

FOOD *for* EVERY CHILD

THE NEED FOR HEALTHY
FOOD FINANCING
IN VIRGINIA

SPECIAL REPORT

ACKNOWLEDGMENTS

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VIRGINIA must address the significant need for fresh food in many of its communities. A myriad of factors have led supermarkets to disinvest from lower-income areas across the commonwealth, creating a public health crisis.

The Food Trust issued *Food for Every Child: The Need for Healthy Food Financing in Virginia* to illustrate this problem and document the urgency of ensuring that all residents of Virginia have access to healthy and affordable food. This goal can be achieved by stimulating vibrant local food systems and the development of healthy food retail in underserved communities.

Despite the fact that agriculture is Virginia's largest industry, many communities throughout the commonwealth do not have enough places to purchase healthy, affordable food.¹ In urban and rural areas of all sizes, from Richmond, to Lynchburg, to Martinsville and large swaths of southern and southwestern Virginia, residents must travel long distances to purchase the foods necessary to maintain a healthy diet. More than 1.7 million Virginia residents, including over 480,000 children, live in lower-income communities with limited supermarket access.²

The lack of access to affordable and nutritious food has a negative impact on the health of children and families in Virginia. A growing body of research indicates that people who live in communities without a supermarket suffer from disproportionately high rates of obesity, diabetes and other diet-related health problems. In contrast, when people live in a community with a supermarket, they tend to eat more servings of fruits and vegetables and are more likely to maintain a healthy weight.³

Increasing the availability of nutritious and affordable food in communities with high rates of diet-related diseases does not guarantee a reduction in the incidence of these diseases. However, removing barriers to supermarket access is a key step toward enabling people to maintain a healthy diet. Furthermore, the development of new supermarkets and other healthy food retail outlets sparks economic revitalization, expands opportunities for Virginia farmers, and brings jobs into communities that need them most.⁴

Access to supermarkets and other healthy food retail is a key factor in the health and development of a community. Through mapping, this study concludes that many lower-income communities in Virginia with poor supermarket access also have a high incidence of diet-related deaths. The study builds on the work undertaken over the past several years by a variety of government, private and civic leaders in Virginia, including Virginia Community Capital, the Virginia Food Desert Task Force, the Commonwealth Council on Bridging the Nutritional Divide and the Virginia Foundation for Healthy Youth, as well as state and local food policy councils. This report

Over 1.7 million Virginia residents, including over 480,000 children, live in lower-income communities with limited supermarket access.

demonstrates that there is still more work to be done in Virginia to ensure that all residents have convenient access to stores selling fresh and affordable foods.

We call upon state and local governments to take the lead in developing a public-private response to the lack of access to healthy food in Virginia. While not a situation of any one sector's making, it is in the interest of the entire community to solve this problem. If Virginia reduced its average body mass index (BMI) by just 5%, it could save over \$18 billion by the year 2030.⁵ This report recommends the creation of a statewide healthy food financing program to encourage healthy food retail development in communities of need and expand market opportunities for Virginia farmers. In cities and states throughout the country, such programs have improved healthy food access while creating jobs and strengthening the economic well-being of communities.

INTRODUCTION

Many communities in Virginia have limited access to a full-service grocery store, and there are numerous communities where none exist.

This shortage of healthy food retail means that residents, particularly those in lower-income communities and rural areas, must travel out of their neighborhoods to reach the nearest store that sells fresh produce and other foods necessary to maintain a healthy diet.

A growing body of research demonstrates that access to healthy food retail has a measurable impact on people's diet and health outcomes. Both the Institute of Medicine and the Centers for Disease Control and Prevention have independently recommended that increasing the number of supermarkets in underserved areas would reduce the rate of childhood obesity in the United States. They also suggest that state and local governments should create incentive programs to attract supermarkets and other healthy food retail to these neighborhoods.^{6,7} Such an investment would have positive economic impacts, as well. Supermarkets create jobs and revitalize communities, serving as retail anchors and sparking complementary development nearby. In addition, healthy food financing programs strengthen local food systems by supporting food hubs and other distribution networks that expand market opportunities for local farmers and producers.

Virginia's adult obesity rate is over 27 percent. Communities of color are disproportionately impacted by this crisis, with 38.5% of African Americans obese, versus 26.3% of Caucasians.⁸ The situation is alarming for children, as well, with nearly 30 percent of Virginia's children ages 10–17 overweight or obese.⁹ Obese children face many physical and psychological issues, such as high blood pressure and cholesterol, diabetes, joint problems and asthma, and they are more likely to be obese as adults.¹⁰

Nearly 30 percent of Virginia's children are obese, and obesity has tremendous health and economic impacts.

Obesity has a tremendous economic impact, as well. The commonwealth is projected to have over 1 million cases of diabetes and over 2 million cases of heart disease by the year 2030 if things continue at their current pace.¹¹ However, if Virginia reduces its average body mass index (BMI) by just 5%, it could save over \$18 billion on medical costs over that same time span.¹² Direct medical expenditures are only one part of the cost of obesity. Further costs include reduced workforce productivity due to absenteeism and short- and long-term disability. These factors increase the cost of doing business in Virginia and weaken the sustainability and competitiveness of local businesses.

The Food Trust, a national food access nonprofit, issued *Food for Every Child: The Need for Healthy Food Financing in Virginia* to ensure that all children live in communities that have access to nutritious and affordable food. This report is designed, in part, to stimulate a process that will result in the development of supermarkets and other healthy food retail in lower-

income communities. To achieve that goal, this study outlines the extent and implications of the supermarket shortage by identifying the gaps in food availability and the relationship between supermarket access, diet-related diseases and neighborhood income levels. (Please see the appendix for a detailed description of the methodology used to create the maps in this report.)

This study builds on the remarkable work undertaken by a variety of government, private and civic leaders in Virginia to improve access to healthy, affordable, locally grown food. In 2013, the Virginia General Assembly "identified the existence of food deserts in Virginia as a significant concern" and commissioned Virginia Tech and Virginia State University to lead a Food Desert Task Force to study the issue.¹³ That task force published a report and provided recommendations, calling for investment in grant opportunities and incentives for healthy food enterprises and policy initiatives that impact food access.¹⁴

In 2014, the Virginia Foundation for Healthy Youth launched its youth-led Fresh Spot campaign, collecting over 2,724 surveys from 169 localities in Virginia. The survey results were released at the 2015 Weight of the State conference chaired by the first lady of Virginia. Among the key findings was that more than one in four Virginians (28%) do not think it is easy to find fresh fruits and vegetables to buy in their neighborhood or community, and of those residents, 75% would eat more fresh produce if stores in their neighborhood or community sold it.¹⁵

Additionally, the governor of Virginia established the Commonwealth Council on Bridging the Nutritional Divide in 2014. This cross-sector Council serves in an advisory role to the governor and is charged with achieving several objectives, including increasing access to affordable, healthy and local foods.¹⁶ To help achieve this goal, Virginia Community Capital launched the Virginia Fresh Food Loan Fund (VFFLF), a \$10 million fund to address the unmet capital needs of healthy food enterprises throughout rural and urban regions in Virginia. The VFFLF seeks to improve access to healthy foods while strengthening the overall food system in Virginia by driving economic development and job creation. State funds are needed to enable the program to provide the flexible financing necessary to address the grocery industry's tight margins and ensure that projects are sustainable. A \$20 million state investment in healthy food financing would be a significant step toward solving this problem in Virginia.

Despite notable progress, this report demonstrates that more work is needed in Virginia to ensure that all residents have convenient access to stores selling fresh and affordable foods. The Food Trust, the American Heart Association and its partners are committed to building on this success and working with state and local leaders to enhance existing efforts to improve healthy food access for residents across the commonwealth.



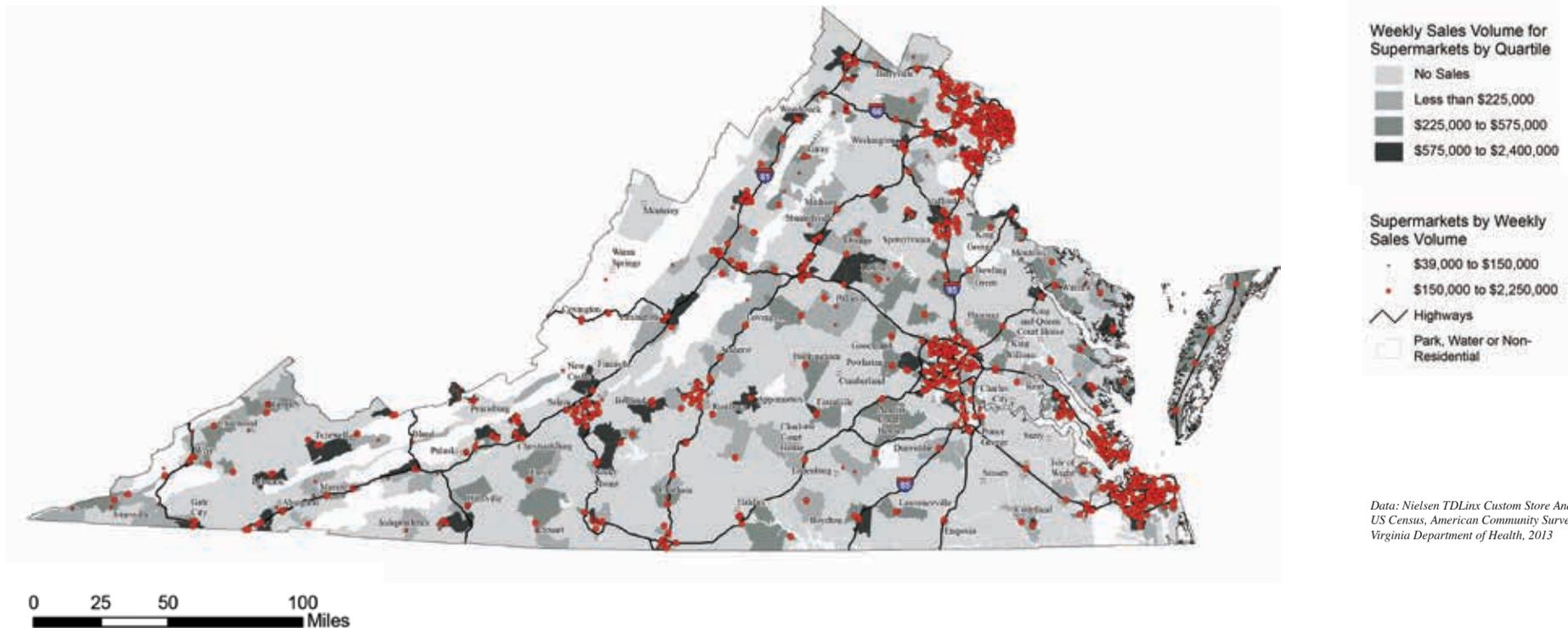
KEY FINDINGS

Access to nutritious food is not evenly distributed in Virginia. Many people have to travel excessive distances to buy food at a supermarket.

- The following pages display a series of maps that illustrate the need for better access to healthy food across the commonwealth of Virginia. There are large areas with few supermarkets and many communities where none exist at all.
- The need for improved food access is then highlighted in the cities of Richmond and Hampton.

MAP 1: *Weekly Sales Volume for Supermarkets* shows the location of 1,056 stores in Virginia and the weekly sales volume at each store. The smaller red circles represent lower weekly sales volume; the larger red circles represent higher weekly sales volume. The gray shading shows how supermarket sales are distributed across each census tract. The darkest areas have the highest concentration of supermarket sales, whereas the light areas have the lowest sales, indicating that few or no supermarkets are located there.

1: Weekly Sales Volume for Supermarkets in Virginia



Data: Nielsen TDLinX Custom Store Analysis, 2015
US Census, American Community Survey, 2009–2013
Virginia Department of Health, 2013

Map 1 features supermarkets in Virginia and the concentration of sales across the commonwealth. Sales tend to be concentrated in communities surrounding major cities, and along major transportation routes.

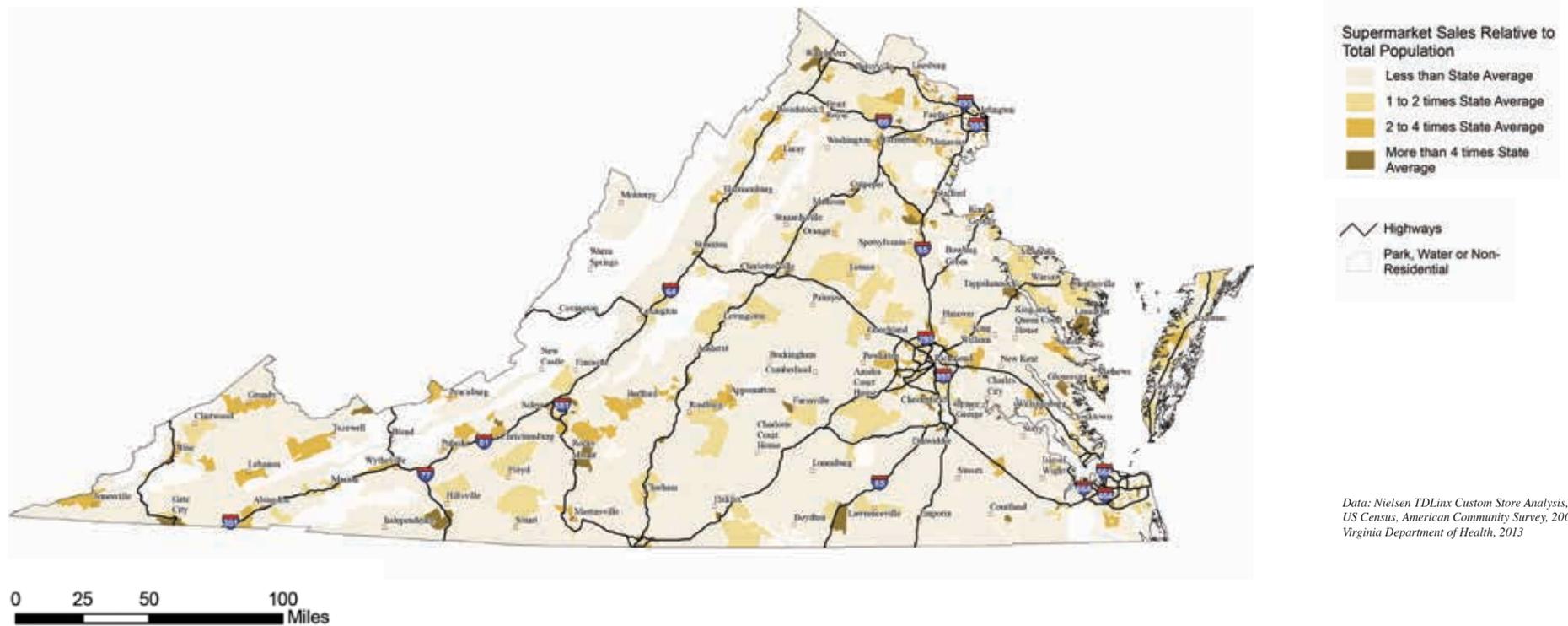
In these neighborhoods, people are either spending more than average in supermarkets, as might be the case in higher-income communities, or more people are

buying groceries in these communities than the number of people who live there, indicating that people are traveling from outside the area to shop.

MAP 2: *Supermarket Sales and Total Population* shows that the amount of supermarket sales in a particular location does not seem to be associated with the population of that area. Neighborhoods with greater-than-average supermarket sales relative to total population are shown in yellow and brown tones.

There are large areas of Virginia with few supermarkets and many communities where none exist.

2: Supermarket Sales and Total Population in Virginia



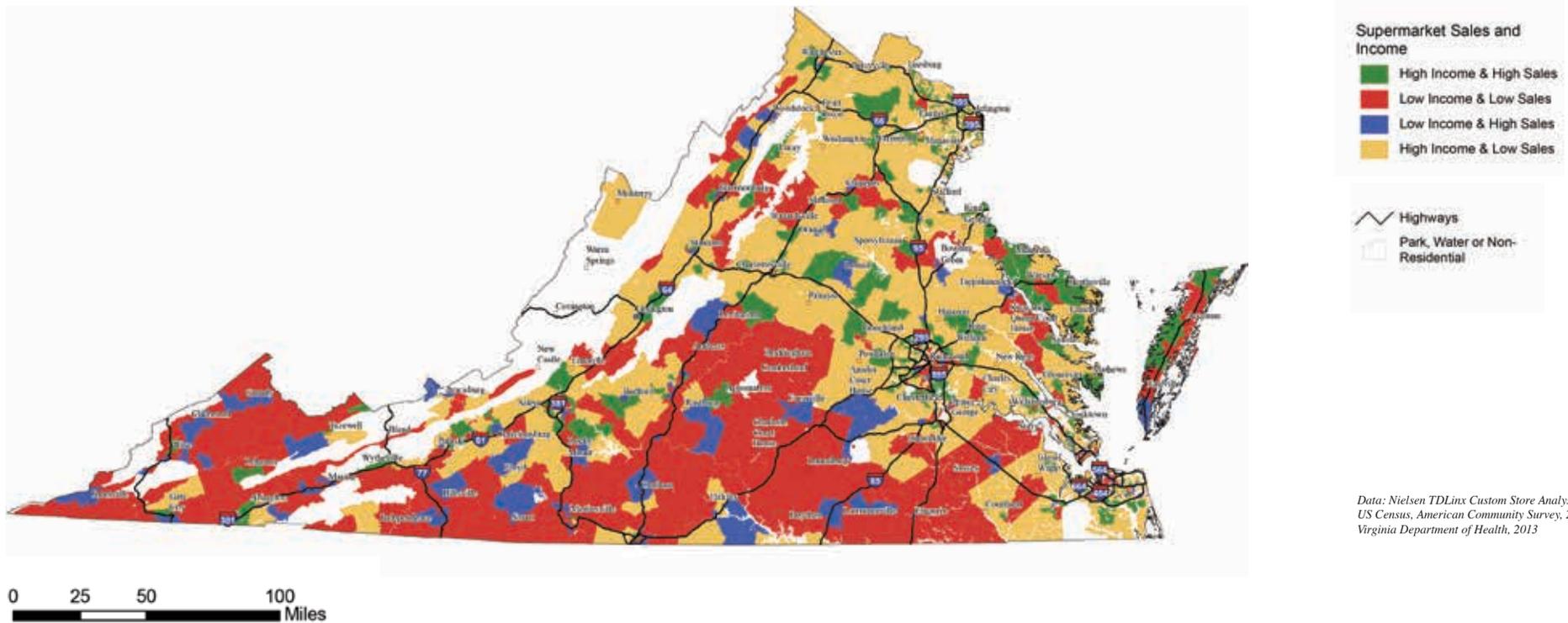
KEY FINDINGS

The uneven distribution of supermarkets in Virginia leaves a disproportionate number of lower-income residents without access to nutritious food.

- This problem is impacting families across the commonwealth. More than 1.7 million Virginia residents, including over 480,000 children, live in lower-income communities underserved by supermarkets.

MAP 3: *Supermarket Sales and Income* shows the distribution of supermarket sales and the distribution of income throughout Virginia. Higher-income areas with higher supermarket sales have the best access to food resources and are indicated by the green areas on the map. In some lower-income areas, there are communities with higher-than-average supermarket sales volumes, as highlighted in blue. People in the areas shown in yellow have fewer supermarkets at which to shop in their community. However, since these communities are higher-income and often have high car ownership rates, residents are more likely to drive to stores or shop at small specialty food purveyors.

3: Supermarket Sales and Income in Virginia



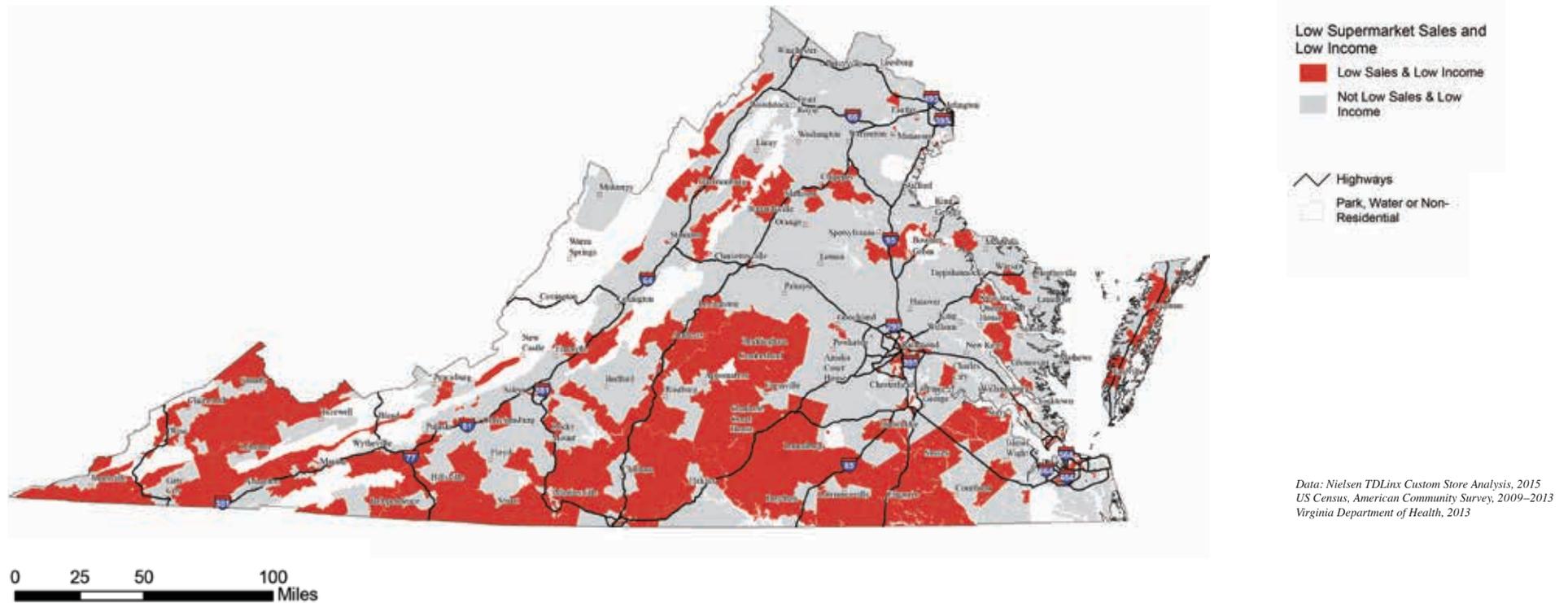
Data: Nielsen TDLinX Custom Store Analysis, 2015
US Census, American Community Survey, 2009–2013
Virginia Department of Health, 2013

The red areas represent lower-income neighborhoods that are not adequately served by supermarkets.

MAP 4: *Low Supermarket Sales and Low Income* further highlights areas with low supermarket sales because there are few to no stores located there. Lower income levels in these communities make it even more challenging for families to travel to where supermarkets are concentrated, especially when public transit is not accessible or convenient. In Virginia, underserved communities are concentrated in rural southern and southwestern areas, and in localities such as Richmond, Hampton and Lynchburg.

The need for more supermarkets in Virginia exists in urban and rural areas of all sizes, from Richmond, to Lynchburg, to Martinsville and large swaths of southern and southwestern Virginia.

4: *Low Supermarket Sales and Low Income in Virginia*



KEY FINDINGS

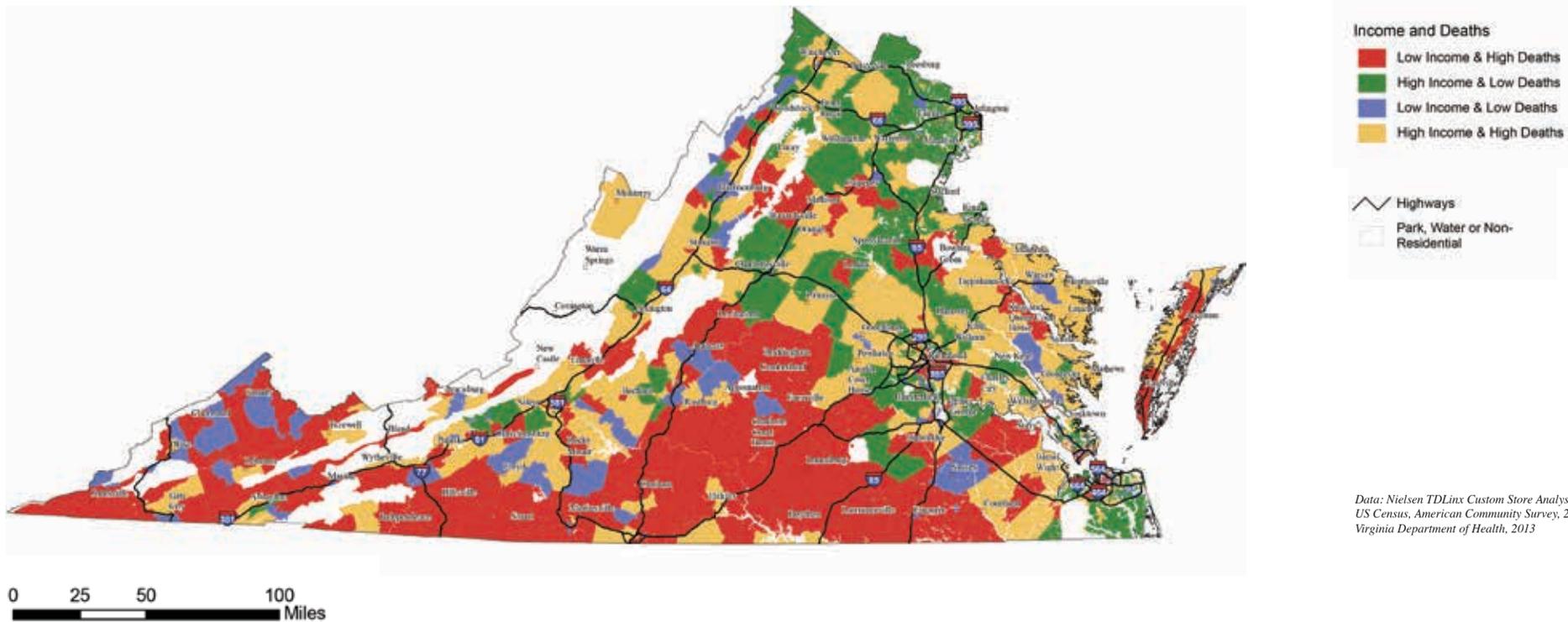
There is a connection between lack of supermarkets and diet-related disease.

- The Food Trust and PolicyLink, a national research and advocacy organization, conducted a comprehensive literature review which found that studies overwhelmingly indicate that people living in communities without a supermarket suffer from disproportionately high rates of obesity and other diet-related health issues, while people living in communities with a supermarket are more likely to maintain a healthy weight.¹⁷

One study, for example, found lower body mass index and better health among residents who live near a supermarket.¹⁸ Another study documented that as distance to a supermarket increased in a metropolitan community, obesity rates increased and fruit and vegetable consumption decreased.¹⁹

MAP 5: *Income and Diet-Related Deaths* shows diet-related mortality data by income in Virginia. The red areas indicate a higher-than-average rate of diet-related deaths occurring in lower-income areas. The yellow areas display higher rates of diet-related deaths occurring in higher-income areas. The blue and green areas have lower rates of diet-related deaths.

5: *Income and Diet-Related Deaths in Virginia*



Data: Nielsen TDLinX Custom Store Analysis, 2015
US Census, American Community Survey, 2009–2013
Virginia Department of Health, 2013

Diet-related diseases such as hypertension, obesity and diabetes create untold suffering and expense in families and communities. Heart disease and stroke accounted for over 30 percent of deaths in Virginia in 2005, and overweight or obese adults are significantly more likely to suffer from these conditions.²⁰ Diet-related deaths are associated with many factors, including the lack of access to a nutritionally adequate diet.

MAP 6: *Areas with Greatest Need* displays lower-income communities where there are low supermarket sales and a high number of deaths due to diet-related disease in Virginia. These areas have the greatest need for more

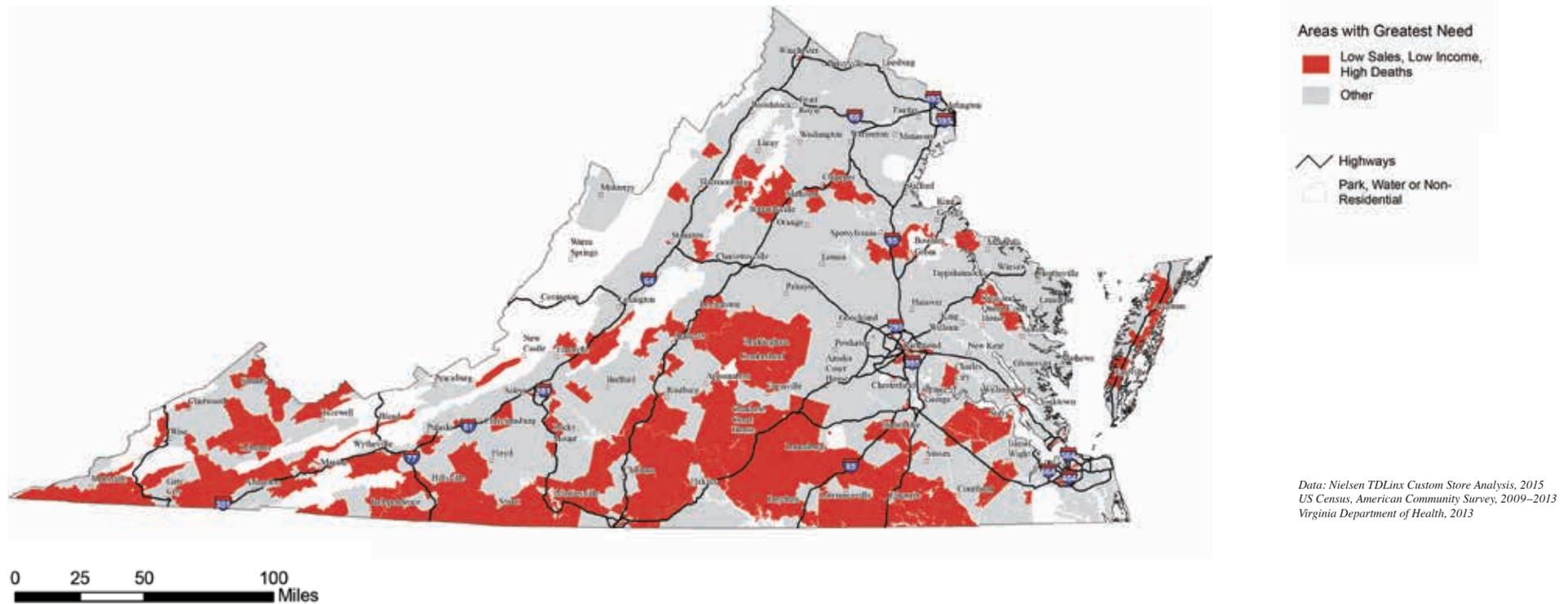
supermarkets and other fresh food retail. To provide affordable and nutritious food in these neighborhoods and others throughout the commonwealth, and to address the high rates of obesity and other diet-related diseases, Virginia should encourage new supermarket and other fresh food retail development in lower-income areas where there are few or no supermarkets.

Increasing the availability of healthy, affordable food in neighborhoods with high rates of diet-related diseases does not guarantee a reduction in their incidence. However, leading public health experts, including the Centers for Disease Control and Prevention and

the Institute of Medicine, agree that it is a critical component of improving health outcomes.

The need for more supermarkets in Virginia exists in urban and rural areas of all sizes, from Richmond, to Lynchburg, to Martinsville and large swaths of southern and southwestern Virginia.

6: *Areas with Greatest Need in Virginia*



KEY FINDINGS

Communities within Virginia's urban, rural and suburban areas lack access to healthy, affordable food.

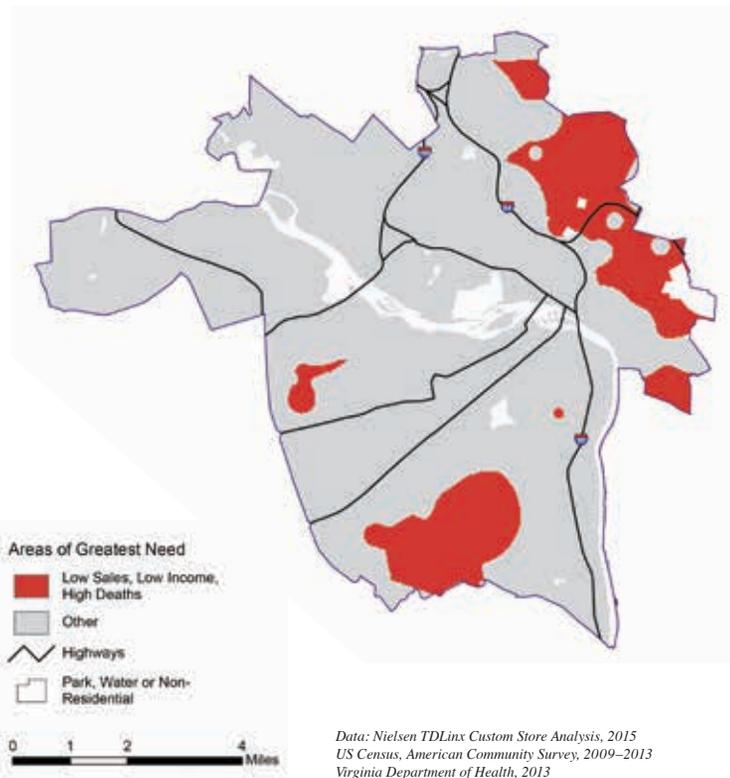
- These maps highlight lower-income neighborhoods in the cities of Richmond and Hampton where there are low supermarket sales and a high number of deaths due to diet-related disease.

These red areas have the greatest need for more supermarkets and other fresh food retail venues, a need that could be addressed by a statewide initiative to build more supermarkets and other healthy food retail in these and other underserved communities.

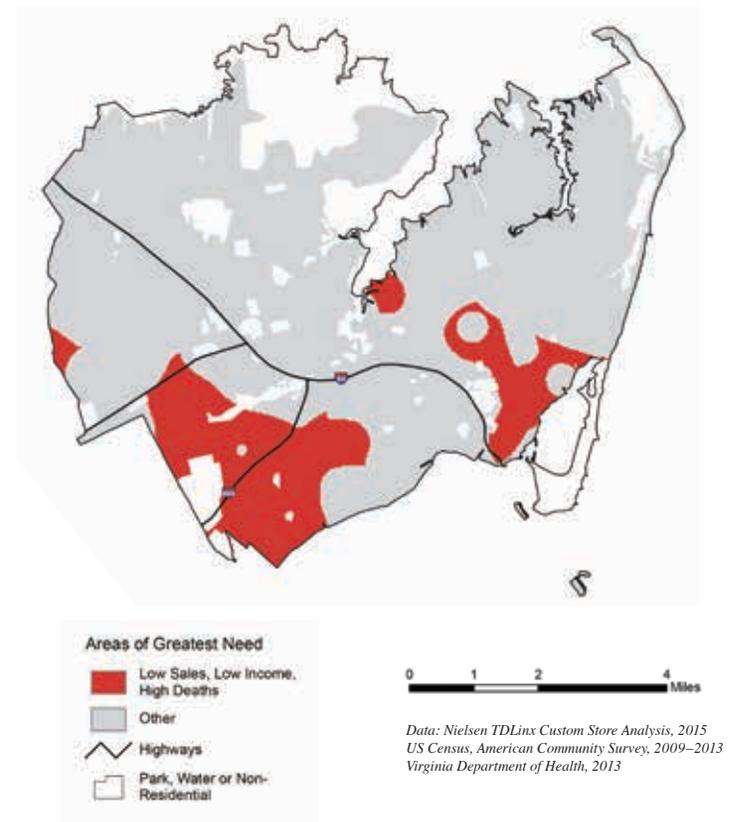
MAP 7: Areas with Greatest Need in Richmond include the East End, the Southside and the Northside, including the Highland Park neighborhood.

MAP 8: Areas with Greatest Need in Hampton include Greater Wythe and Buckroe.

7: Areas with Greatest Need in Richmond



8: Areas with Greatest Need in Hampton



CONCLUSION

Virginia must address the critical need for more healthy food retail in many communities.

Supermarket access is a key factor contributing to the health and economic development of neighborhoods. Through mapping, this study shows that many lower-income communities in Virginia have both poor supermarket access and a high incidence of diet-related deaths.

The increased incidence of obesity and other diet-related diseases in lower-income communities suggests that the state needs to invest in an initiative to stimulate supermarket development in these underserved areas to help combat these diseases. Such an investment would have positive economic impacts, as well, since supermarkets bring jobs to communities that need them the most and provide new market opportunities for Virginia farmers and producers.

States across the country have invested in programs to attract healthy food retail to lower-income, underserved communities. For example, Pennsylvania created the Fresh Food Financing Initiative (FFFI), a public-private partnership that supported 88 projects, creating and preserving over 5,000 jobs and 1.6 million square feet of retail space.²¹ Across the country, healthy food financing programs are improving food access and creating jobs in communities that need them most (see chart, p. 15).

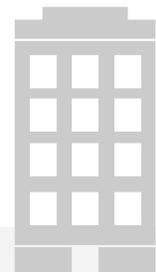
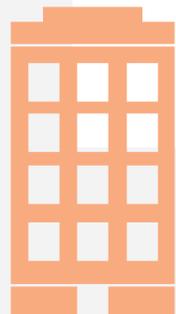
RECOMMENDATION

We recommend that Virginia invest in a statewide healthy food financing program.

The goals of the program should include:

- **Providing grants and loans** to supermarkets, cooperatives, corner stores, farmers' markets and other healthy food businesses for the construction, expansion and renovation of projects in lower-income, underserved areas of urban, rural and suburban Virginia;
- **Improving the health of families** and individuals by increasing access to fresh foods in underserved communities;
- **Creating or maintaining local jobs;**
- **Spurring economic development** and neighborhood revitalization by supporting fresh food retail, which attracts complementary businesses and increases property values; and
- **Expanding market opportunities** for Virginia farmers and producers by supporting food hubs and other food distribution networks dedicated to equity, community development, a strong Virginia food system and healthy food access.

Virginia is well-positioned to support a statewide healthy food financing program to encourage the development of supermarkets and other healthy food retail in underserved communities. There is already much momentum surrounding this issue in Virginia, and leaders in the business, government and civic sectors have all expressed the need for such a program. A \$20 million public investment would help to improve the health of residents, create jobs and spark meaningful economic revitalization in underserved rural and urban communities across the state.



WHY A HEALTHY FOOD FINANCING PROGRAM?

Healthy food financing programs incentivize the development of supermarkets and other healthy food businesses in underserved communities, increasing food access in communities that need it most.

This innovative model was first established in Pennsylvania with the statewide Fresh Food Financing Initiative (FFFI) in 2004. The FFFI took the form of a public-private partnership and encouraged grocery store development in underserved communities throughout the state. Seeded with \$30 million from the state's Department of Community and Economic Development, the FFFI was designed to accommodate the diverse financing needs of large supermarkets, family-owned grocery stores, farmers' markets and other healthy food retailers, whether located in cities, small towns or rural communities. The program has had a tremendous impact in Pennsylvania, supporting 88 fresh food retail projects across the state, creating or retaining more than 5,000 jobs, and improving access to healthy foods for over 400,000 state residents.



Since the launch of the FFFI, several other states and cities, including California, Colorado, Houston, Illinois, Maryland, New Jersey, New Orleans and New York, have all launched or are making preparations to launch their own versions of the Pennsylvania program.

Similarly, the federal government introduced the national Healthy Food Financing Initiative, which has provided financial awards and New Markets Tax Credits to Community Development Financial Institutions, Community Development Corporations and banks investing in new or expanded healthy food retail in underserved communities. The federal program also supports local food production and distribution networks throughout the country.

In addition to increasing families' access to healthy foods, new and improved grocery stores can help revitalize lower-income neighborhoods. They generate foot traffic and attract complementary services and stores, such as banks, pharmacies and restaurants. Studies have found that employees at urban supermarkets in distressed areas tend to live nearby, and the average supermarket hires 90 people or more directly from the areas where they operate.²² By employing local residents, grocery stores create jobs for those who need them most and help establish a virtuous cycle that increases economic activity. At the same time, it takes between five and seven years before the dollars invested in a new supermarket are recovered, so start-up costs are a strong consideration for any grocery project, particularly in a distressed community.²³

In Virginia, much groundwork has been laid and momentum is growing around the creation of a statewide healthy food financing program. Such an initiative would be a key resource for improving healthy food access and sparking economic development across the commonwealth, making for a stronger and more vital Virginia.

Circle Food Store | *New Orleans, Louisiana*

When it originally opened in 1938, Circle Food Store was the first African-American-owned grocery store in New Orleans, and it became a community hub for the Treme neighborhood. In 2005, Hurricane Katrina severely damaged the store, forcing it to close and leaving a major void in the community. In 2014, owner Dwayne Boudreaux was finally able to reopen the store with support from various funding sources, including \$1 million from the New Orleans Fresh Food Retailer Initiative, the city's healthy food financing program. In addition to groceries, the new-and-improved 22,000-square-foot Circle Food Store has a pharmacy and a credit union, and has created 65 jobs, 95 percent of which are filled by local residents.

Bloss Holiday Market | *Blossburg, Pennsylvania*

When the owner of Bloss Holiday Market in Blossburg, Pennsylvania, decided to retire, the 1,400-resident rural community faced the loss of its only store in town and the only supplier of groceries and fresh produce for nearly eight miles. The Pennsylvania Fresh Food Financing Initiative provided Ryan and Melanie Shaut, a young entrepreneurial couple from the community, the financing they needed to purchase and renovate the store, thus preserving the only retailer within 11 miles to accept both food stamps and Salvation Army grocery vouchers for families in need. This project also aids food pantry patrons who receive vouchers that enable them to supplement the pre-packaged foods they get from the pantry with fresh produce at Bloss Holiday Market. In addition to providing nearby access to fresh, healthy foods in a region without a strong public transit system, this project has saved 30 quality jobs for local residents.

Buffalo Grown Mobile Market | *Buffalo, New York*

Massachusetts Avenue Project's (MAP) Buffalo Grown Mobile Market delivers organic, locally grown, affordable produce to Buffalo's lower-income, food insecure neighborhoods. Buffalo Grown Mobile Market travels regularly to drop-off sites where it sells fresh fruits and vegetables and bulk items, like rice and beans. MAP works with local community partners to identify drop-off sites that serve people most in need, such as health and senior centers. The group grows the majority of the produce it sells on its own urban farm and offers onsite nutrition education for market patrons. In 2010, MAP's Mobile Market vehicle became inoperable. Financing from the statewide New York Healthy Food & Healthy Communities Fund, a public-private partnership, allowed MAP to purchase and retrofit a new vehicle so that it can continue to bring healthy, local food to the residents of Buffalo's most underserved communities.

HEALTHY FOOD FINANCING PROGRAMS ACROSS THE COUNTRY

LOCATION	NAME OF PROGRAM	PROGRAM PARTNERS	FUNDING SOURCES	TYPES OF FINANCING
CA	California FreshWorks Fund www.cafreshworks.com	The California Endowment, Capital Impact Partners, Emerging Markets and others	The California Endowment and other private funding: \$264 million raised from a variety of private investors. Additionally, Capital Impact Partners has leveraged funding for CA projects since 2011 through the national Healthy Food Financing Initiative.	Loans: Up to \$8 million. Grants: Up to \$50,000.
CO	Colorado Fresh Food Financing Fund www.chfainfo.com/CO4F	The Colorado Health Foundation, Colorado Enterprise Fund and Progressive Urban Management Associates	Seeded with a \$7.1 million investment from the Colorado Health Foundation. Additionally, the Colorado Enterprise Fund has leveraged funding for CO projects since 2012 through the national Healthy Food Financing Initiative.	Loans: Up to \$1.5 million per project. Grants: May not exceed \$100,000 per project, except in extraordinary, high-impact cases.
IL	Illinois Fresh Food Fund www.iff.org/illinois-food	IL Department of Commerce and Economic Opportunity and IFF	Seeded with a \$10 million grant from the IL Department of Commerce and Economic Opportunity.	Loans: Typical loans range from \$250,000 to \$1 million. Grants: Grants are only available to those who are also applying for a loan. The grant amount can be up to 10% of the loan amount, not to exceed \$100,000.
LA	New Orleans Fresh Food Retailer Initiative www.hope-ec.org/index.php/new-orleans-fresh-food-retailer-initiative	City of New Orleans, Hope Enterprise Corporation and The Food Trust	Federal and private funding. Seeded with \$7 million in Disaster Community Development Block Grant funds. Matched at least 1:1 by HOPE and other investment sources. Additionally, HOPE has leveraged funding for New Orleans projects since 2014 through the national Healthy Food Financing Initiative.	Loans: CDBG loans not to exceed \$1 million. Forgivable Loans: Up to \$500,000 or 20% of total financing needs.
NJ	New Jersey Food Access Initiative www.trfund.com/wp-content/uploads/2013/05/NJ_HealthyFoodRetailInitiativeBrochure_2013.pdf	NJ Economic Development Authority (NJEDA), The Reinvestment Fund (TRF) and the Robert Wood Johnson Foundation (RWJF)	To date, financial partners include: NJ Economic Development Authority (\$4 million), Living Cities (\$2 million credit) and the Robert Wood Johnson Foundation (\$10 million Program Related Investment). Additionally, TRF has leveraged funding for NJ projects since 2011 through the national Healthy Food Financing Initiative.	Loans: Range in size from \$200,000 to \$4.5 million or larger for New Markets Tax Credit transactions. Grants: Range in size from \$5,000 to \$125,000. Recoverable Grants: Early-stage financing with no-interest loans, typically repaid by construction financing.
NY	New York Healthy Food & Healthy Communities Fund www.liifund.org/products/community-capital/capital-for-healthy-food/new-york-healthy-food-healthy-communities-fund	NY Empire State Development Corporation, Low Income Investment Fund (LIIF), The Reinvestment Fund (TRF) and The Food Trust	Seeded with \$10 million from the state's Empire State Development Corporation. Matched with a \$20 million commitment from The Goldman Sachs Group, Inc. Additionally, LIIF has leveraged funding for NY projects since 2011 through the national Healthy Food Financing Initiative.	Loans: Range in size from \$250,000 to \$5 million or larger for New Markets Tax Credit transactions. Grants: Range in size from \$5,000 to \$500,000 for capital grants and \$5,000 to \$200,000 for predevelopment grants.
PA	Pennsylvania Fresh Food Financing Initiative www.trfund.com/pennsylvania-fresh-food-financing-initiative	PA Department of Community and Economic Development, The Food Trust, The Reinvestment Fund (TRF) and the Urban Affairs Coalition	Seeded with \$10 million in year one and an additional \$20 million over the next two years from the state's Department of Community and Economic Development. Matched with \$146 million in additional public and private investment. Additionally, TRF has leveraged funding for PA projects since 2011 through the national Healthy Food Financing Initiative.	Loans: Typical loans ranged in size from \$200,000 to \$3.5 million or larger for New Markets Tax Credit transactions. Grants: Up to \$250,000 per store and \$750,000 in total for one operator. Extraordinary grants of up to \$1 million were made available for projects with high potential for serving areas of extreme need.
Federal	Healthy Food Financing Initiative www.healthyfoodaccess.org/funding/healthy-food-financing-funds	US Departments of Treasury, Agriculture, and Health and Human Services	Since 2011, HFFI has distributed more than \$140 million to over 70 community development entities across the country.	Financing packages vary. HFFI dollars are given to Community Development Financial Institutions (CDFIs) and Community Development Corporations (CDCs) to provide one-time grants and loans to projects in their regions.

GIS Methodology

All tabular data was prepared in MS Excel and mapped in ArcGIS 10.3 by ESRI. The coordinate system and projection used during mapping and analysis were the North American Datum 1983 and Virginia State Plane South. Analysis was at the US Census Bureau's tract level of geography using vector polygons from the 2014 ESRI Data & Maps shapefiles. Virginia statewide analysis used discrete tract polygons while citywide analysis used interpolated rasters and density grids from tract centroids.

Demographic data from the US Census Bureau website (www.census.gov) for the 2009–2013 American Community Survey was chosen due to the presence of income variables not available in the 2010 Decennial Census.

This analysis was performed for the State of Virginia at the level of Census tract. Each of the city maps for Richmond and Hampton are analyzed relative to their respective rates and odds ratios, not relative to the State's rates and odds ratios.

SUPERMARKET SALES

Supermarkets in the 2015 Nielsen TDLinX Custom Store Analysis retail database were included in the analysis of sales. For the purposes of this study, the definition of a supermarket is a store that had an SIC code of 541105 and was identified by Nielsen TDLinX Custom Store Analysis as a "conventional, limited assortment or natural supermarket," a "superette" or a "supercenter" with over \$2 million in annual sales. There were 1,056 supermarkets in Virginia, with an aggregate weekly sales volume of \$356,369,000. (Richmond: 23 supermarkets and \$6,355,000 in sales; Hampton: 15 supermarkets and \$4,405,000 in sales.)

All supermarkets were plotted using the latitude and longitude coordinates for each record and then classified into two categories; between \$39,000 and \$150,000, and more than \$150,000 in weekly sales.

Aggregate weekly sales volume of all supermarkets was attributed to the Census tracts within which they occurred through a spatial join. For Virginia, values of total sales were used to classify the tracts by approximate quartiles into the four categories shown in *Map 1: Weekly Sales Volume for Supermarkets*. For the cities, weekly sales volume was further transformed from a series of points to a continuous raster grid representing the sales density per square mile using the Kernel Density function with a one mile radius in Spatial Analyst. This raster was then classified into quartiles shown in Map 1.

POPULATION

Population data estimates for the State of Virginia by tract were retrieved from the US Census Bureau's 2009–2013 American Community Survey (VA: 8,100,653; Richmond: 207,878; Hampton: 136,957). Density of total population was calculated from the Census tract centroid points using Kernel Density with a search

radius of one mile, or 5,280 feet. Geographies with no population were removed from the analysis, as indicated on the maps.

SALES AND POPULATION DENSITY

For Virginia, the weekly sales volume was divided by the total population of each tract. The result was then divided by the statewide rate ($\$44.00 = \$356,369,000 / 8,100,653$) to create an odds ratio for weekly supermarket sales per person for Virginia.

For the cities, the density of weekly sales volume raster was divided by the density of total population raster. The result was then divided by the city rate (Richmond: \$30.57; Hampton: \$32.16) to create an odds ratio raster.

An odds ratio of 1 is equivalent to the statewide rate. Anything below 1 is below the statewide rate. An odds ratio of 2 means the rate is twice the statewide rate. This is used for *Map 2: Supermarket Sales and Population Density*. A new binary field recorded whether each tract had a weekly sales odds ratio above or below 1.

INCOME

Census tract per capita income by tract was divided by the area per capita income (VA: \$33,493; Richmond: \$27,184; Hampton: \$25,247) giving an income odds ratio. For Virginia, a new binary field was created to store whether the tract had an income odds ratio above or below the statewide rate. For the cities, the odds ratio, assigned to the Census tract centroid, was used to interpolate a grid, which was then reclassified to yield two distinct values, those below and those above the citywide rate.

SALES AND INCOME

The Sales and Income odds ratio binary fields were combined, resulting in four distinct values which correspond to the four possible combinations of high and low odds ratios, used to classify *Map 3: Supermarket Sales and Income* and *Map 4: Low Supermarket Sales and Low Income*.

DIET-RELATED DEATHS

The Virginia Department of Health (VDH) provided mortality data for the specified list of ICD-10 codes for the year 2013. A total of 17,075 deaths were summarized based upon the Census tract number, resulting in a count of diet-related deaths per Census tract. (Richmond: 557; Hampton: 291).

DIET-RELATED DEATHS AND POPULATION

The number of diet-related deaths attributed to each tract was divided by the total population of that tract. This result was divided by the statewide ratio of diet-related deaths to total population (VA: $17,075 / 8,100,653 = 0.0021079$, or 21 diet-related deaths per 10,000 people; Richmond: 0.0026795; Hampton: 0.0021248) to calculate the death odds ratio. For Virginia a new binary field was created to store whether the tract had a death odds ratio above or below the statewide rate. For the cities, the odds ratio, assigned to the Census tract centroid, was used to interpolate a grid, which was then reclassified to yield two distinct values, those below and those above the statewide odds rate.

DIET-RELATED DEATHS AND INCOME

The two binary fields of Deaths and Income odds ratios were combined through multiplication to calculate a new field and raster. This resulted in four distinct values which correspond to the four possible combinations of high and low deaths and income, used to classify *Map 5: Income and Diet-Related Deaths*.

DIET-RELATED DEATHS, SALES AND INCOME

To combine all three variables for Virginia, a new field was created and calculated by tract as the product of deaths odds binary and the Low Supermarket Sales and Low Income variable. For the cities, the two reclassified rasters of 1) Deaths and 2) Low Supermarket Sales and Low Income were combined to create a new raster layer. These results were reclassified to only retain one value, Low Supermarket Sales, Low Income and High Deaths, and mapped to produce *Map 6: Areas with Greatest Need*.

Endnotes

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