. 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, 2012 and 2014

	2012							2014									
	Supermarkets	Convenience stores	Standard corner stores	Healthy corner stores	Enhanced healthy corner stores	Farmers' markets	Mobile produce vendors	Supermarkets	Big Box stores	Produce stores	Convenience stores	Standard corner stores	Healthy corner stores	Enhanced healthy corner stores	Certified healthy corner stores	Farmers' markets	Mobile produce vendors
Citywide	**144**	**83**	**1092**	**477**	**141**	**62**	**104**	**133**	**14**	**32**	**98**	**1008**	**357**	**285**	**18**	**64**	**84**
North	13	3	148	100	28	3	9	12	0	1	3	155	77	71	2	4	11
Lower North	13	1	87	21	30	8	5	6	0	2	3	85	42	53	3	6	5
South	16	5	177	78	8	5	7	13	3	3	5	163	62	24	5	5	1
Upper North	12	3	109	36	9	4	4	9	0	3	4	87	28	20	0	3	5
Lower Northeast	10	8	86	6	5	2	0	9	1	6	7	80	18	10	0	3	3
River Wards	6	6	58	33	8	1	1	7	2	5	8	51	19	26	1	1	0
Central	9	11	48	18	7	14	33	16	0	3	21	72	12	17	3	16	21
Lower Southwest	6	2	50	19	6	0	4	4	0	1	2	28	14	12	0	0	4
University/ Southwest	7	7	52	21	15	8	16	7	0	0	5	44	22	15	1	10	16
Lower Northwest	5	4	5	1	0	4	1	4	0	0	4	9	2	4	0	3	0
North Delaware	6	14	43	12	3	0	0	4	0	3	13	32	6	11	0	2	0
Central Northeast	7	8	20	5	2	0	0	5	1	1	9	14	4	3	0	0	0
Lower South	0	0	2	0	0	0	1	0	0	0	0	0	1	0	0	0	0
Upper Far Northeast	5	4	22	1	0	0	0	4	2	1	6	4	0	1	0	0	0
Lower Far Northeast	6	4	10	60	0	0	0	7	3	0	6	6	0	0	0	1	0
West Park	4	1	20	10	2	2	5	3	1	1	0	21	10	2	0	2	2
Upper Northwest	10	1	57	18	3	8	3	10	0	2	1	41	16	7	0	7	6
West	9	1	98	38	15	3	12	8	0	1	1	116	33	21	3	3	10

Table 3: Low to no walkable access to healthy food and high poverty, 2012 and 2014

	2012					2014					2012 vs. 2014	
	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**	**611,121**	**860,910**	**306,803**	**20.10%**	**1,526,006**	**689,610**	**823,327**	**341,285**	**22.4%**	**34,482**	**11.2%**
North	137,849	35,901	137,904	35,901	26.00%	137,849	49,989	133,346	47,483	34.4%	11,582	32.3%
Lower North	95,777	17,820	95,777	17,820	18.60%	95,777	39,624	80,907	37,180	38.8%	19,360	108.6%
South	132,904	40,870	93,522	27,538	20.70%	132,904	53,490	65,616	30,675	23.1%	3,137	11.4%
Upper North	144,381	58,169	71,582	24,715	17.10%	144,381	59,243	87,247	28,909	20.0%	4,194	17.0%
Lower Northeast	100,232	37,409	61,239	20,611	20.60%	100,232	40,853	67,140	25,548	25.5%	4,937	24.0%
River Wards	68,489	29,010	37,386	17,040	24.90%	68,489	29,597	41,768	18,082	26.4%	1,042	6.1%
Central	117,132	22,768	37,591	12,759	10.90%	117,132	16,697	27,645	9,095	7.8%	-3,664	-28.7%
Lower Southwest	42,087	16,937	24,403	11,155	26.50%	42,087	20,632	28,415	15,242	36.2%	4,087	36.6%
University/ Southwest	81,145	14,296	76,592	14,292	17.60%	81,145	19,221	63,071	14,563	17.9%	271	1.9%
Lower Northwest	50,799	29,376	6,035	4,329	8.50%	50,799	34,782	13,148	8,700	17.1%	4,371	101.0%
North Delaware	100,631	66,903	35,622	27,373	27.20%	100,631	65,465	27,145	20,078	20.0%	-7,295	-26.7%
Central Northeast	78,266	32,939	11,197	3,083	3.90%	78,266	35,549	20,528	6,783	8.7%	3,700	120.0%
Lower South	5,180	3,898	0	0	0.00%	5,180	4,285	0	0	0.0%	0	0.0%
Upper Far Northeast	66,605	48,184	8,478	3,020	4.50%	66,605	50,640	11,756	9,769	14.7%	6,749	223.5%
Lower Far Northeast	70,340	47,066	0	0	0.00%	70,340	52,054	7,925	4,736	6.7%	4,736	0.0%
West Park	43,454	29,734	28,581	22,705	52.30%	43,454	31,495	23,712	14,304	32.9%	-8,401	-37.0%
Upper Northwest	85,093	44,919	43,035	30,755	36.10%	85,093	47,342	39,972	21,050	24.7%	-9,705	-31.6%
West	105,642	34,922	91,966	33,705	31.90%	105,642	38,601	83,986	29,088	27.5%	-4,617	-13.7%

Definitions (see Technical Appendix for details)

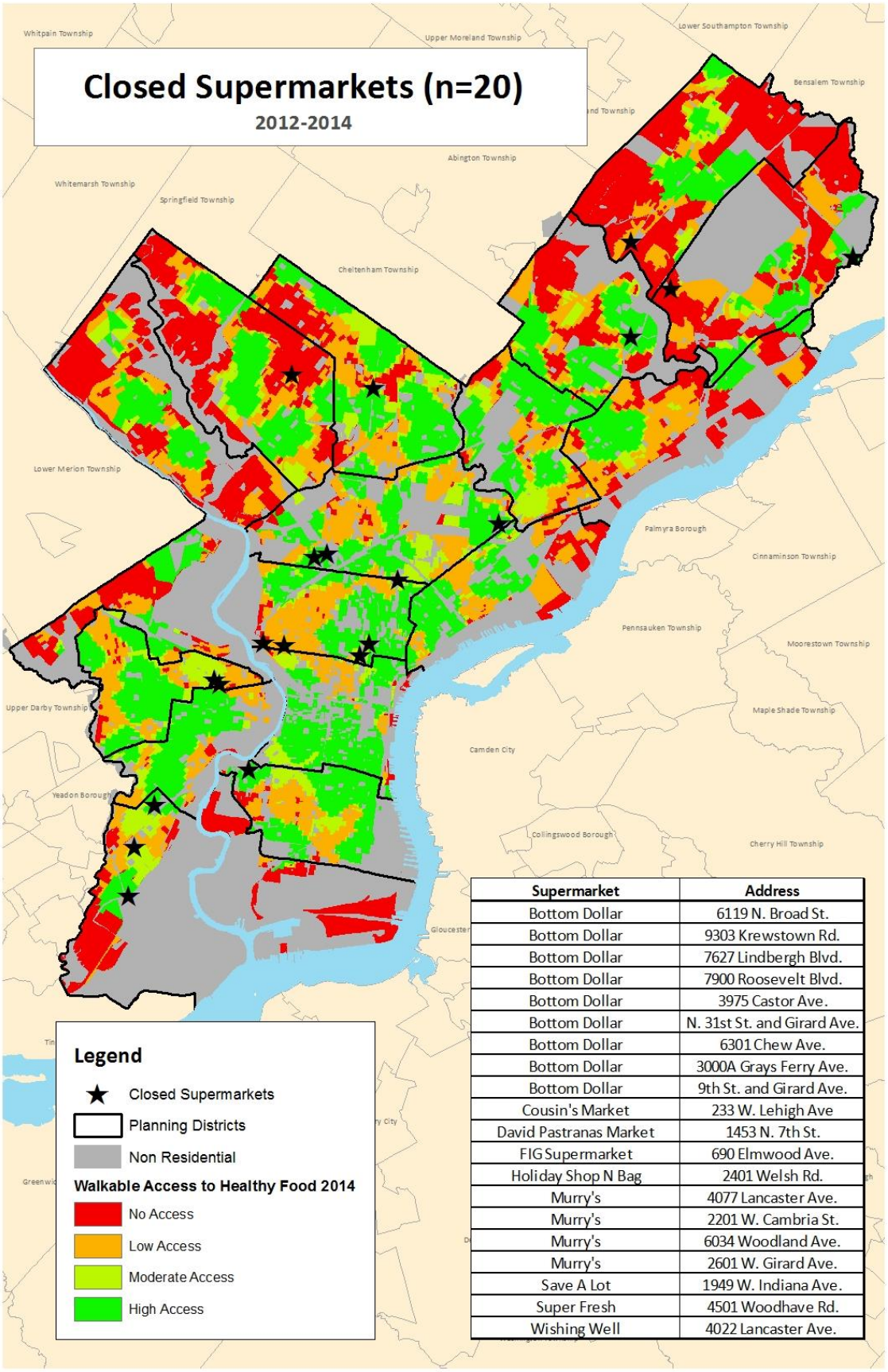
Low to no walkable access: *Low access* refers to an area, for example, without a small supermarket within 0.5 miles. *No access* refers to an area without even a corner store within 2 blocks. **High poverty:** Census block groups (as per 2010 U.S. Census boundaries) in which 20% or more of the households lived below 100% of the Federal Poverty Level (based on 2009-2013 American Community Survey of the U.S. Census).

Table 4: Low to no walkable access to healthy food and high poverty, 2010 and 2014

	2010					2014					2010 vs. 2014	
	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**	**24.10%**	**1,526,006**	**689,610**	**823,327**	**341,285**	**22.4%**	**-26,487**	**-7.2%**
North	137,849	49,067	137,904	49,067	35.60%	137,849	49,989	133,346	47,483	34.4%	-1,584	-3.2%
Lower North	95,777	30,075	95,777	30,075	31.40%	95,777	39,624	80,907	37,180	38.8%	7,105	23.6%
South	132,904	52,142	93,522	38,537	29.00%	132,904	53,490	65,616	30,675	23.1%	-7,862	-20.4%
Upper North	144,381	66,062	71,582	35,515	24.60%	144,381	59,243	87,247	28,909	20.0%	-6,606	-18.6%
Lower Northeast	100,232	44,277	61,239	26,788	26.70%	100,232	40,853	67,140	25,548	25.5%	-1,240	-4.6%
River Wards	68,489	34,606	37,386	20,863	30.50%	68,489	29,597	41,768	18,082	26.4%	-2,781	-13.3%
Central	117,132	29,127	37,591	15,567	13.30%	117,132	16,697	27,645	9,095	7.8%	-6,472	-41.6%
Lower Southwest	42,087	18,611	24,403	12,607	30.00%	42,087	20,632	28,415	15,242	36.2%	2,635	20.9%
University/ Southwest	81,145	15,697	76,592	15,693	19.30%	81,145	19,221	63,071	14,563	17.9%	-1,130	-7.2%
Lower Northwest	50,799	33,332	6,035	4,831	9.50%	50,799	34,782	13,148	8,700	17.1%	3,869	80.1%
North Delaware	100,631	67,936	35,622	27,574	27.40%	100,631	65,465	27,145	20,078	20.0%	-7,496	-27.2%
Central Northeast	78,266	34,223	11,197	3,223	4.10%	78,266	35,549	20,528	6,783	8.7%	3,560	110.5%
Lower South	5,180	3,898	0	0	0.00%	5,180	4,285	0	0	0.0%	0	0.0%
Upper Far Northeast	66,605	48,501	8,478	3,020	4.50%	66,605	50,640	11,756	9,769	14.7%	6,749	223.5%
Lower Far Northeast	70,340	48,122	0	0	0.00%	70,340	52,054	7,925	4,736	6.7%	4,736	*N/A
West Park	43,454	29,593	28,581	22,564	51.90%	43,454	31,495	23,712	14,304	32.9%	-8,260	-36.6%
Upper Northwest	85,093	44,381	43,035	30,217	35.50%	85,093	47,342	39,972	21,050	24.7%	-9,167	-30.3%
West	105,642	32,908	91,966	31,629	29.90%	105,642	38,601	83,986	29,088	27.5%	-2,541	-8.0%

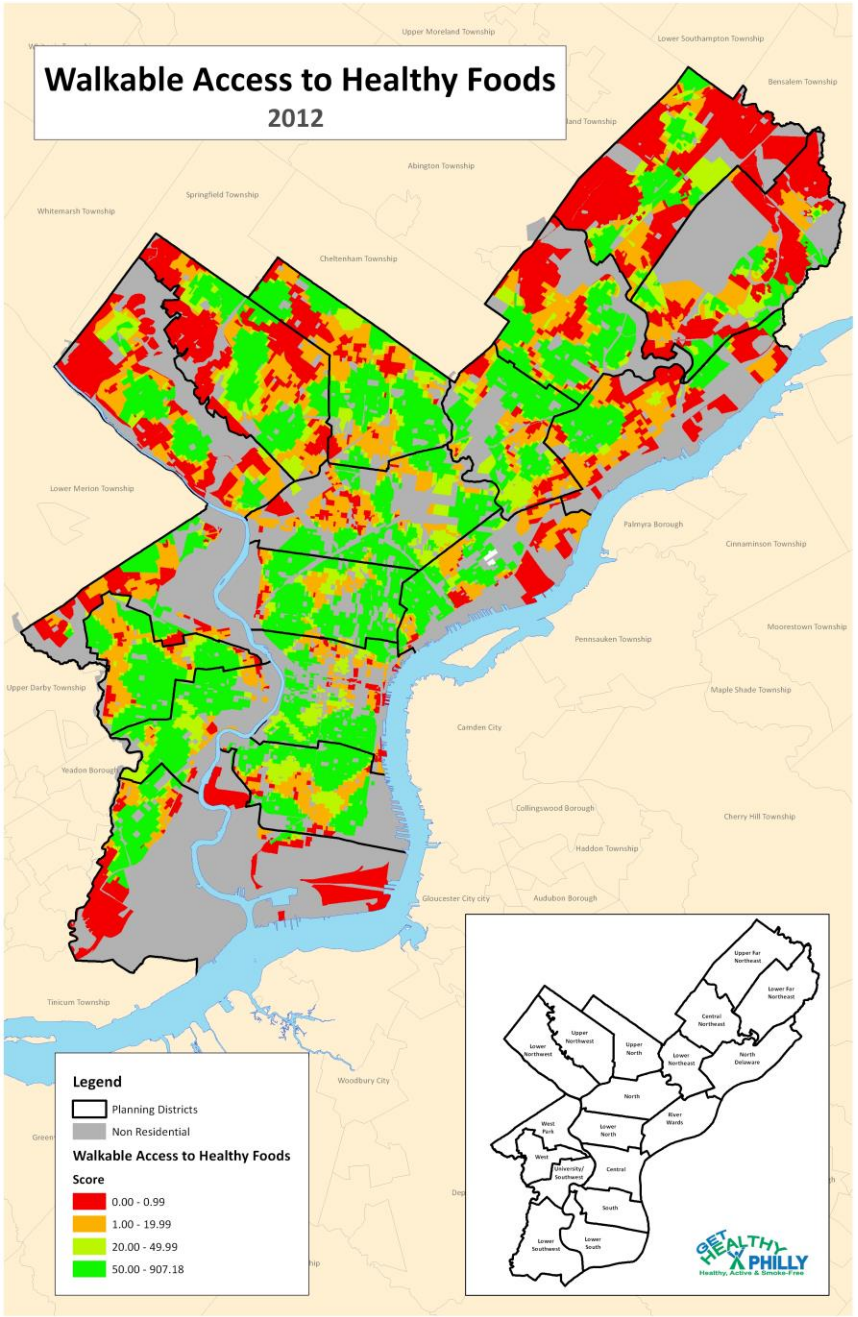
*Cannot calculate. LNA-HP value for 2010 is zero.

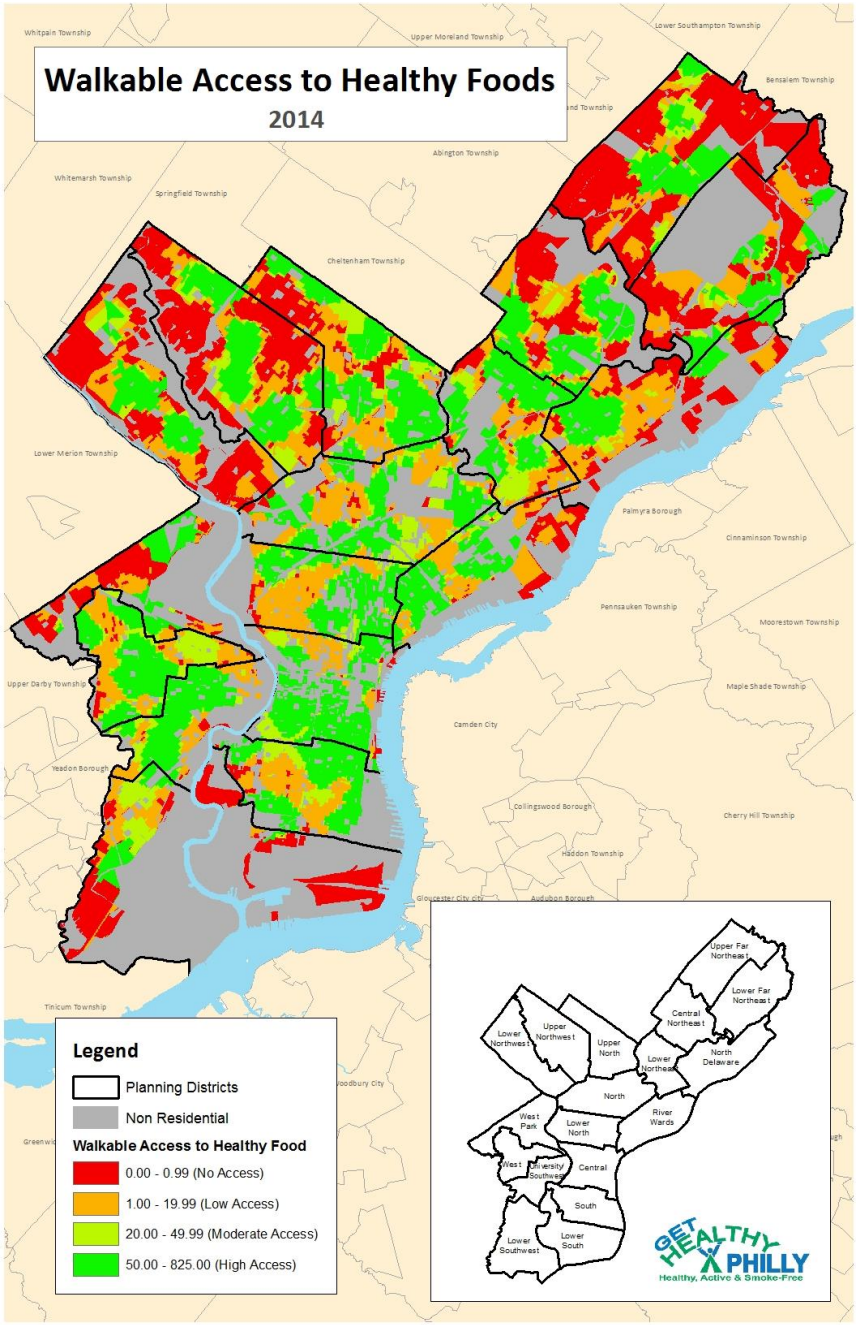
II. Supermarket Closing Map

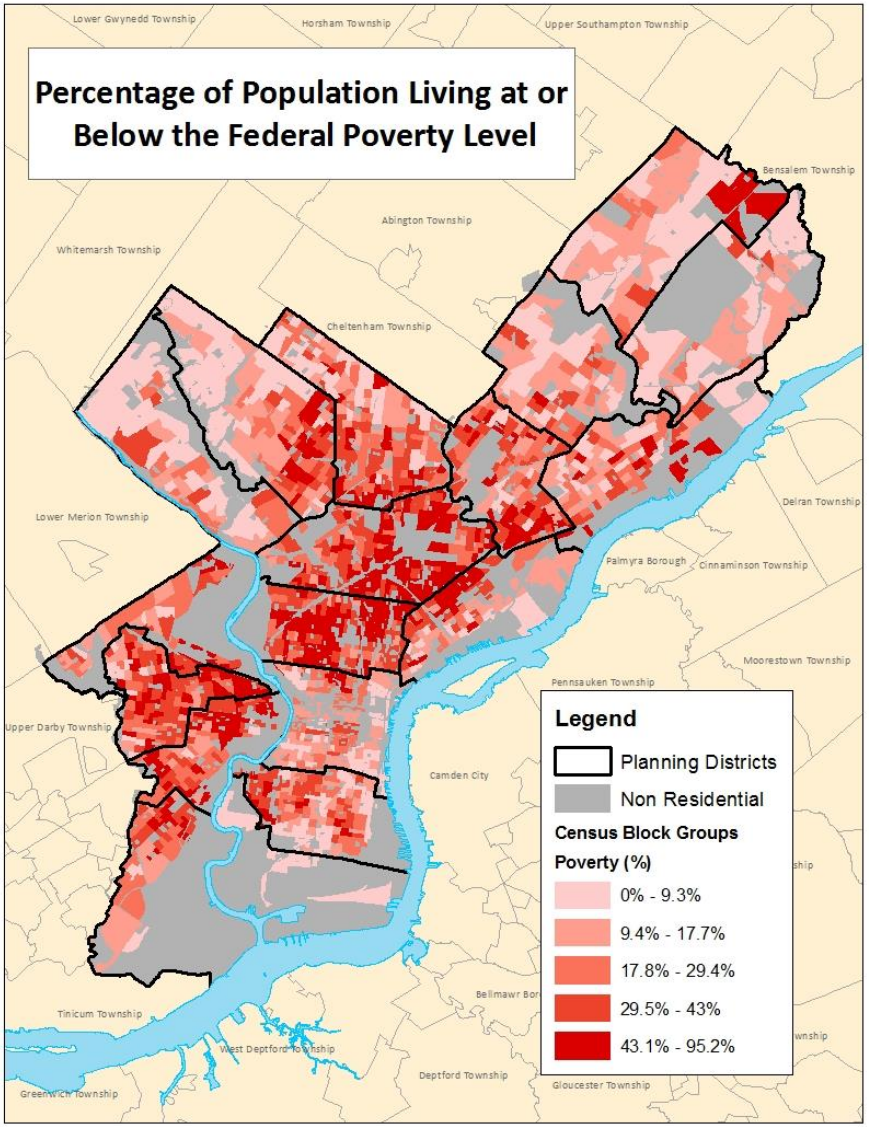


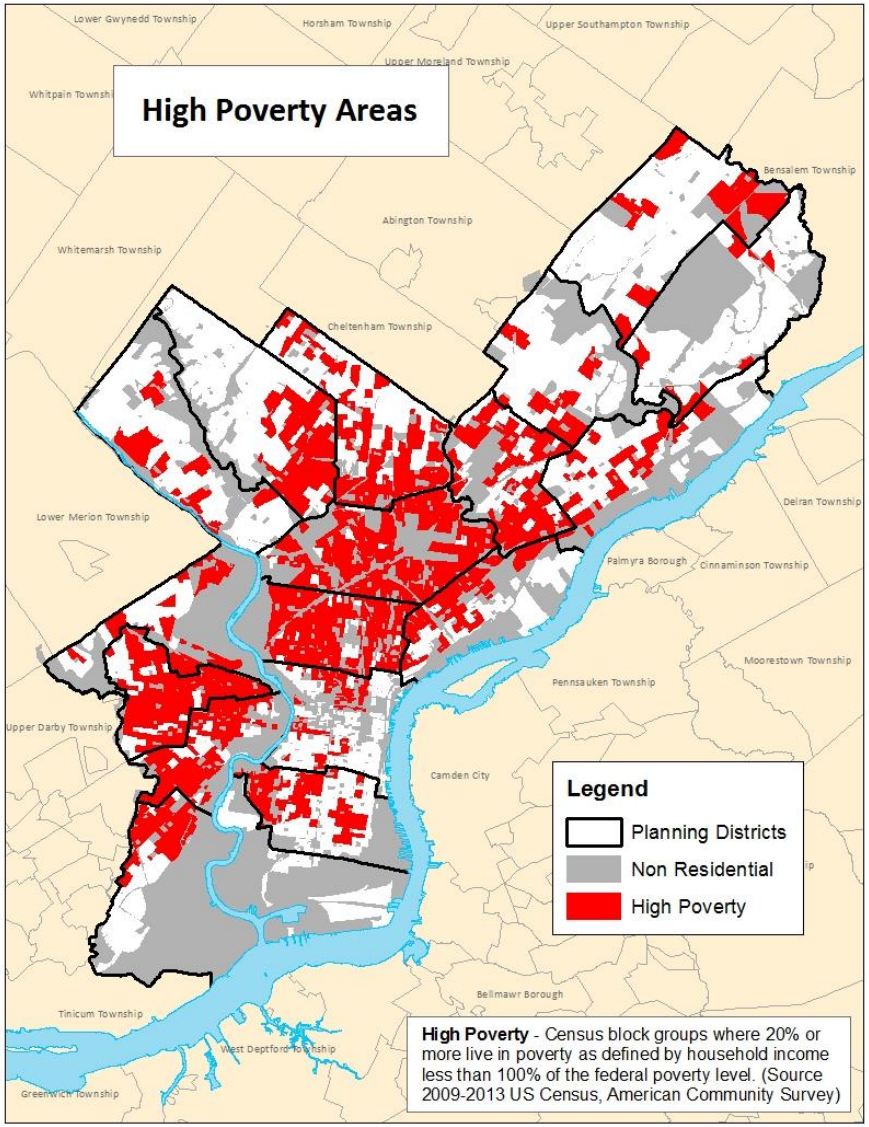
Supermarket	Address
Bottom Dollar	6119 N. Broad St.
Bottom Dollar	9303 Krewstown Rd.
Bottom Dollar	7627 Lindbergh Blvd.
Bottom Dollar	7900 Roosevelt Blvd.
Bottom Dollar	3975 Castor Ave.
Bottom Dollar	N. 31st St. and Girard Ave.
Bottom Dollar	6301 Chew Ave.
Bottom Dollar	3000A Grays Ferry Ave.
Bottom Dollar	9th St. and Girard Ave.
Cousin's Market	233 W. Lehigh Ave
David Pastranas Market	1453 N. 7th St.
FIG Supermarket	690 Elmwood Ave.
Holiday Shop N Bag	2401 Welsh Rd.
Murry's	4077 Lancaster Ave.
Murry's	2201 W. Cambria St.
Murry's	6034 Woodland Ave.
Murry's	2601 W. Girard Ave.
Save A Lot	1949 W. Indiana Ave.
Super Fresh	4501 Woodhave Rd.
Wishing Well	4022 Lancaster Ave.

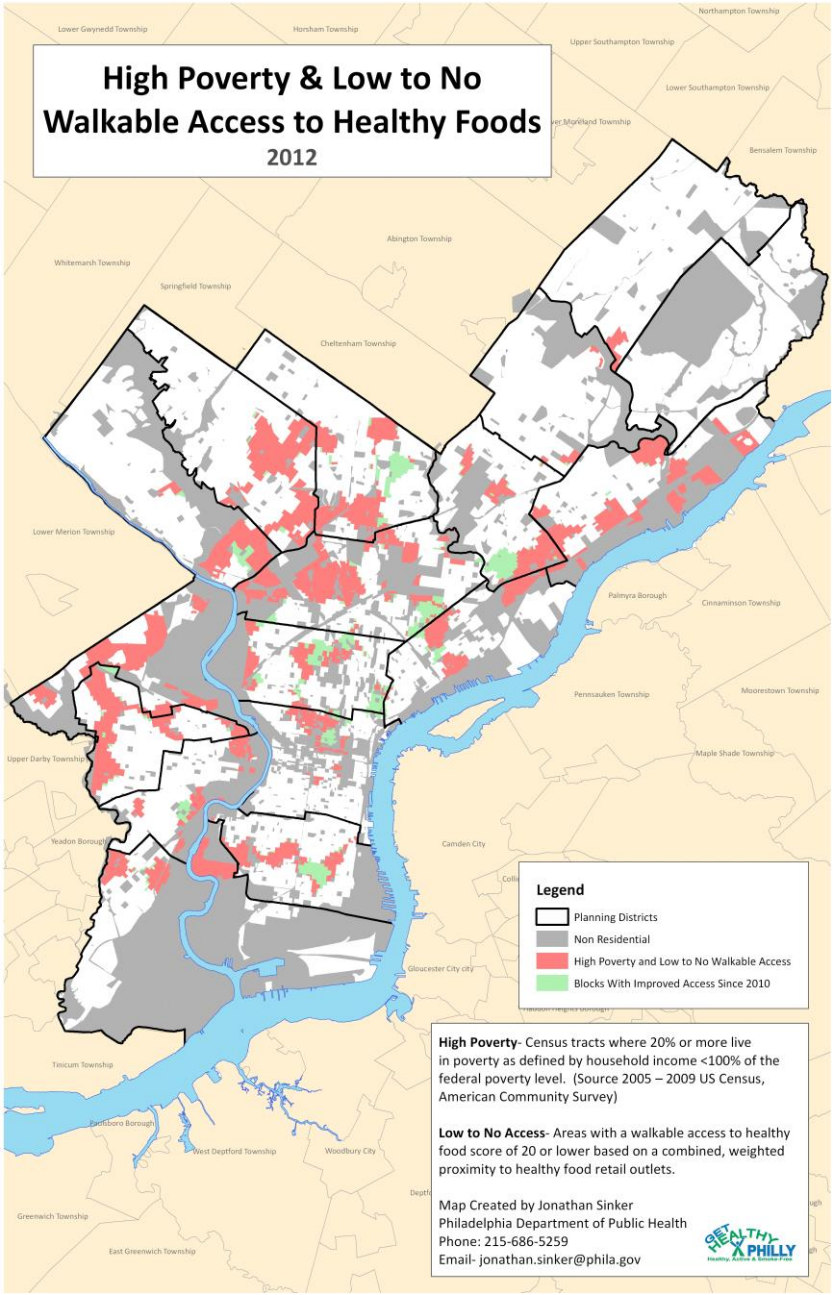
III. City Wide Maps

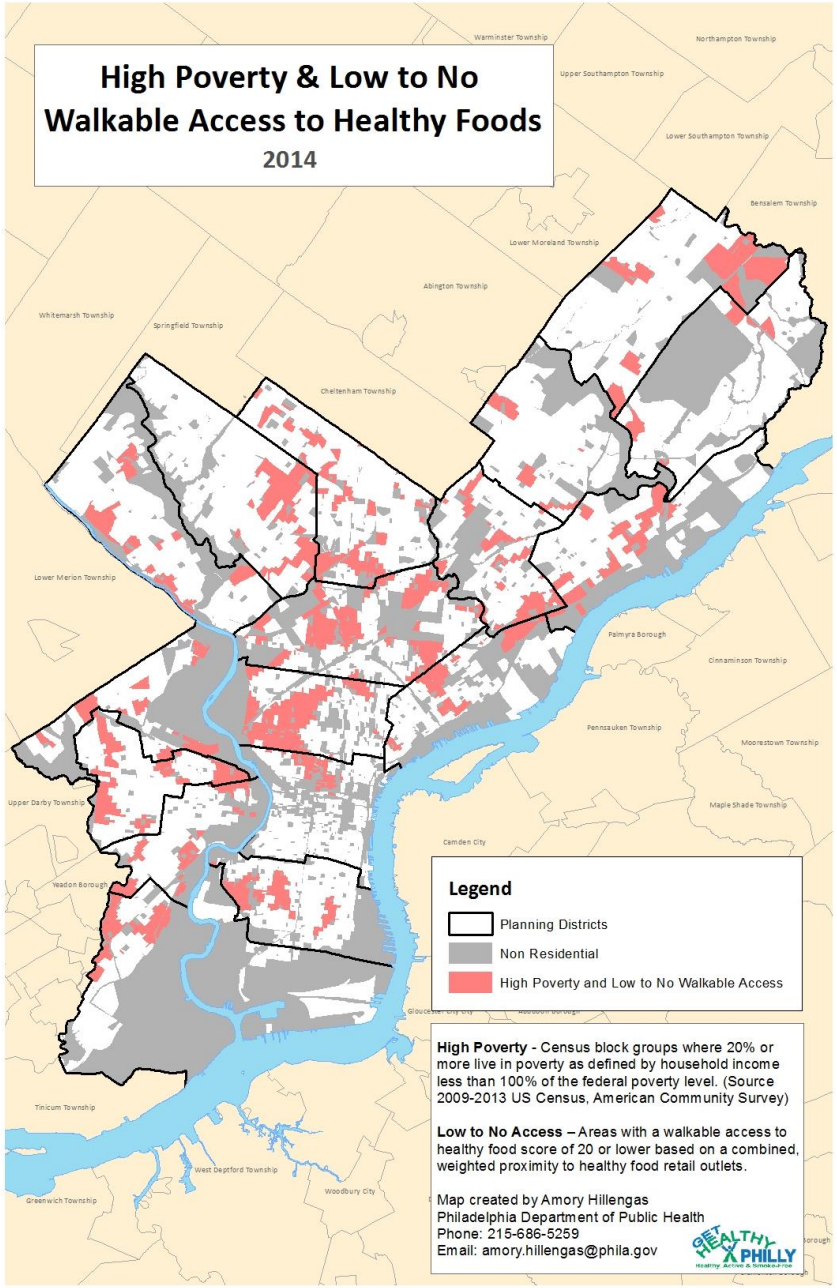

Walkable Access to Healthy Foods
2012
Legend
Planning Districts
Non Residential
Walkable Access to Healthy Foods
Score
0.00 - 0.99
1.00 - 19.99
20.00 - 49.99
50.00 - 907.18
GET HEALTHY PHILLY
Healthy, Active & Smoke-Free


Walkable Access to Healthy Foods
2014
Legend
Planning Districts
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
GET HEALTHY PHILLY
Healthy, Active & Smoke-Free

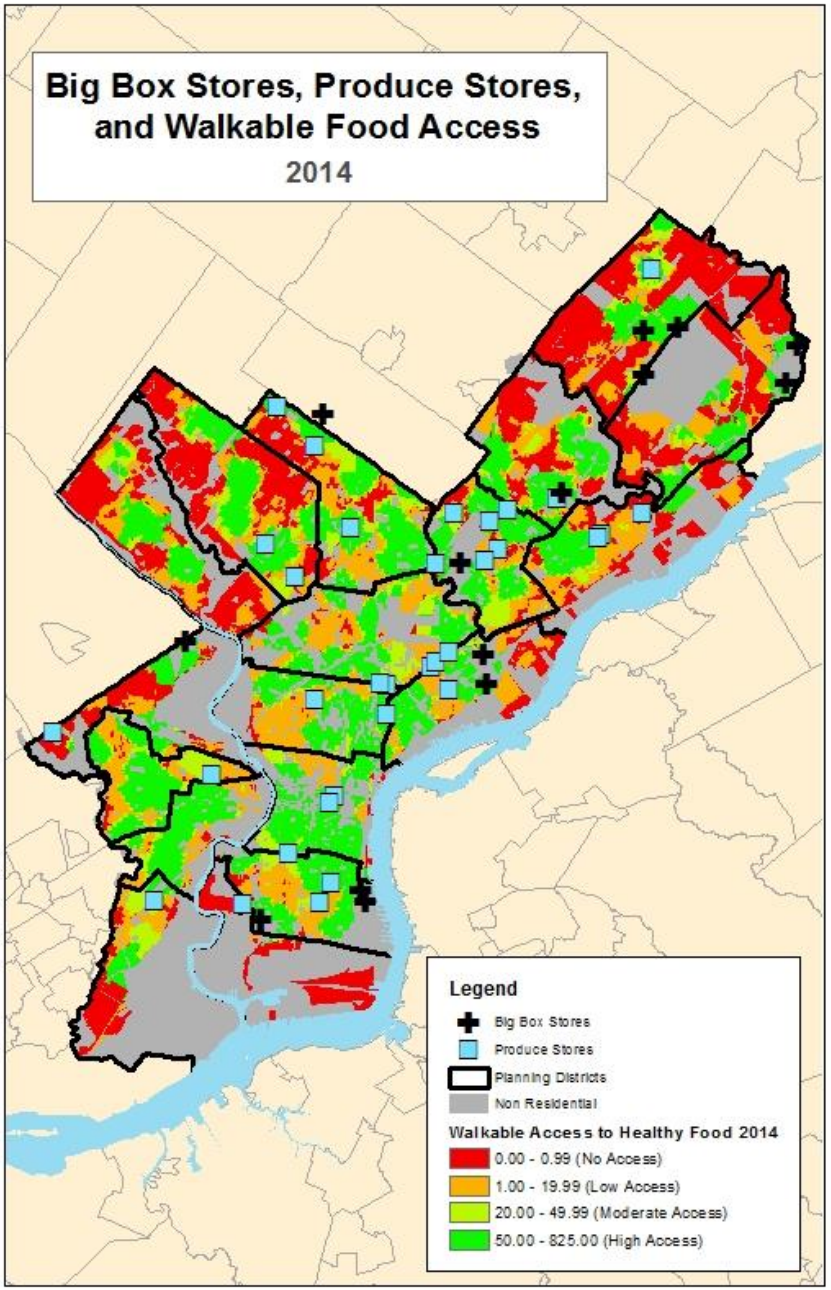

Percentage of Population Living at or Below the Federal Poverty Level
Lower Gwynedd Township
Horsham Township
Upper Southampton Township
Bensalem Township
Abington Township
Whitemarsh Township
Cheltenham Township
Lower Merion Township
Delran Township
Palmyra Borough
Cinnaminson Township
Moorestown Township
Pennsauken Township
Upper Darby Township
Camden City
Tinicum Township
Bellmawr Borough
West Deptford Township
Deptford Township
Gloucester Township
Greenwich Township
Legend
Planning Districts
Non Residential
Census Block Groups
Poverty (%)
0% - 9.3%
9.4% - 17.7%
17.8% - 29.4%
29.5% - 43%
43.1% - 95.2%

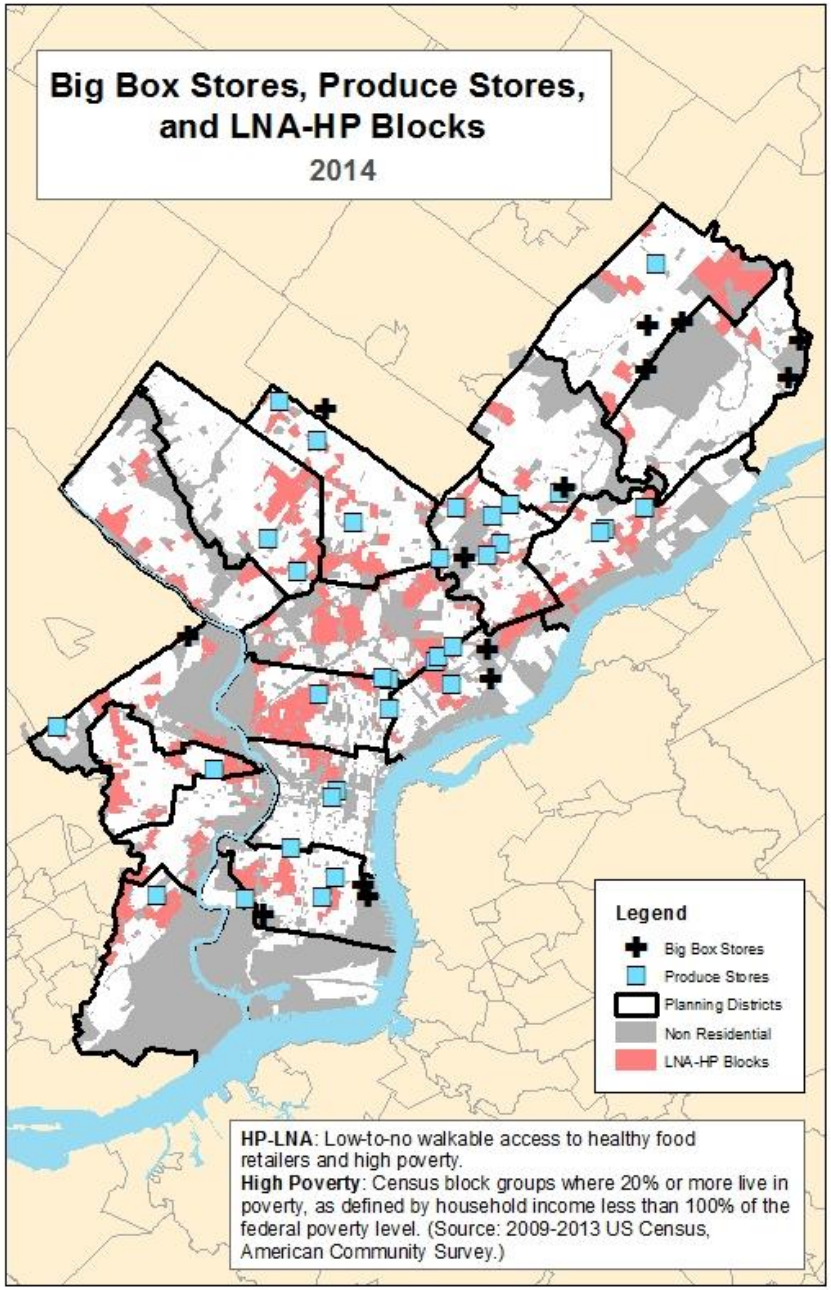

High Poverty Areas
Lower Gwynedd Township
Horsham Township
Upper Southampton Township
Upper Moreland Township
Whitpain Township
Bensalem Township
Abington Township
Whitemarsh Township
Cheltenham Township
Lower Merion Township
Delran Township
Palmyra Borough
Cinnaminson Township
Moorestown Township
Pennsauken Township
Upper Darby Township
Camden City
Tinicum Township
Bellmawr Borough
West Deptford Township
Greenwich Township
Legend
Planning Districts
Non Residential
High Poverty
High Poverty - Census block groups where 20% or more live in poverty as defined by household income less than 100% of the federal poverty level. (Source 2009-2013 US Census, American Community Survey)





Note: Improved blocks for 2014 were not assessed due to database transition issues.


Big Box Stores, Produce Stores, and Walkable Food Access
2014
Legend
Big Box Stores
Produce Stores
Planning Districts
Non Residential
Walkable Access to Healthy Food 2014
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)


Big Box Stores, Produce Stores, and LNA-HP Blocks
2014
Legend
Big Box Stores
Produce Stores
Planning Districts
Non Residential
LNA-HP Blocks
HP-LNA: Low-to-no walkable access to healthy food retailers and high poverty.
High Poverty: Census block groups where 20% or more live in poverty, as defined by household income less than 100% of the federal poverty level. (Source: 2009-2013 US Census, American Community Survey.)

IV. Planning District Maps

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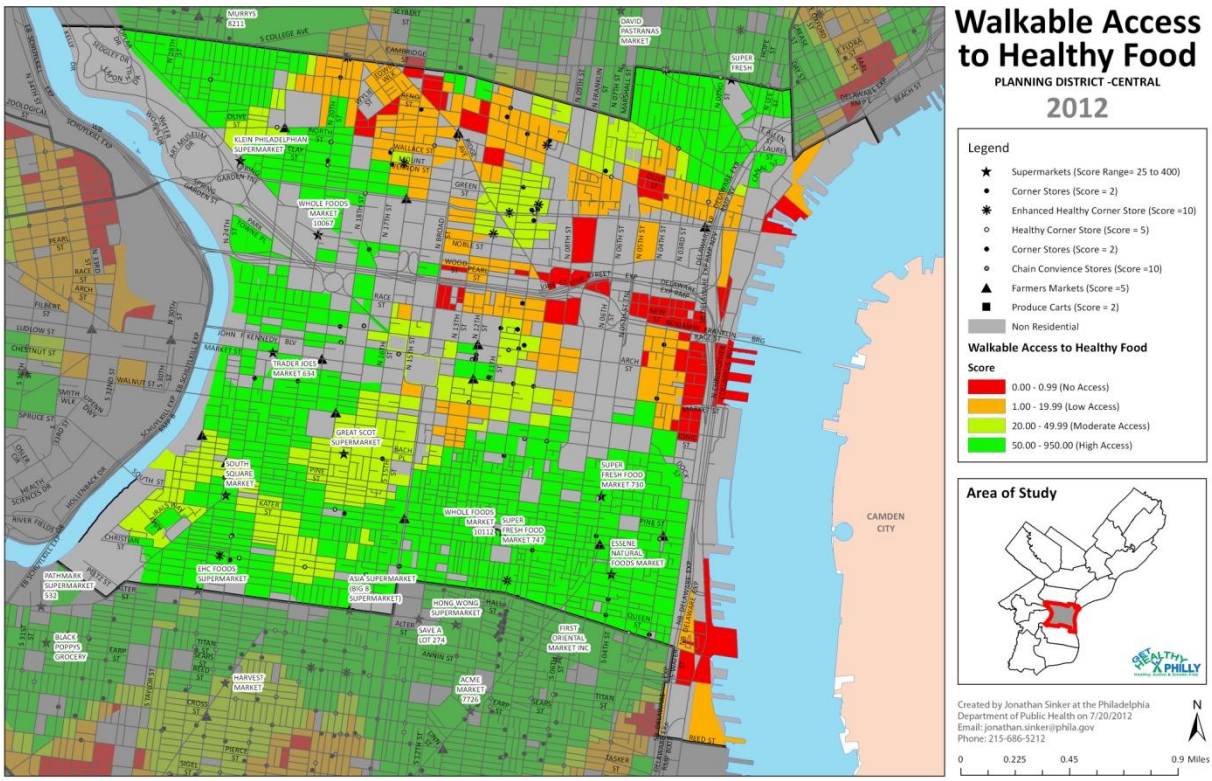
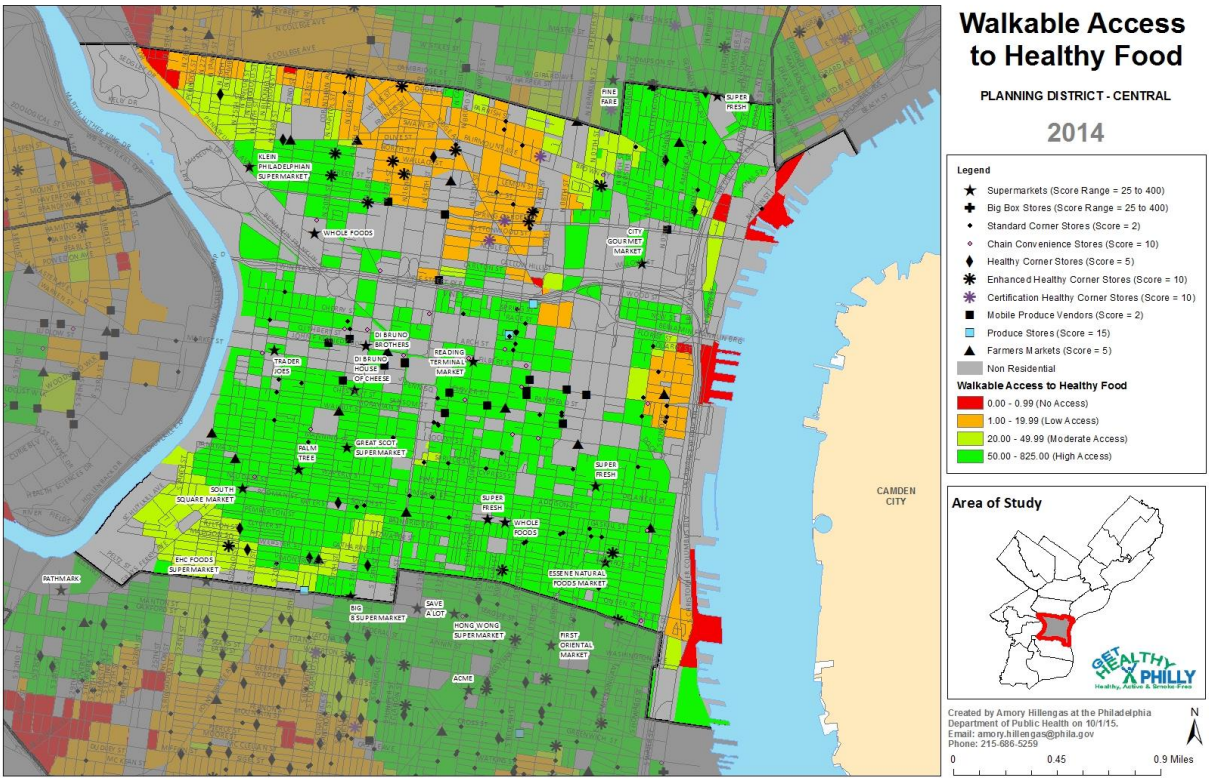
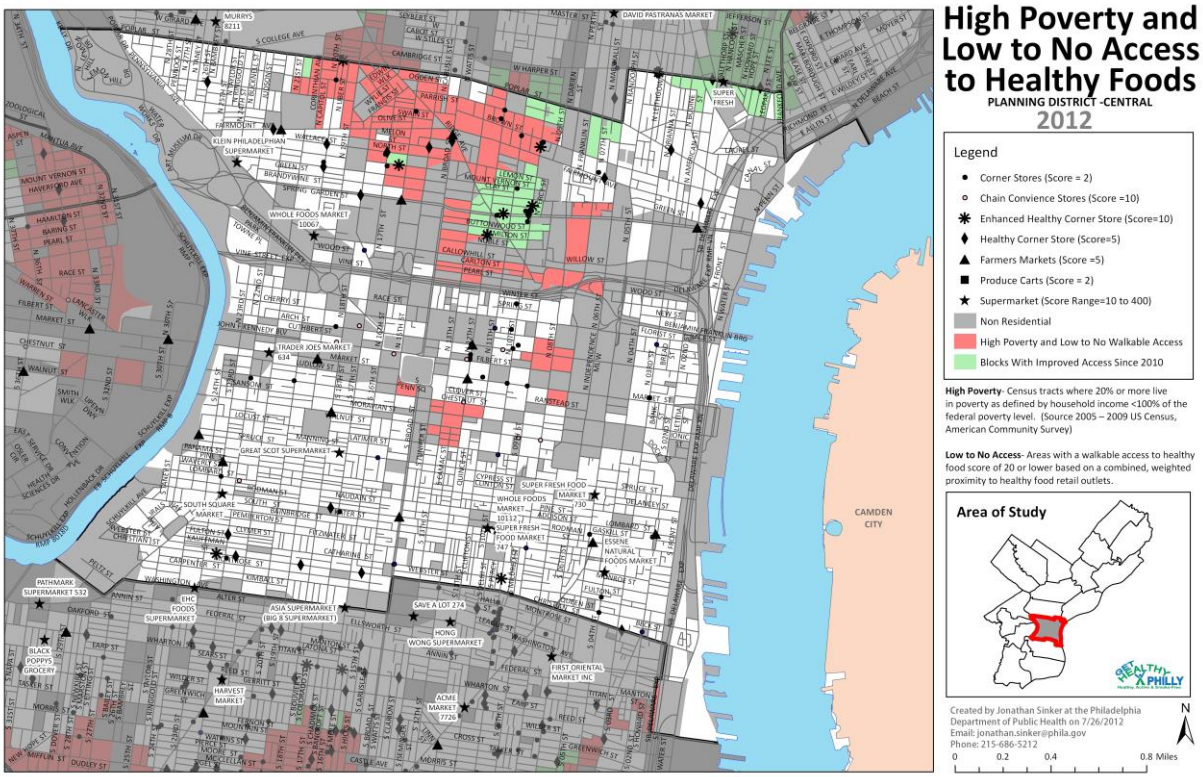
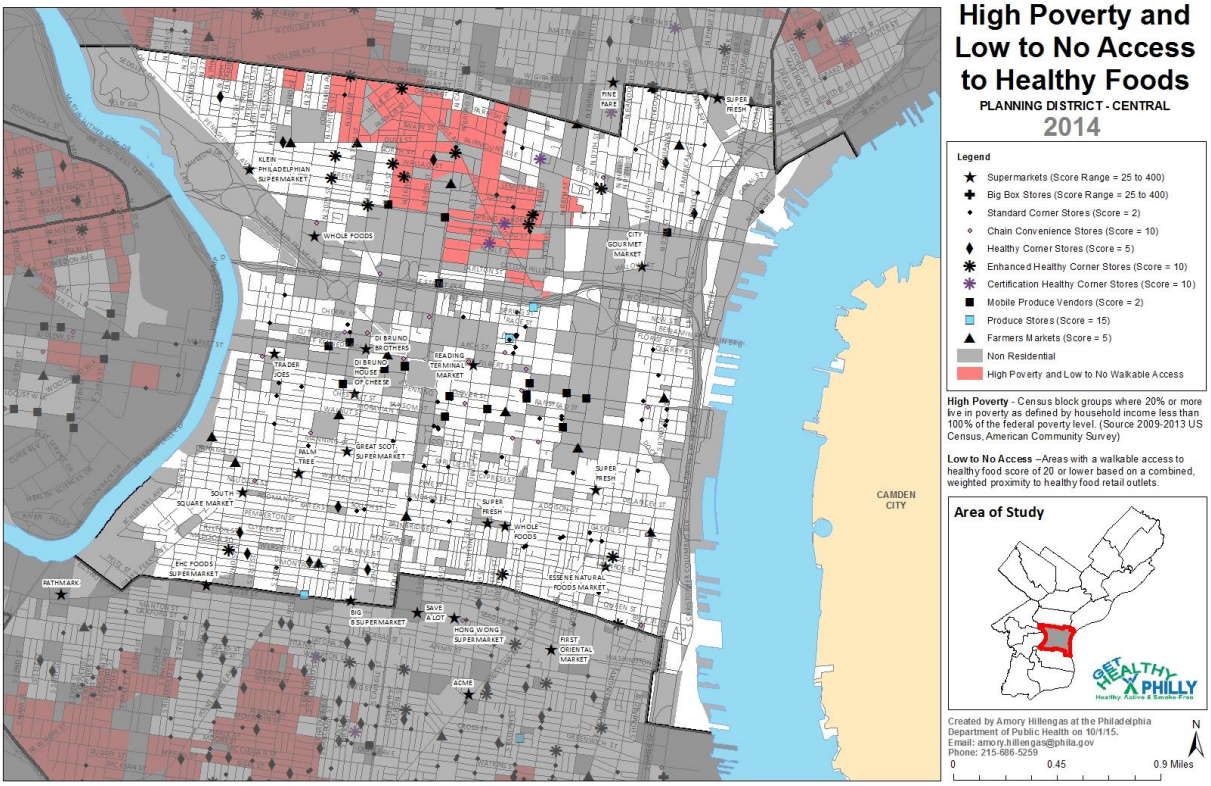
Central


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0
0.225
0.45
0.9 Miles
CAMDEN CITY


Walkable Access to Healthy Food
PLANNING DISTRICT - CENTRAL
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0
0.45
0.9 Miles
CAMDEN CITY

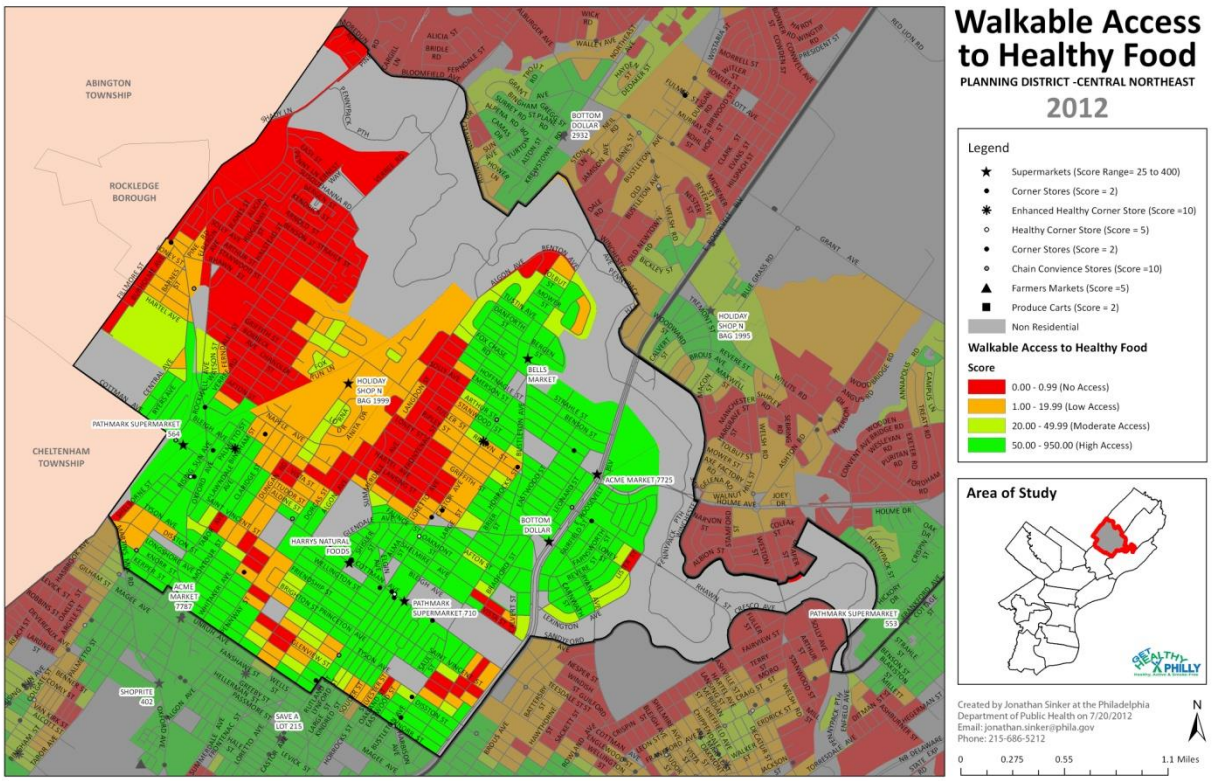
Central

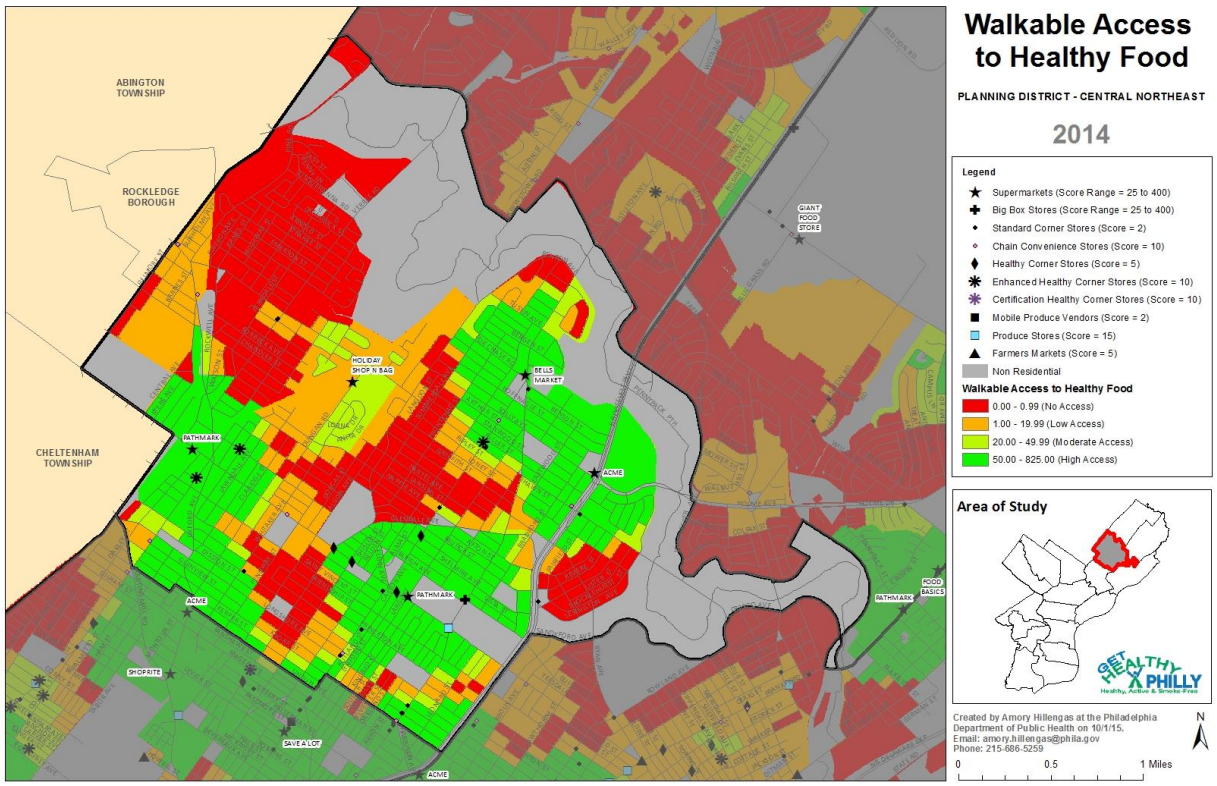




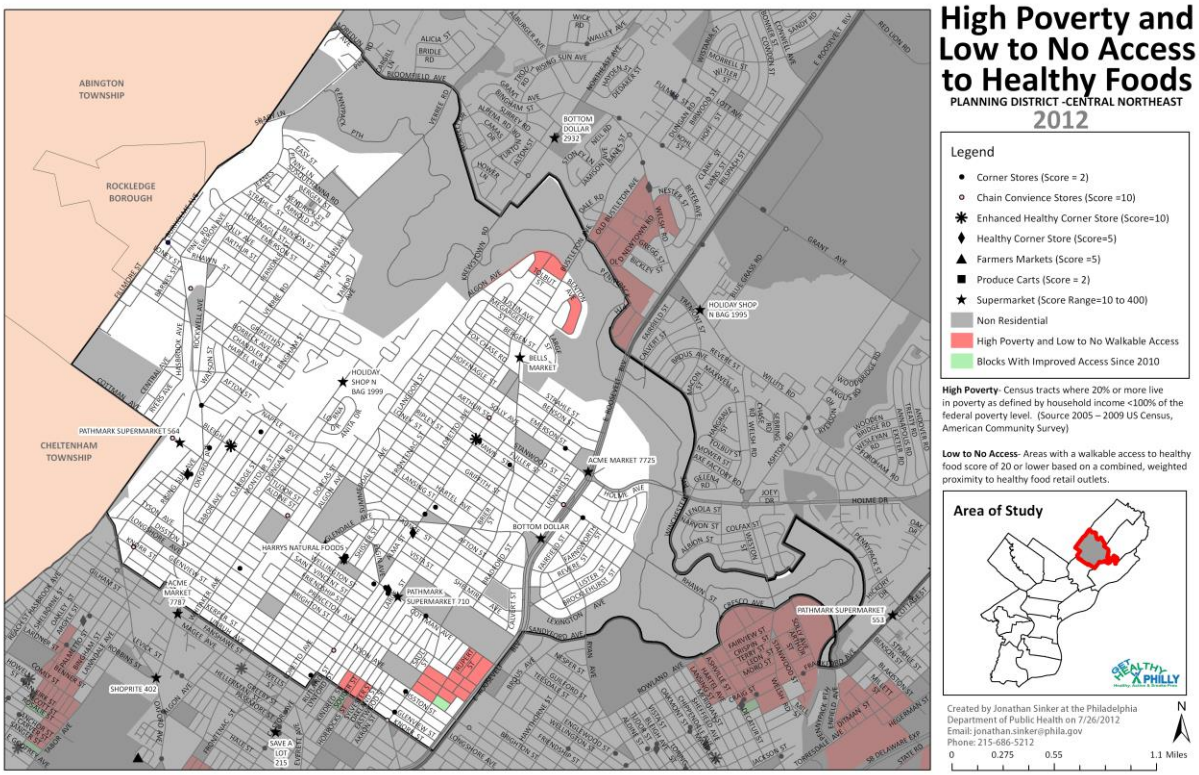
Note: Improved blocks for 2014 were not assessed due to database transition issues.

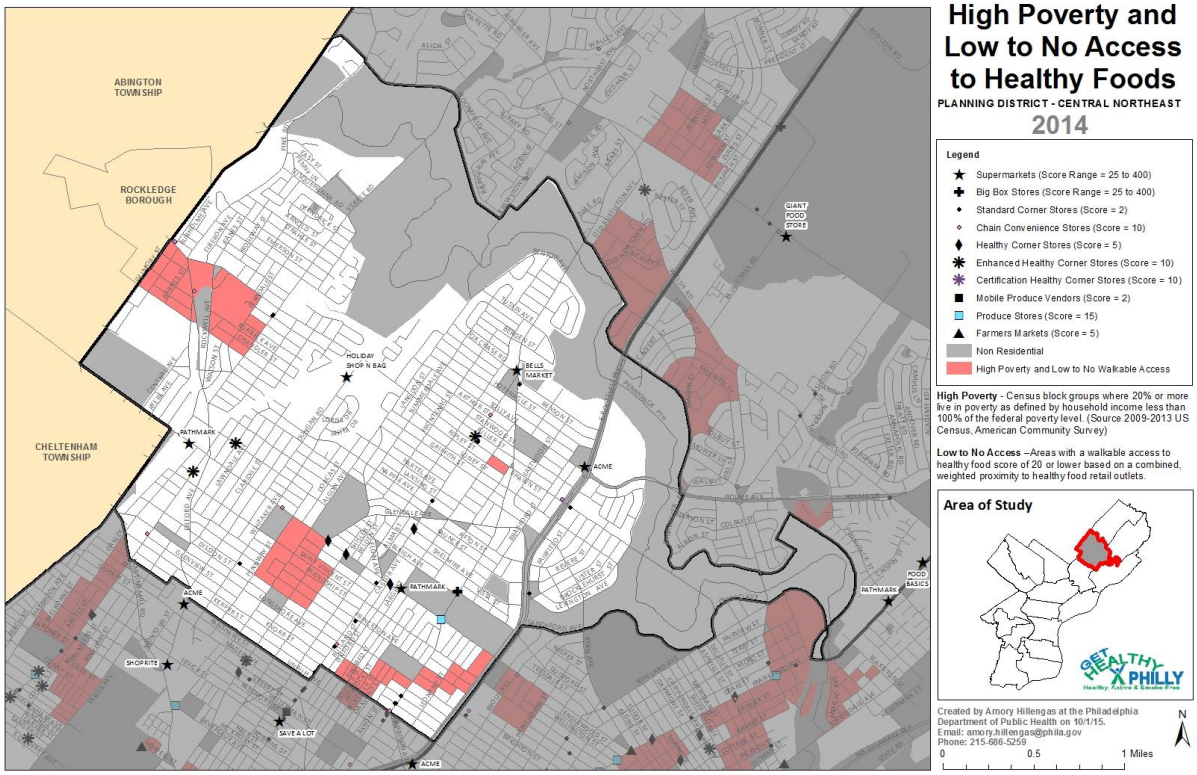
Central Northeast





Central Northeast





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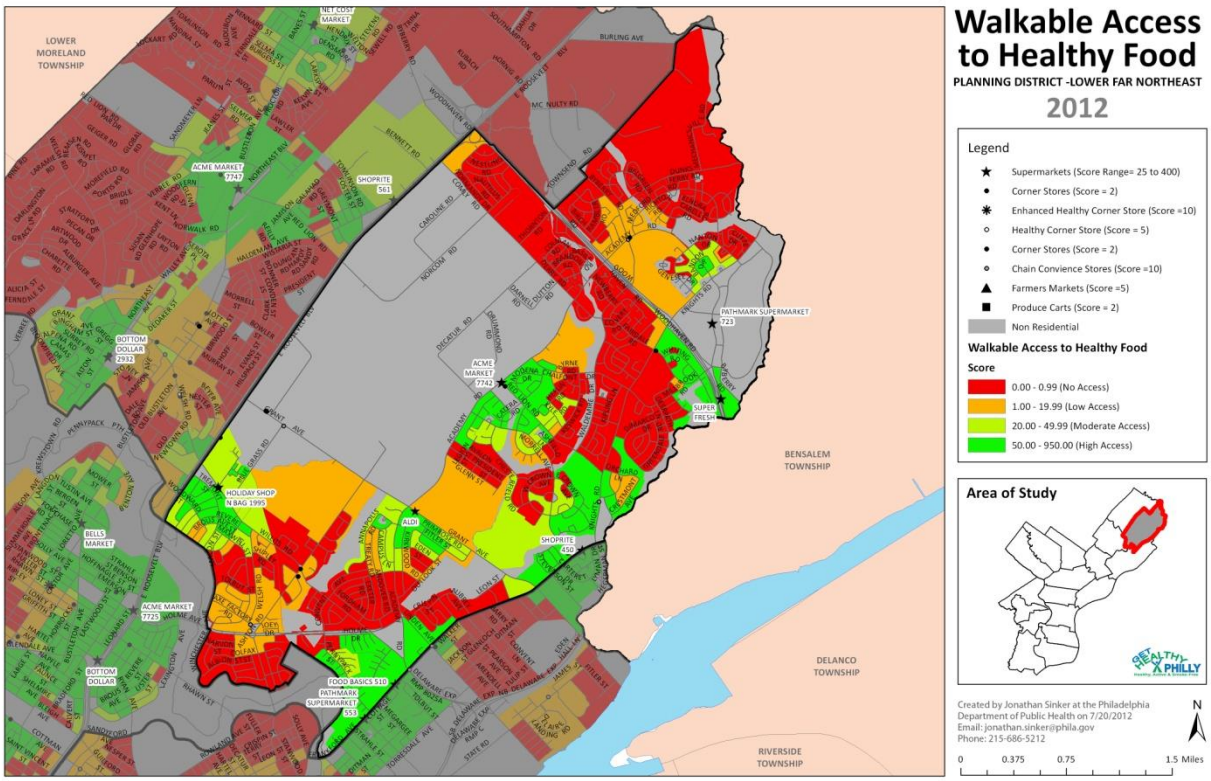
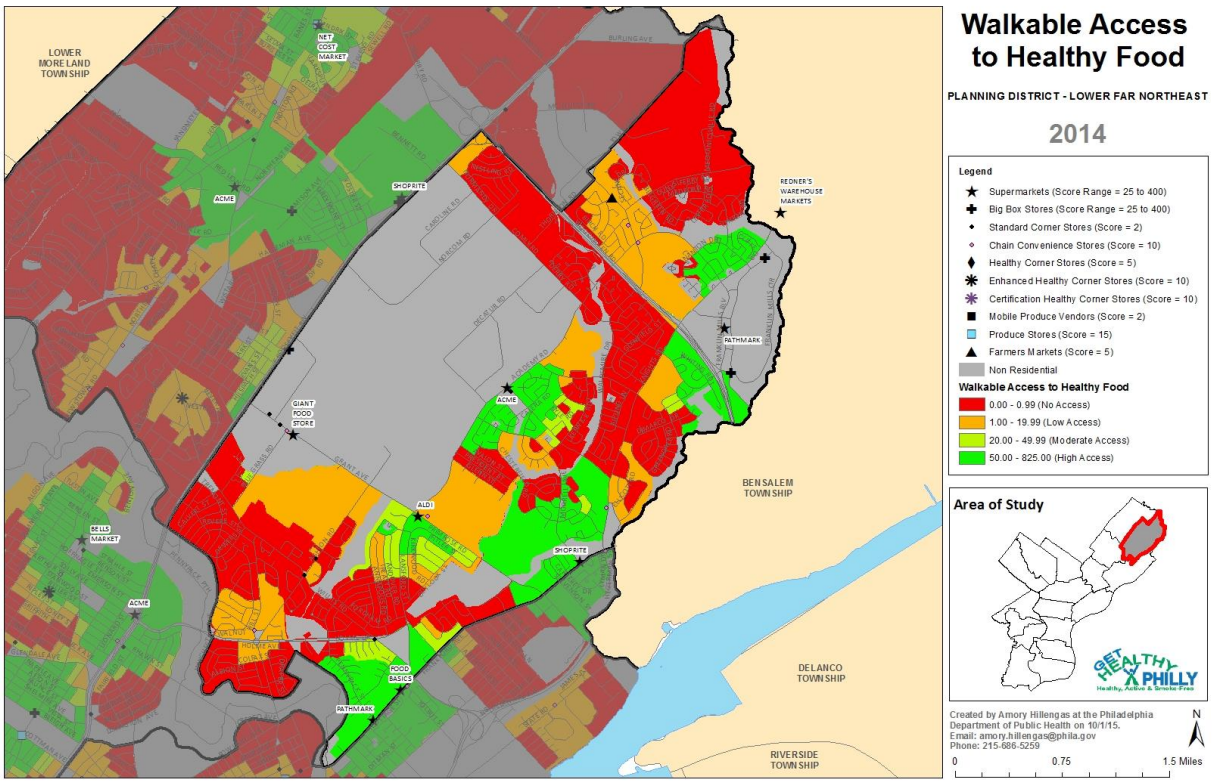
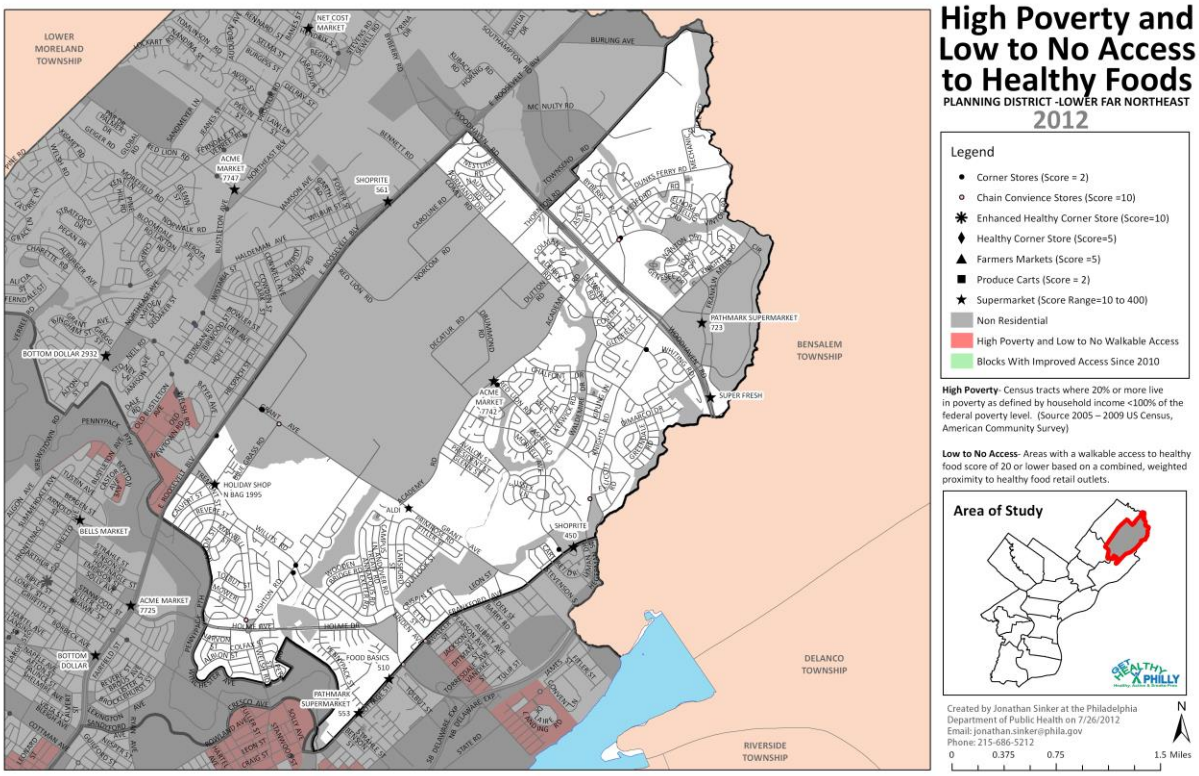
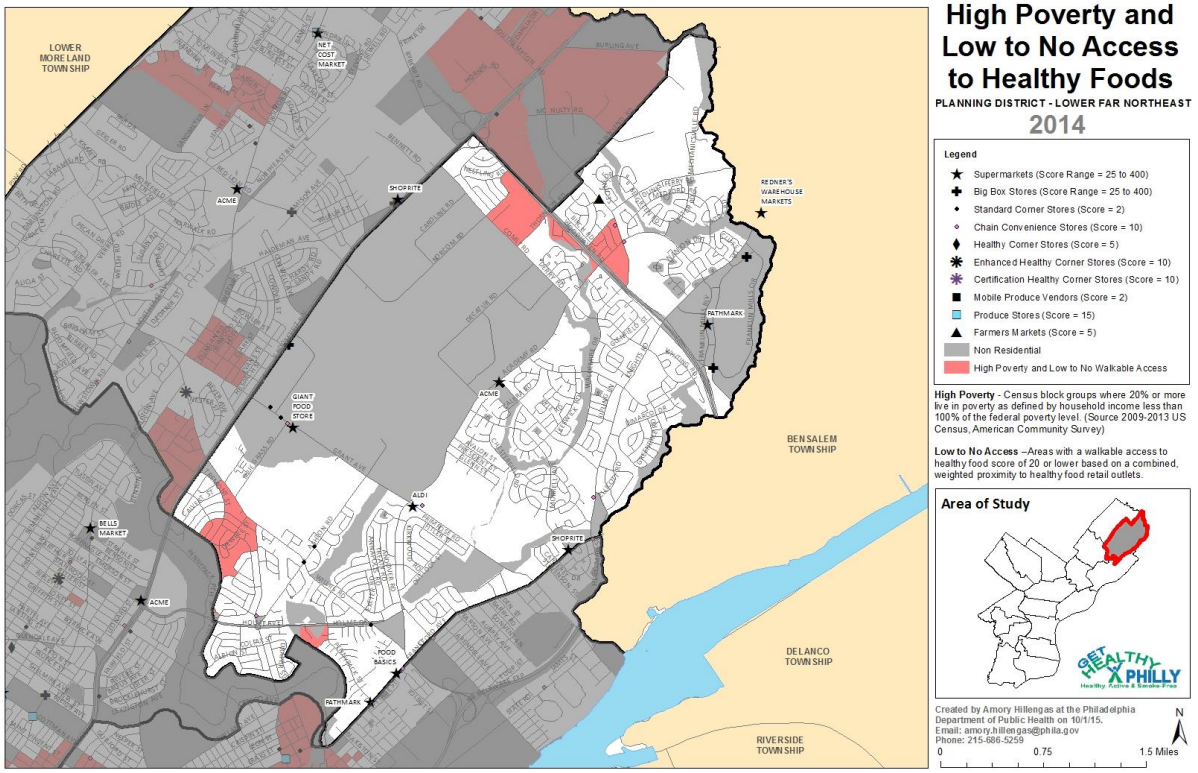
Lower Far Northeast





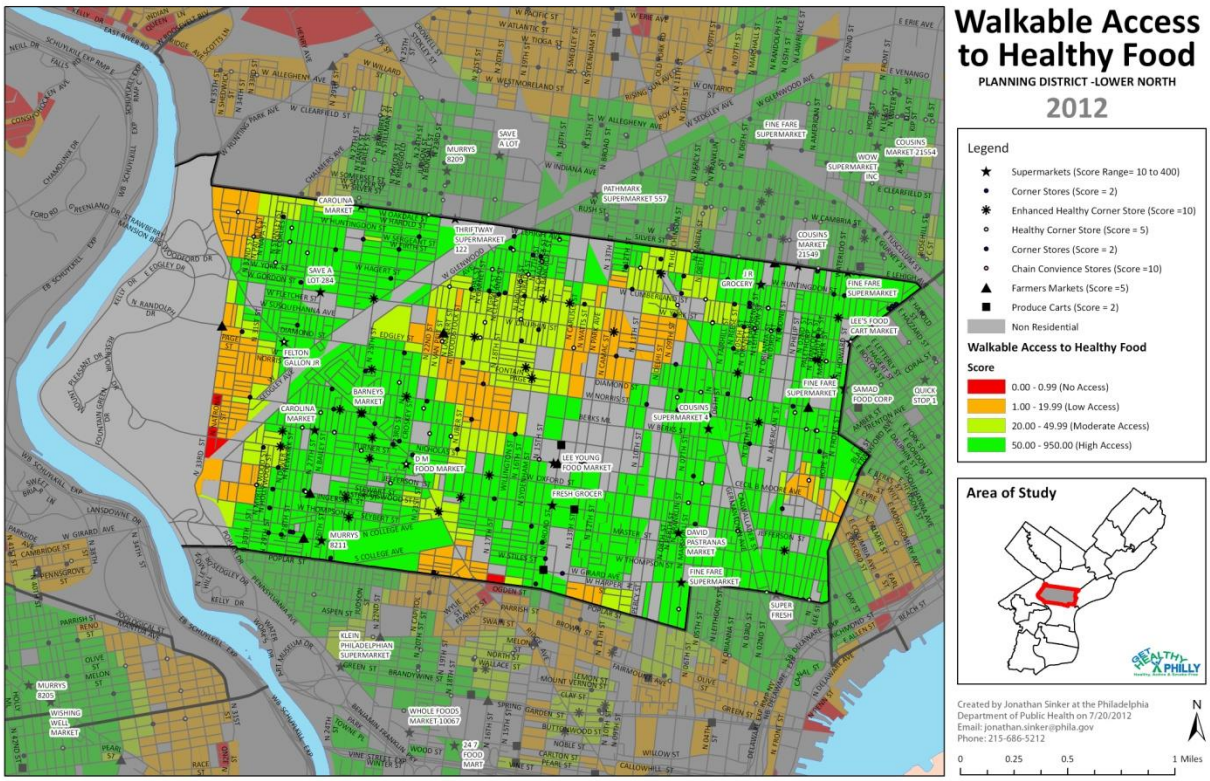
Lower Far Northeast

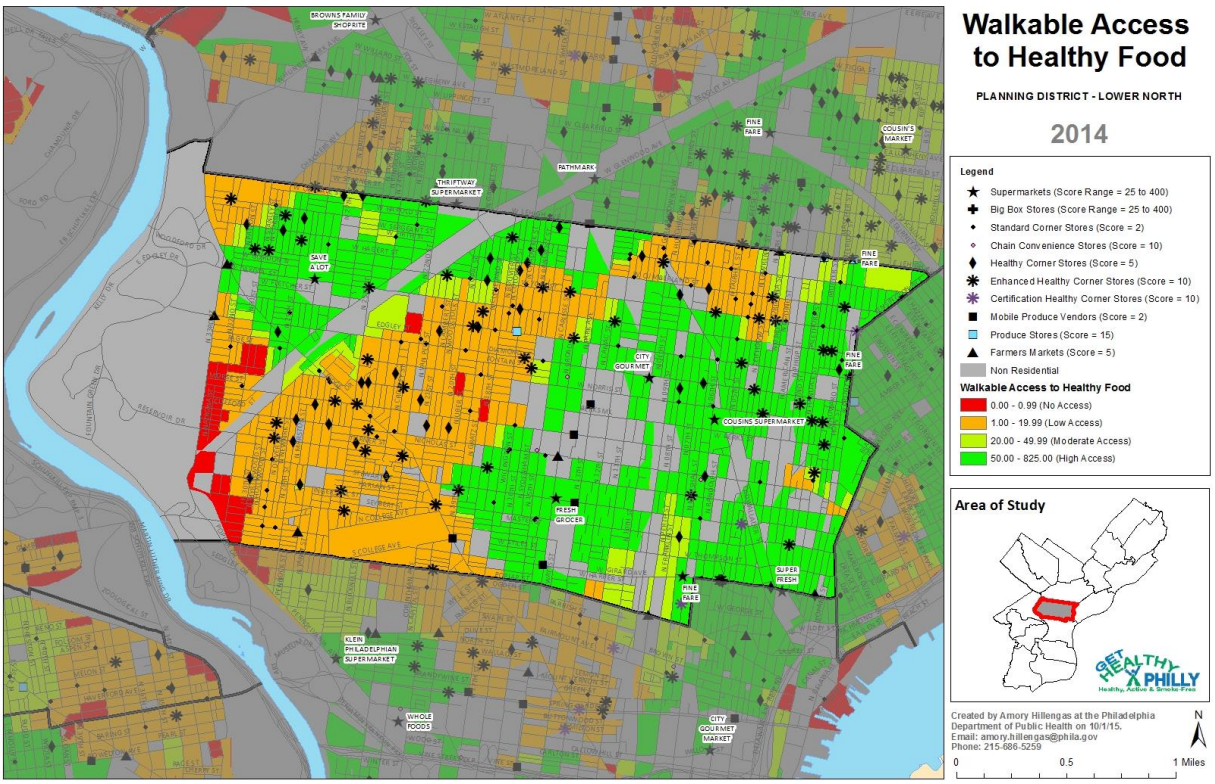




Note: Improved blocks for 2014 were not assessed due to database transition issues.

Lower North


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0
0.25
0.5
1 Miles


Walkable Access to Healthy Food
PLANNING DISTRICT - LOWER NORTH
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
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Area of Study
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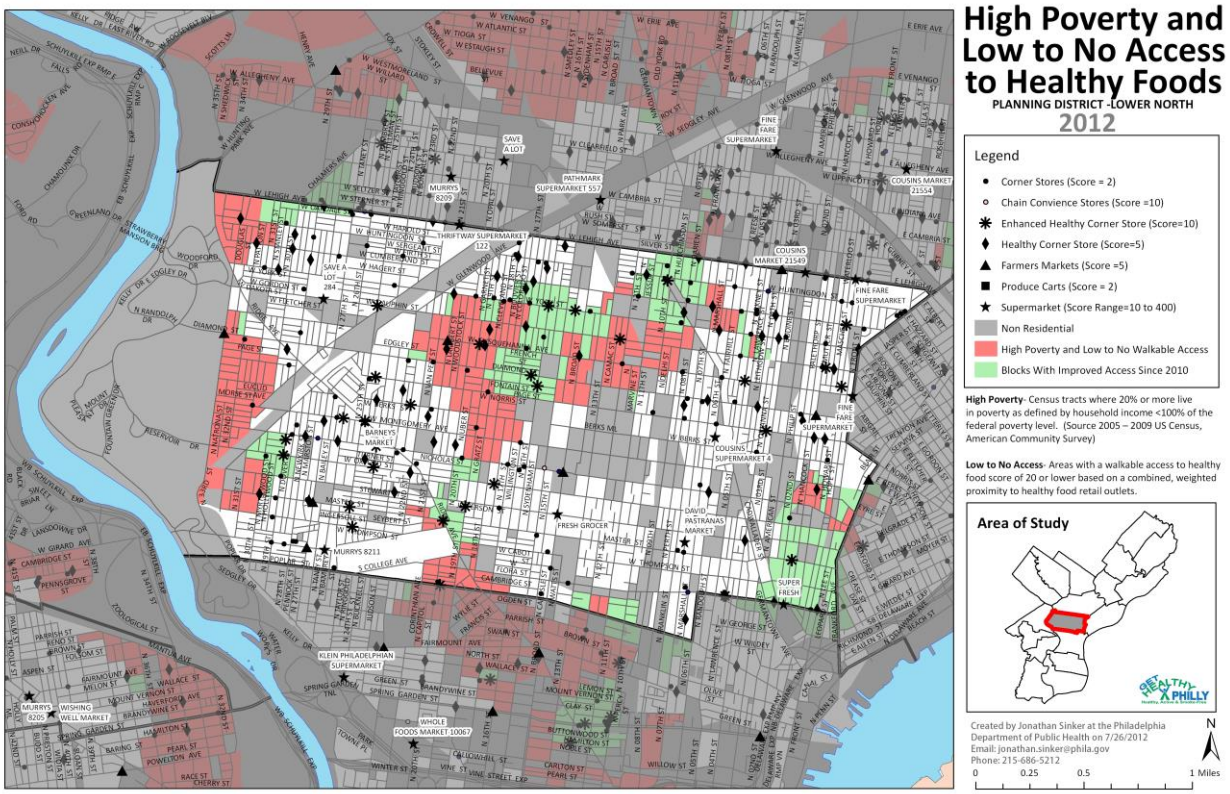
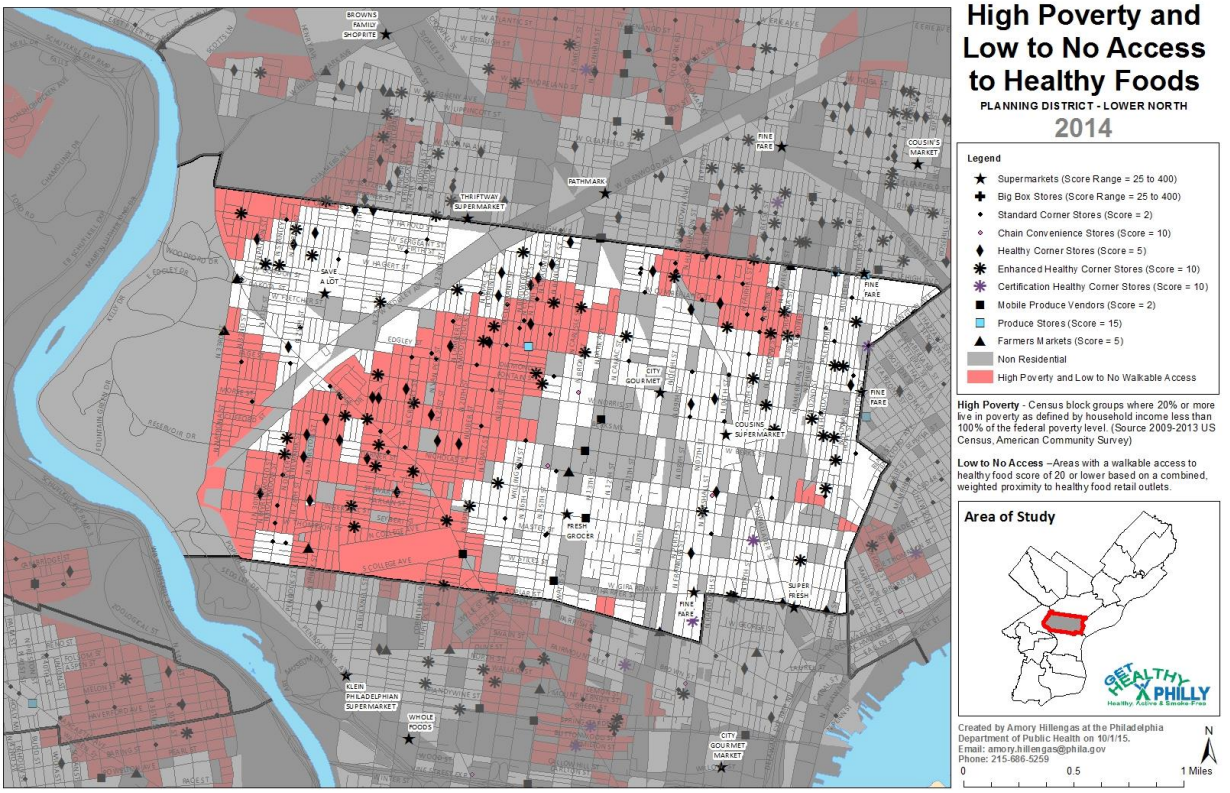
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0
0.5
1 Miles

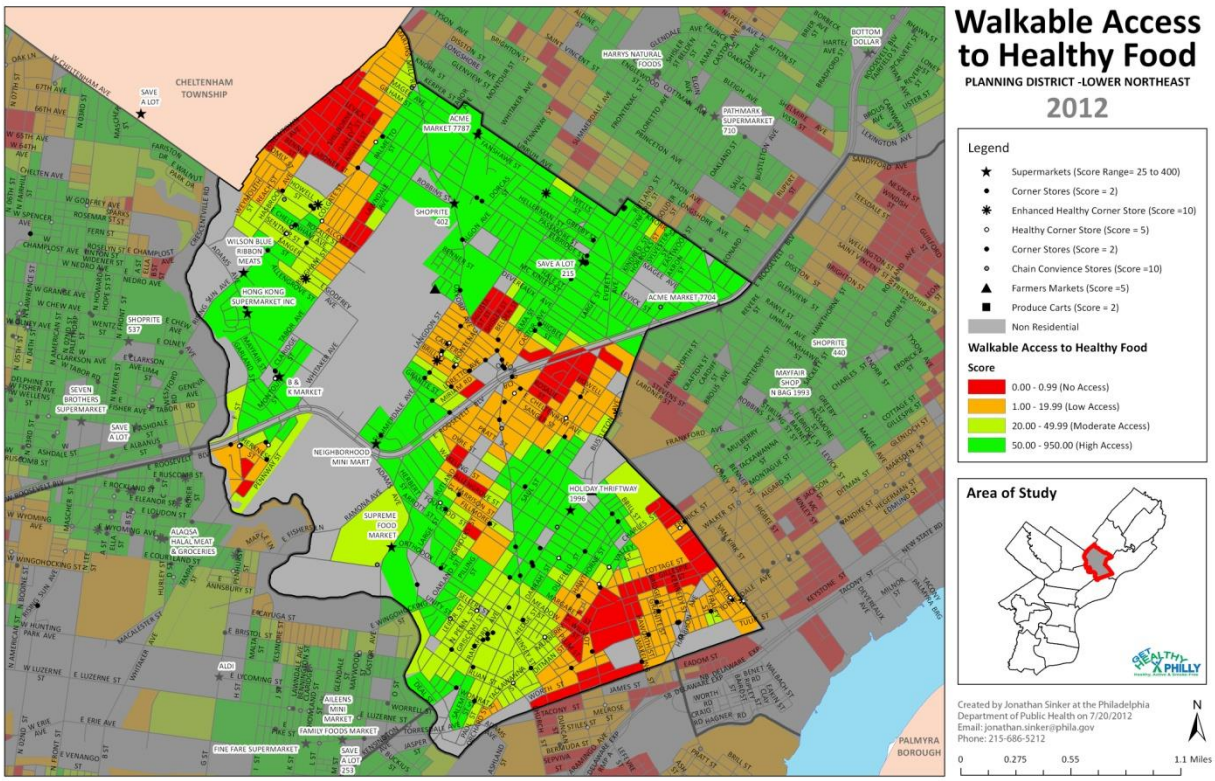
Lower North

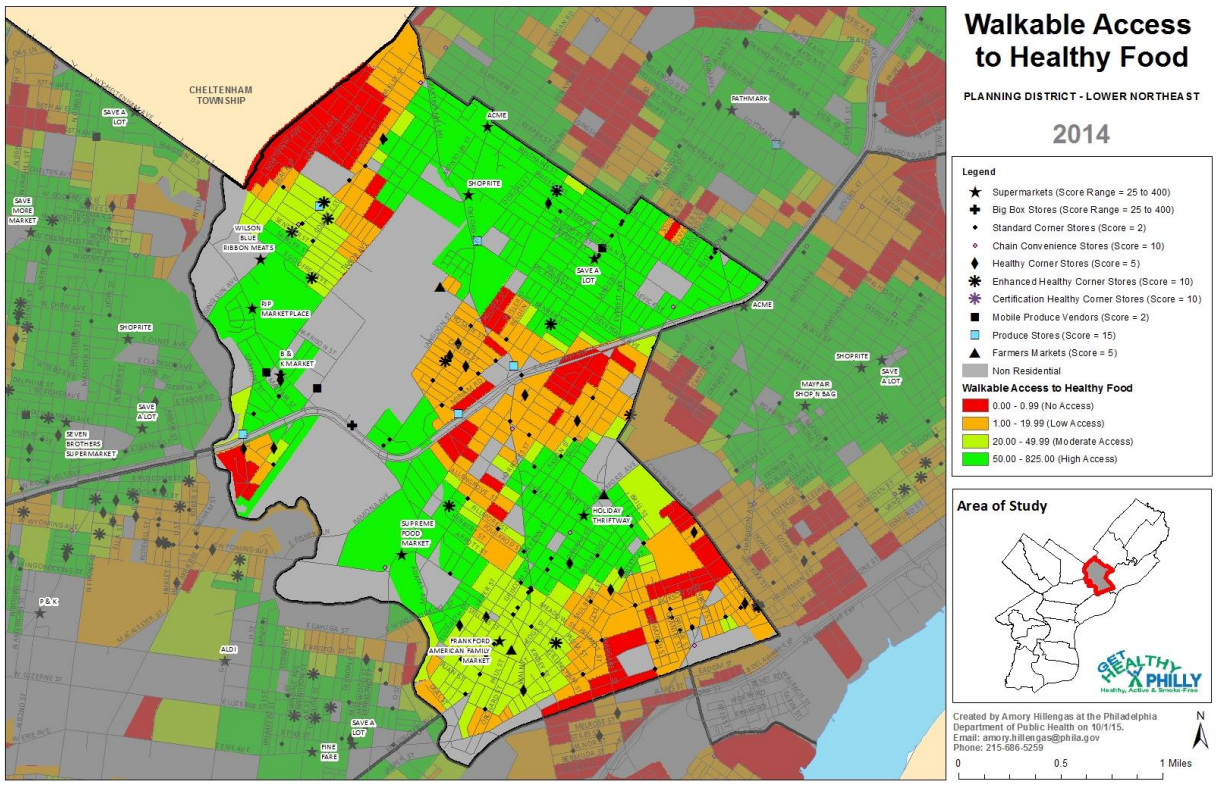




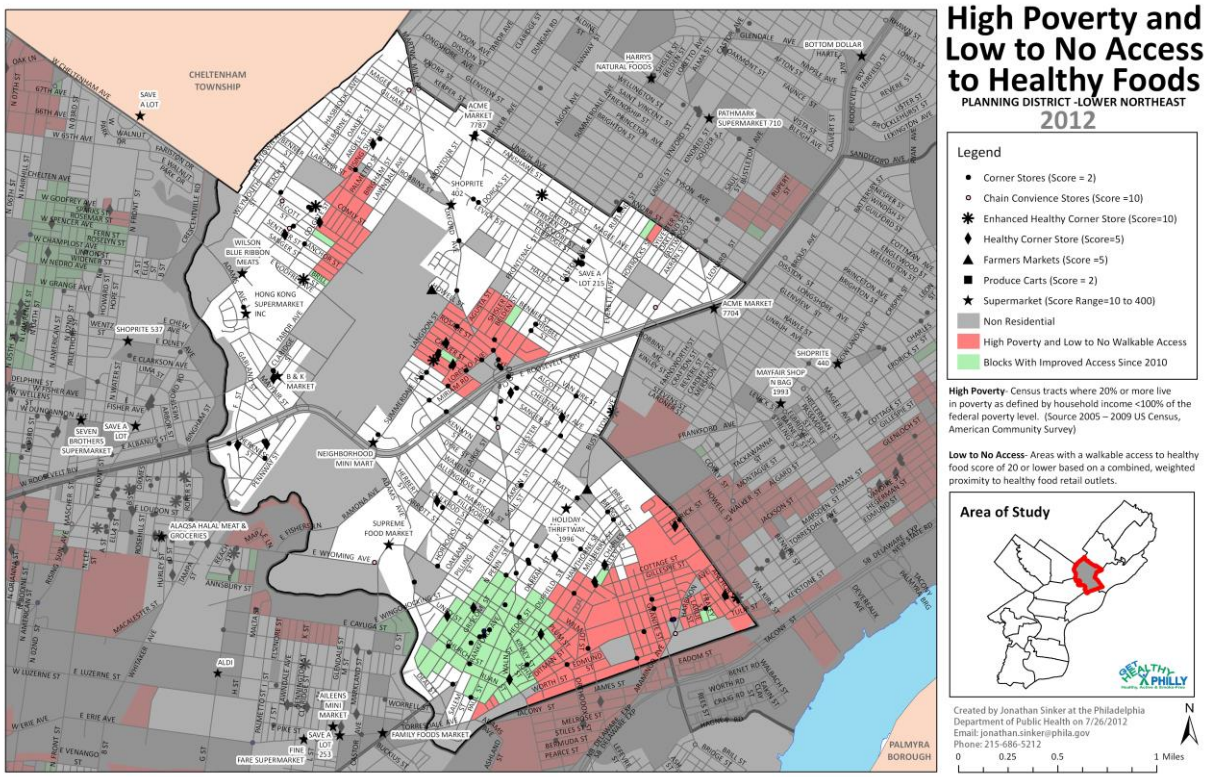
Note: Improved blocks for 2014 were not assessed due to database transition issues.

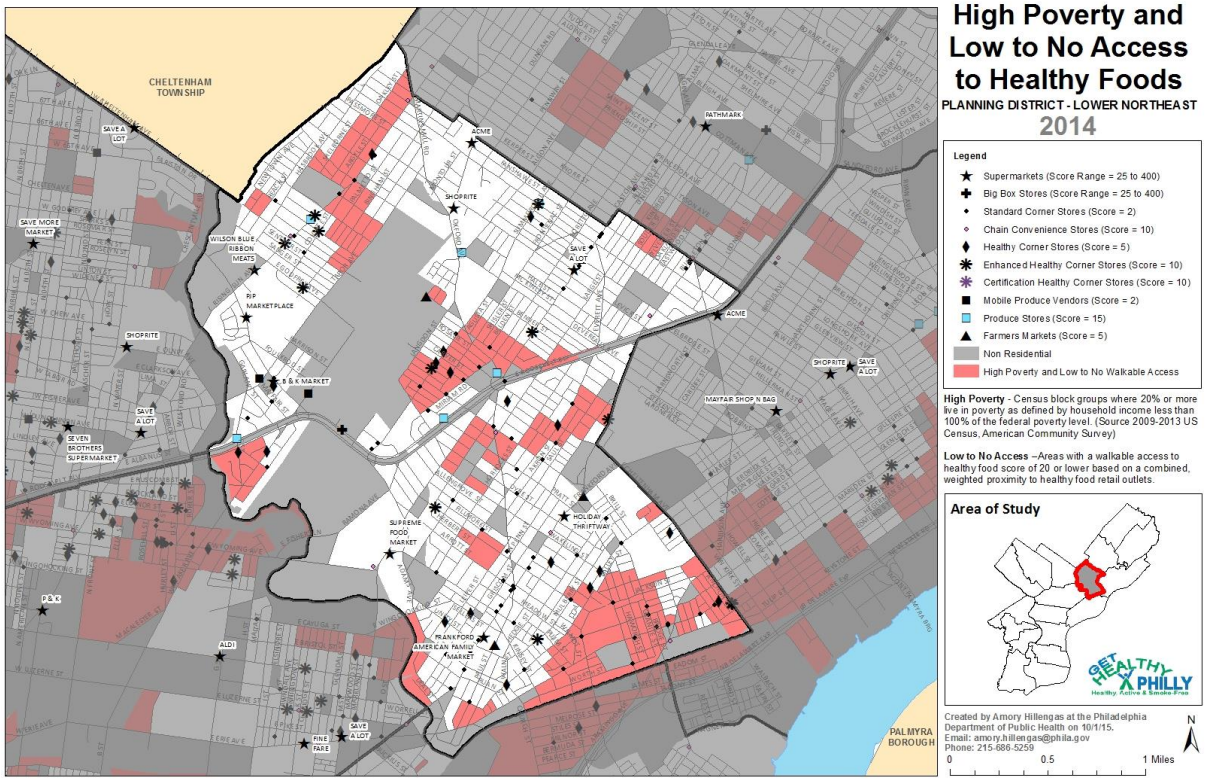
Lower Northeast





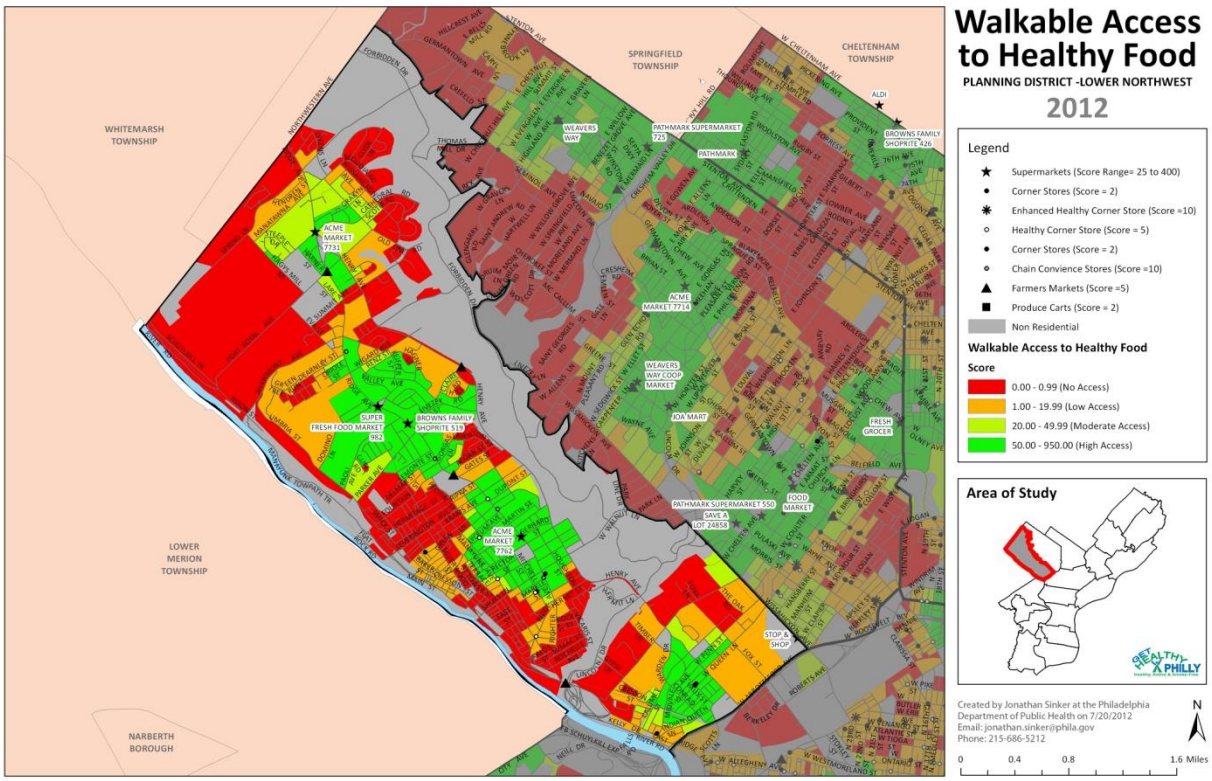
Lower Northeast

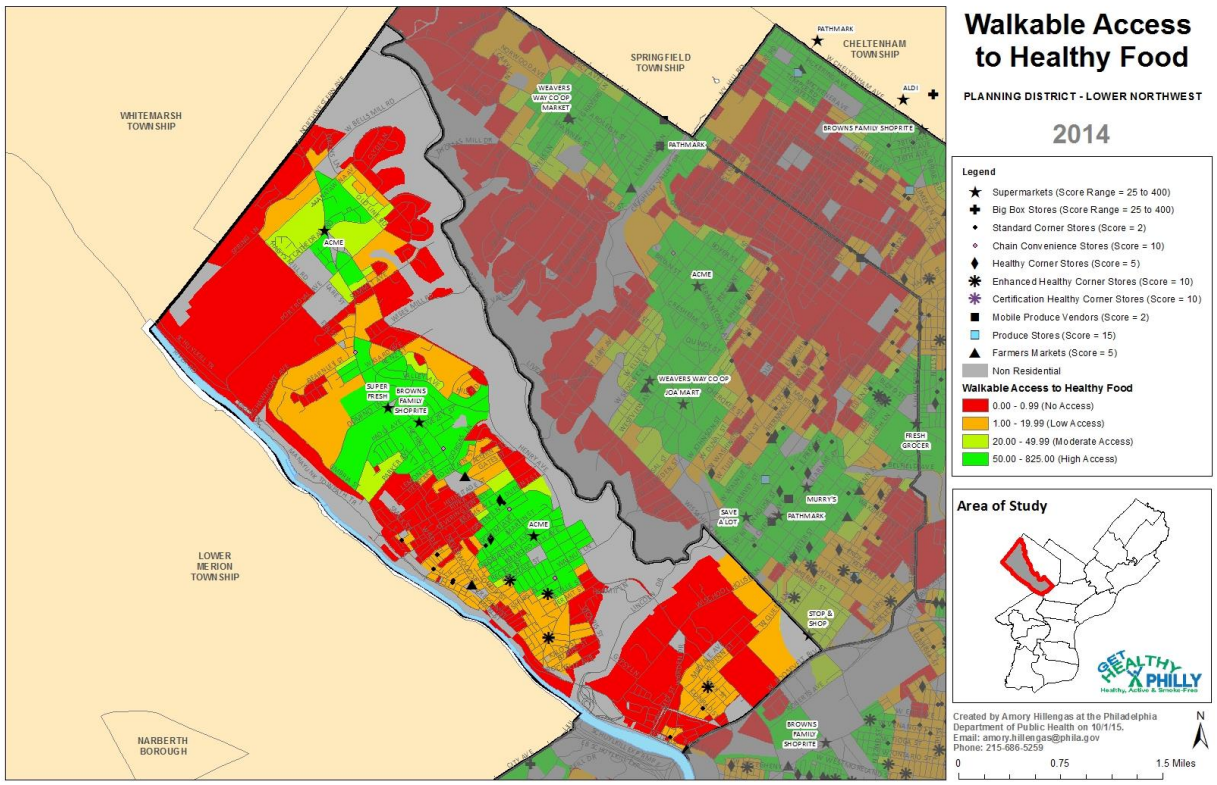




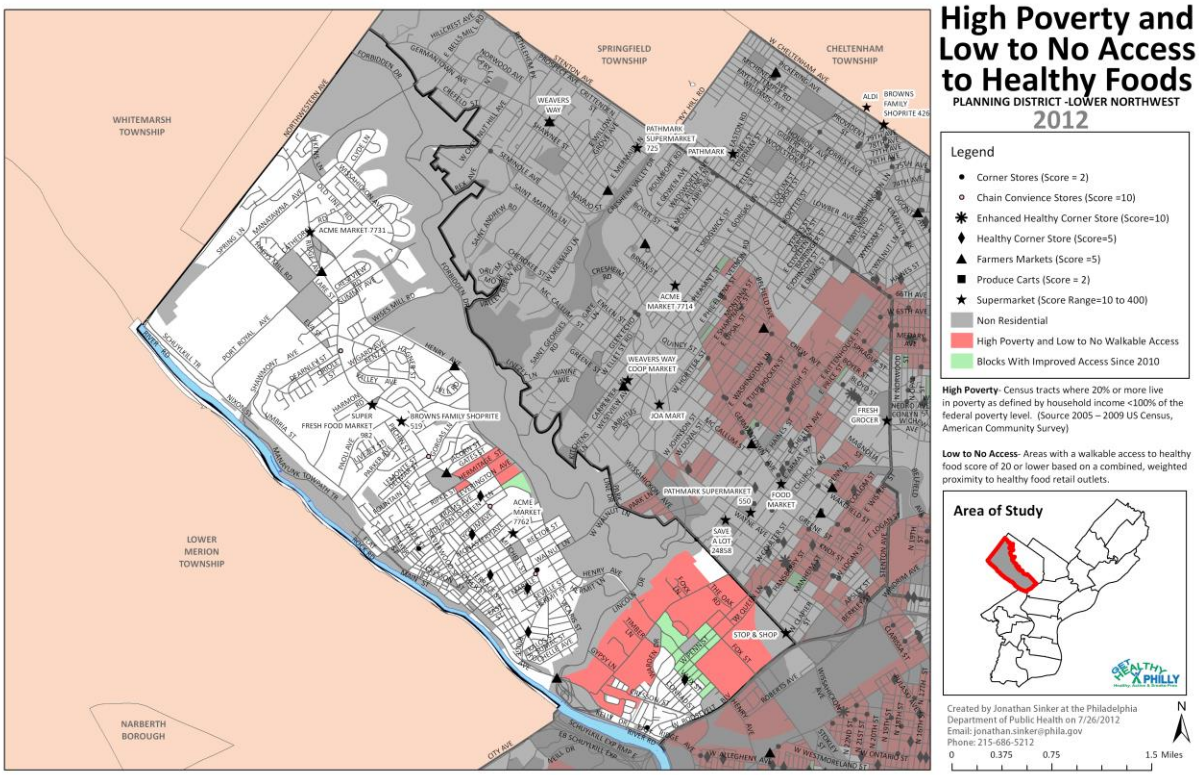
Note: Improved blocks for 2014 were not assessed due to database transition issues.

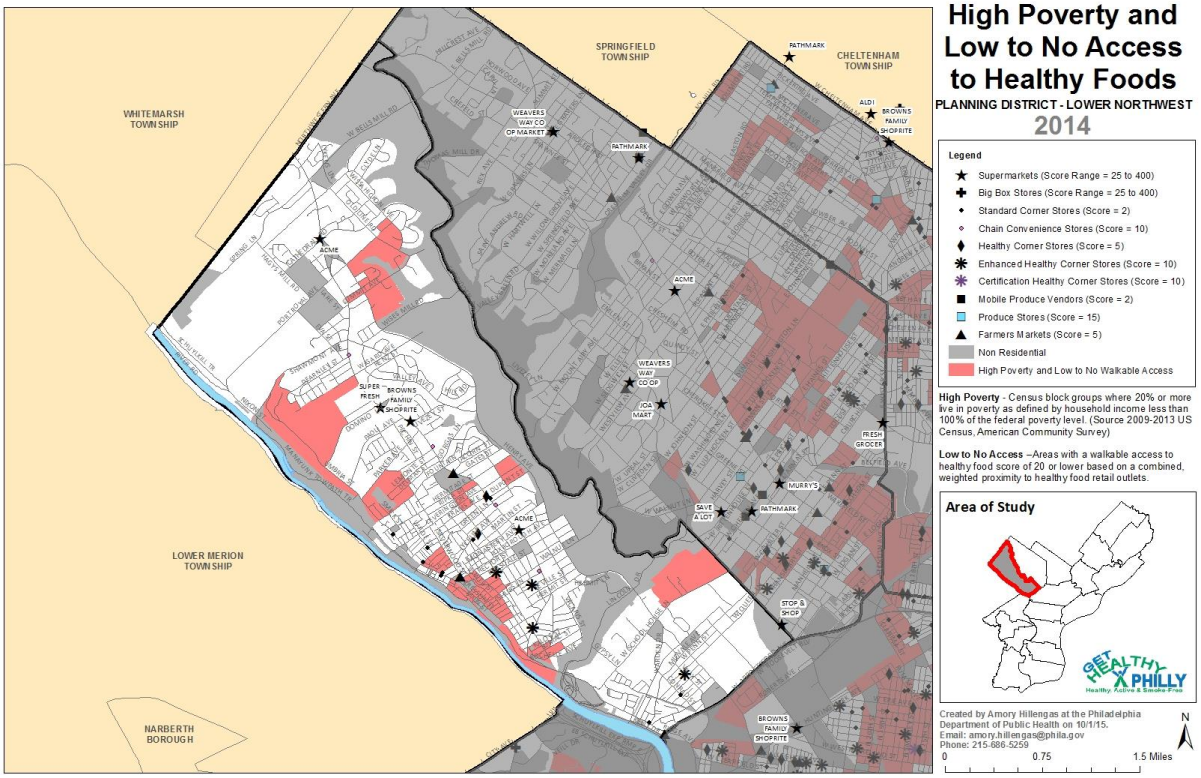
Lower Northwest





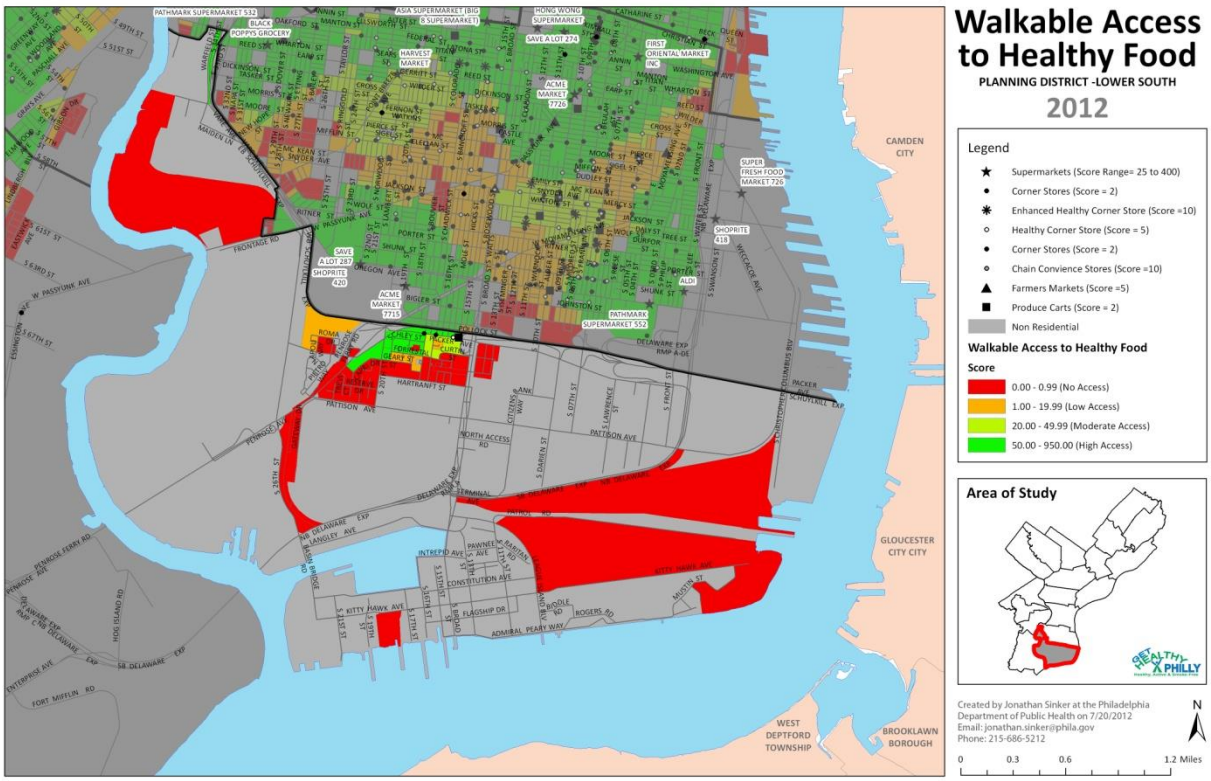
Lower Northwest

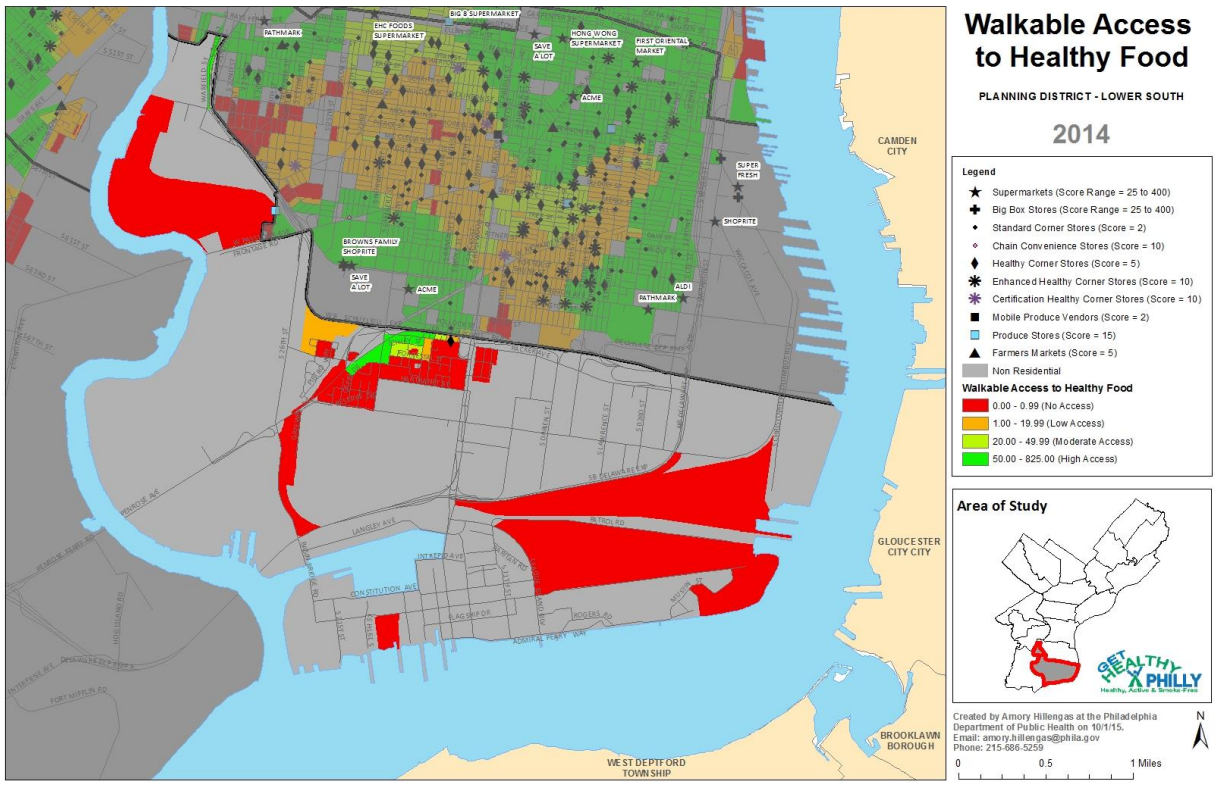




Note: Improved blocks for 2014 were not assessed due to database transition issues.

Lower South


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.3 0.6 1.2 Miles
CAMDEN CITY
GLOUCESTER CITY CITY
WEST DEPTFORD TOWNSHIP
BROOKLAWN BOROUGH


Walkable Access to Healthy Food
PLANNING DISTRICT - LOWER SOUTH
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
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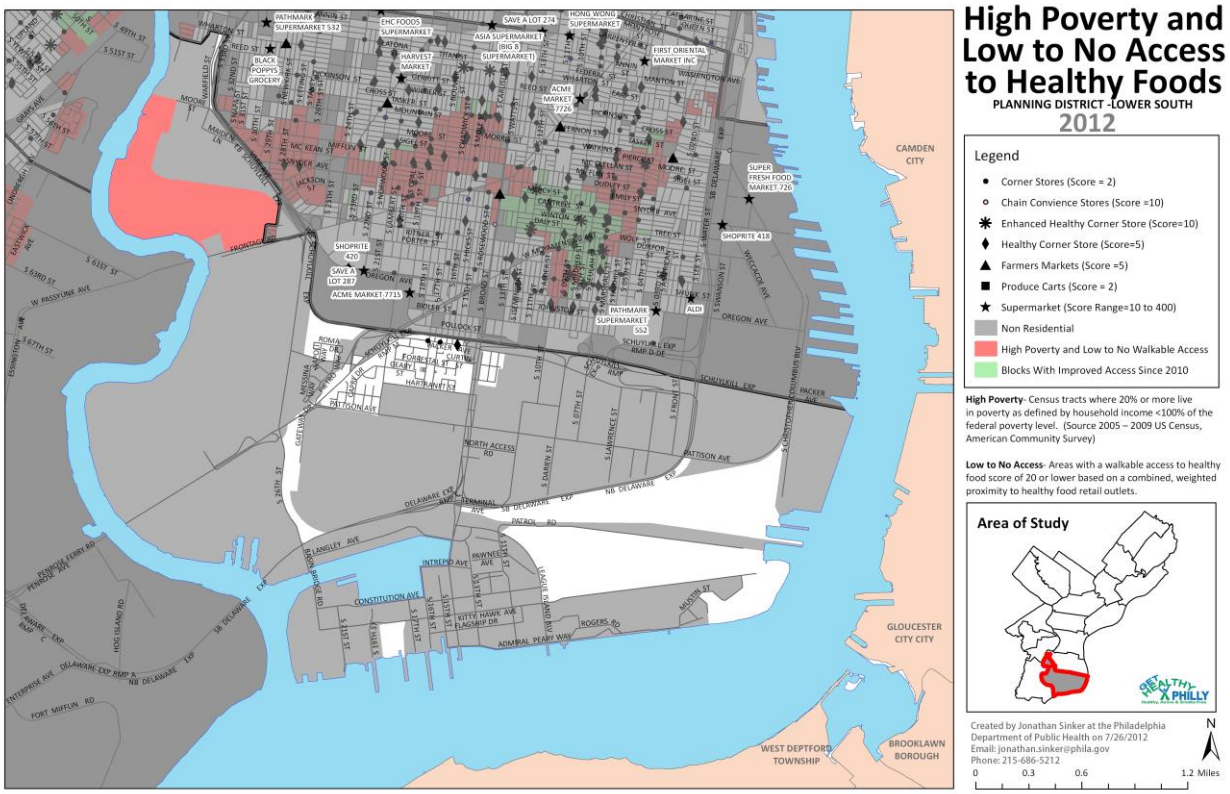
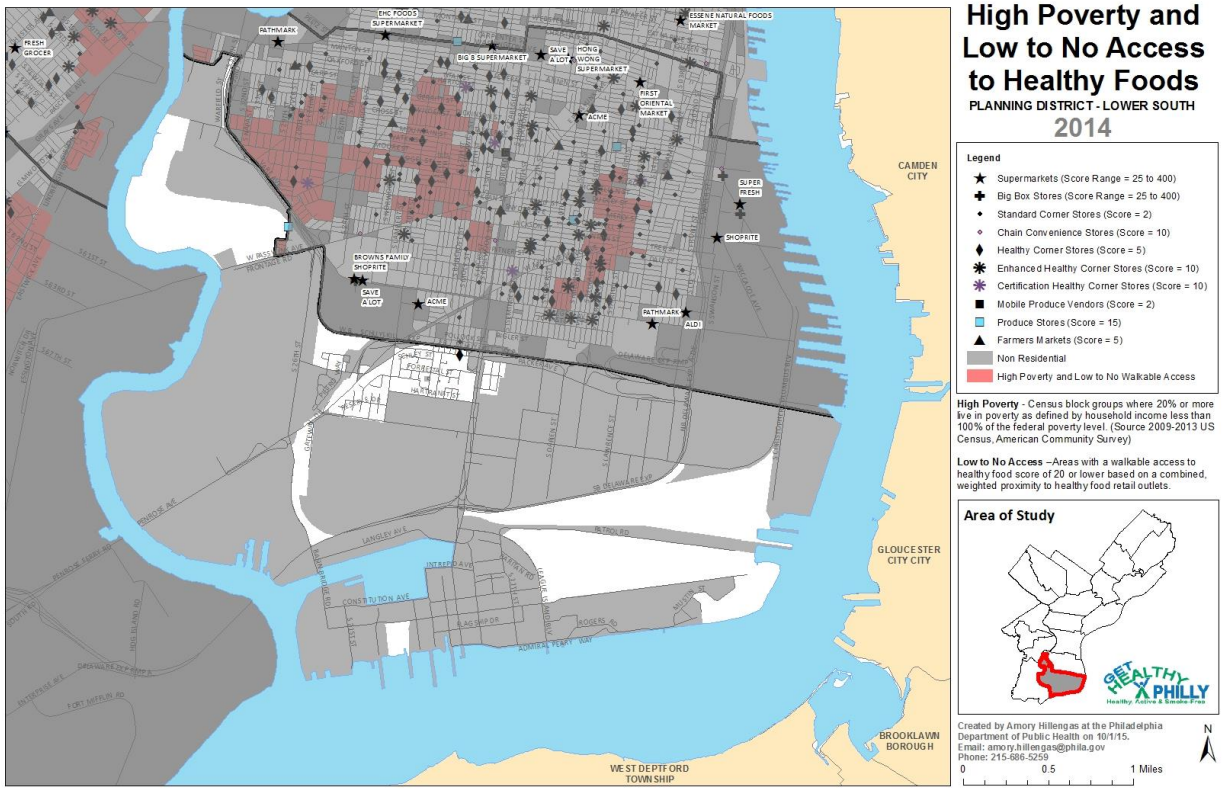
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.5 1 Miles
CAMDEN CITY
GLOUCESTER CITY CITY
WEST DEPTFORD TOWNSHIP
BROOKLAWN BOROUGH

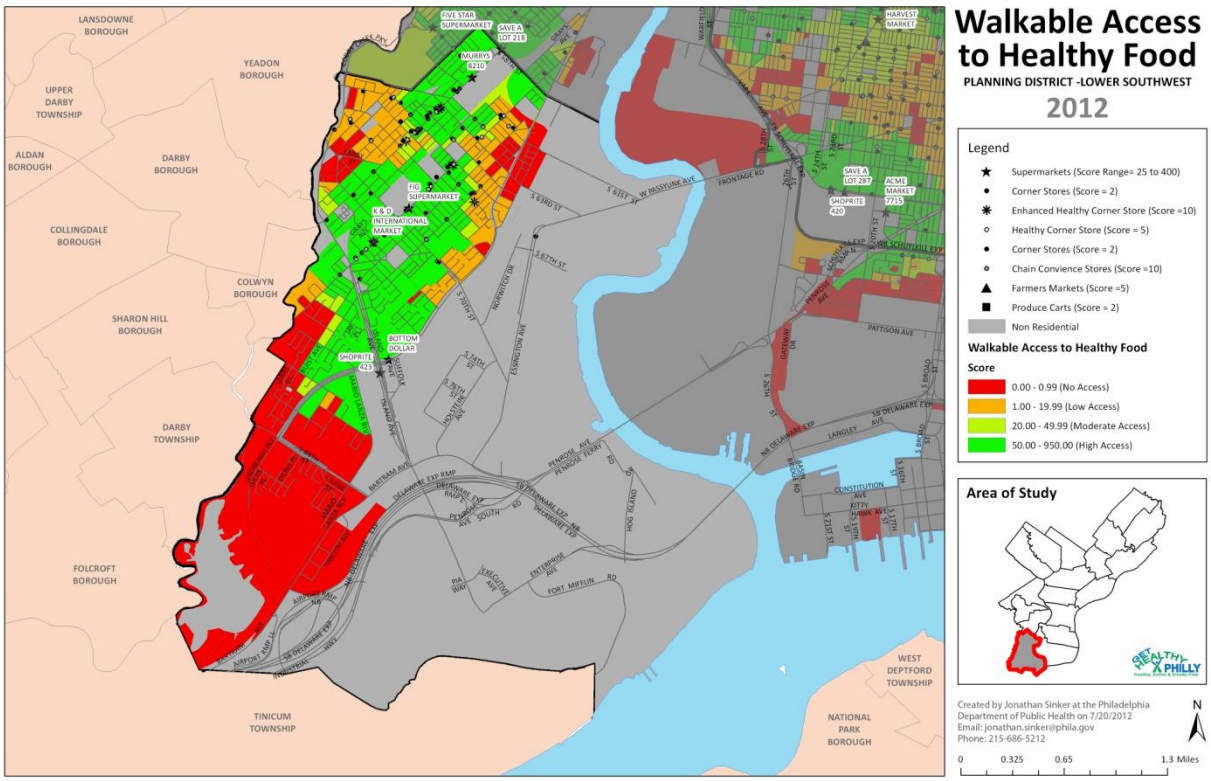
Lower South

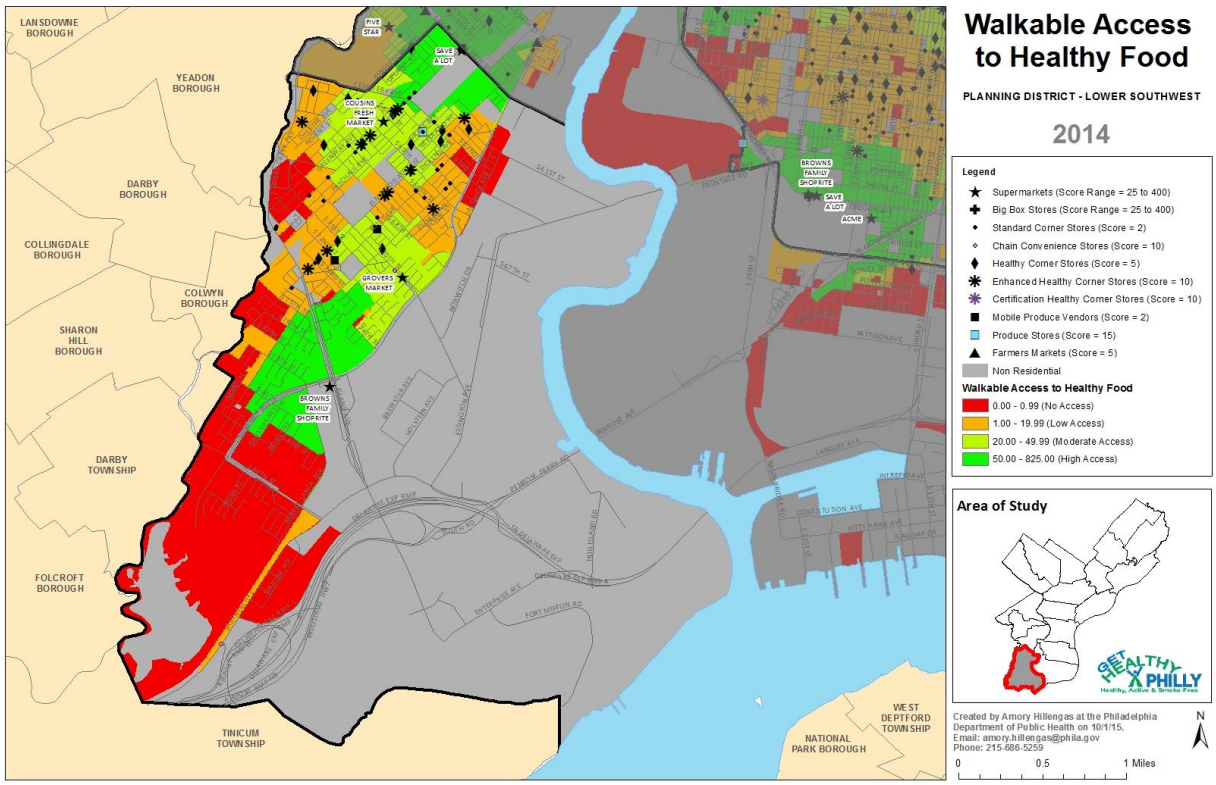




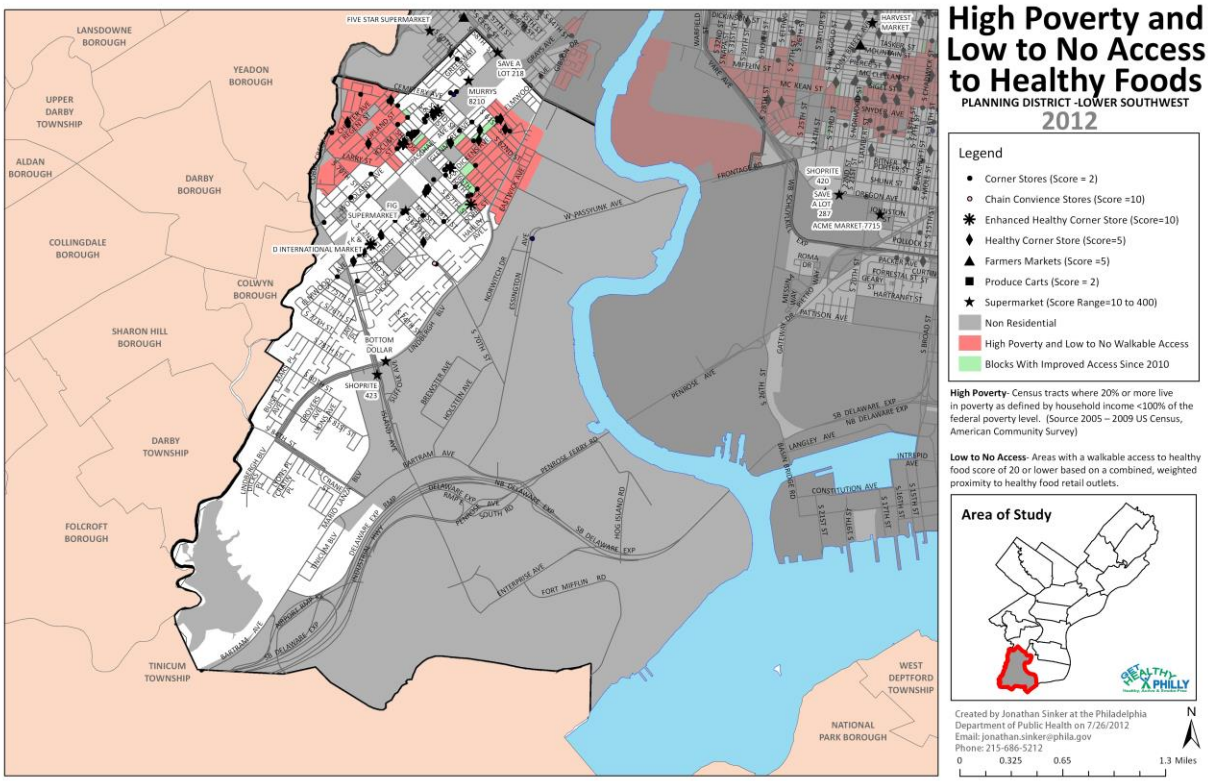
Note: Improved blocks for 2014 were not assessed due to database transition issues.

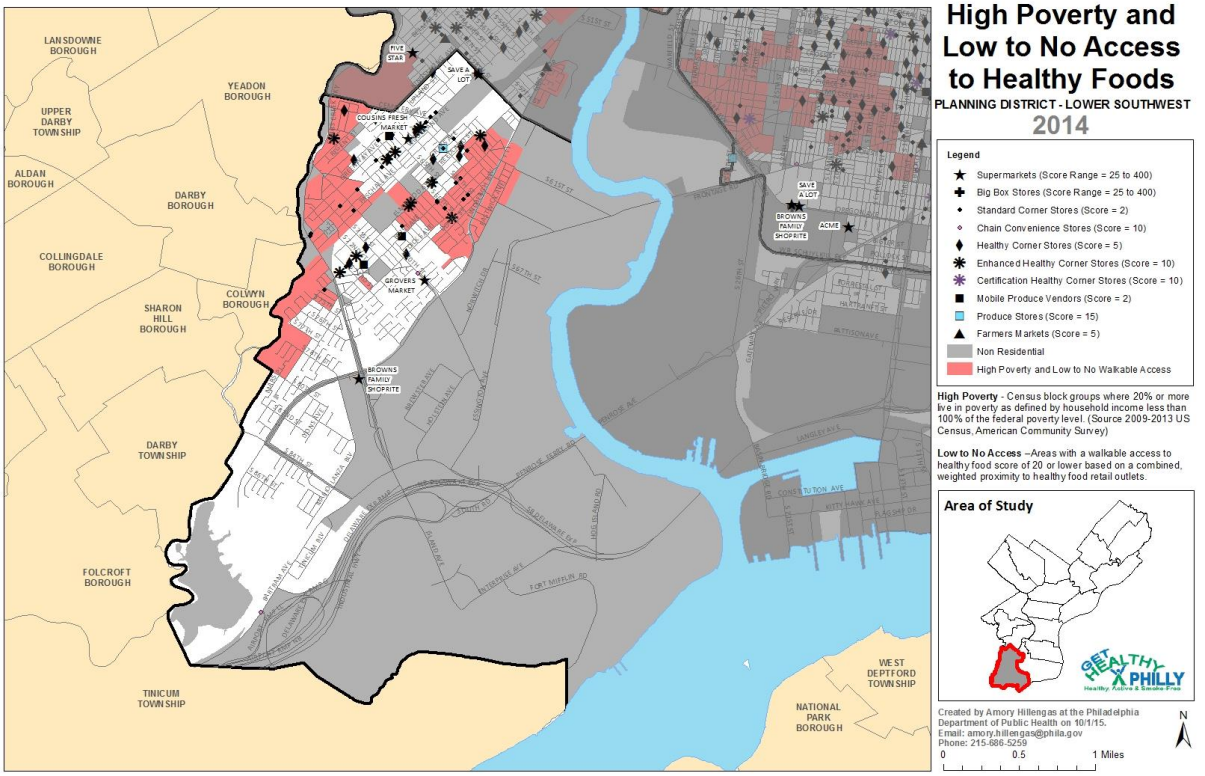
Lower Southwest





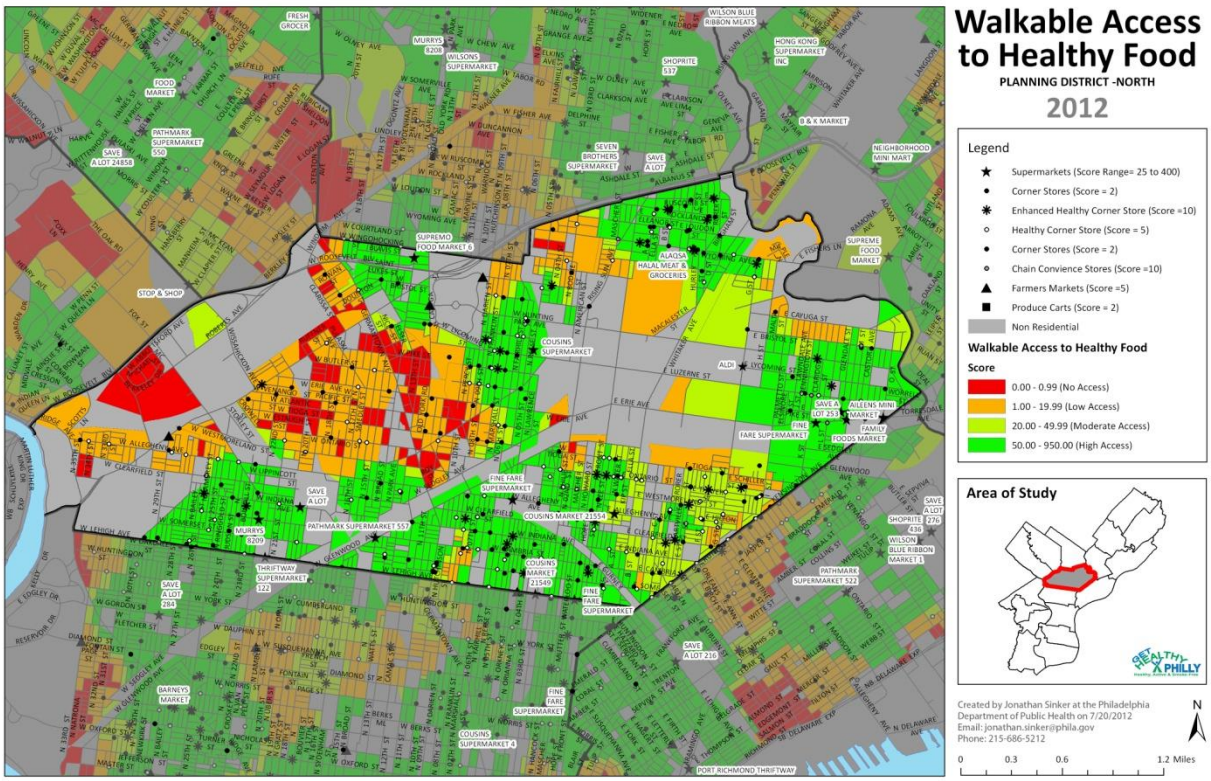
Lower Southwest





Note: Improved blocks for 2014 were not assessed due to database transition issues.

North


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 Convience Stores (Score =10)
Farmers Markets (Score =5)
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Non Residential
Walkable Access to Healthy Food
Score
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
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Area of Study
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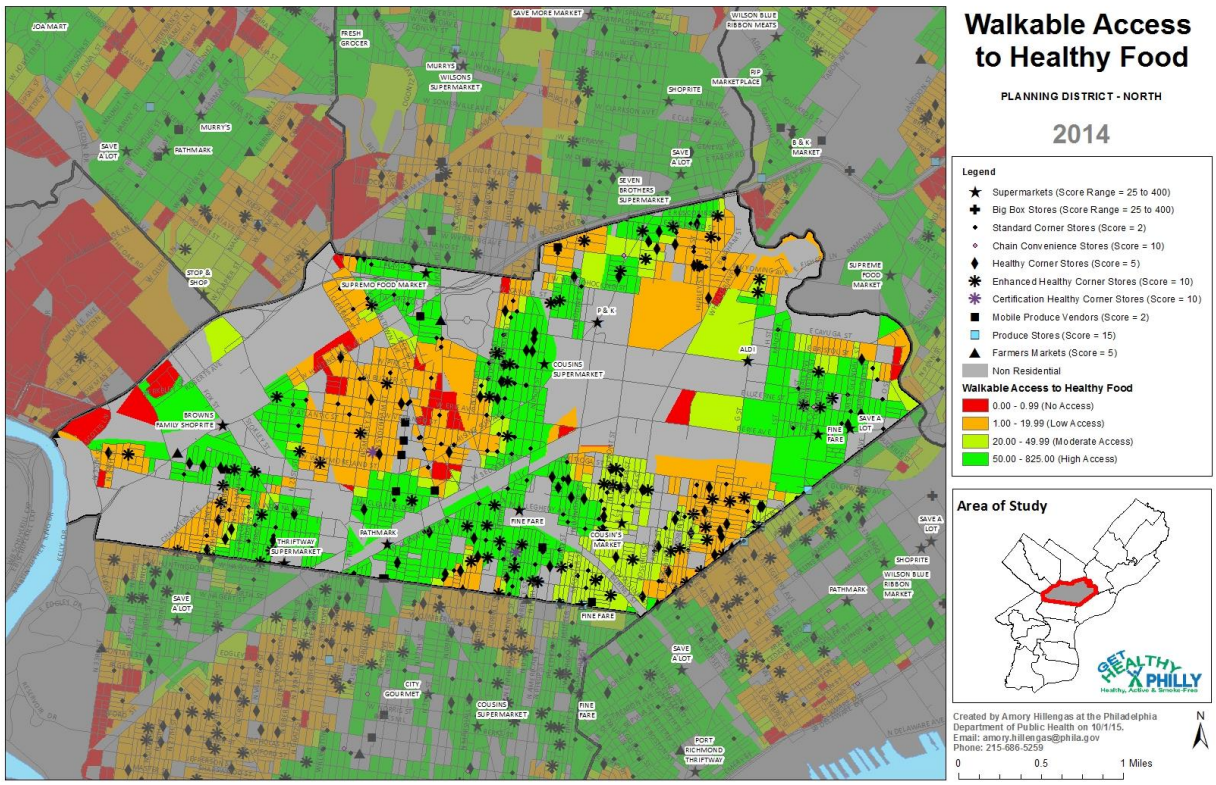
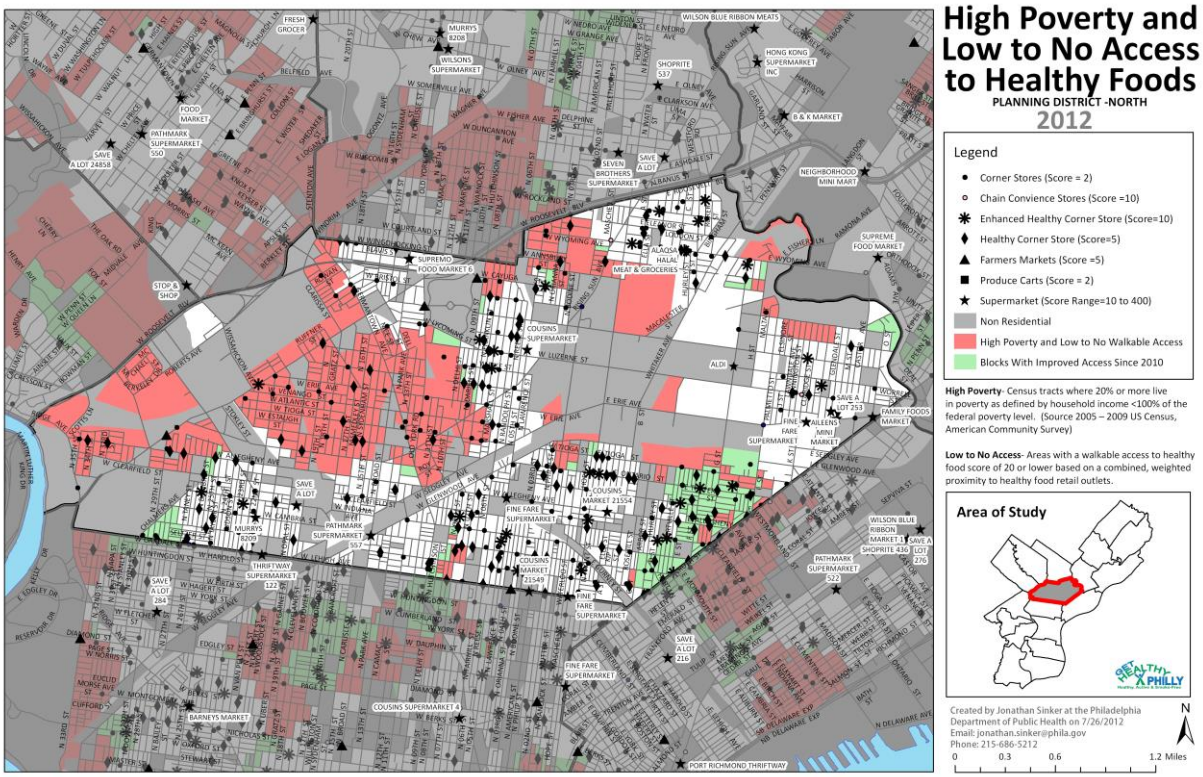
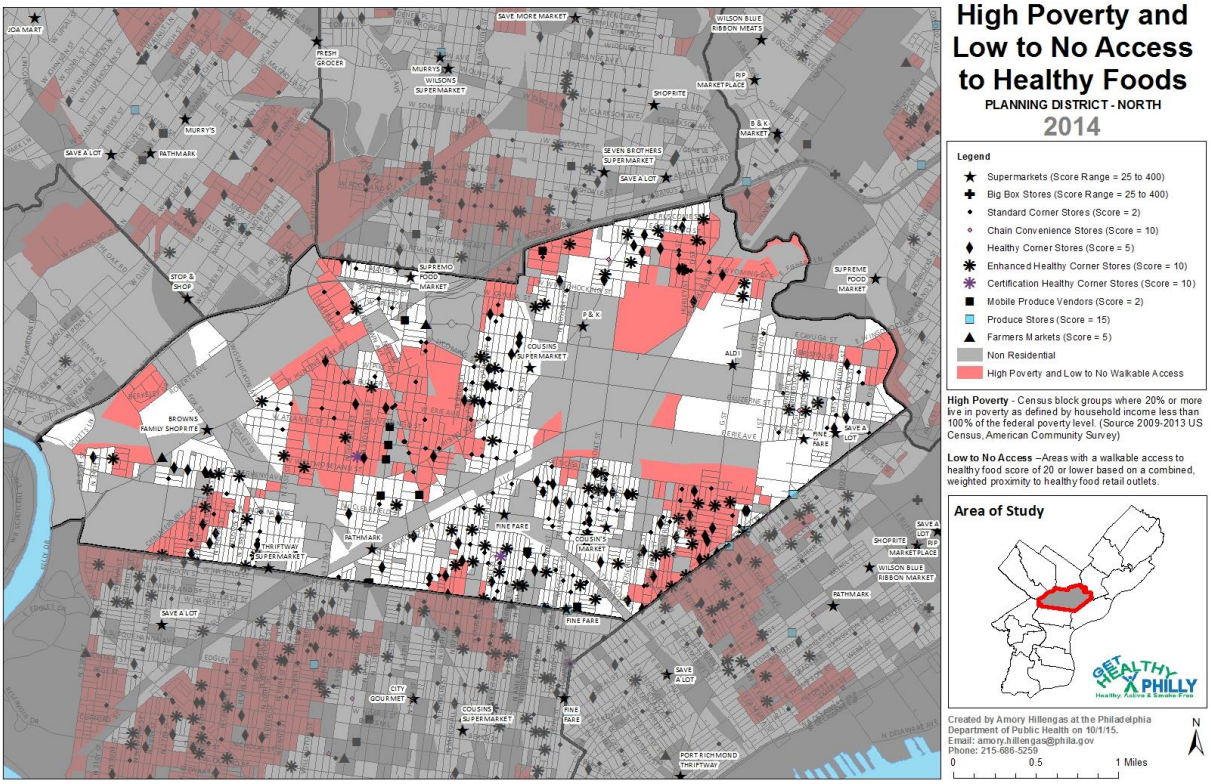
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.3 0.6 1.2 Miles


Walkable Access to Healthy Food
PLANNING DISTRICT - NORTH
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.5 1 Miles

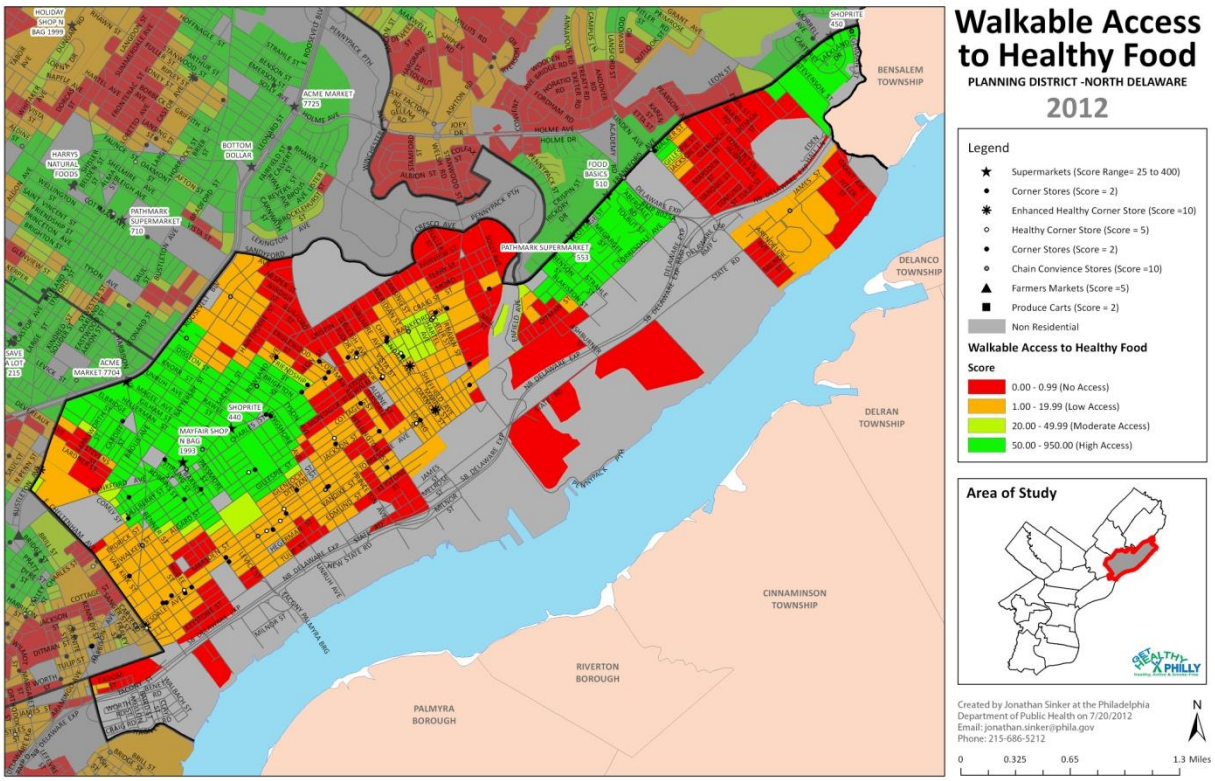
North

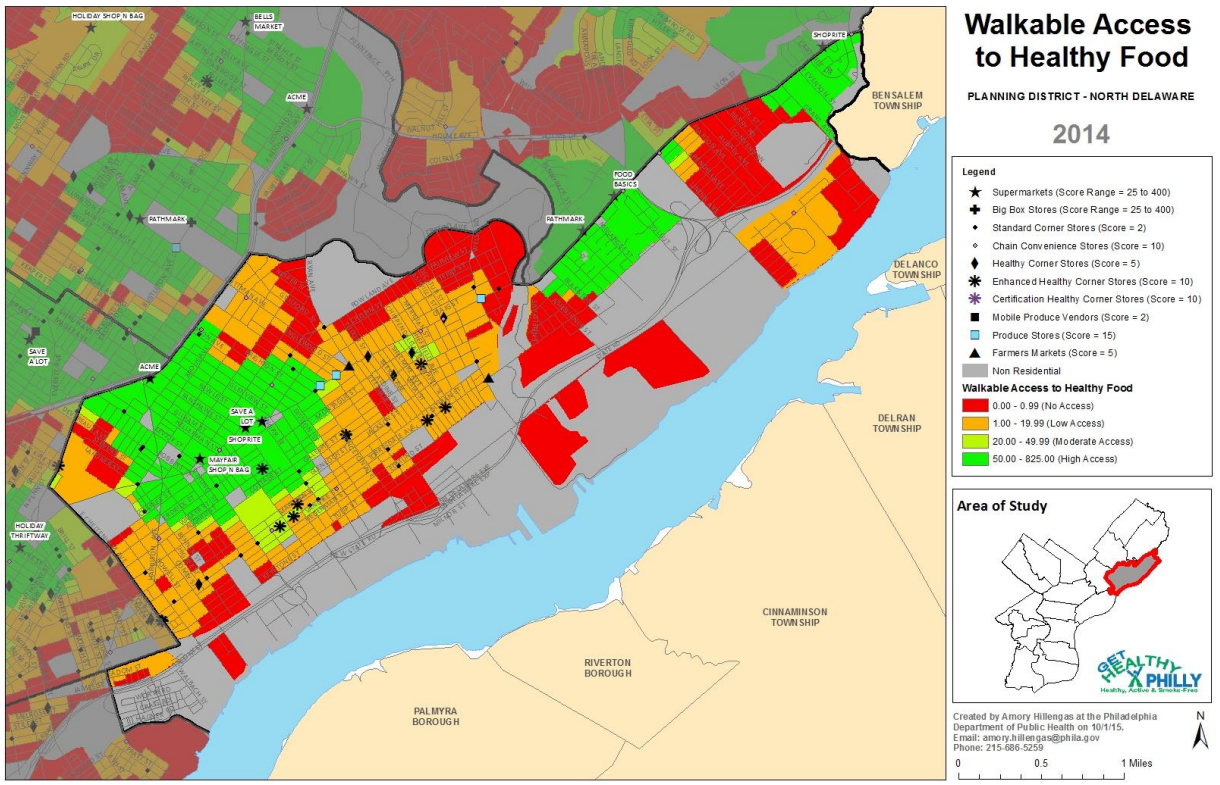




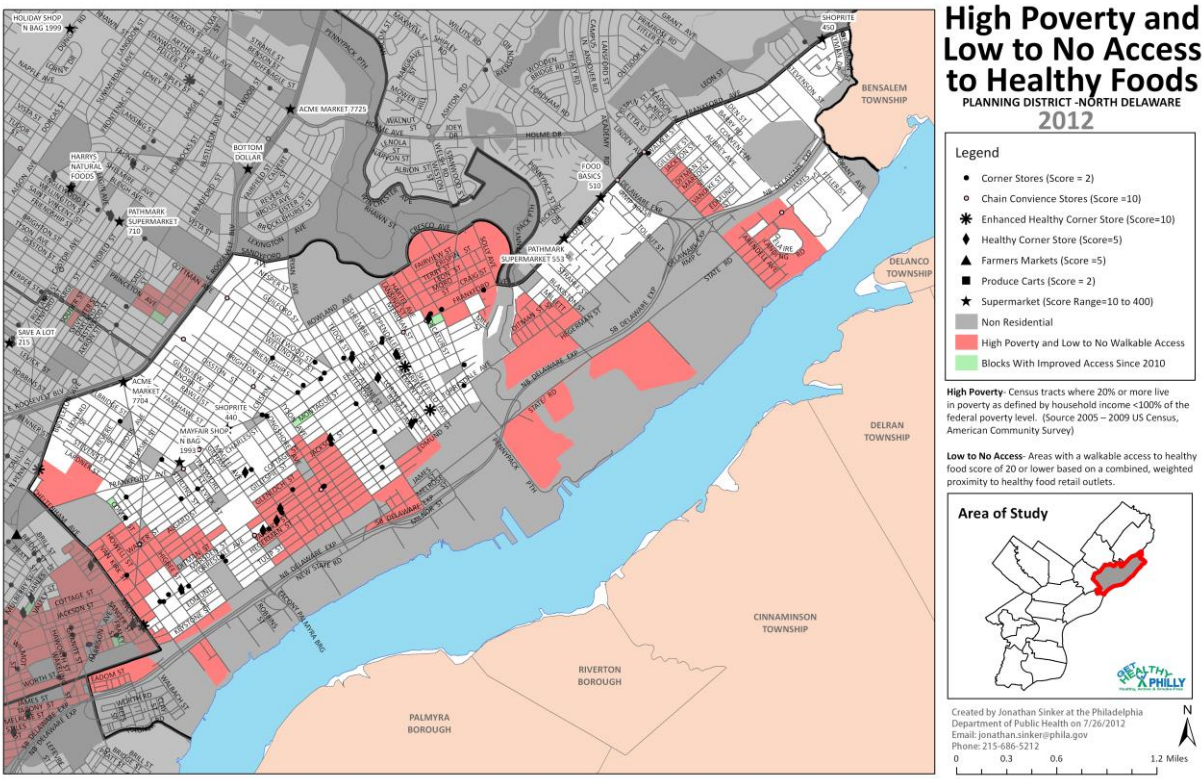
Note: Improved blocks for 2014 were not assessed due to database transition issues.

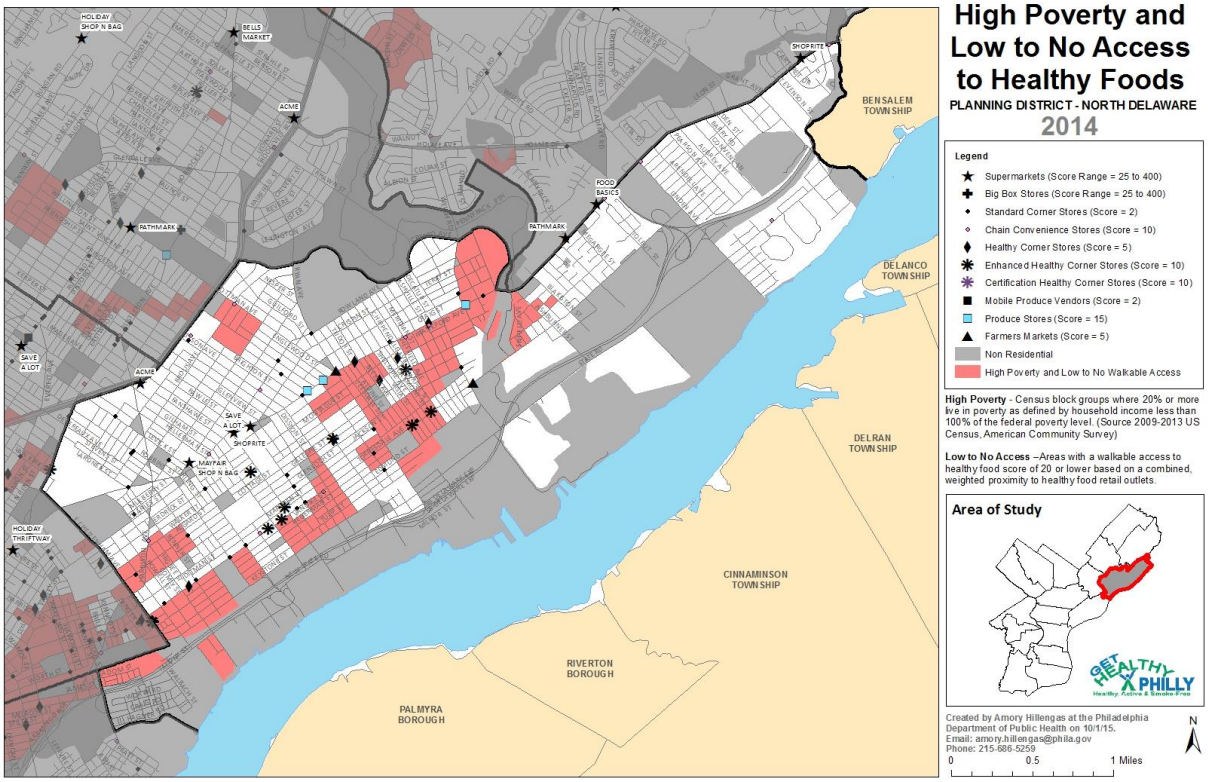
North Delaware





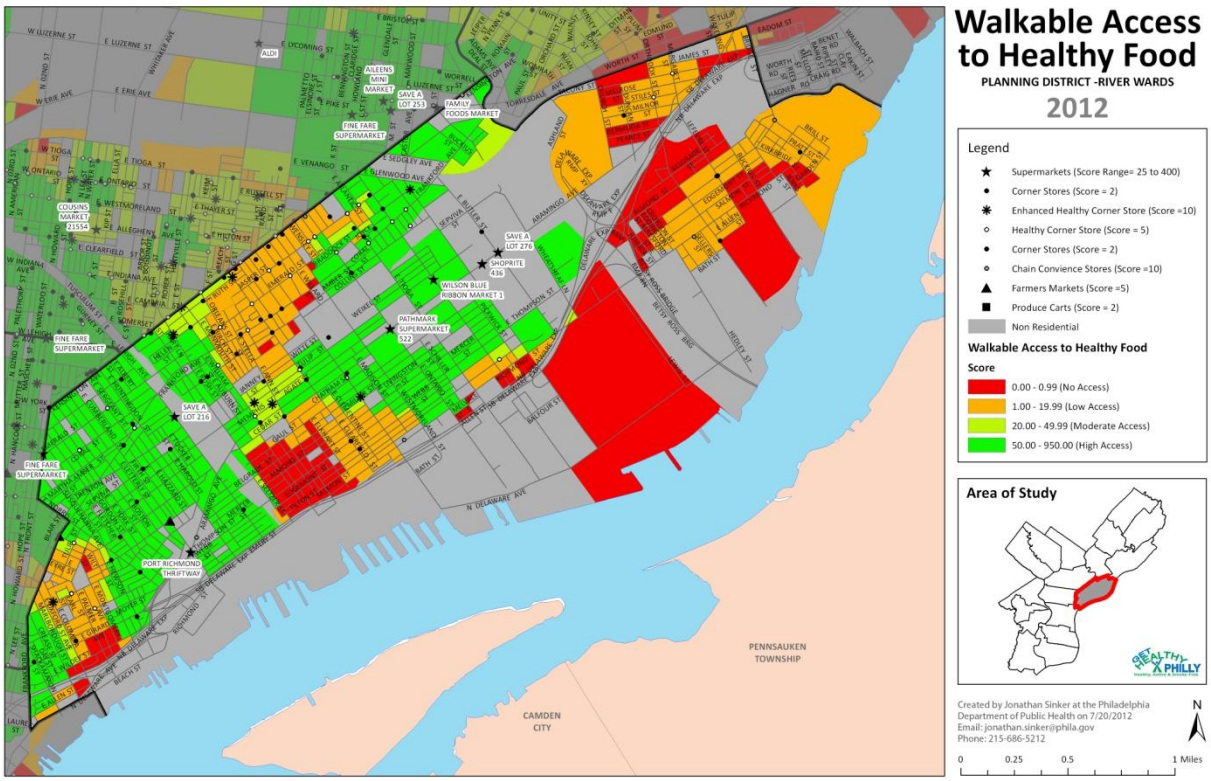
North Delaware

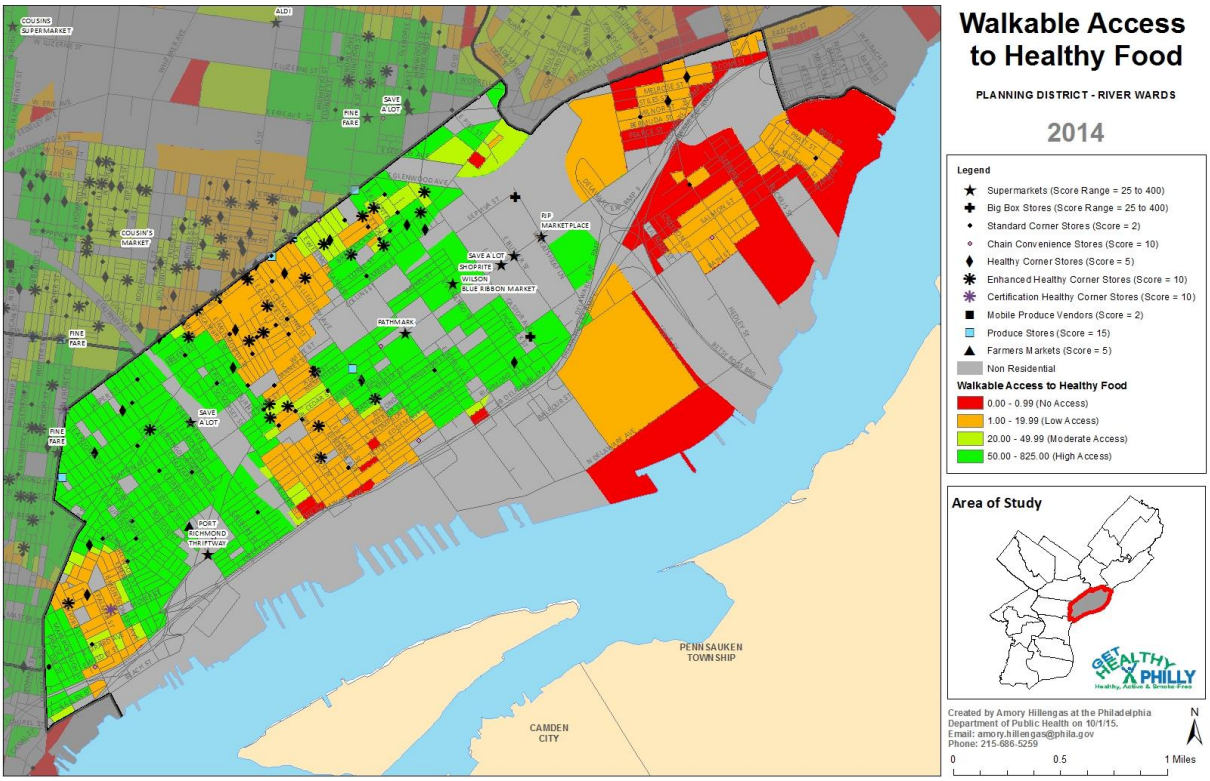




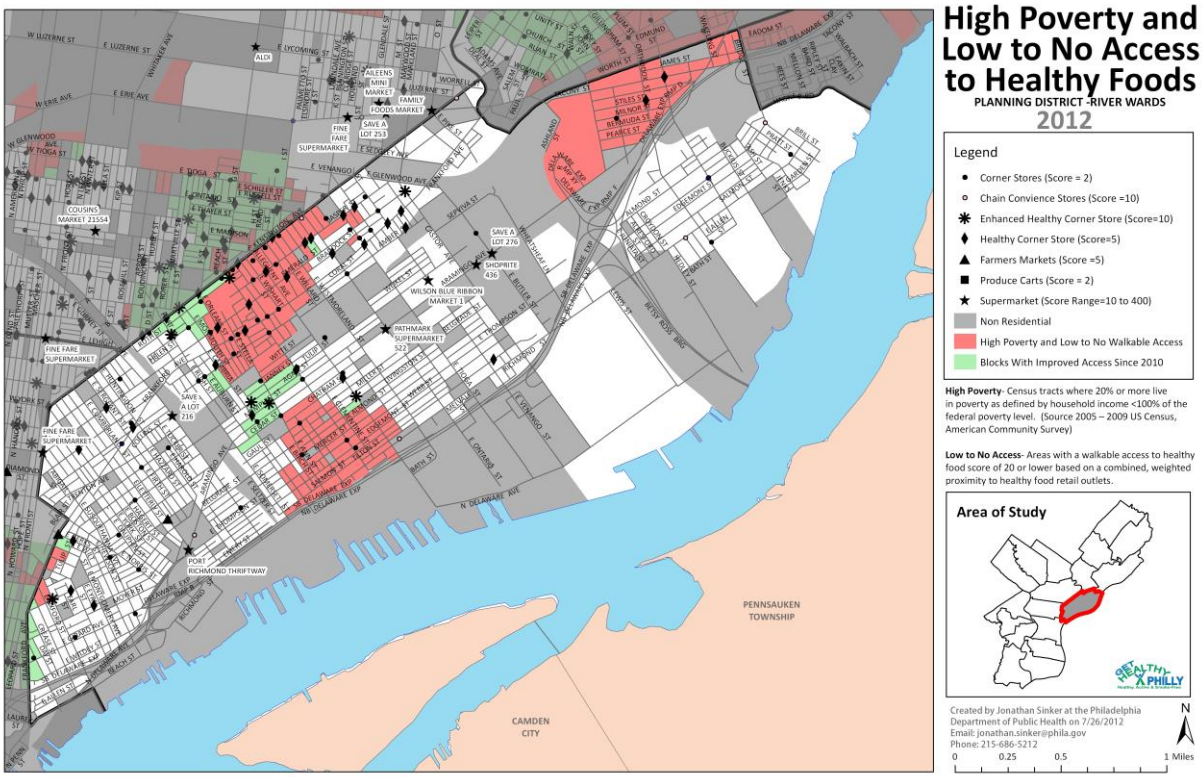
Note: Improved blocks for 2014 were not assessed due to database transition issues.

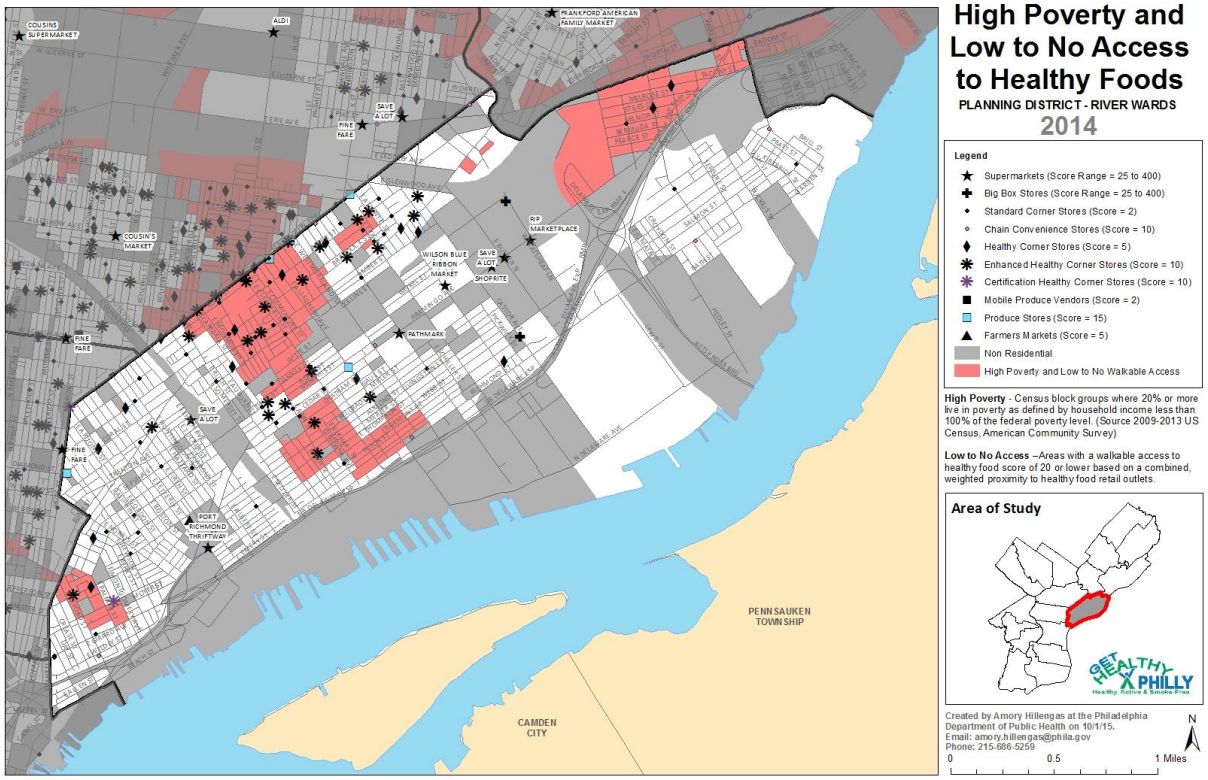
River Wards


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.25 0.5 1 Miles
PENNSAUKEN TOWNSHIP
CAMDEN CITY


Walkable Access to Healthy Food
PLANNING DISTRICT - RIVER WARDS
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.5 1 Miles
PENNSAUKEN TOWNSHIP
CAMDEN CITY

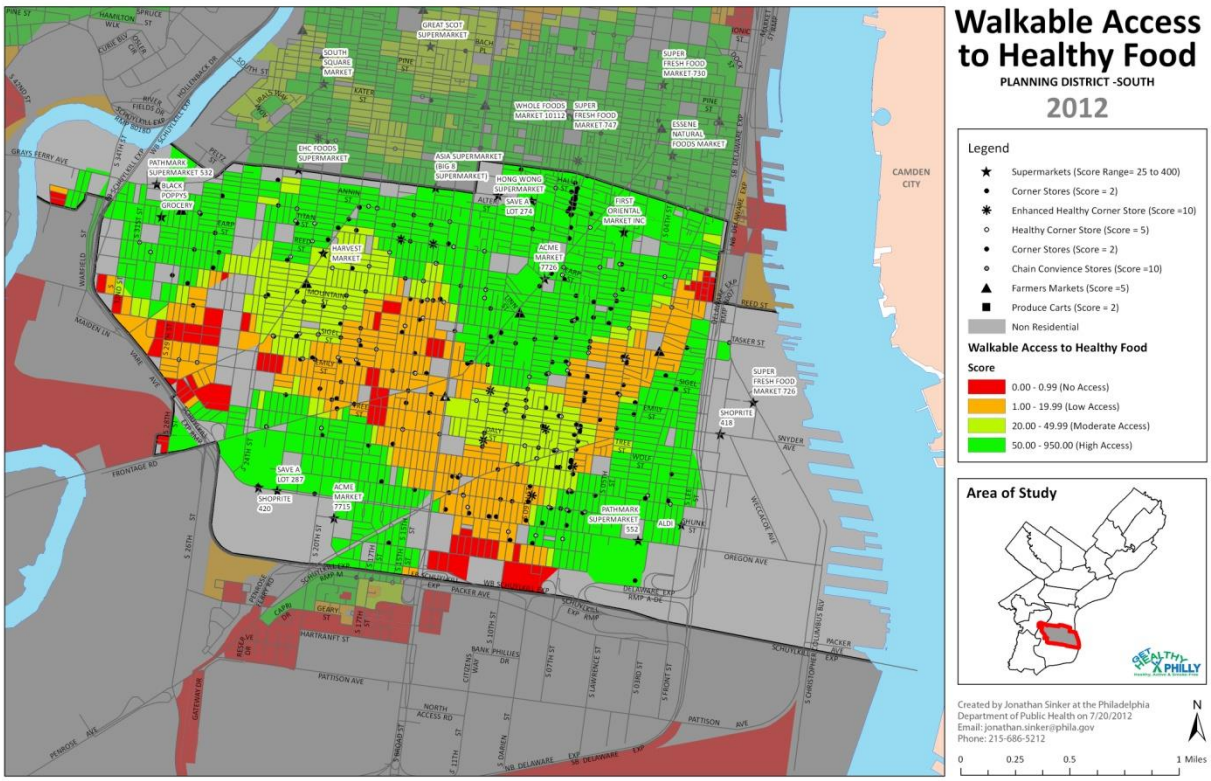
River Wards

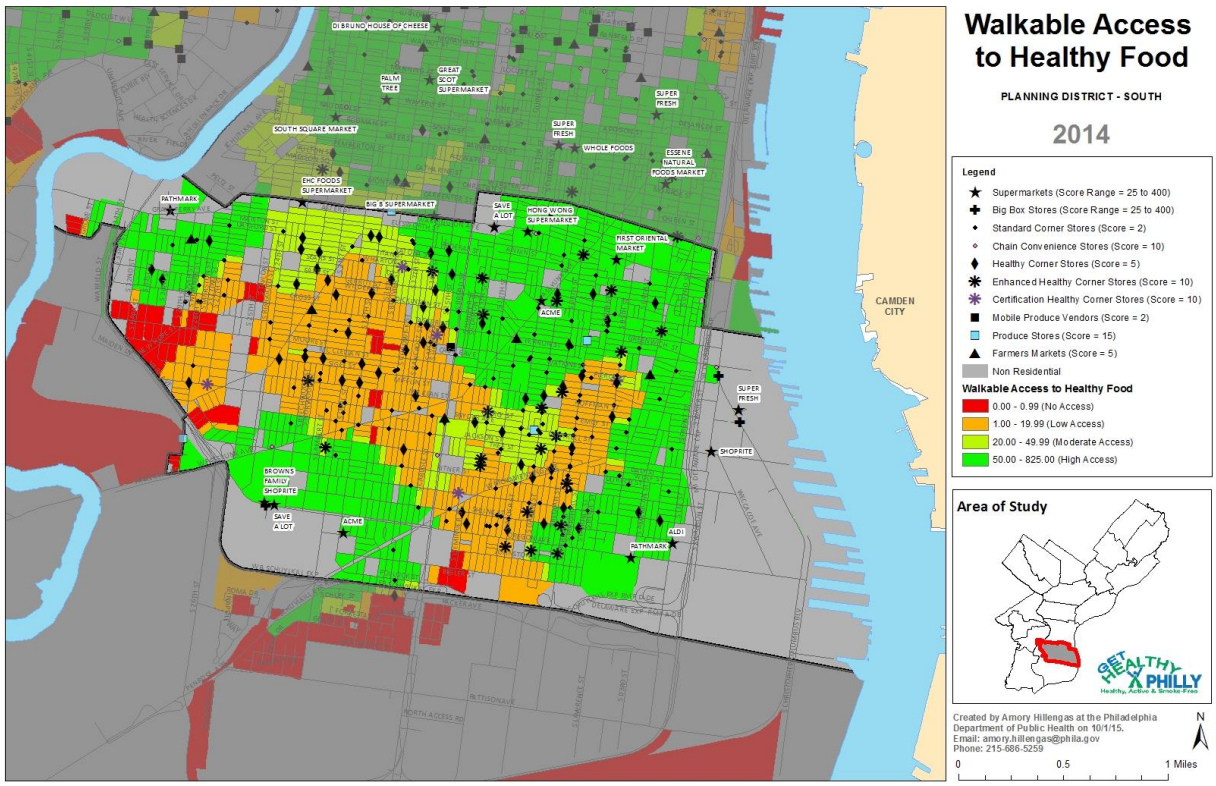




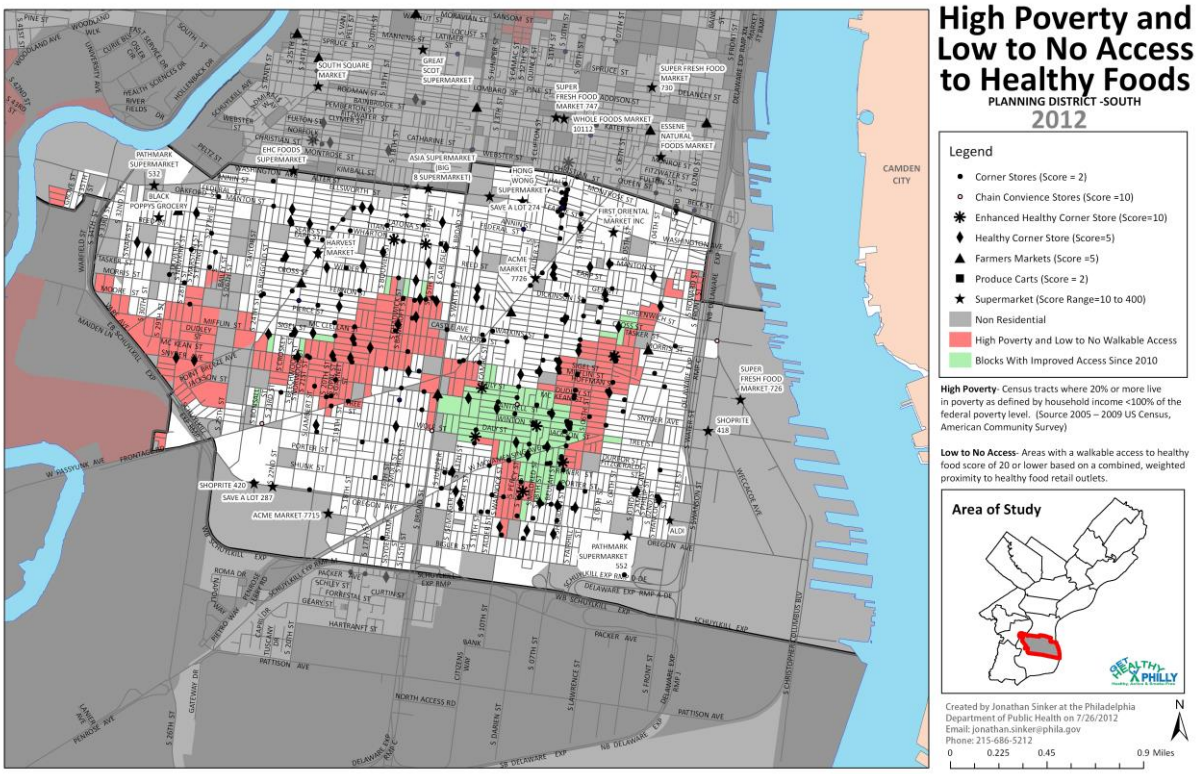
Note: Improved blocks for 2014 were not assessed due to database transition issues.

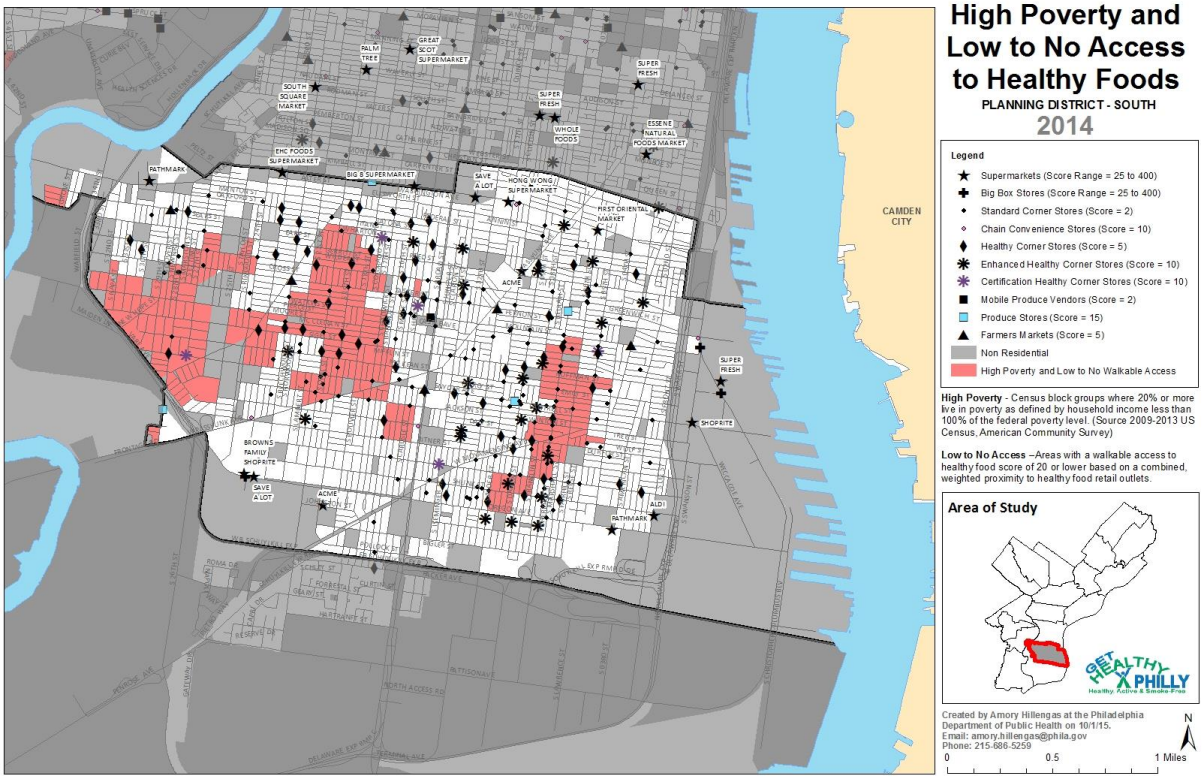
South


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.25 0.5 1 Miles
CAMDEN CITY


Walkable Access to Healthy Food
PLANNING DISTRICT - SOUTH
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.5 1 Miles
CAMDEN CITY

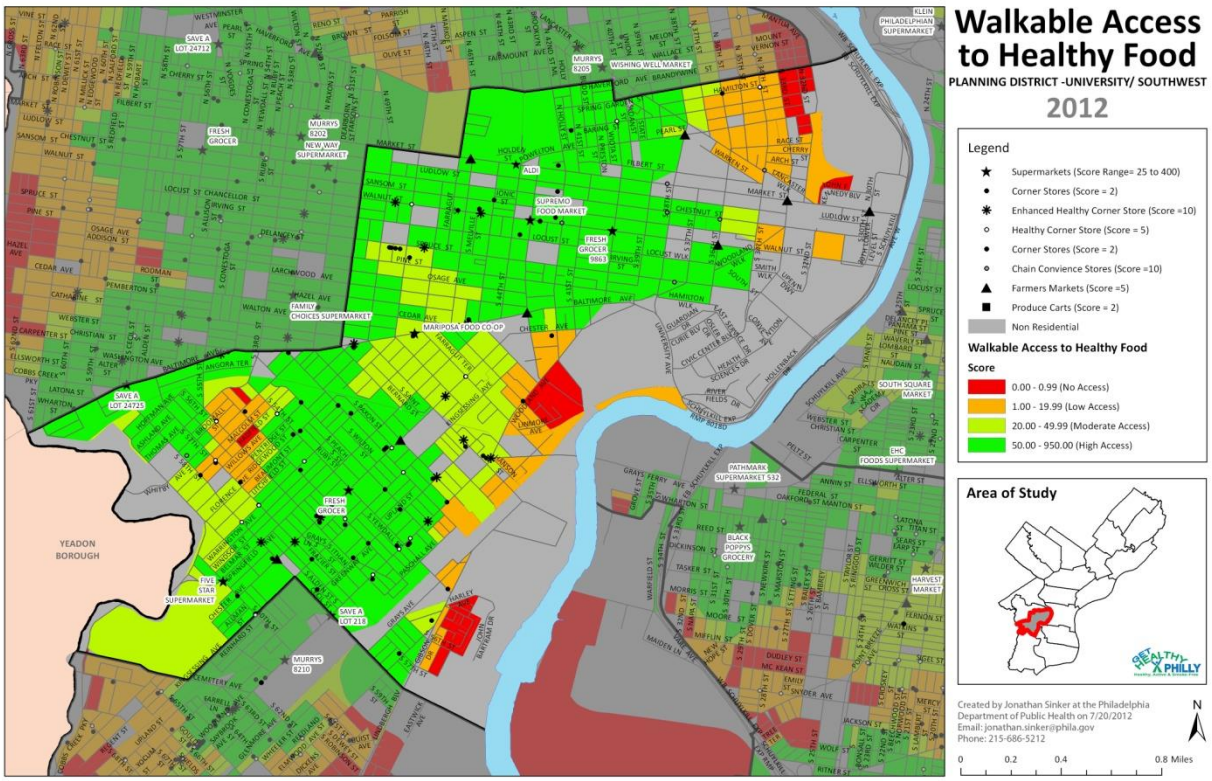
South

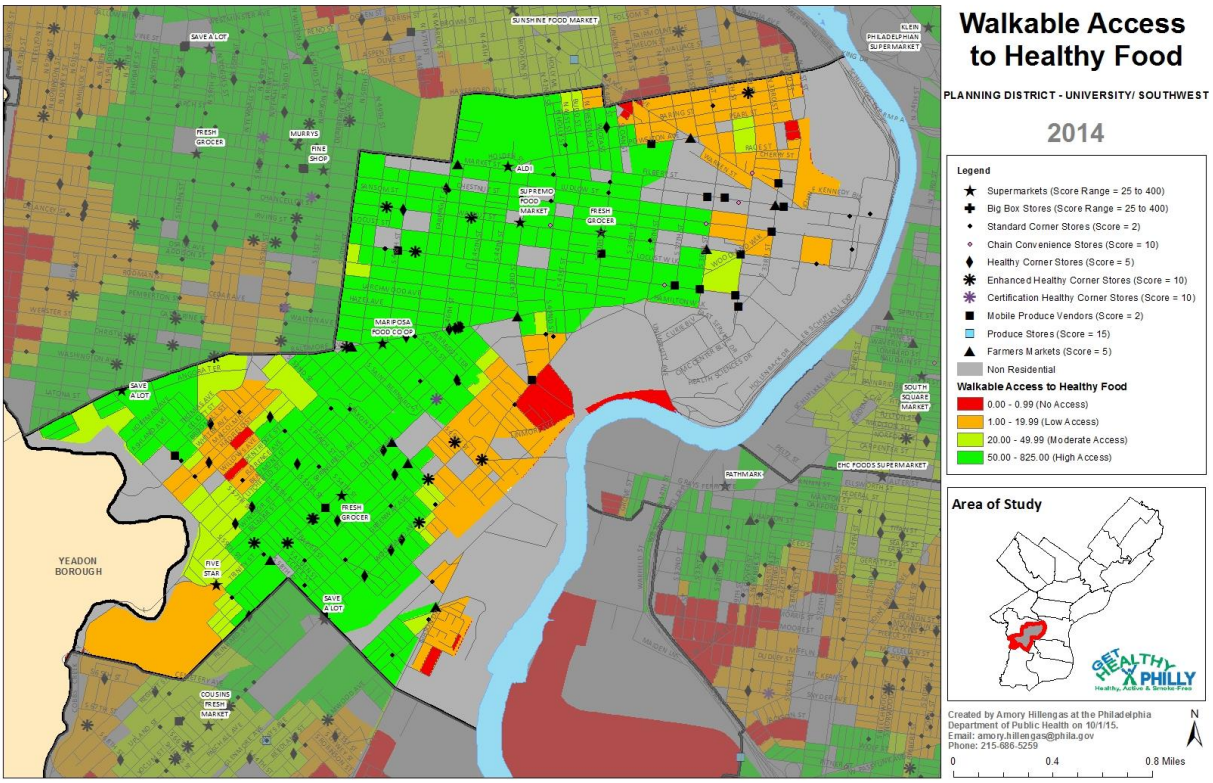




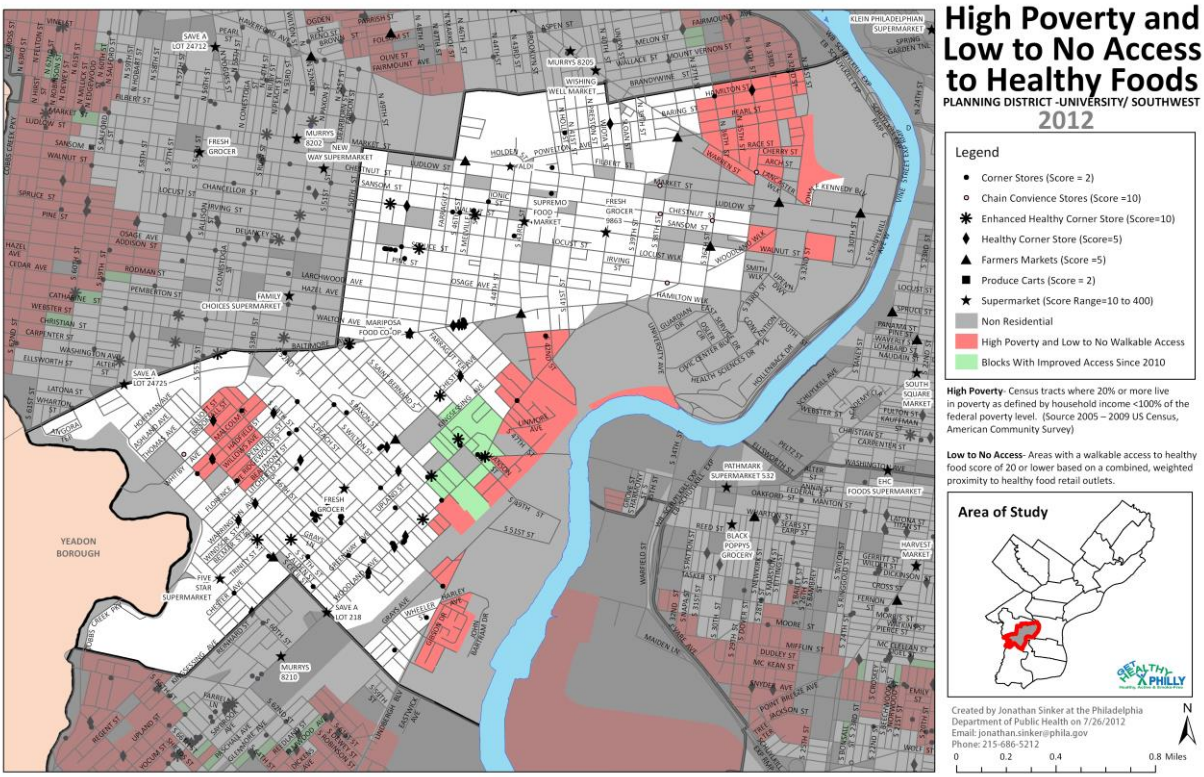
Note: Improved blocks for 2014 were not assessed due to database transition issues.

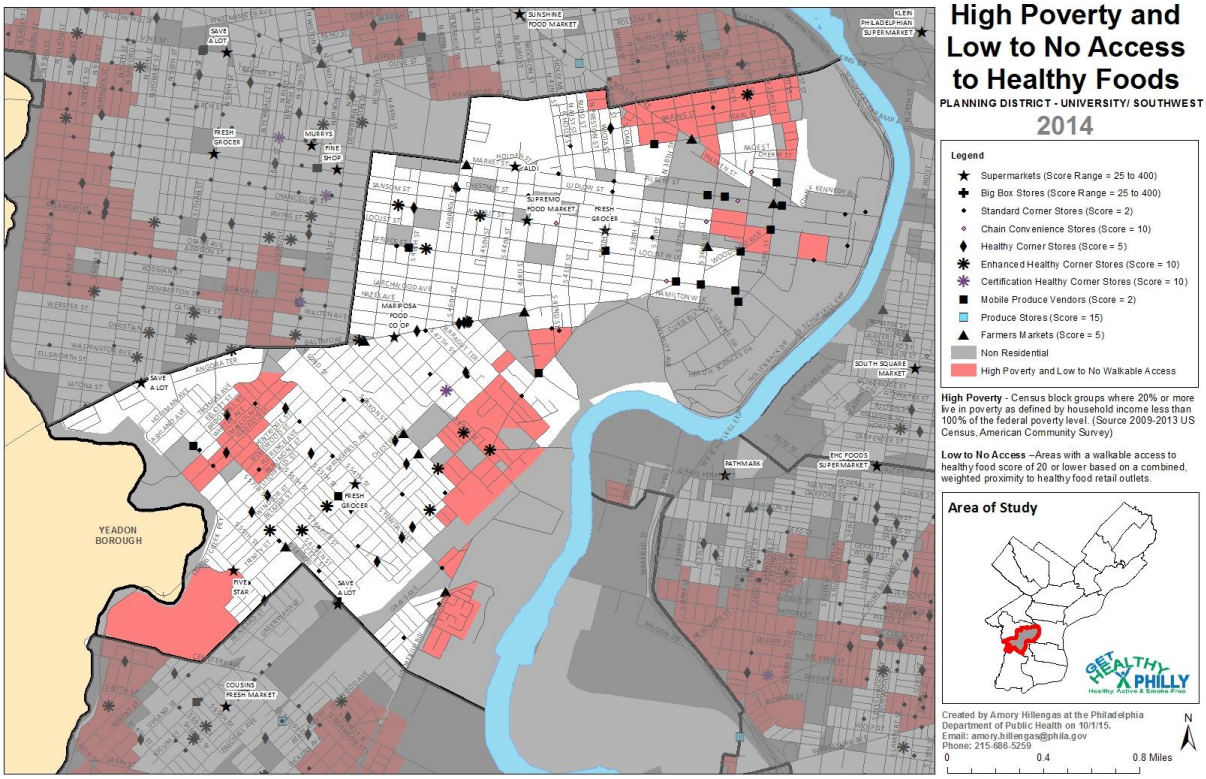
University Southwest





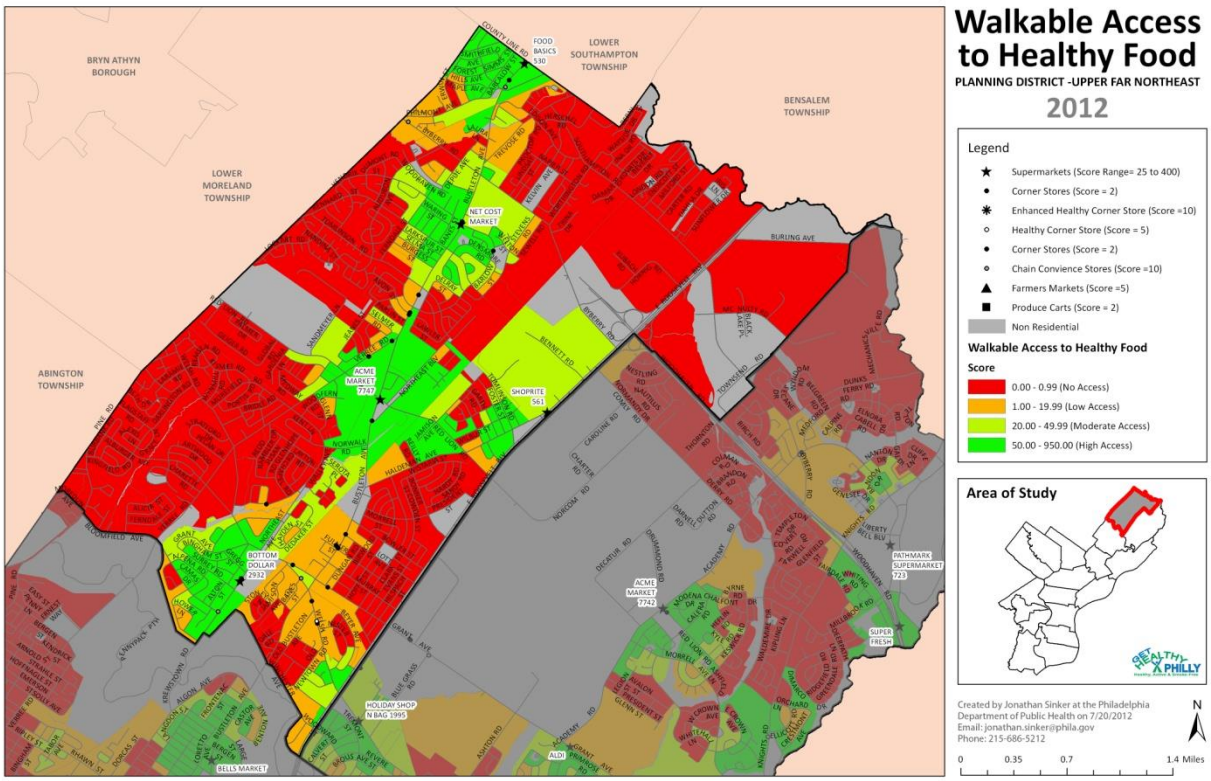
University Southwest

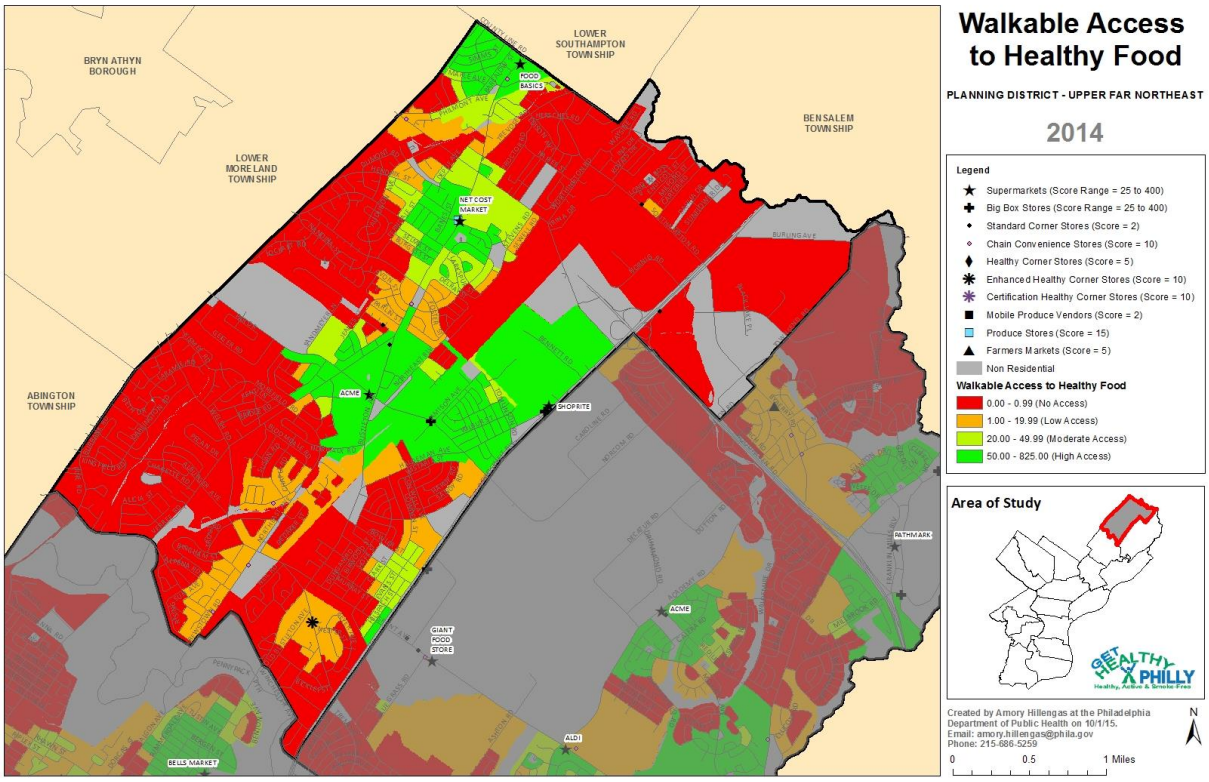




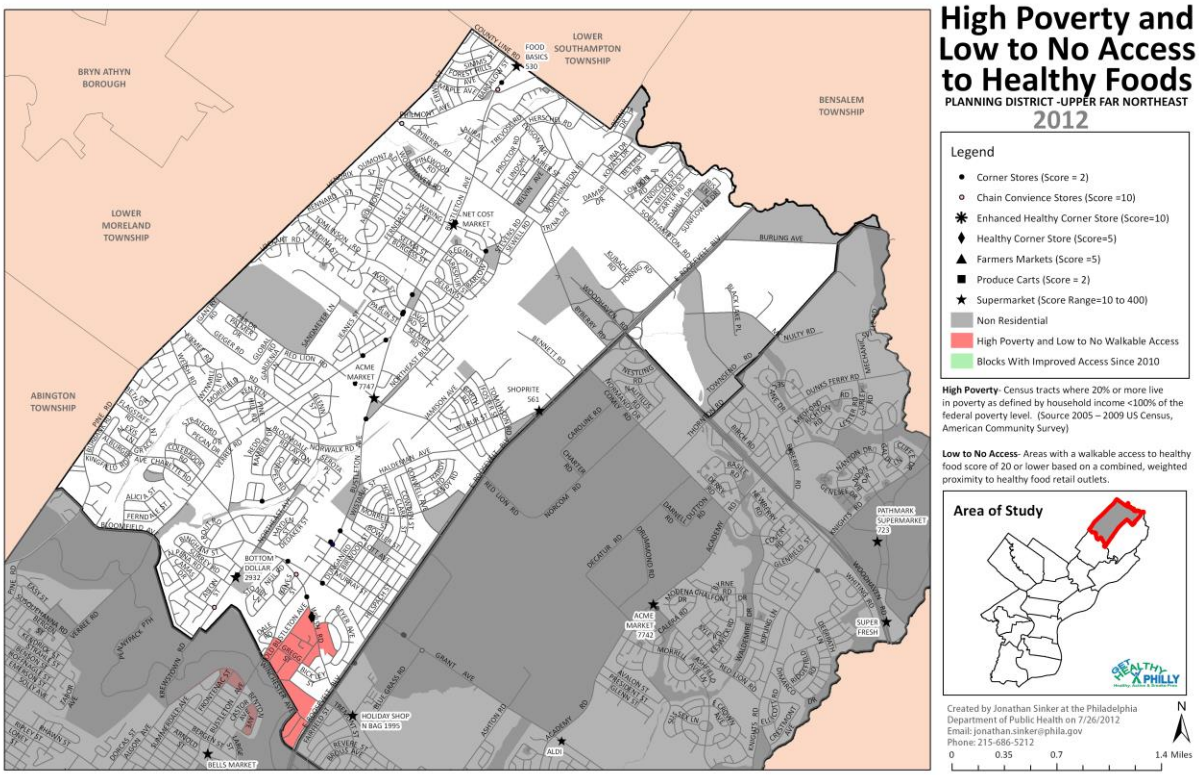
Note: Improved blocks for 2014 were not assessed due to database transition issues.

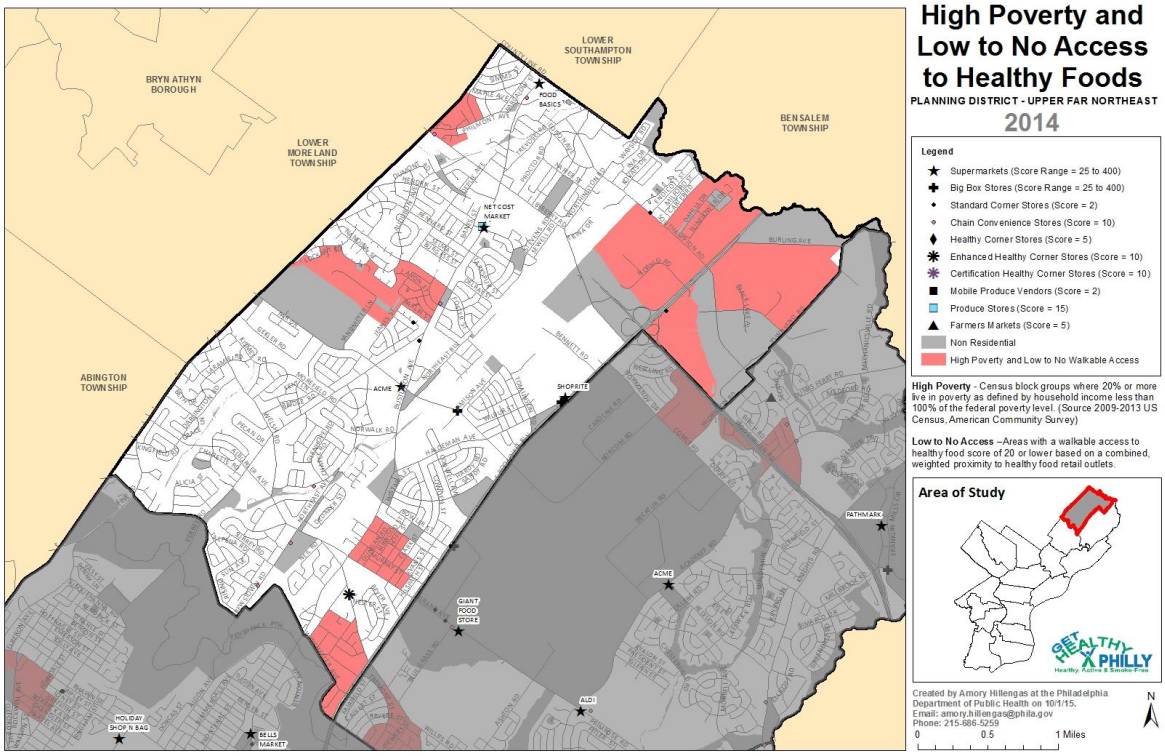
Upper Far Northeast





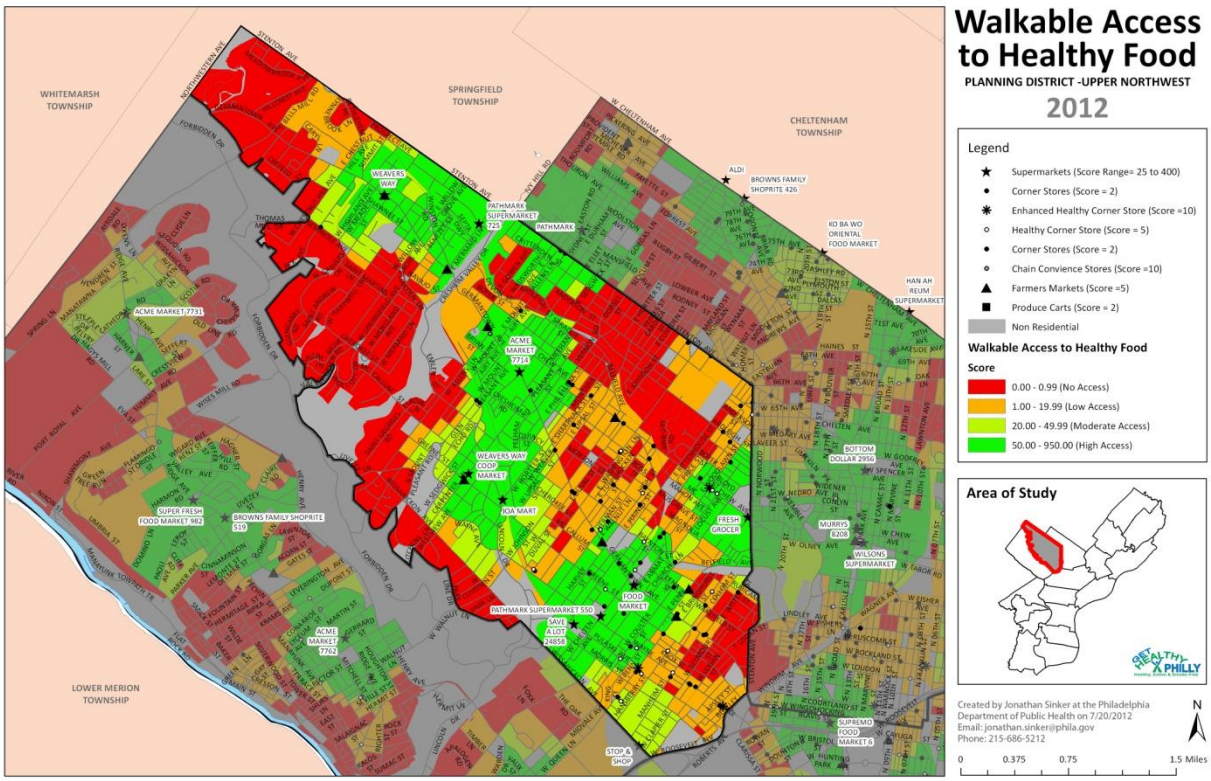
Upper Far Northeast

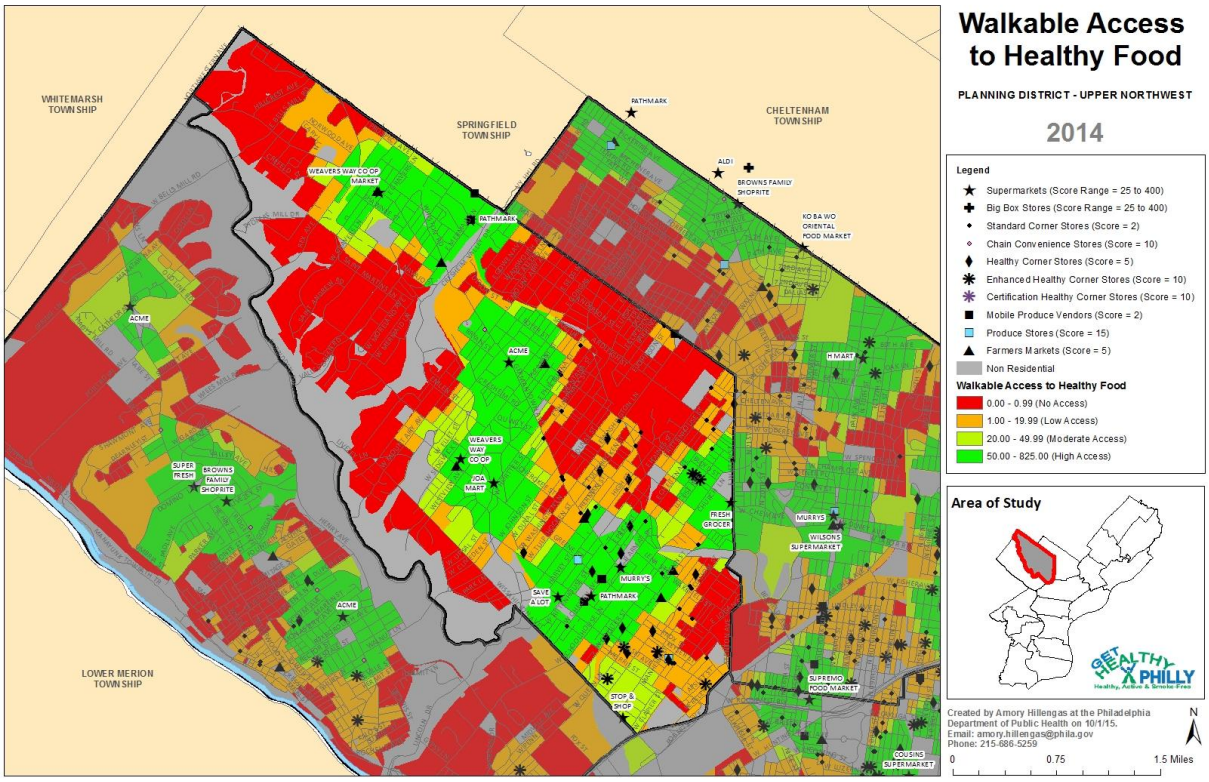




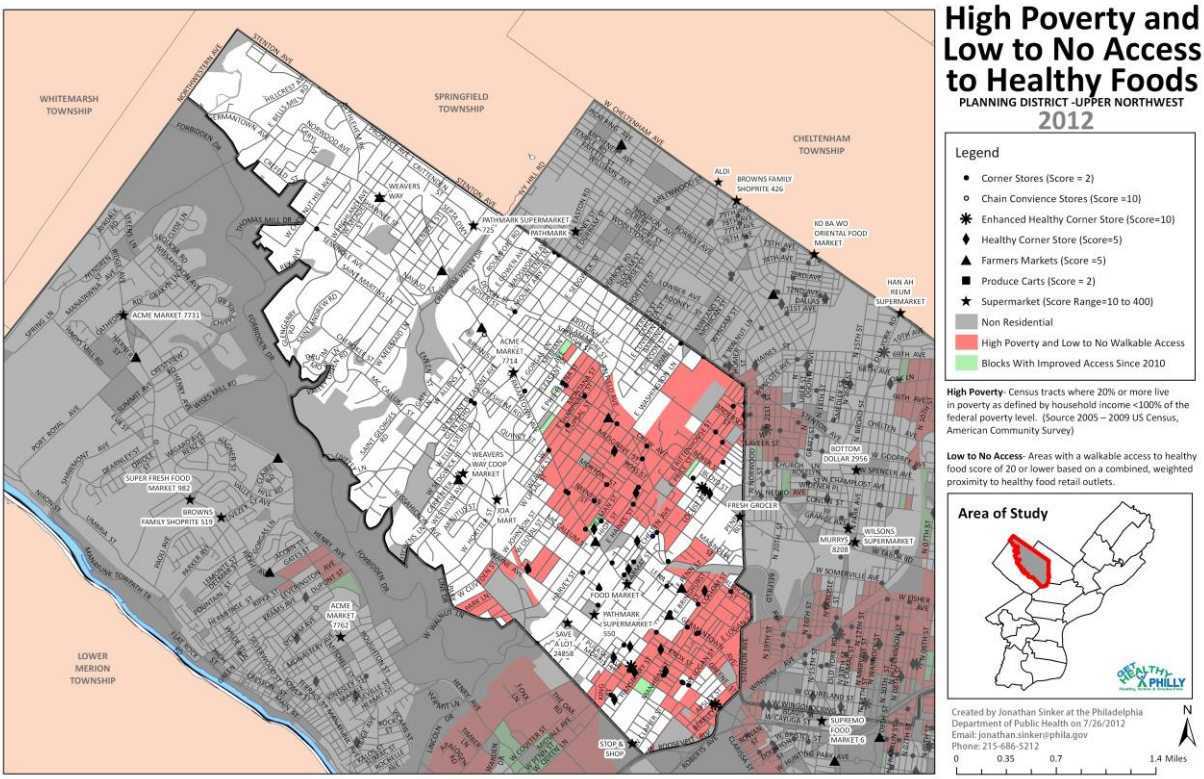
Note: Improved blocks for 2014 were not assessed due to database transition issues.

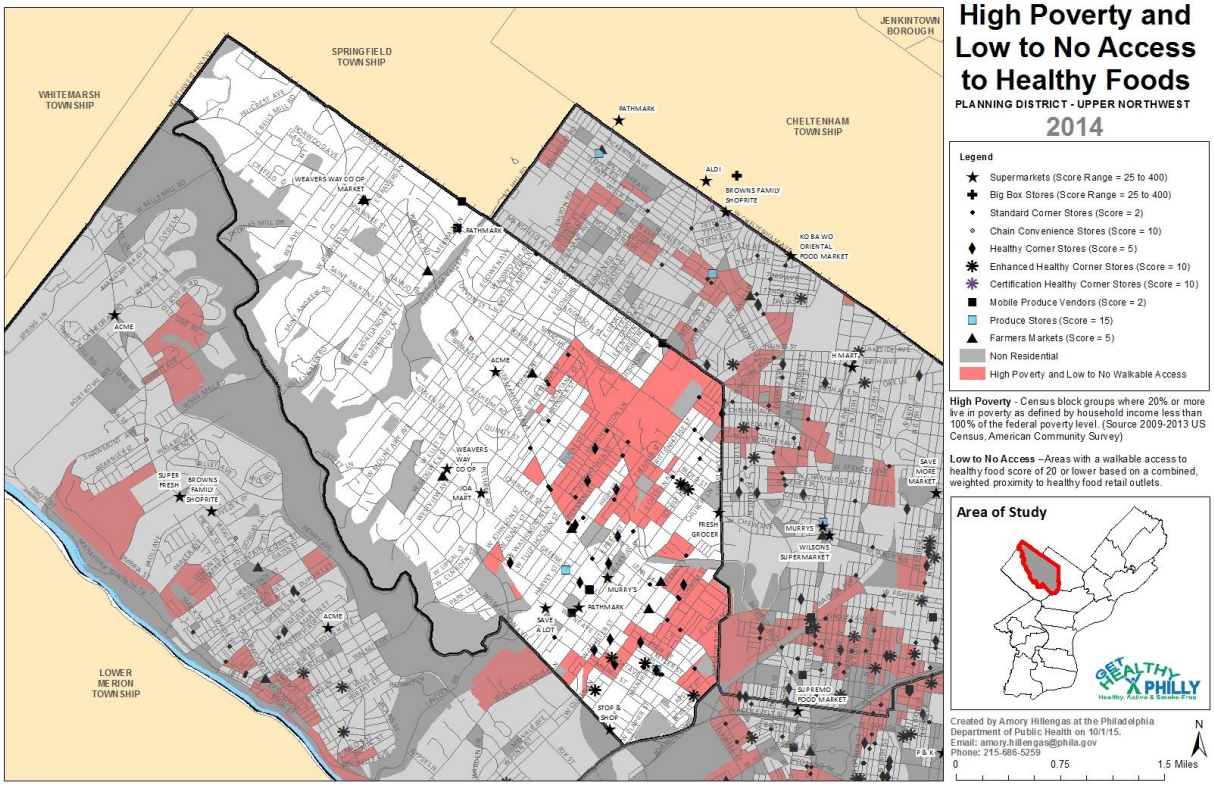
Upper Northwest





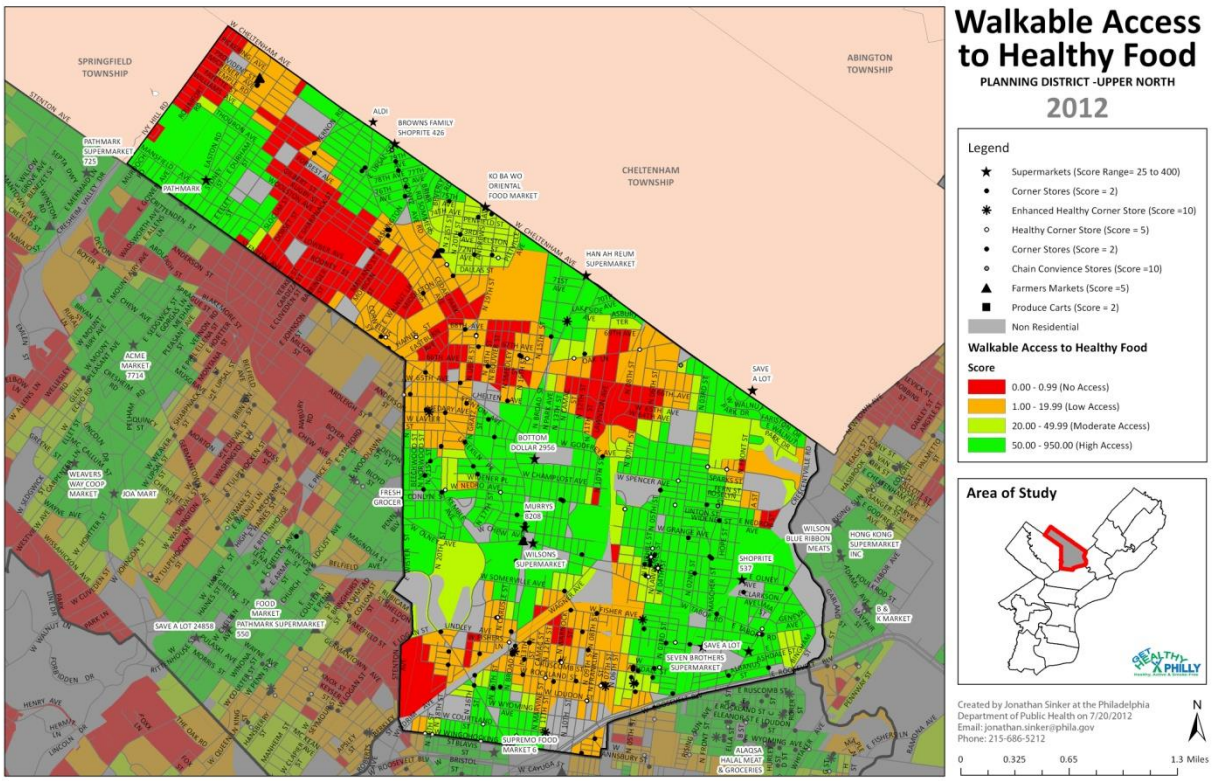
Upper Northwest

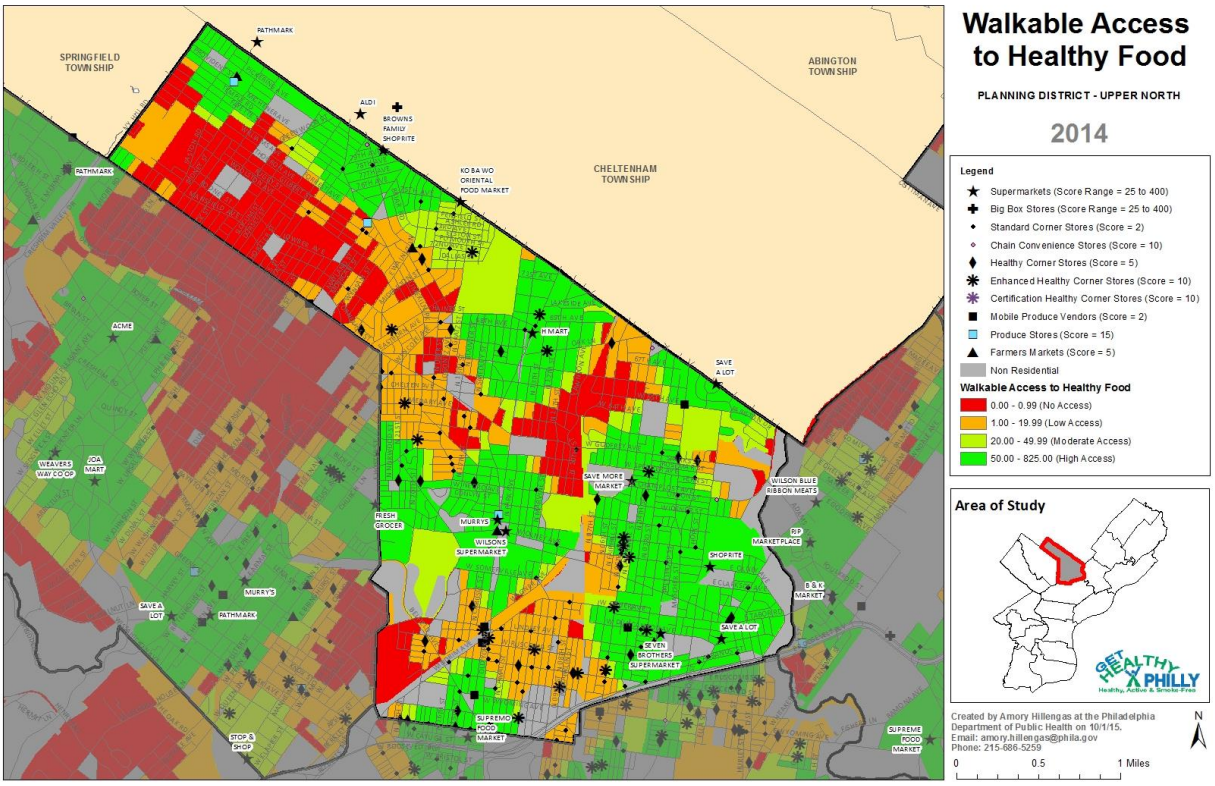




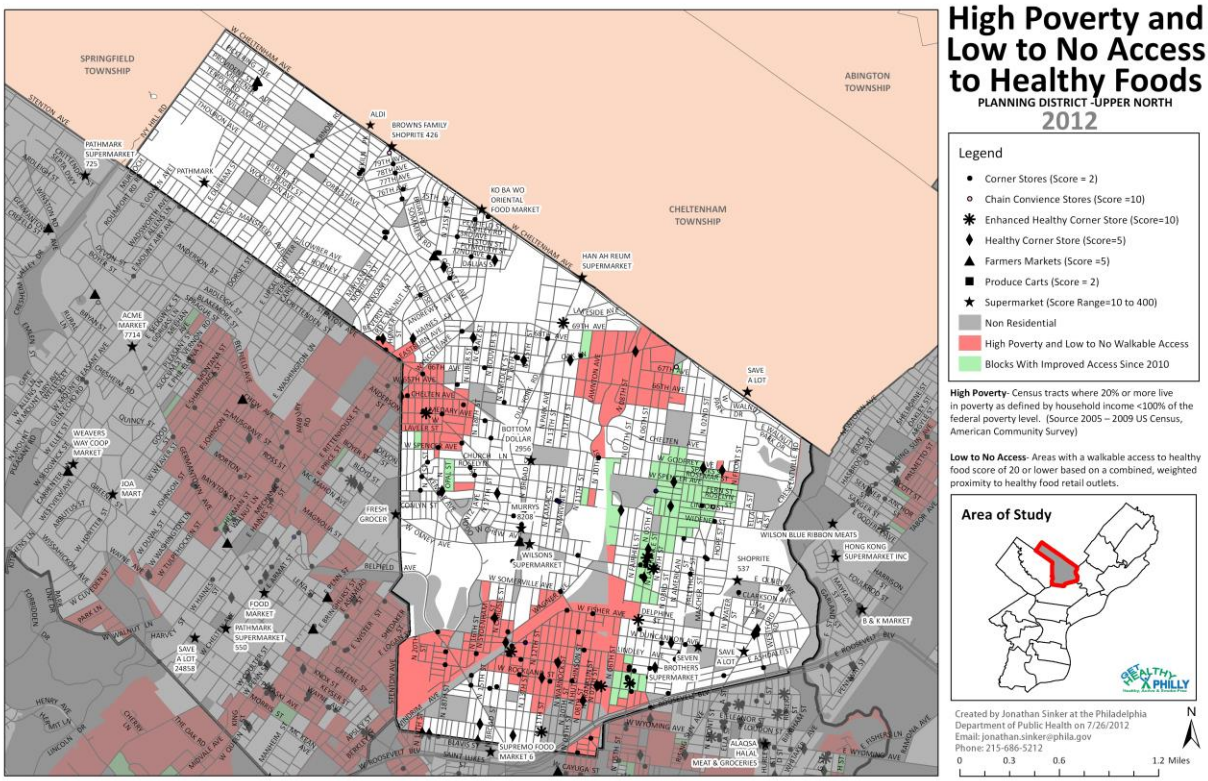
Note: Improved blocks for 2014 were not assessed due to database transition issues.

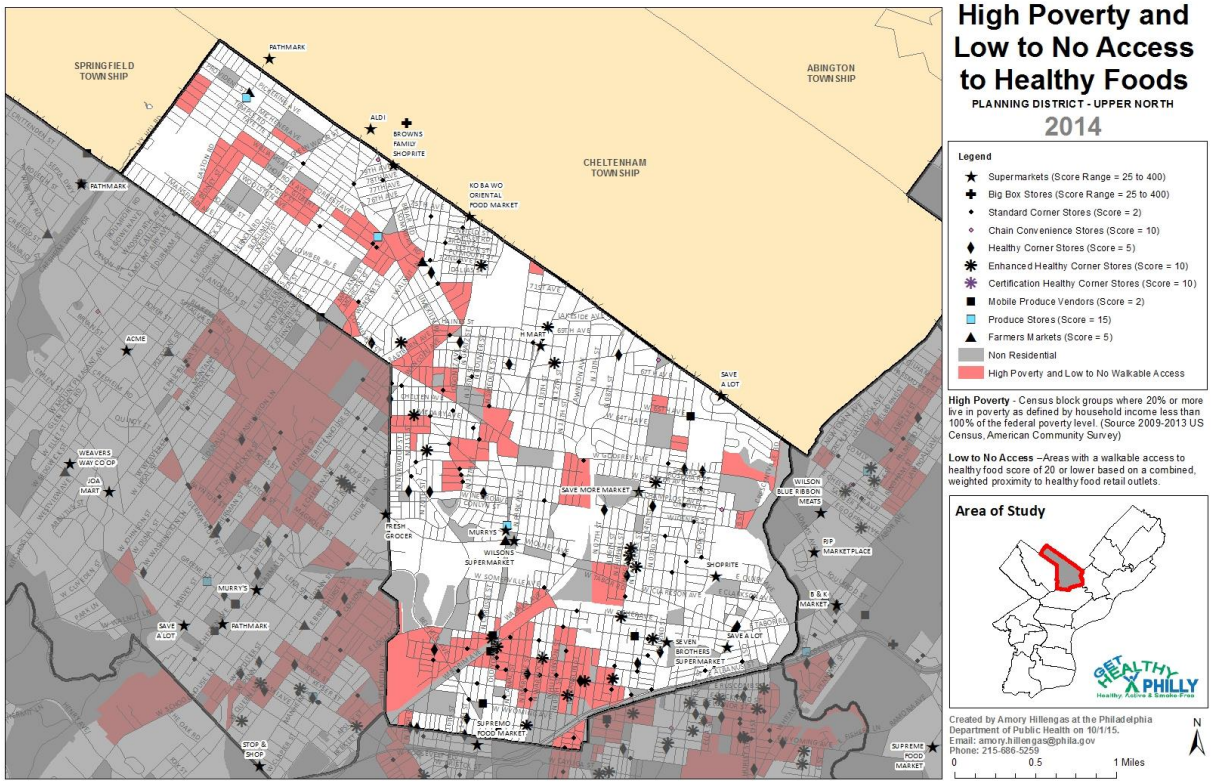
Upper North


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.325 0.65 1.3 Miles
SPRINGFIELD TOWNSHIP
ABINGTON TOWNSHIP
CHELTENHAM TOWNSHIP


Walkable Access to Healthy Food
PLANNING DISTRICT - UPPER NORTH
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.5 1 Miles
SPRINGFIELD TOWNSHIP
ABINGTON TOWNSHIP
CHELTENHAM TOWNSHIP

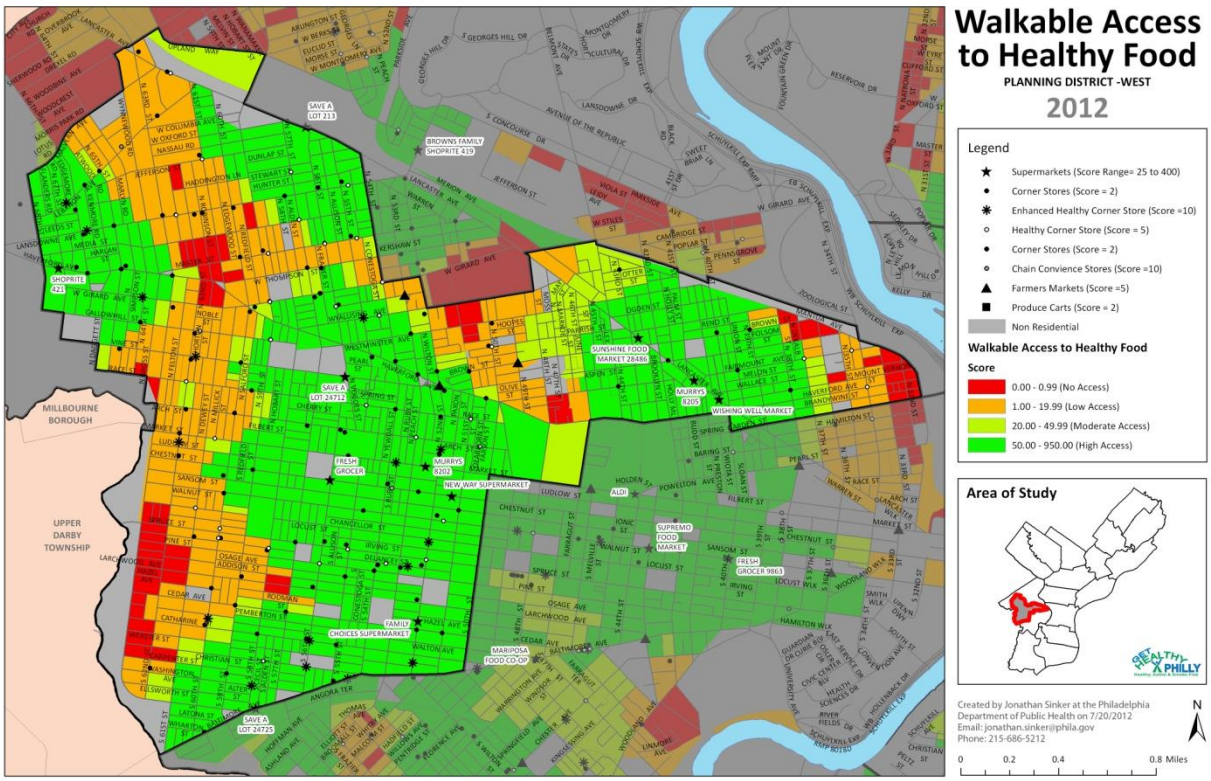
Upper North

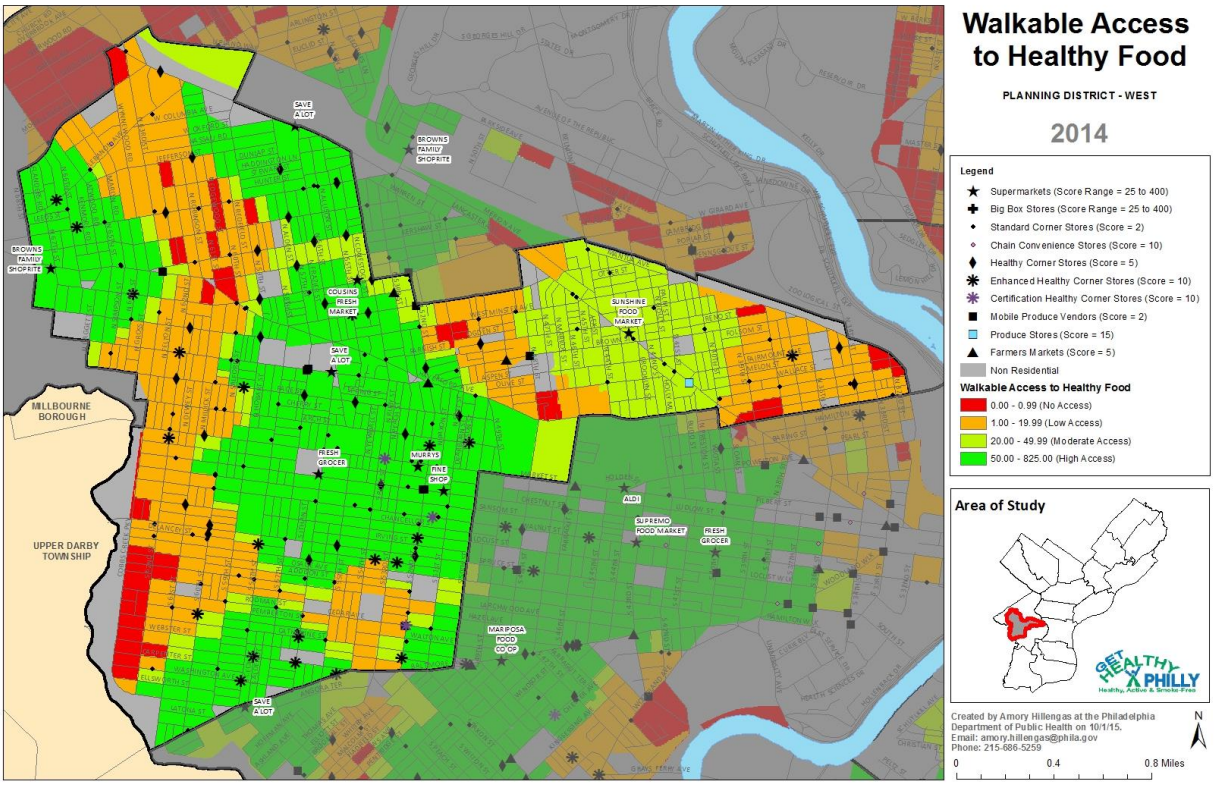




Note: Improved blocks for 2014 were not assessed due to database transition issues.

West


Walkable Access to Healthy Food
PLANNING DISTRICT -WEST
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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.2 0.4 0.8 Miles
MILLBOURNE BOROUGH
UPPER DARBY TOWNSHIP


Walkable Access to Healthy Food
PLANNING DISTRICT - WEST
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
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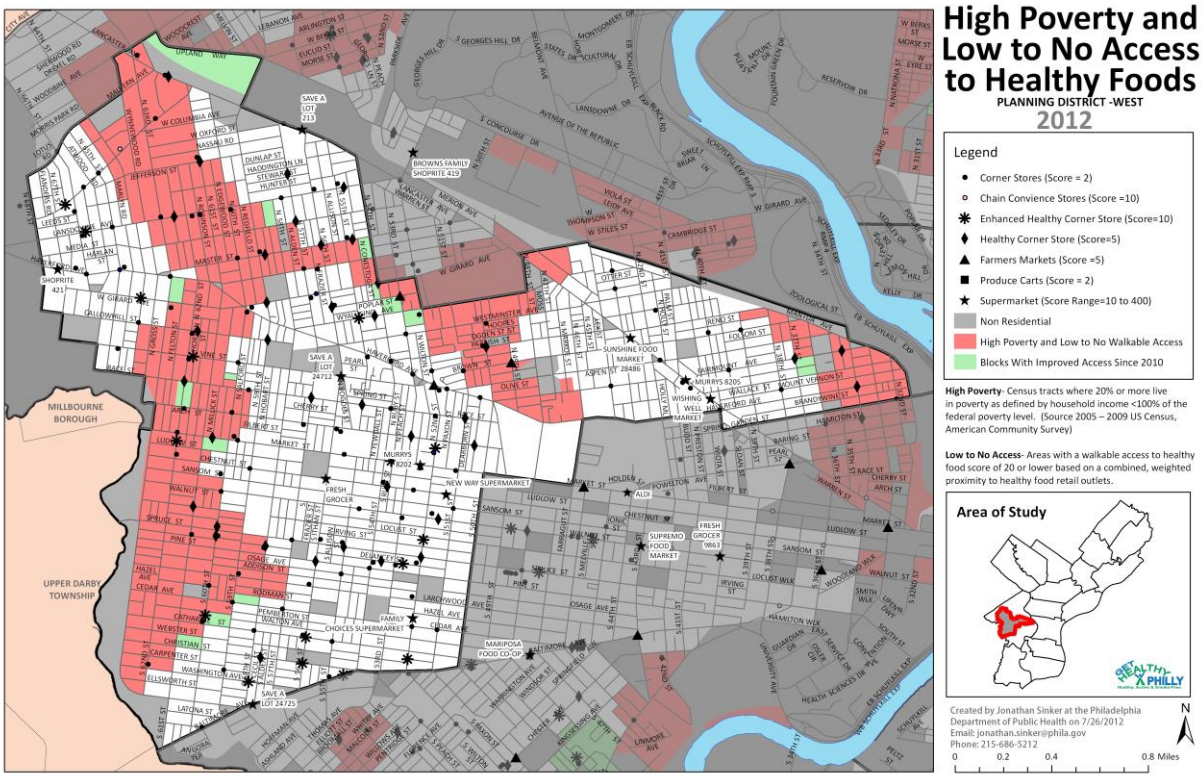
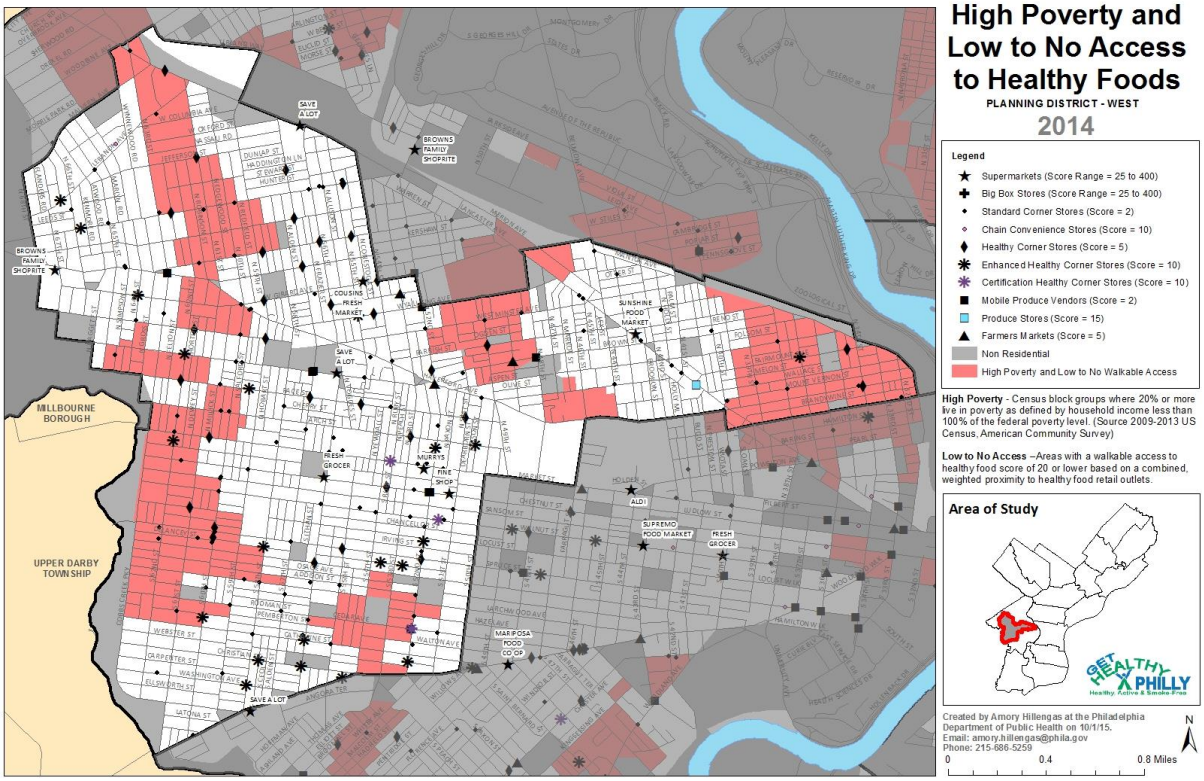
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.4 0.8 Miles
MILLBOURNE BOROUGH
UPPER DARBY TOWNSHIP

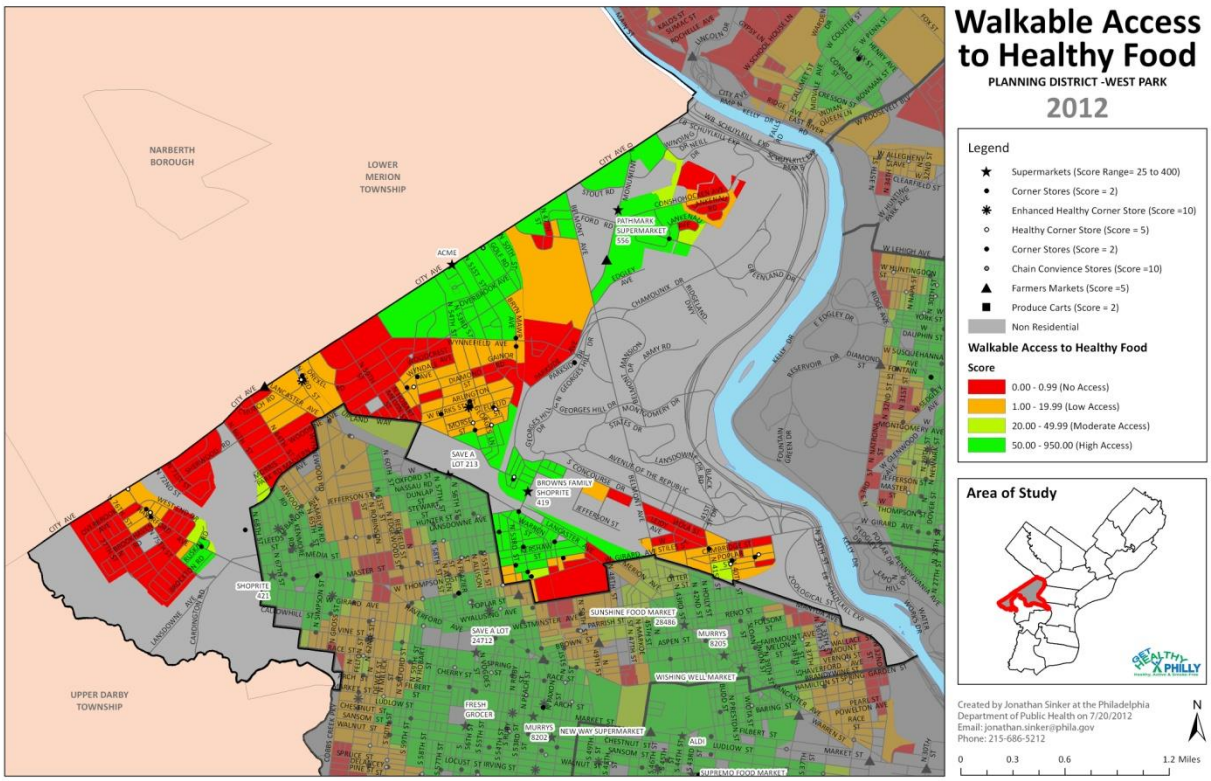
West

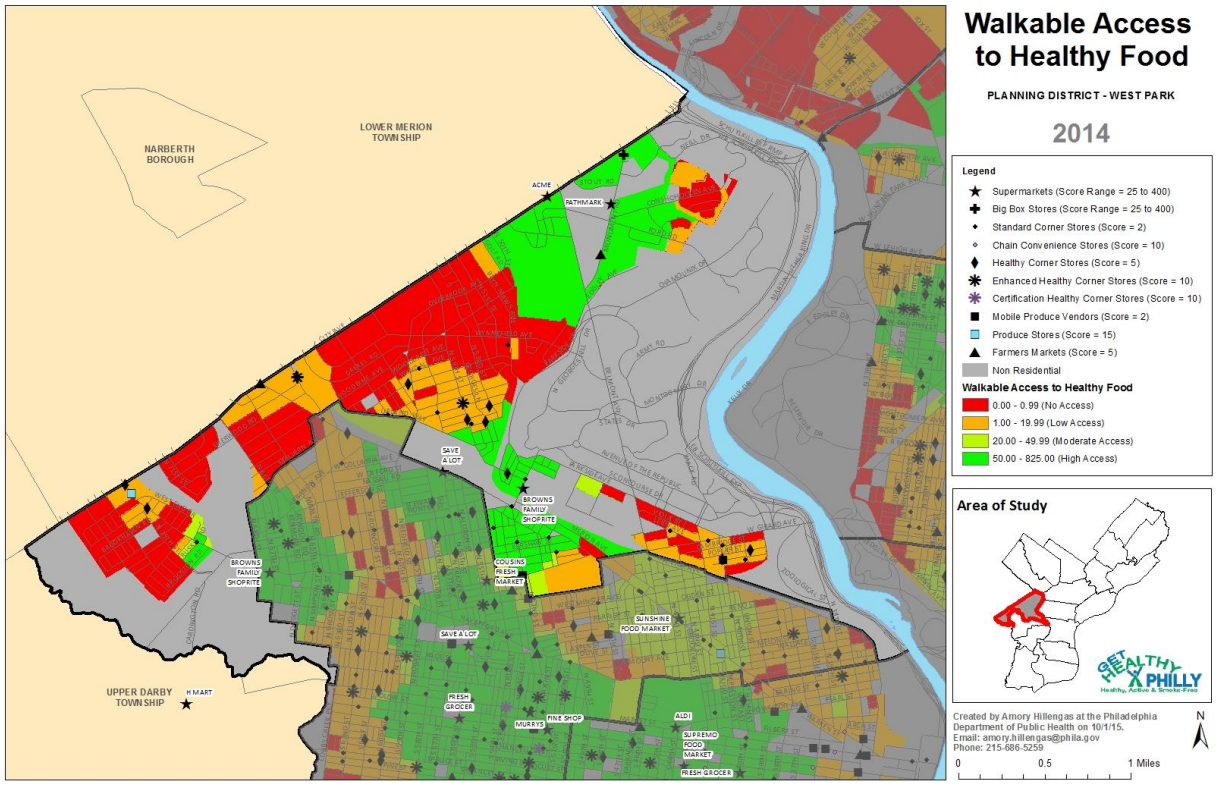




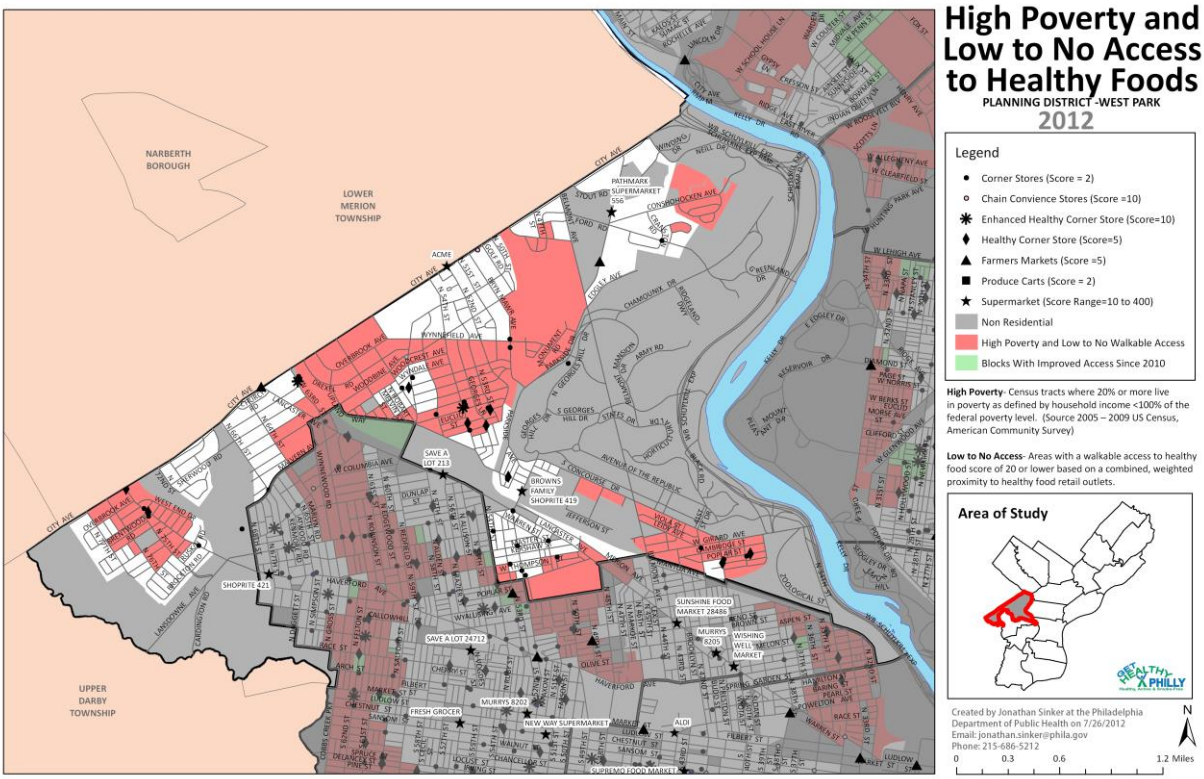
Note: Improved blocks for 2014 were not assessed due to database transition issues.

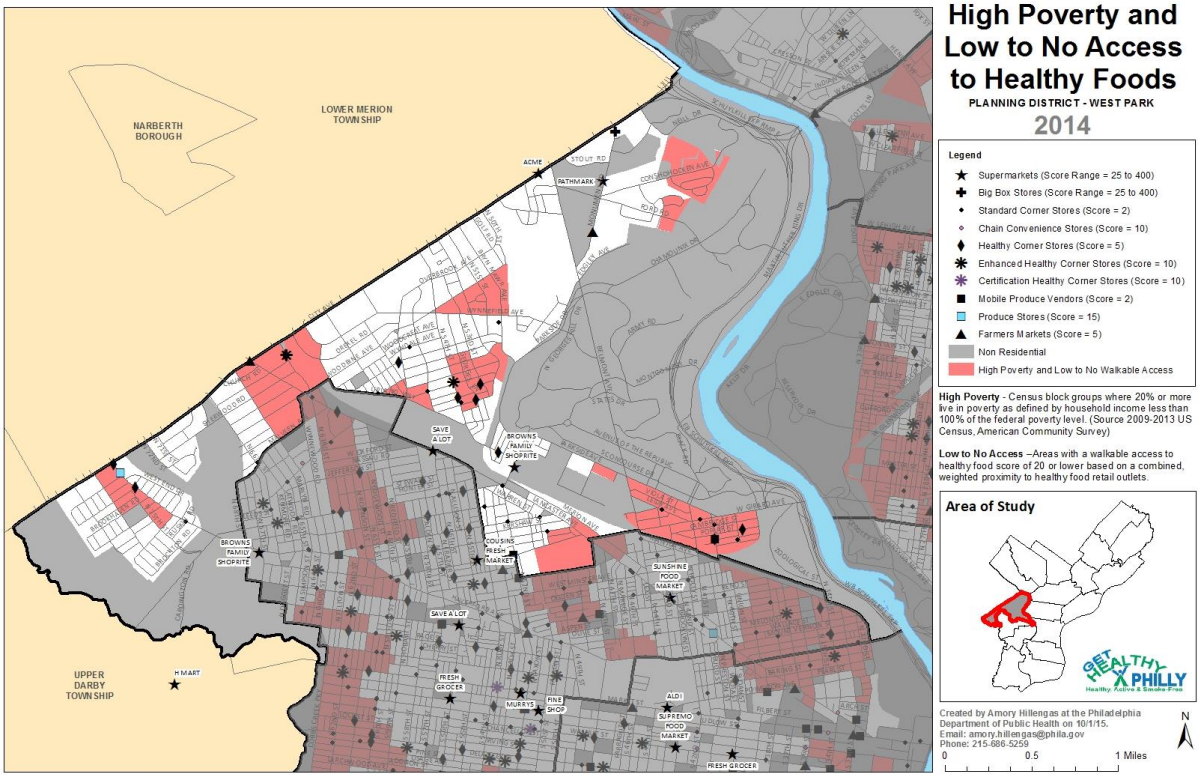
West Park


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 Convience 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
Email: jonathan.sinker@phila.gov
Phone: 215-686-5212
N
0 0.3 0.6 1.2 Miles
NARBERTH BOROUGH
LOWER MERION TOWNSHIP
UPPER DARBY TOWNSHIP
ACME
PATHMARK SUPERMARKET 559
SAVE A LOT 213
BROWNS FAMILY SHOPRITE 419
SHOPRITE 421
SUNSHINE FOOD MARKET 26486
SAVE A LOT 24712
MURRYS 8205
WISHING WELL MARKET
FRESH GROCER
MURRYS 8202
NEW WAY SUPERMARKET
ALDI
SUPREMO FOOD MARKET


Walkable Access to Healthy Food
PLANNING DISTRICT - WEST PARK
2014
Legend
Supermarkets (Score Range = 25 to 400)
Big Box Stores (Score Range = 25 to 400)
Standard Corner Stores (Score = 2)
Chain Convenience Stores (Score = 10)
Healthy Corner Stores (Score = 5)
Enhanced Healthy Corner Stores (Score = 10)
Certification Healthy Corner Stores (Score = 10)
Mobile Produce Vendors (Score = 2)
Produce Stores (Score = 15)
Farmers Markets (Score = 5)
Non Residential
Walkable Access to Healthy Food
0.00 - 0.99 (No Access)
1.00 - 19.99 (Low Access)
20.00 - 49.99 (Moderate Access)
50.00 - 825.00 (High Access)
Area of Study
Created by Amory Hillengas at the Philadelphia Department of Public Health on 10/1/15.
Email: amory.hillengas@phila.gov
Phone: 215-686-5259
N
0 0.5 1 Miles
NARBERTH BOROUGH
LOWER MERION TOWNSHIP
UPPER DARBY TOWNSHIP
ACME
PATHMARK
SAVE A LOT
BROWNS FAMILY SHOPRITE
COUSINS FRESH MARKET
SUNSHINE FOOD MARKET
FRESH GROCER
MURRYS
PINE SHOP
ALDI
SUPREMO FOOD MARKET
H MART

West Park





Note: Improved blocks for 2014 were not assessed due to database transition issues.

V. Technical Appendix

A. Data sources, definitions, and limitations

1. Supermarkets

Supermarket data for Philadelphia County for 2014 were purchased from Nielsen-Trade Dimensions. This dataset came with the street address, sales volume, store trade channel, store sub channel, chain/independent status, number of employees, square footage of the store, and other attributes describing the store.

Supermarkets were identified by the store trade channel "Grocery" and an annual sales of $2 million or higher (as per the Food Marketing Institute[8]). 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, select canvassing, and reviews with colleagues in the Philadelphia City Planning Commission. This was particularly important in identifying local supermarkets missing from the proprietary database and properly classifying stores as supermarkets versus another retailer type. (As noted in the limitations, we were not able to examine every retailer to the same degree.)

Supermarkets were classified by their annual sales volume into 5 categories. Those without sales volume data were assigned to the category with the least sales by default. The median sales volume for Philadelphia supermarkets was about $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
- >= $40 million in annual sales

2. Big box Stores

Big box stores include Wal-Mart, Target, Sam's Club, and BJ's stores that sell groceries. These stores were identified from a list of retailers that accept Supplemental Nutrition Assistance Program (SNAP) benefits (provided by the USDA), in addition to the stores' websites. Phone calls confirmed the sales of fresh fruits and vegetables and every big box store included in this analysis sells fresh produce. We included big box stores within a half-mile of Philadelphia, as well.

Big box stores were also classified into the same 5 categories as supermarkets. Sales volume data were obtained from the Nielsen database. Wal-Mart and Target stores sales were adjusted to represent the proportion of revenue coming from groceries. For Wal-Mart, grocery sales represented 55% of each store's total annual revenue.[9] For target, grocery sales represented

21% of each store's total annual revenue.[10] The total revenue for a Sam's Club or BJ's was used for classification.

- $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
- >= $40 million in annual sales

3. Chain Convenience Stores

Convenience store data for Philadelphia County for 2014 were purchased from Nielsen-Trade Dimensions. Convenience stores were identified by the store trade channel "Convenience Store." Non-chain stores and those that sold gas were excluded. Stores were verified by cross-checking between: a list of retailers that accept Supplemental Nutrition Assistance Program (SNAP) benefits (provided by the USDA), Google Maps, the chains' websites, and phone calls when needed.

4. 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 the data purchased from Nielsen-Trade Dimensions. Corner stores were identified by the store sub channel "Conventional Convenience" or "superette" in additional to "independent" (not chain) status. (This eliminated chain convenience stores.) Stores were verified by cross-checking between: a list of retailers that accept Supplemental Nutrition Assistance Program (SNAP) benefits (provided by the USDA, Google Maps, phone calls when needed, select canvassing, and reviews with colleagues in the Philadelphia City Planning Commission. This was particularly important in properly classifying stores as corner stores versus another retailer type. Additional corner store data were obtained from the Philadelphia Department of Public Health's tobacco retailer database. Healthy corner stores data were provided by Get Healthy Philly.

Standard corner store

In general, 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 650 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/.

Certified healthy corner stores

Healthy corner stores that are high-performing and committed to improving the health of their community are eligible for certification. To become certified healthy, stores must meet set inventory and promotional requirements in 8 different categories. Stores that complete the program receive incentives for their participation such as merchandizing training, marketing materials, or customized reusable bags.

5. 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. We extracted produce vendors from the EHS food retailer database by searching for the terms “produce,” “fruit,” and “veg” in the business name. Those with a “Mobile Food Vendor” facility subtype were designated as mobile produce vendors. Additional mobile produce vendor data were obtained from another healthy food access study conducted in Philadelphia.[11]

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.

6. Produce Stores

The Division of Environmental Health Services (EHS) of the Philadelphia Department of Public Health licenses and inspects food service establishments in Philadelphia. We extracted produce vendors from the EHS food retailer database by searching for the terms “produce,” “fruit,” and “veg” in the business name. We identified facilities with a non-mobile subtype, such as “grocery market,” and designated those as produce stores. These are typically small stores selling primarily fresh fruits and vegetables.

7. 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. From the dataset used in this analysis, seven markets are open 2 days per week; one is open 4 days per week; one indoor market is open 7 days per week year-round, and four outdoor markets are open year-round.

8. 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 block groups (as per 2010 U.S. Census boundaries) in which 20% or more of the households lived below 100% of the Federal Poverty Level. Data were obtained from the 2009-2013 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.

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)[12,13] 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 also fails to 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. In order to compare scores for retailers across studies, we normalized the scores assigned by the two studies. To do this, we used a score of 100 for supermarkets 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 x 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] $2 - $4.99 million	100	100	25

$5 - $9.99 million $10 - $19.99 million $20 - $39 million ≥ $40 million			50 100** 200 400
Big box store $2 - $4.99 million $5 - $9.99 million $10 - $19.99 million $20 - $39 million ≥ $40 million			 25 50 100 200 400
Mid-sized food store[2] Convenience store[3]	21 1	16 4	10
Corner store or small food store[4]	6	10	2
Healthy corner store	--	--	5
Enhanced healthy corner store	--	--	10
Certified healthy corner store			10
Farmers' market	--	--	5
Mobile produce vendor	--	--	2
Produce store			15

*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 x 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.

[1]Farley 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.

[2]Farley 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.

[3]Farley 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.

[4]Farley 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:[14,15,16,17] 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.[18] 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 million[19] 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 studies[20] 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 5). For smaller, less numerous retailers with a greater variety, quantity, or quality of healthy foods—such as

Table 5: Service areas by food retailer

Retailer type	Service area (miles)
Supermarket	0.5
Big box store	0.5
Convenience store	0.25
Corner store	0.1
Healthy corner store	0.1
Enhanced healthy corner store	0.25
Certified healthy corner store	0.25
Farmers' market	0.25
Mobile produce vendor	0.1
Produce store	0.25

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

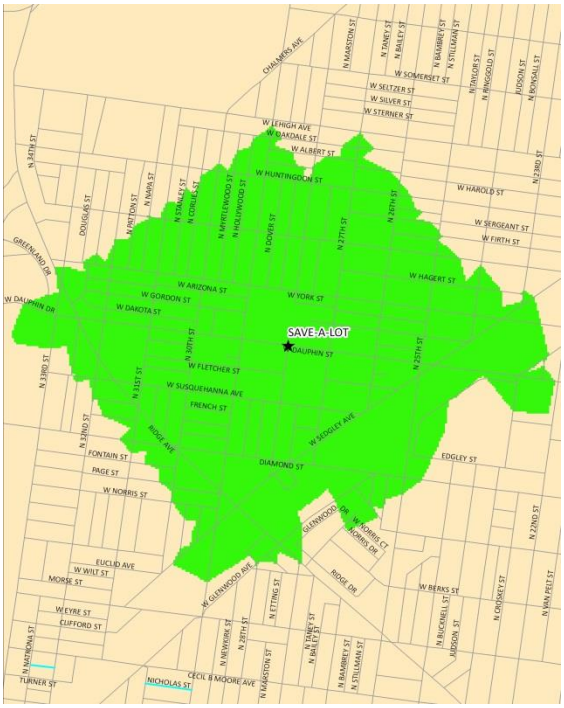
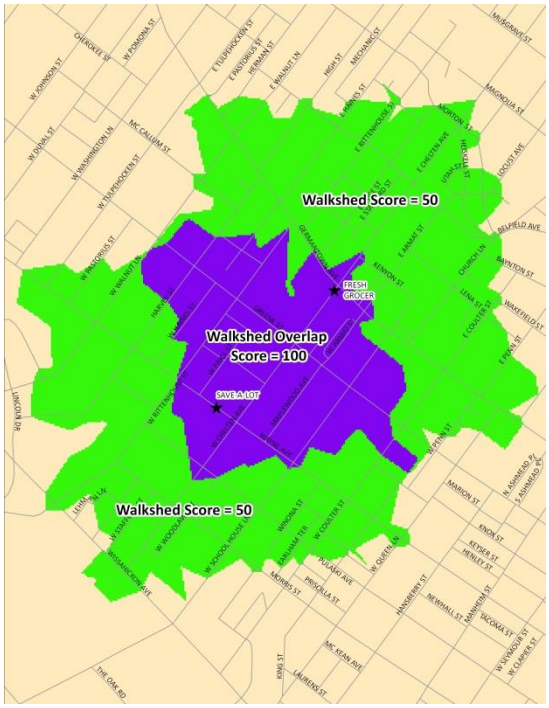


Figure B: Adding walksheds to create food access scores



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 10 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, representing low and no access, and in which 20% or more of the households have incomes below the Federal Poverty Level. These blocks are the areas with low-to-no access and high poverty.

VI. References

[1] U.S. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System 2010.

[2] U.S. Centers for Disease Control and Prevention. Youth Risk Behavior Survey 2013.

[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] http://www.policylink.org/sites/default/files/groceryattraction_final.pdf

[8] Food Marketing Institute. Supermarket Facts. http://www.fmi.org/research-resources/supermarket-facts

[9] Cable News Network Money. Wal-Mart: The $200 billion grocer. http://money.cnn.com/2013/01/31/news/companies/walmart-grocery/

[10] Fortune. Target CEO hires an ex-Safeway colleague to re-invent the store's grocery business. http://fortune.com/2015/04/13/target-safeway-grocery-business/

[11] Brinkley C, Chrisinger B, Hillier A. Tradition of Healthy Food Access in Low-income Neighborhoods: Price and Variety of Curbside Produce Vending Compared to Conventional Retailers. Journal of Agriculture, Food Systems, and Community Development. 2013:1-15.

[12] 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.

[13] 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.

[14] 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.

[15] 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.

[16] 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.

[17] 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.

[18] USDA, Agricultural Marketing Service. *National Farmers Market Manager Survey 2006*. May 2009.

[19] 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

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