The Need for More Supermarkets in Colorado

Healthy Food, Healthy Coloradans
ACKNOWLEDGMENTS

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**Executive Summary**

In 2004, obesity-related medical expenditures in Colorado totaled $874 million. In order for residents to eat better, Colorado must address the significant need for supermarkets and food resources in its communities. Food retailers and public sector development agencies have, in essence, redlined lower-income communities by failing to aggressively combat the factors that have led supermarkets to disinvest from these neighborhoods. Both the Institute of Medicine and the Centers for Disease Control and Prevention have independently recommended that bringing supermarkets to lower-income neighborhoods would reduce the rate of obesity in the United States. They also suggest that local governments should create incentive programs to attract supermarkets to these neglected neighborhoods.¹ ²

The Food Trust in conjunction with the University of Colorado researched and wrote *Healthy Food, Healthy Coloradans: The Need for More Supermarkets in Colorado* to ensure that all people live in communities that have access to safe, healthy and affordable food. A key goal of this report is to stimulate the development of supermarkets in lower- and moderate-income urban and rural neighborhoods across the state.

Poverty rates among Colorado’s children are on a steep incline, with recent data showing an 85% increase since 2000 and 2006.¹ Coupled with this trend, more Colorado households suffer from higher levels of hunger (food insecurity) compared to the United States as a whole.¹ One explanation for higher rates of food insecurity in Colorado is the high number of areas without supermarket access (sometimes termed food deserts). Research demonstrates that rural residents living without sufficient healthy food access, such as those in Colorado’s rural communities, actually pay more for food due to lack of competitive pricing from larger markets and transportation costs to reach the stores.¹ Residents of areas with inadequate access to healthy foods are forced to shop in convenience stores and gas stations that generally do not offer healthy, fresh foods. In fact, according to *Income, Education and Obesity: A Closer Look at Inequities in Colorado’s Obesity Problem*, only a quarter of Colorado’s adults eat five or more fresh fruits or vegetables each week.⁶

In lower-income communities, the lack of a supermarket negatively impacts people’s ability to obtain a nutritionally adequate diet. At the same time, the incidence of diet-related diseases is disproportionately high in lower-income neighborhoods.⁷ Increasing the availability of nutritious and affordable food in neighborhoods with high rates of diet-related diseases does not guarantee a reduction in the incidence of these diseases. However, by removing this as a barrier to healthy eating, we can better focus on helping people improve their diets and health.

Starting in the late 1960s, supermarkets began to close older stores to build bigger and more modern markets in the suburbs, leaving a number of communities without a stable food supply. The public sector has a responsibility to provide a safe, nutritious and stable food supply in underserved communities, a fact made all the more poignant by the estimated $874 million dollars Colorado spends each year treating obesity and diet-related diseases.

Through mapping, this study shows that many communities in Colorado with poor supermarket access also have a high incidence of diet-related deaths. Access to supermarkets is a key factor contributing to the health and development of neighborhoods, providing a stable, affordable source of nutritious food for communities.

We call upon the local and state government to take the lead in developing a public-private response to this problem. While not a situation of any one sector’s making, it is in the interest of the entire community to solve this problem. Solutions that have proven helpful elsewhere in the country include:

- **Convening leaders from business, government, public health, civic and community sectors to develop a strategy to establish more supermarkets in lower- and moderate-income communities.**

- **Strategic investments with public funds to reduce risks associated with the development of more supermarkets in lower- and moderate-income communities.**
Introduction

In 2007, the Colorado Health Foundation identified obesity as a major health issue for Coloradans. Although Colorado is one of the leanest states in the country, its overweight and obesity trends were moving upward similar to the rest of the nation. Obesity can lead to a number of chronic illnesses such as diabetes, hypertension and some cancers. In 2004, obesity-related medical expenditures in Colorado totaled $874 million. The foundation decided to dedicate resources to preventing obesity in Colorado and identified the following measurable goals to help it achieve its vision to make Colorado the healthiest state in the nation:

- Increase the number of children and adults who engage in moderate or vigorous physical activity
- Increase the number of children and adults who eat adequate amounts of fruits and vegetables daily
- Increase the number of children who receive healthy meals at school and have access to healthy vending choices
- Increase the number of underserved Coloradans who have convenient access to recreational exercise and fruits and vegetables

One of the foundation’s strategies is to help increase access to fresh food for underserved Coloradans. To understand the scope of the problem, the foundation commissioned The Food Trust to conduct a study on supermarket access in Colorado. *Healthy Food, Healthy Coloradans: The Need for More Supermarkets in Colorado* maps the locations of supermarkets throughout Colorado and diet-related deaths offering a glimpse of the potential need for action in a number of Colorado’s neediest communities. The foundation also commissioned The Food Trust to begin work in the Denver area to address specific food access challenges in several communities.

The Food Trust is a nationally recognized nonprofit organization working to ensure that every child and family has equal access to affordable and nutritious food. The mission of The Food Trust is to increase the availability of fresh foods, develop a stable food supply in underserved communities and improve the connection between urban and agricultural communities. The Food Trust has created a model to increase access to healthy food in Pennsylvania and has replicated the model in Illinois, Louisiana and New York. Presently in Pennsylvania, The Food Trust co-manages, alongside The Reinvestment Fund, the Fresh Food Financing Initiative (FFFI), a public-private partnership that works to increase supermarkets and healthy corner stores in economically disadvantaged communities throughout Pennsylvania. To date, the FFFI has financed 74 supermarket projects in lower-income communities across Pennsylvania, which will create or retain more than 4,800 jobs.

More Colorado households suffer from higher levels of food insecurity compared to the average American household. Limited access to food is a possible contributing factor to food insecurity. In Colorado, supermarkets are concentrated in a few areas across the state and significant gaps exist in rural and lower-income areas. This shortage of supermarkets means that lower-income residents must travel out of their communities to purchase food or shop at more expensive convenience stores with less selection and often low-quality food. The insufficient access to affordable and nutritious food in lower-income areas reduces the purchasing power of residents and may exacerbate long-term health problems resulting from nutritionally inadequate diets.

Lower-income Colorado residents are likely to suffer from chronic diseases at rates significantly higher than those of the population as a whole. Many lower-income families in Colorado have limited funds with which to purchase nutritionally adequate foods, and recent increases in the cost of food place further strain on these limited resources. As demonstrated in this report, the same families are also likely to have few, if any, places in their communities in which to shop for reasonably priced foods.

The state’s supermarket deficit could be eased and diet-related health problems decreased through a highly visible initiative to build more supermarkets in lower-income neighborhoods and to improve the health and nutrition of the children who live here. The Food Trust has authored *Healthy Food, Healthy Coloradans* to ensure all children live in communities that have access to safe, nutritious and affordable food. This report is designed, in part, to stimulate the construction of supermarkets in lower-income neighborhoods. To this end, this study outlines the extent and implications of the supermarket shortage, identifying the gaps in food availability and the relationship between diet-related diseases and lower-income neighborhoods.
Methodology

To demonstrate which communities lack supermarkets, a geographical representation of food access, income and diet-related health problems was created by mapping the locations of supermarket sales, income and diet-related mortality data. (See appendix for more detail.) Retail sales data for supermarkets were obtained from Trade Dimensions; diet-related mortality data were provided by the Colorado Department of Public Health and Environment; and demographic data were derived from the 2000 U.S. Census.

A series of maps was created using Geographic Information Systems computer mapping software. The weekly sales volume at supermarkets was divided by the total population of each census tract. The result was then divided by $62.70 (the statewide ratio of sales to population) to calculate a ratio for weekly supermarket sales per person. The resulting ratios were mapped throughout the state. Ratios greater than one represent sales higher than the state average and ratios less than one represent sales less than the state average. For the purpose of this study, “supermarket” is defined as an establishment with more than $2 million in weekly sales.

A panel of physicians was organized to determine diet-related death causes. The panel, through a process of exclusion, determined which diseases were unrelated to diet and through a process of elimination identified those that were diet-related. These diseases were mapped in the study. A total of 87,099 diet-related deaths were mapped, including deaths due to tumors (neoplasm of the stomach, other digestive organs, breast); endocrine, nutritional and immunity disorders (diabetes mellitus); and diseases of circulatory systems (hypertension, myocardial infarction, heart disease). “High” diet-related mortality areas are defined as having ratios greater than the statewide rate and “low” areas have ratios less than the statewide rate.
Key Findings

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

The uneven distribution of supermarkets is a serious problem in Colorado. There are large areas of the state with few supermarkets and many neighborhoods where none exist.

Map 1a/1b: Weekly Sales Volume for Supermarkets shows the location of 533 stores throughout Colorado and the weekly sales volume of each store. The smaller red circles represent lower weekly sales volumes; the larger red circles represent higher weekly sales volume. Many people are traveling considerable distances to buy food from supermarkets in the few neighborhoods where supermarkets are easily accessible. The gray shading shows how supermarket sales are distributed across the state. It is necessary to note that a sizeable portion of central Colorado is federally owned or reserved land and is excluded from this analysis. The darkest areas represent communities where the highest supermarket sales are concentrated. The light areas are where sales are lowest, indicating few or no supermarkets located there. Rural regions of Northeastern Colorado (including the communities of Brush, Yuma and Wray), Northwestern Colorado (including the communities surrounding Dinosaur, Rangely and Meeker) and Southern Central Colorado (including Antonito, San Luis and Alamosa) are shown to have a disproportionately low density of supermarkets. Map 1b highlights several lower-income and urban communities of Denver with low supermarket rates such as Northeast Denver (i.e. North Park Hill, Northeast Park Hill, East Colfax and Elyria Swansea) and West Central Denver (i.e. Sun Valley, Valverde and Jefferson Park).

MAP 1a/b
Weekly Sales Volume for Supermarkets

Supermarkets by Weekly Sales Volume ($ millions)
- $39 - $151
- $152 - $2,950

Weekly Sales Volume for Supermarkets by Quartiles
- No Sales
- $1 - $714,286 / sq. mile
- $714,287 - $1,750,000 / sq. mile
- $1,750,001 - $42,272,273 / sq. mile


MAP 2a/b
Supermarket Sales and Total Population
Supermarket Sales Relative to Total Population
- less than state average
- 1 - 1.99 times state average
- 2 - 4 times state average
- more than 4 times state average

Major Roads
Federal Lands & Open Space
Counties
Denver Int’l Airport

Map 2a/b: Supermarket Sales and Total Population
Communities with greater-than-average supermarket sales are shown in yellow and brown tones. In these communities, people are either spending more than average in supermarkets, as might be the case in higher-income communities, or more people are buying food in these communities than the number of people who live there, indicating that people are traveling from outside the area to shop there.
The uneven distribution of food in Colorado disproportionately affects large numbers of lower-income people.

A nationwide survey of 21 metropolitan areas calculated the number of supermarkets per 10,000 residents in every zip code. The study found that the number of supermarkets in the lowest-income areas was almost 30 percent less than the number in the highest-income areas. Colorado has numerous lower-income and rural communities with limited access to the types of food necessary to maintain a healthy diet. Data from the national leader in supermarket industry trade data, Trade Dimensions indicates that Colorado ranks in the bottom third of states for supermarket density per population, 37th among the 50 U.S. states.

Lower-income households are six to seven times less likely to own cars than all other U.S. households. Taking public transportation to purchase groceries can create barriers for lower-income residents, particularly those who are elderly or disabled. In Colorado, lower-income residents in rural areas are at an even greater disadvantage due to limited public transportation, which creates obstacles to shopping.

**Map 3a/b: Supermarket Sales and Income** shows the distribution of supermarket sales and the distribution of income throughout the state. People in the areas shown in yellow have fewer supermarkets in which to shop. However, these communities are higher income, often have high auto-ownership rates and are places where residents can afford to drive to supermarkets to shop.

Higher-income areas with higher 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 high supermarket sales, as highlighted in blue. This trend is prevalent in several rural communities where people travel from surrounding areas to access the supermarket.

The red areas represent lower-income communities not adequately served by supermarkets.

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**Data sources:** Trade Dimensions Retail Database, 2008; U.S. Bureau of the Census, 2000.
As highlighted in Map 4a/b: Low Supermarket Sales and Low Income, supermarket sales are lower in the red areas because there are few, if any, supermarkets located there. Income is also lower in these areas, indicating that people living there are less able to afford to travel to the areas where supermarkets are concentrated. This map, then, identifies those areas where people have low income and insufficient access to a supermarket, including:

a) Several lower-income neighborhoods in Denver, including Westwood, Barnum, Barnum West, Villa Park, Sun Valley, North Park Hill, Northeast Park Hill, East Colfax, Elyria Swansea, Clayton, Cole, Globeville, Five Points and Montbello

b) Large portions of Eastern Colorado including the Route 50 corridor including the communities of La Junta, Las Animas, Lamar and Holly

c) The far northeast corner of Colorado, including the communities of Julesberg, Ovid and Sedgwick

d) Communities near Southern Central Colorado, including Walsenburg, Sanford, Antonito, San Luis, Monte Vista, Del Norte and Center

e) Western Colorado, including the communities surrounding Dinosaur and Rangely and the rural area between Cortez and Durango
There is a connection between diet-related disease and lack of supermarket access.

Many studies have demonstrated a relationship between supermarkets and health. One recent study found lower body mass index among adolescents who live near a supermarket. Another study documented that fruit and vegetable intake increases as much as 32 percent for each additional supermarket in a community.

Map 5a/b: Diet-Related Mortality and Income shows mortality data by income in Colorado and the Denver metro area for the following diet-related causes of death: neoplasms (stomach, other digestive organs, breast); endocrine, nutritional and immunity disorders (diabetes mellitus); and disease of circulatory systems (hypertension, myocardial infarction, heart disease). The red areas indicate a higher rate of diet-related deaths occurring in the lower-income areas of Colorado. The blue and green indicate a lower rate of diet-related deaths.

Diet-related diseases create untold suffering and expense in communities. Diet-related deaths are associated with many factors, one of them being the ability to procure a nutritionally adequate diet.

Areas with Greatest Need

Low income, low sales & high mortality
Other
Major Roads
Federal Lands & Open Space
Counties
Denver Int'l Airport

Data sources: Trade Dimensions Retail Database, 2008;

Map 6a/b: Areas with Greatest Need shows lower-income communities in Colorado where there are low supermarket sales because few-to-no supermarkets are located there and a high number of deaths due to diet-related diseases. These areas have the greatest need for more supermarkets.

As this and previous maps demonstrate, many areas in Colorado, rural and urban, are underserved by supermarkets. As a result, lower-income residents have to rely on expensive and limited corner stores or must travel long distances to shop for affordable food. At the same time, the incidence of diet-related disease is extremely high, disproportionately affecting residents of lower-income neighborhoods.

To provide affordable and nutritious food in neighborhoods, Colorado should attract new supermarket development to lower-income areas where there are high rates of diet-related diseases and few supermarkets.

Increasing availability of nutritious and affordable food in neighborhoods with high rates of diet-related disease does not guarantee a reduction in the incidence of these diseases. However, by removing this as a barrier to healthy eating, we can better focus on helping people improve their diets and health.
Conclusion

Access to supermarkets is a problem in many Colorado neighborhoods but exceedingly so in lower-income, inner-city and rural communities where the incidence of diet-related disease is highest.

The lack of supermarkets in certain communities means that residents must shop at convenience and corner stores. Diets that rely on food from convenience stores are often higher in foods that contribute to diet-related disease.

The increased incidence of diet-related disease in lower-income communities suggests that the public sector needs to invest in supermarket development in neighborhoods to help combat disease. The public sector has a responsibility to help provide a safe and nutritious food supply in underserved communities, in order to safeguard public health and promote economic development.

Recommendations

Three key actions are recommended for Colorado stakeholders to address this problem.

First, the gap in the number of supermarkets between lower- and higher-income communities needs to be erased through significant public investment.

Second, leaders from business, government, public health, civic and community sectors should build on current efforts to develop a strategy to increase access to healthier foods, including adding more supermarkets in lower-income communities.

Finally, state and local governments should create a grant and loan program to support local supermarket development projects in order to create access to affordable and nutritious food.
Appendix: GIS Methodology

SUPERMARKET SALES
Supermarkets in the 2007 Trade Dimensions Retail Database were included in the analysis of sales. For the purposes of this study, the definition of a supermarket is any store that has an SIC (Standard Industrial Classification) code of 541105 and an actual annual sales volume of greater than $2 million. (Colorado total of $269,695,000 in weekly sales volume.) Stores were plotted using the latitude and longitude coordinates for each record as provided by Trade Dimensions. Supermarket points were classified into two categories – above and below $150,000 in weekly sales volume.

Weekly sales volume was enumerated by census tract. The resulting table contained a single record for each census tract in the state, and the individual weekly sales volumes of each supermarket in separate columns within that census tract. The sales volumes were summed per census tract, and the resulting table was joined to the census tract shapefile. The area in square miles was calculated for each census tract and the weekly sales volume was divided by this area. The resulting values of sales density were used to classify the census tract into the four categories shown in Map 1: Weekly Sales Volume for Supermarkets.

CENSUS DEMOGRAPHICS
Population
Population data for the State of Colorado were retrieved from the U.S. Census Bureau website at http://www.census.gov for the year 2000 decennial census by census tract. (Colorado population: 4,301,261 people.)

Income
Per capita income data for the State of Colorado were retrieved from the U.S. Census Bureau website at http://www.census.gov for the year 2000 decennial census by census tract. (Colorado per capita income: $24,049.) These data were prepared and added to ArcGIS as a DBF table, then joined to an existing shapefile of census tracts.

SALES AND POPULATION
The weekly sales volume was divided by the total population of each census tract. The result was then divided by $62.70 (the statewide ratio of sales to population: 269,695,000/4,301,261=62.70) to create an odds ratio for weekly supermarket sales per person. An odds ratio of one is equivalent to the statewide rate. Anything below one is below the statewide rate. An odds ratio of two means the rate is twice the statewide rate. This is used for Map 2: Supermarket Sales and Total Population.

SUPERMARKET SALES AND TOTAL POPULATION
A new binary field was created to store whether the census tract had an odds ratio for weekly supermarket sales per person above or below the statewide rate.

INCOME AND POPULATION
Per capita income was divided by the statewide per capita income ($23,104) to create an odds ratio for income per person. A new binary field was created to store whether the census tract had an income odds ratio above or below the statewide rate.

SALES AND INCOME
The two binary fields of sales and income odds ratios were combined through multiplication to calculate a new field’s values. The resulting field has four distinct values which correspond to the four possible combinations of high and low odds ratios. “High” is defined as areas having odds ratios greater than one and “low” as areas having odds ratios less than one. The low supermarket sales and low-income areas are present as one of the categories in this new field used to classify the state wide census tract for Map 3: Supermarket Sales and Income. Finally, the census tract was reclassified to show only the low supermarket sales and low-income census tracts for Map 4: Low Supermarket Sales and Low Income.

DIET-RELATED DEATHS
The Colorado Department of Public Health and Environment provided mortality data for the specified list of ICD-10 codes for the year 2000-2007 (in order to obtain enough numbers in each census tract). A total of 87,099 (0.0202496 per cent of population) diet-related deaths were mapped, including deaths due to the following: neoplasms (stomach, other digestive organs, breast); endocrine, nutritional, and immunity disorders (diabetes mellitus); and diseases of circulatory systems (hypertension, myocardial infarction, heart disease).

Since data were not available at the individual address level, the level of geography used to identify records was the census tract level. The data were entered into ArcGIS as a DBF table and then summarized based upon the census tract. The resulting table showed counts of deaths per census tract. This table was joined to an existing shapefile of census tracts, using the FIPS code for the join. A point shapefile was created, using ET GeoWizard, from the original polygon census tracts, with the count of diet-related deaths as an attribute field.

DIET-RELATED DEATHS AND POPULATION
Since the mortality data was at the level of the census tract, it was necessary to acquire population count data at the same level of geography. This data was also joined to the census tracts shapefile. The total number of deaths attributed to each tract was divided by the total population of that tract. This result was divided by the citywide ratio of diet-related deaths to total population (87,099/4,301,261 or 0.0202496 percent of population), so that an odds ratio could be calculated.
Endnotes


12 Ratio per 10,000 people is 1.11; national median is 1.25.


Building Strong Communities Through Healthy Food

The Food Trust, a nonprofit organization based in Philadelphia, was founded in 1992 in response to the critical need for stable, nutritious and non-emergency food supplies in urban neighborhoods. Now in its second decade, the Trust is a national leader in the increasingly active dialogue concerning the diet-related health problems that are endemic in America’s lower-income communities.

With partners at The Reinvestment Fund and the Greater Philadelphia Urban Affairs Coalition, the Trust manages the Fresh Food Financing Initiative (FFFI), a public/private partnership that works to increase supermarkets and healthy corner stores in economically disadvantaged communities throughout Pennsylvania. To date, the FFFI has financed more than 70 food retail projects in low-income communities across Pennsylvania, which will create or retain more than 4,800 jobs and 1.4 million square feet of retail space. The initiative was named one of the Top 15 Government Innovations in American Government for 2008 by Harvard University’s John F. Kennedy School of Government.

The Trust works in Philadelphia-area schools and recreation centers, teaching and motivating youth in grades K-12 to adopt healthier lifestyles, including choosing more nutritious foods and getting regular physical activity. In addition, the Trust developed and implements the Kindergarten Initiative, an innovative school-based program that teaches young children about healthy eating by providing nutrition education and fresh fruit-and-vegetable snacks in the classroom as well as field trips to local farms. Trust educational programs are geared to children and families from economically disadvantaged communities in which culturally diverse, minority populations predominate. The Kindergarten Initiative was chosen as the model for a state wide initiative in Pennsylvania, which provides grants to schools across the state to start similar programs.

As the Regional Lead Agency for the Mid-Atlantic Farm to School Network, The Food Trust promotes and provides technical assistance to farm-to-school projects in the Mid-Atlantic region (Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia and Washington, DC). The Trust also operates 30 regional farmers’ markets with community partners and advocates for public policies that promote good nutrition in schools and communities.

For more information or to order additional copies of this report, visit thefoodtrust.org or contact The Food Trust at:

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