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Food access and food deserts: the diverse methods that residents of a neighborhood in Duluth, Minnesota use to provision themselves

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Using data from a survey of residents living in a United States Department of Agriculture defined food desert in Duluth, Minnesota, this article examines the diverse ways that people living in a neighborhood without a grocery store feed themselves. We found that there is no singular experience of living in a food desert. Many neighborhood residents were highly mobile and shopped at a wide variety of local grocery stores, and a small group of neighborhood residents without cars relied on public transit, neighborhood convenience stores, and borrowing vehicles in order to provision themselves. These coping strategies were expensive and time-consuming, especially for the most vulnerable members of the community such as single parents and those without cars. We use the variety of experiences of people living in a food desert to propose interventions that would help improve food access in the community.

Keywords: food access; food desert; urban development; neighborhood

Introduction

The concept of the food desert has received much scholarly attention as of late from urban planners, public health scholars, and others interested in the diets and provisioning practices of low-income people. Drawing on a survey of residents living in a food desert in the Lincoln Park neighborhood in Duluth, MN, we document the diverse array of provisioning strategies that residents use in order to access food. We argue that residents of food deserts, like residents of any harsh environment, engage in complex and difficult strategies in order to survive: they shop at grocery stores both close and far away from their neighborhood and utilize a wide-variety of government programs to increase their food access. The range of problems faced by low-income residents of neighborhoods without grocery stores suggests that there is no "one-size-fits-all" solution to improve food access for residents of food deserts. Rather, community activists and neighborhood development practitioners should look for ways to improve food access that build on the already existing systems of food provisioning that are present in urban communities. Our research adds to the existing food desert literature by focusing on one neighborhood and documenting how community residents access food. We use this data to propose interventions that respond to the specific problems faced by those in Lincoln Park. Our interest in exploring the conditions in food deserts is not to promote a certain diet (i.e. only organic or only local), but to argue from a

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social justice perspective that all have the right to sufficient amounts of healthy, tasty, and affordable food (Chilton & Rose, 2009).

What are food deserts, and how do people living in food deserts provision themselves?

Food deserts are low-income neighborhoods that have relatively poor access to healthy and affordable food (Larsen & Gilliland, 2008; USDA, 2009). These neighborhoods may have other shopping venues like convenience stores and liquor stores, but lack a reasonably priced well-stocked grocery store. Some scholars also argue that there is a relationship between food deserts and the civic-structure of a neighborhood in that neighborhoods with strong community organizations and a sense of identity are better able to respond to the lack of a grocery store than un-cohesive or poorly organized neighborhoods (Morton, Wright, Bitto, Oakland, & Sand, 2005). Therefore, one way to fight food deserts is to support neighborhood organizations so that they are empowered to improve resident's access to food. Those living in neighborhoods with grocery stores are more likely to have higher fresh fruit and vegetable intake (Larson, Story, & Nelson, 2009; Michimi & Wimberly, 2010; Pearson, Russell, Campbell, & Barker, 2005; Wrigley, Warm, & Margetts, 2003). Similarly, the public health literature clearly notes the health problems related to poor diets and hunger: hungry persons suffer from two to four times as many individual health problems, such as unwanted weight loss, fatigue, headaches, inability to concentrate, and frequent colds (NIH, 1999).

Shaw (2006) identifies three types of barriers that people who live in neighborhoods without grocery stores face when trying to access healthy food: physical, economic, and attitudinal barriers. *Physical barriers* are the concrete things that get in the way of people making it to a grocery store like distance from a store, snow or ice-covered streets, lack of curb cuts and sidewalks, which makes travel difficult for people in wheelchairs, and a lack of convenient transit connections to grocery stores. As grocery stores leave the city centers and big-box retail food outlets emerge in the suburbs, the United States is increasingly creating a food system in which cars are necessary for accessing healthy food because it is not available within walking distance from people's homes (Larsen & Gilliland, 2008). This means that convenience stores and other non-traditional food outlets, which are often located within walking distance of residential neighborhoods, are becoming increasingly important parts of how people access food (Black & Kouba, 2005). One study found that large big-box retail grocery stores have a limited impact on the diets of young people who lived only half a mile from the store; instead the study found that their diet was more closely related to their access to convenience stores that were closer (Hendrickson, Smith, & Eikenberry, 2006). In Duluth, which has a hilly landscape and long winters with large amounts of snow and ice, shopping for food without a car is even more difficult (Larsen & Gilliland, 2008).

Economic barriers refer to the difficulty people who live in food deserts have paying for the groceries they need. With the recession and the large amount of income inequality in the United States, this is becoming an increasingly important barrier to healthy food. Traveling to and from the grocery store can be expensive, especially when residents must use taxi services. Food delivery services are often either unavailable or too expensive for most consumers to use. Similarly, in neighborhoods with only a high-priced grocery store, economic barriers may be more limiting than physical barriers. People living in food deserts who shop for food in convenience stores pay higher prices for food (Chung & Myers, 1999; Kaufman, MacDonald, Lutz, & Smallwood, 1997). Large big-box stores

located close to highways buy food in bulk, draw in customers from a wide radius, and are able to sell food at deeply discounted prices (Hendrickson et al., 2006). In contrast, small stores in inner city neighborhoods sell food at highly inflated prices. Even worse, when residents of food deserts travel outside of their community to shop, any savings are offset by transportation costs (Blanchard & Lyson, 2005; Hendrickson et al., 2006; Larson, Story, & Nelson, 2009). With rising fuel costs, transit is becoming particularly expensive. Neighborhood grocery stores provide more benefits than simply access to convenient food. They provide a neighborhood meeting place as well as a store to purchase inexpensive items like newspapers, milk, and flour, which are less expensive than the transit costs it would take to drive to buy them at a larger store (Wrigley et al. 2003). Communities lacking a grocery store lack a place where someone can easily purchase an item they forgot during a weekly shopping trip, which forces consumers to travel a far distance for a small purchase (Short, Guthman, & Raskin, 2007). Similarly, as there have been fewer grocery stores around, people are choosing to shop less often and make less frequent but larger shopping trips (Blanchard & Lyson, 2005).

Attitudinal barriers refer to the different tastes and desires of individual consumers. For example, if an individual prefers pre-packaged foods and has only fresh vegetables available in their neighborhood markets, then they are experiencing life in a food desert *even if their neighbors who have other dietary needs are not living in a food desert.* Locating a health food store or co-op in a neighborhood, where most residents desire a more traditional shopping experience or feel uncomfortable in this environment improves physical access to healthy food, but in a way that does not meet the needs of neighborhood residents. Similarly, for working parents who need access to healthy prepared foods or members of immigrant communities interested in purchasing specialty foods, a small limited-selection grocery or convenience store only partially solves their food access needs. Therefore, it is important to recognize the variety of criteria that determine where residents of food deserts choose to do their shopping (Whelan, Neil, Daniel, & Cannings, 2002).

Food deserts are caused by different factors including redlining and the economic fragmentation of metropolitan areas, the development of large big-box retail outlets on the outskirts of cities, and the changing economics of small business ownership. Fragmentation of metropolitan development in the US contributed to the concentration of low-income communities in the inner city and the concentration of wealthier residents in the suburbs (Dreier, Mollenkopf, & Swanstrom, 2005). This is not to say that urban communities cannot support grocers; research on Lincoln Park indicates that there is a leakage of $5.3 million a year from Lincoln Park to grocers outside of the community (Pine & Bennett, 2011), a finding echoed in a series of studies from Social Compact and other research organizations documenting the economic conditions within food deserts around the nation (Social Compact 2010, 2012). In addition, the act of redlining by banks resulted in a lack of access to credit in urban neighborhoods and forced retailers and investors out of the inner city. Scholars have also noted the decline in the number of smaller neighborhood grocery stores and the growth of larger grocery stores in suburban locations (Larsen & Gilliland, 2008). These forces created car-oriented neighborhoods with good access to healthy food outside of the city, and inner-city communities with limited transit options cut-off from access to healthy food. Because food deserts disproportionately affect low-income people, food insecurity is most commonly experienced by people who are dealing with other hardships, such as lack of access to health insurance, poor housing conditions, lack of income, and low educational attainment (Black & Kouba, 2005; USDA, 2009). Macro-level forces that shape opportunities

in urban areas interact with specific land use and dietary needs to create the challenging set of conditions faced by residents of food deserts.

Residents of food deserts engage in a variety of strategies in order to obtain food from outside the neighborhood. One set of coping strategies involves solving the dilemma of transporting themselves to grocery stores outside of their neighborhood. Walking, driving, taking a taxi to the grocery store, using public transit, and utilizing food delivery services are examples of either labor-intensive or expensive ways of overcoming this obstacle (Bostock, 2001; Russell & Heidkamp, 2011; Walker, Block, & Kawachi, 2012). These strategies contribute directly to the leakage of economic activity outside of the community and, because of the importance of financial considerations to low-income shoppers (Walker et al., 2011), place financial burdens on those with limited means. Different populations living in food deserts have dissimilar abilities to use these transportation coping strategies. Whelan et al. found that single mothers without family in the neighborhood had the most difficulty reaching the grocery store, while senior citizens and those with cars had little difficulty reaching the grocery store (2002).

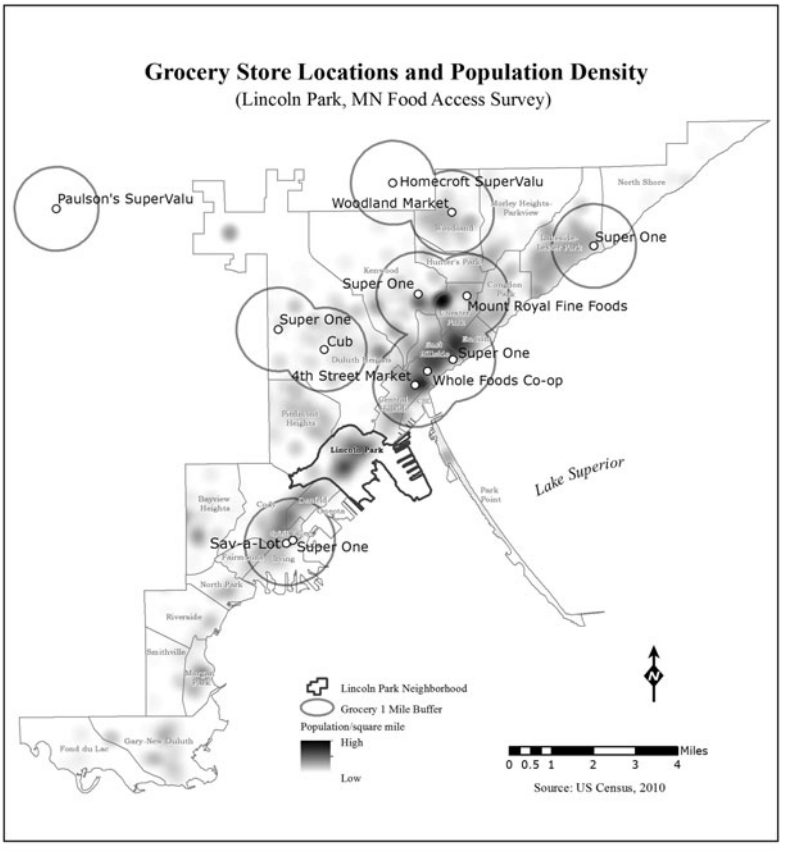
A separate coping strategy involves substituting locally available foods or frozen packaged foods for fresh foods in order to decrease the number of shopping trips needed to provision a household (Whelan et al., 2002; Walker et al. 2010). Because of the limited selection of produce and healthy food at convenience stores (Pearson et al., 2005), these strategies contribute to unhealthy diets of people who live in food deserts and illustrate the importance of proximity in decisions about where and how to shop (Hackett et al., 2008).

What types of foods shoppers are interested in purchasing also affects where they need to travel for food access. Whelan et al. found that households with children tended to look for ways to feed themselves from local convenience stores, while older adults were more likely to be more concerned with buying food that their children would eat, and households without children were more concerned with purchasing foods that were convenient for them to cook (2002, Hendrickson et al., 2006). This finding indicates that food-purchasing decisions need to be understood within the context of how residents of food deserts solve the other problems in their life (Wrigley et al. 2003). Taken as a whole, food-buying and provisioning choices differ little between residents of food deserts and residents of food oases, in that economic considerations are paramount, and all consumers make food choices based on cultural, physical, and economic constraints (Walker et al., 2012). Our research focused only on those living in food deserts and found that households, differentiated by demographic characteristics such as age, the presence of children, and income chose to shop at different area stores based on their particular understanding of how best to provision themselves.

Situating the Lincoln Park case study

Located at the Northern tip of Interstate Highway 35 W and about 150 miles north of the Minneapolis Saint Paul Metropolitan region, Duluth is the fourth largest city in the state of Minnesota. It sits at the western tip of Lake Superior at the end of the Great Lakes St. Lawrence Seaway, and the city's port is the farthest inland freshwater seaport, giving it direct access to international shipping lanes. Lincoln Park, formerly known to many Duluthians as the West End, lies west of downtown on the waterfront of the St. Louis River. Although it is a densely populated urban neighborhood, there is no grocery store within one mile of the community (See Map 1). It is located just

off Interstate 35 and has good transportation linkages to downtown Duluth and neighborhoods further west in the city. Similar to the City of Duluth overall, population has held steady in recent years. As Table 1 indicates, the median age of the community is lower than the City of Duluth as a whole, as is the median household income, and median home value. Lincoln Park is a place where many first-time homebuyers make their first purchase and also serves as a prime rental destination, given its proximity and short commute time to both downtown Duluth and local higher education facilities.



Map 1.

Table 1. Lincoln Park neighborhood and Duluth demographic summary.

	Duluth	Lincoln Park
Population	86,265	6145
Median age	36.5	33.1
Median household income	$45,135	$34,847
Median home value	$129,572	$88,729

Research methods

Our research was guided by the question: "How are residents of the Lincoln Park neighborhood accessing groceries?" We answered this question through qualitative and quantitative analysis of the local shopping community in Lincoln Park. Other surveys have relied on different methodologies to understand the conditions within food deserts: focus groups (Walker et al., 2011, 2012; Whelan et al., 2002), qualitative interviews (Coveney & O'Dwyer, 2009), qualitative interviews augmented by GPS tracking (Huang, Rosenberg, Simonovich, & Belza, 2012), GIS-based analysis of census and other secondary data sources (Jiao, Moudon, Ulmer, Hurvitz, & Drewnowski, 2012; Hallett & McDermott, 2011; Russell & Heidkamp, 2011; Sadler, Gilliand, & Arku, 2011; Thomas, 2010), and surveys of multiple neighborhoods (Coyle & Flowerdew, 2011). Our research adds to food desert scholarship using a survey of neighborhood residents, including both qualitative and quantitative data augmented by an analysis of prices at local convenience stores to document problems accessing food and identify possible interventions. Our mixed-methods approach analyzing how residents of Lincoln Park conduct their shopping will help guide neighborhood development practitioners looking to understand the conditions within food deserts.

Store inventory of the local shopping community

We identified each store in the neighborhood that sold food and completed a checklist identifying the cost of a typical "market basket" of goods. We surveyed traditional grocery stores as well as stores that sold only a few food items. For each item on our checklist, we noted if it was available for sale at the store and, if so, how much the item cost. For comparison purposes, we also included the costs of these goods at other local large and small grocery outlets.

Shopper survey

We partnered with the local community group Volunteers Caring and Patrolling (VCAP) to distribute a self-completion questionnaire to the 2800 households in the Lincoln Park neighborhood. The questionnaires were distributed as part of the March issue of the VCAP newsletter "Community Spirit." Distribution took place on March 5–6, 2011. A benefit of partnering with VCAP is that they are a well-known neighborhood institution whose newsletter is distributed monthly and includes neighborhood news not covered elsewhere. A disadvantage of working with this group is that every neighborhood has divisions and our relationship with VCAP could have limited response rates among some residents. Each household received a packet that contained an introduction letter to the project, a two-page questionnaire consisting of 23 questions, and a space for respondents to write comments. Each packet also included a self-addressed, postage-paid envelope in which to return the questionnaire to us. Over the course of the next month, we received 382 completed questionnaires (a 14% response rate). In contrast, Coyle and Flowerdew had response rate of 29.5% surveying 600 residents in six neighborhoods of Dundee, Scotland for a total of 177 returned questionnaires (2011), and Morton et al. had a response rate of 60.1%, mailing questionnaires to a stratified sample of rural Iowa residents, and following up with phone calls resulting in a total of 720 returned questionnaires (2005). Although our response rate was lower than the aforementioned studies, our

survey was more geographically focused and centered on only one community. Coyle and Flowerdew conducted their research in six neighborhoods comprising between 2500 and 8000 residents each, and Morton et al. conducted their survey in two rural counties with a total population of 16,000 people. Approximately, one in three of our respondents included comments on their questionnaires. We also coded respondents' comments based on their description of conditions within the neighborhood and their desired solution to the problems faced. We used a GIS system to analyze the survey results. We asked each survey participant to write down the closest intersection to his or her house to facilitate geographic analysis and still protect confidentiality.

Store inventory findings

There are currently no grocery stores in the Lincoln Park neighborhood. This means that all residents of the community need to travel outside of the neighborhood to do their grocery shopping. Our analysis of the existing stores in the community fulfilled the general assumption that convenience stores have a smaller grocery selection and higher prices than traditional grocery stores offer. We surveyed the availability and cost of 100 different grocery items at six food-selling stores, chosen for their diversity in sizes and styles and for their proximity to the Lincoln Park neighborhood[1]. We then compared the cost of a typical market basket of goods that contained only elements available at both traditional grocery stores and convenience stores in Lincoln Park. We chose the Woodland Marketplace, Cub Foods (mall area), and Super One Foods (plaza) to represent big-box-type grocery stores; The Little Store and Holiday Stationstore, both located in the Lincoln Park neighborhood, to represent convenience stores; and the 4th Street Market, located in the Central Hillside, to represent a smaller store selling primarily groceries and deli items.

Our comparison of the price and product availability at the different stores revealed that although many traditional grocery items are available at neighborhood convenience stores, these businesses are not adequately equipped to provide affordable and healthy food on a scale that would benefit the people of Lincoln Park, as they have limited availability of fresh vegetables and fruit (Table 2). Neither convenience store stocked fresh ground beef, and the selection of fresh goods was limited to a small variety of fruits and vegetables. In addition, the convenience stores sell vegetable oil at almost three times the cost of what traditional grocery stores charge. Table 3 shows that a traditional market basket of shopping goods costs an average of $11.45, when purchased at

Table 2. Fruits and vegetables available at selected stores (Lincoln Park, MN food access survey).

	Apple	Banana	Orange	Lettuce	Carrot	Potato
Woodland marketplace foods	×	×	×	×	×	×
Cub foods	×	×	×	×	×	×
Super one foods	×	×	×	×	×	×
4th street market	×	×	×	×	×	×
The little store			×	×		×
Holiday station store	×	×	×			

Table 3. Market basket of goods comparison (Lincoln Park, MN food access survey).

Woodland marketplace foods	$11.41
Cub foods	$10.51
4th street market	$13.04
Super one foods	$10.84
The little store	$18.97
Holiday station store	$17.18

Note: Items in survey: apples (three), oranges (two), white bread (16 oz. loaf), cereal (12 oz.), canned peaches (15 oz.), canned corn (15.25 oz.), and skimmed milk (1 gal.).

any of the non-convenience stores in our survey, with Cub Foods having the lowest price of $10.51 and the 4th Street Market having the highest price of $13.04. In sharp contrast, this same basket of goods costs $18.08, an average of 58% more, if purchased from a Lincoln Park convenience store.

Although it is well known that food from a convenience store is slightly more expensive than food from a larger grocery store due to the added price of convenience, our survey showed a 101.7% average price increase, when comparing the average prices at convenience stores to average prices at grocery stores. As Figure 1 illustrates, price differences ranged from a slightly higher cost for goods, such as milk, to an astounding 290% increase for vegetable oil. One reason for this large price difference is the fact that convenience stores carried only name-brand products and smaller sized goods, in comparison to grocery stores that carry more store-brand products and more bulk-sized packaged items.

Survey results showed that the 4th Street Market stood out as a smaller convenience store-sized grocery store that stocked both name brand and store-brand items, had a full

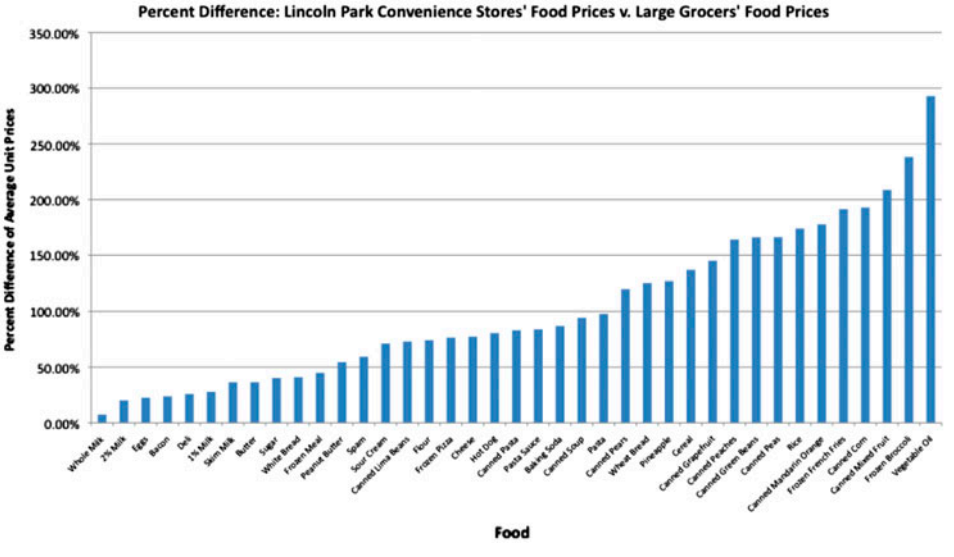


Figure 1. Price differentials between convenience stores in Lincoln Park and grocery stores in Duluth (Lincoln Park, MN food access survey).

Table 4. Survey respondents as compared to Lincoln Park population (Lincoln Park, MN food access survey).

	Duluth (%)	Survey (%)
Female	50.9	72.9
Income 50,000 or less	80.8	77.2
Bachelor's degree	12.1	33.2
$n = 377$		

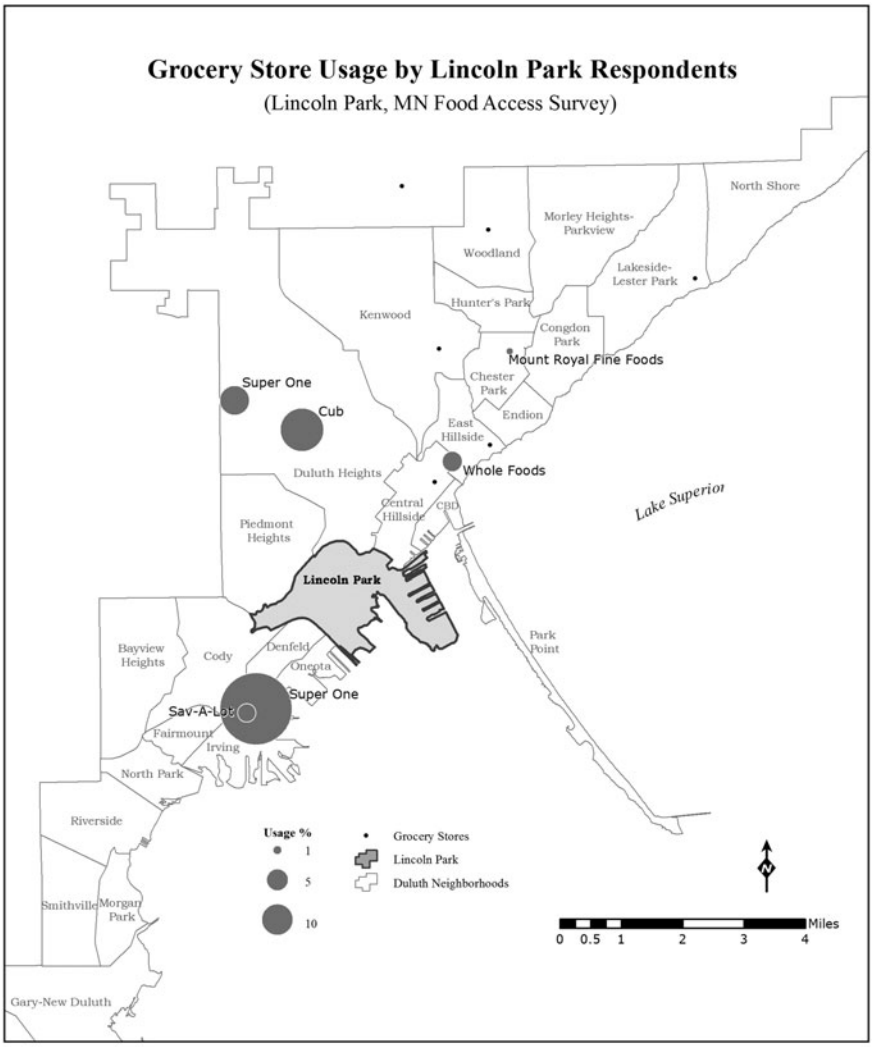
selection of canned and frozen vegetables, offered a small selection of fresh vegetables, and charged only moderately higher prices than much larger traditional grocery stores. This anomaly shows that although convenience stores will likely continue to charge more for the cost of convenience, they could also better meet neighborhood needs by stocking a different mix of products.

Shopper survey findings – quantitative

We partnered with the local community group VCAP to distribute a questionnaire to 2800 households in the Lincoln Park. Over the course of the next month, we received 382 completed questionnaires (a 14% response rate). Residents who chose to respond to our survey were similar to the overall population of Lincoln Park, although there are some clear differences (Table 4). Respondents tended to be slightly older than the average Lincoln Park resident, our respondents were overwhelmingly female, and educational achievement and the income of our respondents were higher than the average Lincoln Park resident.

Grocery shopping in Lincoln Park

Lincoln Park does not have a grocery store, but neighborhood residents are still able to shop for groceries. They accomplish this by traveling to a variety of different shopping outlets outside of the neighborhood. We asked respondents to tell us which grocery store they usually shop at, and allowed them to choose more than one option. As Map 2 indicates, about half of the responses we received were to the nearby West Duluth Super One, about one-fifth were to Cub Foods (mall area), a little more than 8% were to the Super One (mall area), and a little over 5% shop at the convenience stores in Lincoln Park. Interestingly, almost every shopping outlet in the Twin Ports area was mentioned in our survey, including the Whole Foods Co-op, the discount food merchants Save-A-Lot in West Duluth, Walmart in Superior, and Sam's Club in the Mall area. The diversity of different venues that Lincoln Park residents utilize to do their shopping indicates that residents make sophisticated decisions when choosing where to shop for food: stopping for groceries on the way home from work, driving to distant stores for lower prices, and choosing to shop at stores that meet specific dietary requirements. The results also indicate that there is no "one-size-fits-all solution to grocery shopping problems in the neighborhood because people will continue to shop at the stores that best fulfill their grocery-shopping needs.



Map 2.

The types of grocery stores that people shopped at varied by income: lower income residents were more likely to shop at local convenience stores, whereas upper income residents were more likely to travel to more expensive stores outside of the community. In this vein, 12% of households earning less than $25,000 per year shop at convenience stores in Lincoln Park and none of the households earning more than $75,000 per year shop at those stores. Also, 88% of households earning less than $25,000 per year shop at the West Duluth Super One, and only 50% of households earning more than $100,000 shop at this grocery store. Similarly, 9% of households earning less than $25,000 a year shop at the discount grocer Save-A-Lot, and no households making over $100,000 a year shop there. The clearest link between income and shopping is evident with the Whole Foods Co-op, which draws in a full 33% of the richest households in the neighborhood and only 3% of the neighborhood's lowest income group.

Table 5. How Lincoln Park residents reach the grocery store (Lincoln Park, MN food access survey).

Walk	0.5%
Bike	0.3%
Bus	3.2%
Drive	82.1%
By being driven to the stores	10.7%
Taxi	2.7%
Other	0.5%
$n = 377$	

Traveling outside of the neighborhood for groceries is a hurdle that all neighborhood residents frequently face (Table 5). Most rely on cars, as is evidenced by the survey data that report that 82% of respondents drive themselves to the grocery store with the remaining traveling to the grocery store by getting a ride with someone else (11%), taking a taxi (3%), taking the bus (3%), or by walking/biking (1%). In terms of getting home from the grocery store, the picture is very similar, with the exception of taxi and bus usage: only 2% of residents take the bus home from the store and a slightly larger 5% take a taxi home. Where residents shopped was also closely related to how many cars were in the households. For example, 29% of those households that had no car shopped at the convenience stores in Lincoln Park, and only 7% of the households with at least one car shopped at these stores.

Fast food, dining out, and cooking in Lincoln Park

The survey also asked questions about how often Lincoln Park residents cooked food in their homes, ate out, ordered food for delivery, and shopped for groceries (Table 6). In general, the survey results indicate that the vast majority of meals in Lincoln Park are cooked at home, with 85% of respondents reporting that they cook at home more than four times per week. A large majority of respondents (79%) do not order food for delivery. Another common way that people have meals in Lincoln Park is by eating out, with 44% of respondents reporting that they have eaten at a sit-down restaurant in the last week, and about half having gone to a fast-food restaurant.

Non-traditional food sources

Although the food deserts' literature tends to focus mostly on shopping outlets and fast-food/restaurant meals, our survey also tried to capture information about the extent to

Table 6. Cooking and dining out in Lincoln Park (Lincoln Park, MN food access survey).

	0	1	2	3	4+
How often per week do you cook food at home for yourself or your family?	0.3%	1.4%	4.1%	8.9%	85.4%
How often per week do you order food to be delivered to your home?	79.0%	15.3%	4.1%	0.3%	1.4%
How often per week do you eat at sit-down restaurants like Pizza Luce or T-Bonz?	56.3%	31.3%	9.4%	1.6%	1.3%
How often per week do you eat at fast-food restaurants (such as McDonalds or Quiznos)?	48.4%	32.3%	13.3%	4.3%	1.6%
$n = 377$					

Table 7. Non-traditional food provisioning strategies in Lincoln Park (Lincoln Park, MN food access survey).

	Not important	Somewhat important		Very important	
	1	2	3	4	5
Food shelf (like CHUM or Salvation Army)	73.2%	4.1%	6.1%	6.1%	10.5%
SHARE food-buying club	88.5%	4.4%	3.6%	3.0%	0.6%
Minnesota family investment program (MFIP)	88.3%	0.9%	0.6%	1.5%	8.7%
Ruby's food pantry	90.0%	4.1%	1.8%	2.4%	1.8%
Meat from hunting	74.6%	9.6%	7.3%	4.4%	4.1%
Fish that you caught	76.3%	9.9%	8.2%	3.8%	1.8%
Vegetables from a garden	51.7%	4.8%	16.5%	8.0%	9.1%
$n = 377$					

which Lincoln Park residents eat food from non-traditional sources, such as food shelves, hunting, fishing, and gardening (Table 7). Because each of these sources offers discounted foods for various reasons (either by residents growing their food themselves or through donation) and are tailored to meet the needs of neighborhood residents, we felt they serve an important, though often overlooked, role in provisioning the community.

We also found that a significant number of area residents use food shelves to provision their households. Food shelves originally began as emergency food support programs in the 1980s, during a period of drastic cuts to the federal social welfare system (Poppendieck, 1999). Since this time they have become institutionalized organizations providing for people experiencing food insecurity and give away a limited amount of food – usually a one-week supply – to those in need. They receive discounted commodity food from the federal government and receive donations of cash and food from corporations and individuals. In our survey, 27% of respondents rated the food shelf at least "somewhat important" and 10.5% described it as "very important." This compares to a national food shelf usage rate of 5.1% (Nord, Andrews, & Carlson, 2011). These numbers rise even higher if we look only at those neighborhood residents who use EBT, with 74% of EBT users in the Lincoln Park neighborhood describing the food shelf as "somewhat important" to their diet. Similarly, about 20% of residents residing in households without children consider the food shelf an important part of their diet, and an astounding 39% of respondents with children ranked the food shelf as at least "somewhat important" to their diet.

Lincoln Park residents also use food-buying programs, such as SHARE and Ruby's Food Pantry. SHARE stopped their distributions in 2012, but was a food-buying club based in Milwaukee, Wisconsin that purchased food directly from wholesalers before turning it over to a volunteer-led network to distribute. SHARE saved participants 30–50% as compared to shopping at a supermarket; however, selection was limited and participants chose their food from an order sheet that included about 50 items. Ruby's Food Pantry is a food distribution program that receives donations of food from corporations and sells a set selection of these items to customers for a flat fee of $15 that is charged to participants in order to defray transportation costs, although customers receive in excess of $100 worth of food. About 12% of respondents ranked SHARE as being at least "somewhat important" in their efforts to access food and 10% described Ruby's Pantry in this way. SHARE has one distribution site in West Duluth and Ruby's Food Pantry is currently located in the Central Hillside neighborhood, and has opened a new site in the Morgan Park neighborhood.

According to the survey, other self-provisioning systems, like hunting, fishing, and gardening, were also important to residents of Lincoln Park. For 25% of respondents, meat from hunting was at least "somewhat important," 24% ranked fish as "somewhat important," and 48% described vegetables from their garden as "somewhat important".

The Minnesota Family Investment Program (MFIP) provides cash assistance and food assistance to families with children whose household income falls below a certain income threshold, depending on household size and income source. About 12% of households in Lincoln Park rank MFIP as "somewhat important" for them in accessing food. If we look only at households with children, we can see that a full 28% of these households ranked MFIP as at least "somewhat important." Thus, this benefit plays a vital role in feeding about a quarter of this neighborhood's households with children.

Shopper survey results – qualitative

The questionnaire also asked respondents the following question: "What would you like to change about food access in Lincoln Park?" Of the 375 returned questionnaires, 158 (42%) included written comments. This was a higher response rate than we expected, especially considering that residents did not know too much about who was administering the survey, who would read the completed questionnaires, or if their comments would be taken seriously. Respondents' comments included descriptions of the problems they faced personally with getting groceries, as well as the difficulties they saw their neighbors facing. The two researchers read the comments and coded the data following the basic tenets of grounded theory (Glaser & Strauss, 1999), which asks researchers to go into the field with the purpose creating theory out of their observations, not to prove or disprove existing theories. To this end, we asked open-ended questions on our questionnaire and were interested in representing how neighborhood residents viewed difficulties with food access as opposed to documenting specific problems or theoretically derived dilemmas of living in a food desert. We then conducted a member check with five neighborhood informants and discussed with them our reading of the qualitative data to ensure it reflected what our informants were seeing in the community. We also held four public meetings and engaged with a group of neighborhood activists called Fair Food Access Lincoln Park that developed around this time to push for better food access in the community. These consultations underscored the fact that neighborhood residents were using a variety of different ways to obtain groceries, as informants told us about their shopping habits. They also highlighted the importance of a bricks and mortar store, as many informants talked passionately about their desire for a local Lincoln Park grocery store. Five themes stood out in the types of comments collected from the questionnaires: (Table 8) (1) residents wanted a store in the Lincoln Park neighborhood; (2) they wanted improved access to affordable food; (3) they preferred a

Table 8. What residents would like to change about food access in Lincoln Park (Lincoln Park, MN food access survey).

A closer store/not specific	43%
A closer store/large like Super One or Cub Foods	23%
Improve access to affordable food	20%
A closer store/corner store	19%
Improve access to higher quality and diverse food items	15%
$n = 158$	

small corner store; (4) they wanted to see increased access to high-quality foods; and (5) they wanted a large store, like a Super One or Cub Foods, located closer to their neighborhood.

A closer grocery store

The most common comment from respondents was that Lincoln Park needed a closer grocery store. Because our questionnaire focused on access to groceries, and community groups in the area have been attempting to increase grocery options in the community for a long time, the prevalence of this comment was not a surprise. Many respondents who drove to the grocery store noted not only the difficulty they had doing their shopping, but commented on how others in the neighborhood were also experiencing this problem. A middle-aged woman who does her grocery shopping by driving to the nearby Super One, as well as shopping at the local convenience stores wrote, "It would be great to have a grocery store here. There are many low-income families here with limited transportation. Only expensive convenience stores without healthy food choices."

Respondents noted that traveling to grocery stores outside of the neighborhood was inconvenient and lowered their quality of life. Similarly, respondents detailed the difficulties experienced when traveling to a grocery store and the high costs and limited selection available at the local convenience stores. An older male resident of the neighborhood who drives to the Super One in West Duluth wrote, "[a] small grocery store with staples that are reasonable priced would be great. With Grand Ave so busy whenever the freeway is being worked on it can take 1 1/2 h just to go to the store for milk and bread." This comment speaks to the importance of a neighborhood shopping venue and of the real-added convenience of a neighborhood store, especially in a city where winter weather and summer road construction make transportation a challenge.

A closer full-service store

Many respondents argued that they would like to see a full-service grocery store, like Super One or Cub Foods, come to the neighborhood so that people could do all of their grocery shopping within the Lincoln Park neighborhood. For example, a middle-aged male resident of the neighborhood that does his grocery shopping at the Super One in the Mall area wrote, "[a] store like cub or Super One In Lincoln Park area. Like down on Garfield Ave where that big lot sits empty." Many of the neighborhood organizations working on improving food access in the community have focused on encouraging a large grocer to locate in the community, and this comment echoes those efforts.

In contrast to other strategies to improve food access, a big grocery store would solve many of the food access problems residents of Lincoln Park face and allow residents to shop in a mainstream store without the stigma associated with other efforts. An older woman who does most of her grocery shopping at the Sav-A-Lot chain writes "[a] major food chain store in West End area-NOW … it's either up over the hill or West Duluth area." A local store would offer choice, affordability, and convenience all in one.

Improved access to affordable food

Many respondents noted that the convenience stores in Lincoln Park are overpriced and argued that there needed to be more affordable shopping opportunities in the community. These comments support our finding that prices at existing grocery outlets

in the neighborhood are too high for many neighborhood residents. For low-income people, these prices are especially problematic because people who shop at convenience stores are overpaying for food that is of low nutritional value. Many respondents noted the unusually high prices of convenience stores and the low income levels in the community. For example, a middle-aged woman who usually drives to the Super One in West Duluth to do her grocery shopping wrote "[i]t would be great to have a grocery store here. There are many low-income families here with limited transportation. Only expensive convenience stores without healthy food choices."

Respondents' comments also underscore the fact that an affordable store would help to strengthen the sense of community within the neighborhood. Similar to residents who wanted a full-scale major grocery chain, respondents wrote of their desire for a grocery store similar to the ones found in other neighborhoods. One respondent wrote about the declining aspects of Lincoln Park and argued, "I believe that if an affordable, positive, clean, market were to open up in the Lincoln Park area it would make a very positive impact on this wonderful, growing, diverse, ethnic area we call "Lincoln Park" "West End".

A closer corner store

Even though many prominent voices in neighborhood redevelopment are focused on bringing large grocery stores into food deserts, we found support for a small corner store. This type of store would be accessible to people who do not have cars and would benefit individuals who do not want to travel long distances for basic food items like bread and milk. An older woman who shops at Cub wrote "[a] small grocery store with possibly a deli, fresh fruits and vegetables. Like the old neighborhood corner store." Many older survey respondents noted that when they were growing up in the neighborhood there used to be more local grocery stores.

Many respondents also noted that this type of small convenience store would be a "community location" where people would do more than simply buy groceries. It would be a meeting place for the neighborhood; a place where residents could get to know their neighbors. A small neighborhood store could improve neighborhood quality of life and improve access to grocery stores at the same time. A middle aged woman who shops at the Super One in the Mall Area combined her desire for a grocery store with her interest in seeing a more vibrant neighborhood: "I would love a Lincoln Park (still West End to me) to come back to what it once was (I lived here all my life). A family neighborhood where you could run and get milk or some pop or maybe some ice cream on a nice summer night." The smaller size of a store like this would allow it to serve the function of allowing residents to quickly and conveniently buy the food that they need.

Improved access to high quality and a diversity of food items

Although there is a stereotype that poor people *choose* to eat unhealthy food and are therefore satisfied with their existing shopping options, this survey found that some Lincoln Park residents were interested in improved access to healthy food, more diverse food options, and higher quality food. As a young woman who shops at the Super One in West Duluth noted on her questionnaire, "I would like to see a better variety of foods when I have money fresh and organic are preferred but expensive. It's hard to keep away from the appeal of cheap junk food." An important element of food security is the

ability to eat the type of food that you want to eat and to not be forced to eat food that you do not desire.

Considering the limited selection of food options currently available in the Lincoln Park community, those community members who lack the ability to travel outside of the community for food do not have the ability to decide their own diet. As a middle-aged man who drives to the grocery store described, "[f]ood sources in Lincoln Park are aimed almost exclusively for poor people. A glutton of fast food and the limited selection of healthy food at Super One in Spirit Valley supply cheap processed food heavily dependent on sugar, fat, and salt. This along with little exercise only helps cause obesity, heart disease, and diabetes. This neighborhood has no alternative for fresh veggies, fruit, or meat. We normally have to go to Cub Foods or the Whole Foods." By working to provide higher quality food this problem could be solved.

Discussion

This paper contributes to the food desert literature by identifying where residents of food deserts shop and what difficulties they have accessing food. Our survey results found a complex food provisioning system in the Lincoln Park neighborhood. Similar to real deserts, those who live in areas where living conditions are difficult engage in a variety of different strategies in order to provision themselves. Data from our research suggest that because there is no singular experience to living in a food desert, government and community development groups should implement a variety of different responses to the problem of food access that would address residents' immediate concerns.

Helping neighborhood residents reach the grocery store

The vast majority of Lincoln Park residents bear the costs of mobility privately and rely on either their own cars to reach grocery stores or use their social relationships to borrow cars from family or friends. Because of the low median household income in the neighborhood, high cost of gas to reach the nearest grocery store, and data showing that economic considerations are very important to residents of food deserts (Walker et al., 2011; Walker, Block, & Kawachi, 2012; Whelan et al., 2002), finding ways to support this portion of the community is important. This could be done through a government or public–private program that eases the burden of car maintenance and upkeep, reduces the cost of snow-tires, and helps support the needs of low-income drivers. Further expanding programs that offer discounts for food purchases would directly connect fuel costs with food access. Similarly, given the connection between community and civic structure and food accessibility (Morton et al., 2005), encouraging car pooling would address food access and build community within the neighborhood.

A small minority of the hardest hit members of the neighborhood is dependent on transit or local convenience stores to do their shopping. A program that strengthens transit options such as a shuttle bus service or improving access to grocery stores for public transit users would affect a small but vulnerable fragment of neighborhood residents. This could be done in low-cost ways. As one respondent wrote, "[a]s far as transportation to and from the grocery store I have noticed that there aren't many covered and enclosed bus shelters. Now, people my age aren't the issues, it's the people with children and the elderly who need it. Waiting in the cold blowing snow, or the standing in the rain is surely no treat!!" Further, working with transit officials to improve neighborhood walkability and pedestrian access to neighborhood grocery stores would improve

residents' ability to provision themselves and improve neighborhood quality of life. Because residents of food deserts face a variety of different problems in addition to food access (Black & Kouba, 2005; USDA, 2009), working on this type of solution would tie food access in with other neighborhood problems.

Improving food access for the most vulnerable members of society

Although many in the neighborhood are able to access the food they need, a significant portion of the community faces immense problems accessing safe and healthy food. The fact that almost 40% of the neighborhood's households with children who participated in our survey use the food shelf implies that food shelves play an essential role in neighborhood provisioning. Strengthening these systems, for example, through a public health campaign to increase SNAP participation rates or working with the existing food shelf system to increase access could have an immediate impact on the lives of neighborhood residents, where in Minnesota only 62% of such eligible to receive these benefits actually receive them (Food Research Action Center, 2012). To this end, consistent with other scholarship that has noted the growing importance of the food shelf for low-income people, for community members who use EBT, the food shelf has become the norm, and not just an emergency food outlet. Although our qualitative responses were overwhelmingly in favor of a neighborhood grocery store, non-traditional food delivery outlets such as hunting, fishing, gardening, MFIP, Ruby's Pantry, and SHARE are all used by sizable numbers of community members and provide food at lower costs than traditional grocery stores. Making these food options more available for neighborhood residents (for instance, by supporting neighborhood gardening efforts or organizing a reduced fee shuttle bus to Ruby's Pantry) are low-cost ways to meet people's needs.

Bringing healthy food to the community

Existing food outlets in the community are insufficient in terms of their selection and have prices that are too high. Our store assessment clearly documented very high prices and inadequate selection in neighborhood stores – especially in terms of fresh and healthy vegetables. Because of research indicating that proximity to healthy food is positively correlated with healthy food consumption (Larson, Story, & Nelson, 2009; Michimi & Wimberly, 2010; Pearson et al., 2005; Wrigley et al., 2003), bringing food to the neighborhood is an important goal. Part of the reason for stocking lesser quality goods is that with low turnover of goods, it is more difficult for smaller stores to keep a fresh stock of fruits, vegetables, and other items that can be bought in bulk, thus lowering the cost. Similarly, small retailers pay higher costs for their stock than large retailers, thereby making it difficult, though not impossible, to make a profit on high-quality, healthy food. Therefore, working with existing retailers to solve the barriers to selling healthy food would positively impact all neighborhood residents.

Although many Lincoln Park residents travel outside of the community to shop, those who utilize neighborhood stores tend to be without cars, live in households with children, and are on public assistance programs. Therefore, working to provide healthy food in existing convenience stores or working to help a grocer locate to the neighborhood will directly benefit these at-risk populations. Research shows that convenience stores sell lower quality food, and not the fresh and healthy food that people need to thrive and nourish their families (Hendrickson et al., 2006). In addition, stores that are not primarily grocery stores often carry a lot of unhealthy packaged foods that are easy

to stock, but are not nutritious in the long run. Of the respondents who chose to contribute written comments, 43% described the need for a neighborhood grocery store. Responses varied regarding type of store preference: a full-service grocery store, a smaller store, a store with low prices, or a store that stocked a diverse array of goods. The consensus was clear that respondents want a "bricks and mortar" space in the community to improve food access for themselves and for their neighbors. Because many residents also eat out, working with the local restaurants to serve low-price healthy meals could also address this problem.

The term food desert paints low-income urban neighborhoods without grocery stores as monolithic communities suffering from a common problem. Our mixed-methods analysis of provisioning strategies in Lincoln Park found this overarching narrative inaccurate; residents shopped at a wide variety of different grocery stores and used multiple traditional and non-food sources to provision themselves. Convenience stores in the neighborhood had very high prices and a limited selection of food, and neighborhood residents without cars were mostly likely to shop at these local convenience stores. The diversity of experiences in the community implies that community development practitioners should embrace multiple strategies to support food access in Lincoln Park.

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Note

1. Survey took place during the second week of December 2010. We understand that prices fluctuate and that our analysis represents a snapshot of prices during the time of our research.

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