CHAPTER. 2

What We Eat
& Our Health

What We Eat and Our Health

What would we need to grow to feed the people of our region? How many acres producing how many pounds of potatoes would be required to satisfy our regional appetite for America's favorite vegetable? How many acres of asparagus? Apples? Wheat? Before we examine how much of our food our region might produce, we first consider what we need to be healthy and well fed.

Research shows that "[f]ood choices influence the health and well-being of individuals," which is evident in the consumption patterns and corresponding health of Americans over the last century.[1] Americans are, on average, heavier, and our health problems reflect our larger sizes and richer diets. The average American consumed roughly several hundred fewer calories per day in the 1950s than at the start of the 21st century.[2] Western society's obesity epidemic, as well as other chronic diseases, are attributed to both over-consumption and decreased physical activity.[3] Therefore, it is important to understand consumption trends and what is in the food that Americans, including people in the Saint Louis Regional Foodshed, eat.

With the onset of the convenience food era in the 1950s,[4] coupled with the greatest increase in automobile ownership and mileage traveled per licensed driver during the 1960s[5] Americans have increased their consumption of high sugar, high fat, and non-nutritious foods and decreased their physical activity.[6] From "TV dinners" to fast food at the drive-through, Americans today eat more processed and packaged foods than ever. A New York Times article from April 2010 claims:

> "No country has embraced the movement toward commercialized, prepackaged food as much as the United States. Americans eat 31 percent more packaged food than fresh food, and they consume more packaged food per person than their counterparts in nearly all other countries.
> A sizable part of the American diet is ready-to-eat meals, like frozen pizzas and microwave dinners, and sweet or salty snack foods."[7]

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1 *Diet Quality and Nutrition: Overview*, USDA ERS (May 26, 2012) http://www.ers.usda.gov/topics/food-choices-health/diet-quality-nutrition.aspx.

2 Office of Communications, U.S. Dep't of Agric., *Agriculture Fact Book 2001-2002*, at 20 (2003) http://www.usda.gov/factbook/2002factbook.pdf [hereinafter *Agriculture Fact Book*]..

3 *See The Obesity Prevention Source: Physical Activity*, Harvard School of Public Health, http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/physical-activity-and-obesity/#references (discussing the energy imbalance problem associated with obesity and the role of decreased physical activity worldwide in the obesity epidemic) (last visited July 22, 2013).

4 *See* Laura Shapiro, *Something from the Oven: Reinventing Dinner in 1950s America* 17, 18 (2004) (discussing the introduction of first frozen dinner by Quaker States Foods in 1952 and Swanson's subsequent contribution to the frozen dinner industry by "giv[ing] the concept landmark status and a generic identity" as the "TV dinner").

5 Todd Litman, Victoria Transport Policy Institute, *The Future Isn't What it Used to Be: Changing Trends and Their Implications For Transport Planning* 5, 6 (2013) http://www.vtpi.org/future.pdf.

6 *See Agriculture Fact Book*, *supra* note 2, at 14, 17 (discussing the increase in overall calorie consumption without increased physical activity; and the significant increase in consumption of added oils and fats and in caloric sweeteners between 1950s and 2000); *see also The Obesity Prevention Source: Physical Activity*, Harvard School of Public Health, http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/physical-activity-and-obesity/#references ("Physical activity associated with work, home, and transportation has declined due to economic growth, technological advancements, and social changes."). (last visited July 22, 2013).

7 Hannah Fairfield, *Factory Food*, N.Y. Times, Apr. 3, 2010, http://www.nytimes.com/2010/04/04/business/04metrics.html. For an infographic comparing U.S. and other countries' consumption per capita of packaged and fresh food, *see* Hannah Fairfield, *Factory Food*, N.Y. Times (2009), http://www.nytimes.com/imagepages/2010/04/04/business/04metrics_g.html?ref=business.

The appetite for convenience food in the U.S. has led to diets that are high in fat, salt, and sugar and low in nutritional value.[8] Diets loaded with fat, salt, and sugar and lacking in nutrients can easily help make us fat and sick. Our region, the Saint Louis Regional Foodshed, reflects these American trends both in what we eat and our health.

Food no longer travels directly from farm to plate. And the food we eat is often radically transformed as it journeys from its origins to our table. It gets processed in a system that increasingly robs the food of nutrition that our bodies need while increasing risks of exposures to contaminants that can cause illness. The addition of non-food chemicals further complicates food.

In the past, grains were ground into flour for use in breads and pasta or sold whole and often consumed whole. Today grains undergo processing that strips them of their bran, fiber, and nutrients while adding bromides and bleaches to make them perform better in processed, pre-made foods or to extend their shelf lives. Even meats entering the industrial food system are subject to chemical additives like nitrates,[9] phosphates,[10] and growth-stimulating hormones[11] and substances like transglutaminase,[12] colloquially referred to as 'meat glue'. These additives help grow livestock bigger and faster; make meat appear fresher for longer, or make small meat cuts appear larger.

Most consumers do not encounter the corn and soy beans grown in our region until they have been extensively processed into food additives like corn syrup, oil, starch, or soy protein isolate (or soy lecithin) or until they have been transformed from animal feed into pork, chicken, beef, or turkey. Over the last half-century, grain and meat products had the largest increases in estimated annual per capita consumption.[13] Graph 2-1 illustrates how much each major food commodity contributed to total U.S. per capita consumption in 2009.

Graph 2-1 shows that dairy products (33%) and flour and cereal products (11%) alone made up nearly half of the nation's per capita consumption in 2009.

Processed fruits and vegetables (7 and 11%, respectively) were consumed almost equally to fresh fruits and vegetables (7 and 10%, respectively). Meat products (9%), caloric sweeteners (7%), and fats and oils (4%) made up the additional 20%.[14]

Regular consumption of ultra-processed food, like junk food and fast food, makes individuals susceptible to weight gain and malnutrition.[16] These foods typically have large quantities of "refined sugar, saturated and trans-fats, and chemicals . . . and lack health-promoting ingredients like insoluble fiber, water[,] and vital nutrients."[17] Consumption of these foods can also give rise to inflammation, which is linked to "chronic degenerative diseases like diabetes, cancer, osteoarthritis, and cardiovascular disease."[18]

FIGURE. 2-1

ULTRA PROCESSED FOODS ADVERTISED AS "GROCERIES OR SNACKS" IN A LOCAL WALGREEN'S STORE AND AN AISLE LINED WITH CANDY ON SALE IN A LOCAL WALMART, 2012[15]

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8 *Id.*

9 Angel White, *What are the Types of Harmful Food Additives?*, Livestrong.com, (Feb. 10, 2011) http://www.livestrong.com/article/378707-what-are-the-types-of-harmful-food-additives/.

10 Chance Brooks, *Marinating of Beef for Enhancement* 1 (2007) http://www.beefresearch.org/CMDocs/BeefResearch/Marinating%20of%20Beef%20for%20Enhancement.pdf.

11 Eric Schlosser, *Fast Food Nation* 263 (First Perennial ed. 2002)..

12 "Transglutaminase is an enzyme approved for use as a binder to form smaller cuts of meat into a larger serving of meat. It is a natural substance derived from fermented bacteria, a non-toxigenic and non-pathogenic strain of the organism *Streptoverticillium mobaraense*, and it is often used in a blend of binders to form a bond between meat and poultry proteins, holding smaller pieces together." *Safety of Transglutaminase Enzyme*, USDA Food Safety & Inspection Serv., http://www.fsis.usda.gov/factsheets/Safety_TG_Enzyme/index.asp (last modified May 15, 2013).

13 *See Agriculture Fact Book*, *supra* note 2, at 19, 15 (providing estimated per capita consumption of grain and meat products from 1950-59); U.S. Census Bureau, *Section 3. Health and Nutrition*, *in* Statistical Abstract of the U.S.: 2012, 99, 141, 142 (131st ed. 2011) http://www.census.gov/prod/2011pubs/12statab/health.pdf [hereinafter *Section 3. Health and Nutrition*] (providing 2009-estimated per capita consumption of grain and meat products).

14 *Section 3. Health and Nutrition*, *supra* note 13, at 141 (providing 2009 estimated per capita consumption of grain and meat products); *See also Food Consumption in America,* Visual Econ. (2010), http://visualeconomics.creditloan.com/food-consumption-in-america_2010-07-12/.

15 As of July 2013, Walmart's grocery home page contained an ad promoting youth consumption of processed, high sugar foods and displays processed, low nutrient-containing food products as "Featured Categories." *Groceries, Produce, and Cleaning Supplies for Less*, Wal-mart, http://www.walmart.com/cp/grocery/976759 (last visited July 18, 2013).

16 *Ultra-Processed Food and Obesity*, Heart MD Institute (2011) http://www.heartmdinstitute.com/health-topics/diabetes-obesity/203-ultra-processed-food-obesity.

17 *Id.*

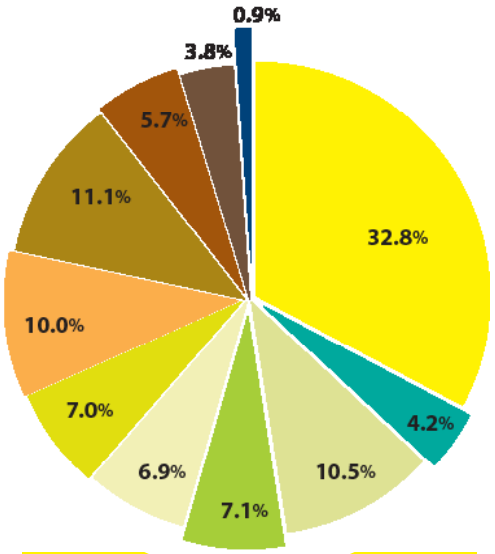
18 *Id.*

More and more people are questioning whether much of what is served as convenience "foods" deserve the term "food" at all. Simply reading the ingredients of any processed food item reveals that the things we eat contain numerous additives that are more likely to come from a chemical factory than a farm.

What We Eat: The Data

Table 2-1 on the next page shows the USDA recommended consumption of all major food groups for adults[19] (recommendations vary for children)and compares per capita consumption data from 1950s[20] to 2009.[21]

Maps throughout this chapter illustrate our region's estimated per capita in-home consumption of various foods in 2006, as well as the relative costs of certain foods.



GRAPH. 2-1
U.S. PER CAPITA CONSUMPTION OF MAJOR FOOD COMMODITIES, 2009

- Red Meat (Boneless, Trimmed Weight)
- Poultry (Boneless, Trimmed Weight)
- Fish&Shellfish(Boneless,TrimmedWeight)
- Total Dairy Products
- Total, Fat Content Only
- Flour & Cereal Products
- Total Caloric Sweeteners
- Fresh Fruits
- Processed Fruits
- Fresh Vegetables
- Processed Vegetables

[19] The USDA provides slight differentiations in daily consumption recommendations for adult men, divided into three age groups, and for adult women, divided into three age groups. Calculations of annual recommended consumption per capita for each food group are based on the approximate average recommendation between all age groups for men and women. *See generally* U.S. Dep't of Agric., *Food Groups*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/ (follow hyperlink for each food group webpage and then select the food group's associated link for daily recommended consumption).

[20] *See Agriculture Fact Book*, *supra* note 2, at 19, 15, 20, 18, 18, 17, 16 for the 1950-1959 averaged national consumption data per capita for grain products, meat, total caloric sweeteners, vegetables, fruits, added fats and oils, and all dairy products, respectively.

[21] *See Section 3. Health and Nutritionsupra* note 13, at 141, 142 (providing 2009 estimated consumption per capita for the food products listed in Table 1). USDA daily serving recommendations were calculated in pounds by converting serving sizes in cups or teaspoons to ounces and then converting ounces to pounds. This conversion enabled MCE to compare recommended consumption to actual consumption data.

TABLE 2-1. PER CAPITA CONSUMPTION OF MAJOR FOOD GROUPS FROM 1950s & 2009

Food Product	USDA recommend adult consumption (lbs./person/year)	1950-1959 Averaged annual consumption per capita (lbs./person/year)	2009 Estimated annual consumption per capita (lbs./person/year)	2009 Estimated total consumption by Foodshed Population (lbs.)
Total grain products	136.9 half of which should be of whole grains	155.4	194.5	792,534,012.5
Total meat (beef, veal & mutton, pork, chicken, turkey, fish & shellfish)	114 -136.85 (5-6 ounces of protein per day)	138.2	190.9	777,865,002.5
Total caloric sweeteners	32.2*	109.6	130.7	532,566,557.5
Vegetables (total)	375 - 547.5 (2-3 cups per day)	338.8	390.9	1,592,810,002.5
Fruits (total)	273.75-365 (1.5-2 cups per day)	248.7	257.0	1,047,204,325.0
Added fats and oil (fat content only)	22.81 (6 teaspoons per day)	44.6	78.5	320,273,385.0
All dairy products	547.5 (3 cups per day)	703	607.1	473,765,547.5

* Consumption of caloric sweeteners is not "recommended"; rather, no more than 32.2 lbs. per person per year should be consumed, if at all.

Grain

On average, the USDA recommends approximately six ounces of grains daily (with slight variations in recommended serving sizes by age, by gender, and by activity level), half of which should be from whole grains.[22] Although Americans typically consume more than the daily-recommended serving of grain, we are not consuming enough whole grains.[23]

In 2000, USDA examined the American food supply and consumption in its Agriculture Fact Book. After excluding the amount of grains wasted in homes and "throughout the marketing system" through spoilage or other loss, it appears that the average American consumed approximately ten daily servings of grain per day in 2000.[24] However, it is clear that massive amounts of grain in the American diet have been unaccounted for in this supply-oriented calculation.

When calculating this average, the USDA's food supply database only measures products made from grain flours and not those made from whole grains.

Thus, the food supply database did not account for "wheat bran, wheat germ, wheat berries [or] products [made] directly from [them]" or "whole-grain foods made directly from field corn."[25]

The database excluded items common in the American diet, including Wheaties and All-Bran cereals, Triscuit crackers, Doritos, corn tortillas, and popcorn.[26]

As a result, USDA Economic Research Service estimates that Americans actually consumed an additional 11 daily servings per capita in 2000, noting that this is the amount recommended for teenage boys or adult men involved in heavy labor.[27]

In 2006, the USDA divided the nation into 35 groups based on geographic location and metro/non-metro status and estimated each group's mean per capita consumption for various foods and each group's relative price ratios for various foods. For a map illustrating the 35 groups across the United States used to calculate these figures, see Appendix A.

Moving west to east, the "Nonmetro West North Central Group" contains Missouri counties on the western outskirts of the Foodshed (Ralls, Audrain, Callaway, Osage, Maries, Phelps, Bollinger, and Cape Girardeau). The "Metro Midwest 2 Market Group" contains the six urban core counties, the 10 counties with a high number of commuters to the urban core (see Map 1-1) as well as 10 additional Missouri counties (Pike, Montgomery, Gasconade,Crawford, Dent, Reynolds, Iron, Madison, St. Francois, and Perry) and 11 additional Illinois counties (Jackson, Randolph, Perry, Jefferson, Marion, Bond, Fayette, Effingham, Montgomery, Green, and Scott). The "Nonmetro East North Central Group" contains the Illinois counties on the eastern outskirts of the Foodshed (Pike, Brown, Cass, Morgan, Sangamon, Christian, Shelby, Clay, Wayne, Hamilton, Franklin, Williamson, and Union) (see Map 1-1).[28]

For the majority of the counties, which are part of the Metro Midwest 2 Market Group, it is estimated that its prices for whole grain products were 1.19-1.25 times the price of refined grain in 2006 (see Map 2-1).[29] Many Americans prefer the taste of refined (processed) grains to whole grains and in the Saint Louis Regional Foodshed, refined grains (like white bread) are also be slightly cheaper, offering a greater incentive to choose processed grain products over whole grains.

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[22] U.S. Dep't of Agric., *How Many Grains Are Needed Daily?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/grains_amount_table.html (last modified June 4, 2011).

[23] *Agriculture Fact Book*, *supra* note 2, at 19.

[24] *Id.*

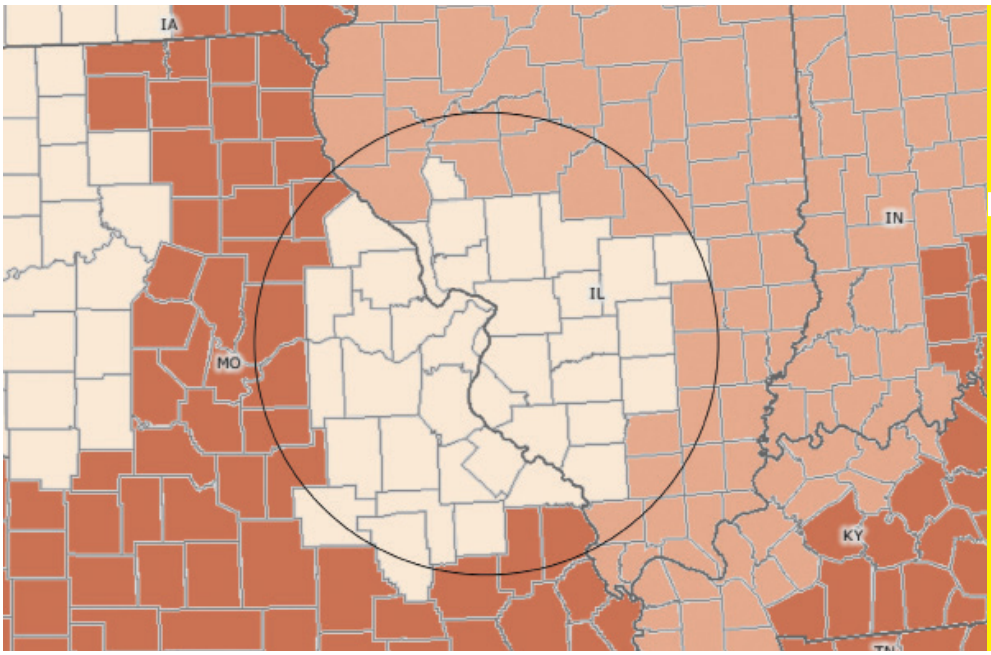
[25] *Id.*

[26] *Id.*

[27] *Id.*

[28] Ctr. Applied Research & Envtl. Sys., National Interactive Maps: CARES Map Room (2011), http://ims2.missouri.edu/tool/maps/default.aspx. (select "Food Environment drop down menu, select "USDA Food Environmental Atlas" and follow "Food Eaten at Home" hyperlink; select "Relative Consumption of Fruits & Vegetables (Compared to Prepared Foods), 2006" and select "Make Map" button).[herein after ctr. Applied Research + Envtl, Sys., Relative Consumption of Fruits + Vegitables] For all Center for Applied Research and Environmental Systems (CARES) maps created for this study, the first step to create all CARES maps in this report is given here and omitted from subsequent footnotes: Select "Administrative Areas" menu and follow "Census Boundaries" hyperlink; then select "County Boundaries." The parenthetical that follows the CARES Map Room URL in each footnote describes the second step, which is locating each layer on the CARES website that is used for the particular map. When data from CARES maps are referenced in the study, that data can be located on the CARES Map Room webpage with the following final steps: select "select features" tool from toolbar and drag mouse across Foodshed counties on map; select [specific data layer name] from Active Map Layer drop down menu and select "Download All Data" button. If a map shows more than one data layer, repeat the last step for each data layer's exact numbers.

[29] *See* Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" option and follow "Relative Food Prices" hyperlink; select "Relative Price Ratio of Whole Grains (Compared to Refined Grains), 2006" and select "Make Map" button) (last visited July 25, 2013).



MAP 2-1.

RELATIVE PRICE RATIO OF WHOLE GRAINS (COMPARED TO REFINED GRAINS) 2006

LEGEND

- 2010 State Boundaries
- 2010 County Boundaries
- **Price ratio of Whole grain Per Refined grain (2006, USDA)**
- No Price Difference
- Between $0.01 – 1.24 to $1.0
- Between $1.25 – 1.27 to $1.0
- Between $1.28 – 1.29 to $1.0
- Between $1.30 – 10.0 to $1.0
- Unknown

Protein

TABLE 2-2. PROTEIN FOOD GROUP AND MEAT CONSUMPTION

Food Product	USDA recommended consumption per capital (lbs./person/yr)	1950-1959 averaged annual consumption per capita (lbs./person/yr)	2009 Estimated annual consumption per capita (lbs./person/yr)	2009 Estimated total consumption by foodshed population (lbs.)
Total meat (beef, veal, lamb & mutton, pork, chicken, turkey, fish and shellfish)	114-136.85 (5-6 ounces of protein per day)	138.2	190.9	792,534,012.5

The USDA recommends consumption of 5-6 ounces of total protein per day on average (with variations for age, gender and activity level).[30] At the national level, meat consumption in 2009 exceeded the recommended amount of protein by nearly 25% and over half of the total meat consumed was "red meat," which consists of beef, veal, lamb, mutton, and pork.[31] Therefore, Americans consume more than the recommended amount of protein in meat alone, even though the USDA's Protein Foods Group "consists of meat, . . . dairy, seafood, beans and peas, eggs, processed soy products, nuts and seeds."[32]

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30 U.S. Dep't of Agric., *How Much Food from the Protein Food Group is Needed Daily?* ChooseMyPlate.gov, http://www.choosemyplate.gov/printpages/MyPlateFoodGroups/ProteinFoods/food-groups.protein-foods-amount.pdf.

31 *Section 3. Health and Nutrition, supra* note 13, at 141.

32 U.S. Dep't of Agric., *What Foods are in the Protein Foods Group?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/protein-foods.html (last visited July 10, 2013) [hereinafter *What Foods are in the Protein Foods Group?*].

With more meat and too much fat in our diets, Americans' health problems reflect this imbalance.

One alternative for meat consumption that some consumers have chosen is to buy locally from producers raising grass-fed cattle, which are lower in fat. In the St. Louis Foodshed, Sugar Creek Piedmontese produces beef which contains less total fat, less saturated fat, more protein, and fewer calories than typical grain-finished beef due to the Piedmontese breed of cattle and their grass-fed diet.[33] Buffalo are another option because buffalo eat grass exclusively. Grass-fed beef and buffalo can be purchased at farmer's markets, some grocery stores, and directly from producers.

However, it remains more expensive than beef raised in confinement livestock operations which are fattened quickly on grains before slaughter.

TABLE 2-3. SUGAR AND OTHER CALORIC SWEETENER CONSUMPTION

Food Product	USDA recommended consumption per capital (lbs./person/yr)	1950-1959 averaged annual consumption per capita (lbs./person/yr)	2009 Estimated annual consumption per capita (lbs./person/yr)	2009 Estimated total consumption by foodshed population (lbs.)
Total sugar	32.2*	109.6	130.7	532,655,557.5

Sweetner

Table 2-3 shows consumption of caloric sweeteners, which are not part of any food group in the USDA recommended balanced diet.[34] For a 2,000-calorie daily diet, an individual should consume "no more than 40 grams of added sugars" a day, or 10 teaspoons.[35] "A teaspoon of white sugar has about 15 calories."[36]

USDA recommends that people should limit added sugar because it contains no nutritional value. Nevertheless, Americans consume over 300% more than the USDA suggested maximum daily limit of added sugar consumption (Table 2-3). This extreme level of over-consumption is a more complex issue than Americans simply being unaware of their sugar intake, though sugar is often found in unexpected places like salad dressings and spaghetti sauce. Rather, chemically based factors contribute to our sugar obsession: Food is not ordinarily like a substance of abuse, but intermittent bingeing and deprivation changes that. Based on the observed behavioral and neurochemical similarities between the effects of intermittent sugar access and drugs of abuse, [authors] suggest that sugar, as common as it is, nonetheless meets the criteria for a substance of abuse and may be "addictive" for some individuals when consumed in a "binge-like" manner.[37]

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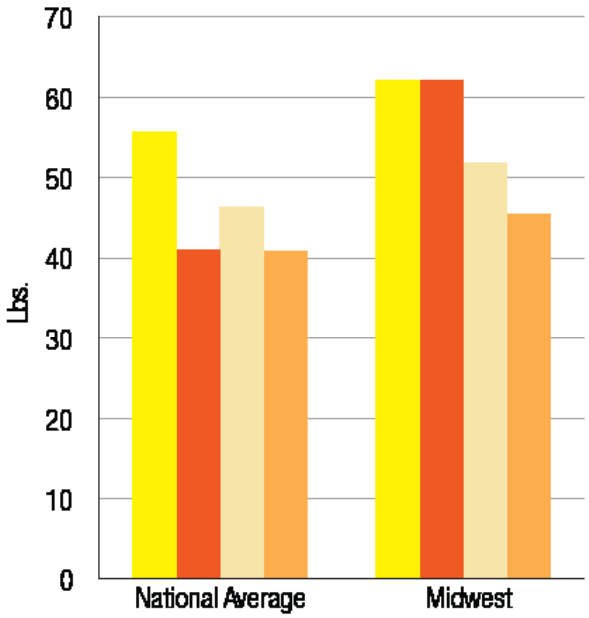
33 *Sugar Creek Piedmontese Brochure*, Sugar Creek Piedmontese (2010) http://sugarcreekpiedmontese.com/pdfs/Sugar-Creek-brochure.pdf.

34 *Agriculture Fact Book*, *supra* note 2, at 20.

35 *Id.*

36 Acad. Nutrition & Dietetics, *Question of the Day: Is Honey More Nutritious than White Sugar?*, EatRight.org, (2012), http://www.eatright.org/Public/content.aspx?id=6442453071.

37 Avena et al., *Evidence for Sugar Addiction: Behavioral and Neurochemical Effects of Intermittent, Excessive Sugar Intake*, 32 Neuroscience & Biobehavioral Revs. 20, 31 (2008) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2235907/pdf/nihms36189.pdf.



GRAPH 2-2 NATIONAL AVERAGE VS. MIDWEST CONSUMPTION OF ADDED SWEETENERS, 2005

TOTAL CORN SWEETENERS
CORN SWEETENERS IN "sugars, sweets, and beverages"
TOTAL REFINED SUGARS
REFINED SUGARS IN "sugars, sweets, and beverages"

"Sugar, as common as it is, nonetheless meets the criteria for a substance of abuse and may be "addictive" for some individuals when consumed in a "binge-like" manner."

We also love our sweet snacks. USDA estimated that the entire Saint Louis Regional Foodshed consumed between 115 and 125 pounds of packaged sweet snacks per capita at home in 2006.[50] Again, this figure does not include the snacks eaten at events, movies, and other locations.

The previous passage describes some of the more insidious effects of sugar: when provided with opportunities to eat a lot of sugary foods, some of us cannot resist because of "feel good" chemical reactions occurring in our brains.[38]

While there are many factors that lead to over-consumption of unhealthy food, such as availability, price, special occasions, and emotions, the data suggest the Midwest is provided with and receptive to opportunities where sugary foods are abundant. A USDA Economic Research Service study in 2005 revealed that the national consumption per capita of all corn sweeteners was 55.7 lbs. and 40.9 lbs. of which was in "sugars, sweets, and beverages."[39]

The Midwest was the region with the largest consumption of these products per capita, with 62.1 lbs. of total corn sweeteners, 45.5 lbs. of which were in "sugars, sweets, and beverages" (Graph 2-2).[40]

USDA Economic Research Service study also revealed that the Midwest had the largest per capita consumption of refined sugars. The national total consumption per capita of refined sugar was 46.4 lbs., while the Midwest came in at 51.9 lbs. per capita.[41]

Like all regions, the Midwest consumes most of its refined sugars in grain products like breads and donuts, followed by "sugars, sweets, and beverages."[42] However, "people in the Midwest consume proportionally more sugar in grain products (20.9 percent more than the average) than they consume of sugar in all products (11.9 percent above the average).[43]

Examining the "sugars, sweets, and beverages" portion of our sweetener consumption, many of these added sweeteners are those that frequently travel through a straw as sodas and energy drinks. For example, a 20 oz. Pepsi and a 20 oz. Powerade Fruit Punch contain 17.25 teaspoons and 7.8 teaspoons of sugar, respectively.[44]

Other examples of drinks with added sugars in 8-ounce servings include Fanta Orange Soda (11 teaspoons[45]), Sunny Delight Drink (4 teaspoons[46]), and Hawaiian Punch (6 teaspoons.[47])While an eight-ounce glass of Welch's Grape Juice contains no added sugar, it does contain 36 grams of natural sugar from Concord grapes and counts for two servings of fruit.[48]

People often assume juice is automatically a healthier choice, however many of us consume multiple juice servings, which contribute a lot of calories and fail to satisfy hunger.

In the Saint Louis Regional Foodshed, we love our sodas. Based on the USDA's estimated per capita consumption for the Nonmetro West North Central group, the Metro Midwest 2 Market Group, and the Nonmetro East North Central group, nearly the entire region consumed an estimated 65-70 gallons per year per person at home in 2006 (Map 2-2).[49] This does not even include the consumption of soft drinks at restaurants, movie theaters, baseball games, and the like.

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38 *See id.*

39 Stephen Haley et al., U.S. Dep't of Agric., *Sweetener Consumption in the U.S.: Distribution by Demographic and Product Characteristics* 14 (2005) http://www.ers.usda.gov/media/326278/sss24301_1_.pdf.

40 *Id.*

41 *Id.*

42 *Id.*

43 *Id.* at 13.

44 *See* Marissa Harshman, *Sugar High in Beverages*, The Columbian (June 17, 2012) http://www.columbian.com/news/2012/jun/17/Sugar-high-in-drink/. The serving sizes were changed for this report in order to compare the amount of sugar added in beverages of the same size.

45 *Fanta Orange*, Nutrition Connection, http://productnutrition.thecoca-colacompany.com/products/fanta-orange (last visited July 31, 2012).

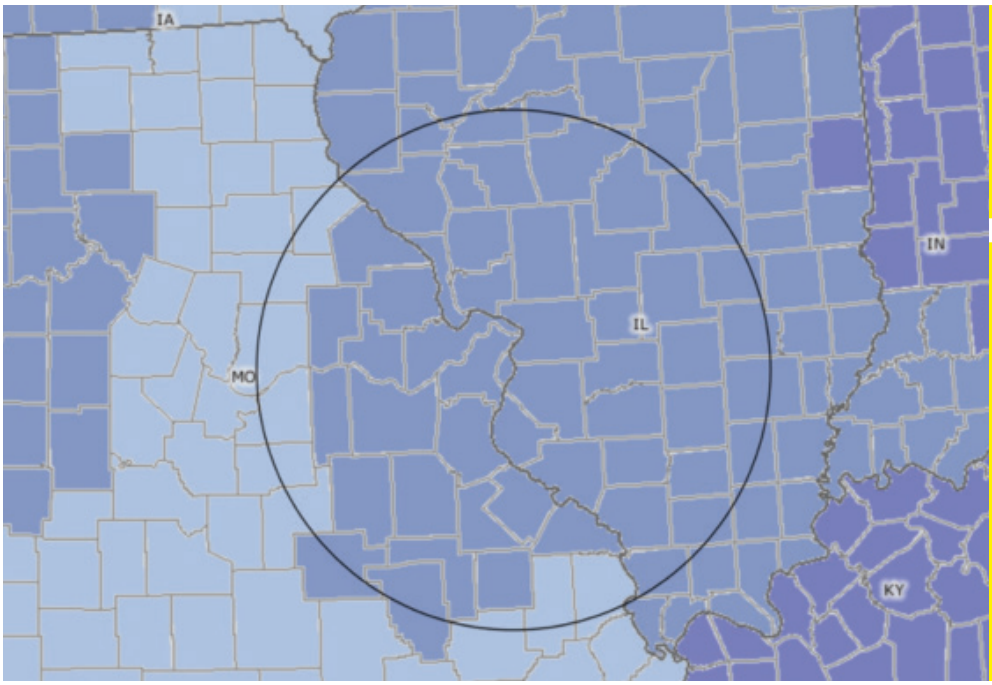
46 *Calories in Tangy Original Style*, Calorie Count, http://caloriecount.about.com/calories-sunny-delight-tangy-original-style-i101308 (last visited July 31, 2012).

47 *Calories in Fruit Juicy Red*, Calorie Count, http://caloriecount.about.com/calories-hawaiian-punch-fruit-juicy-red-i108158.

48 *Welch's 100% Grape Juice Fact Sheet*, Welch's (2011) http://www.welchs.com/media/115765/welchs100percentpgjfactsheet.pdf.

49 Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" and follow "Food Eaten at Home" hyperlink; then select "Soft Drink/Sweetened Beverage Consumption (Gallons per Capita), 2006" and select "Make Map" button).

50 Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" and follow "Food Eaten at Home" hyperlink; then select "Packaged Sweet Snack Consumption (Pounds per Capita), 2006" and select "Make Map" button).



MAP 2-2.
CONSUMPTION PER CAPITA OF SOFT DRINKS, 2006

LEGEND
2010 State Boundaries
2010 County Boundaries
Soft Drink/Sweetened Beverage Consumption (Gallons per Capita),2006
0 Gals. Soft Drinks, per Capita
0 - 60 Gals. Soft Drinks, per Capita
60 - 65 Gals. Soft Drinks, per Capita
65 - 70 Gals. Soft Drinks, per Capita
>70 Gals. Soft Drinks, per Capita
Unknown

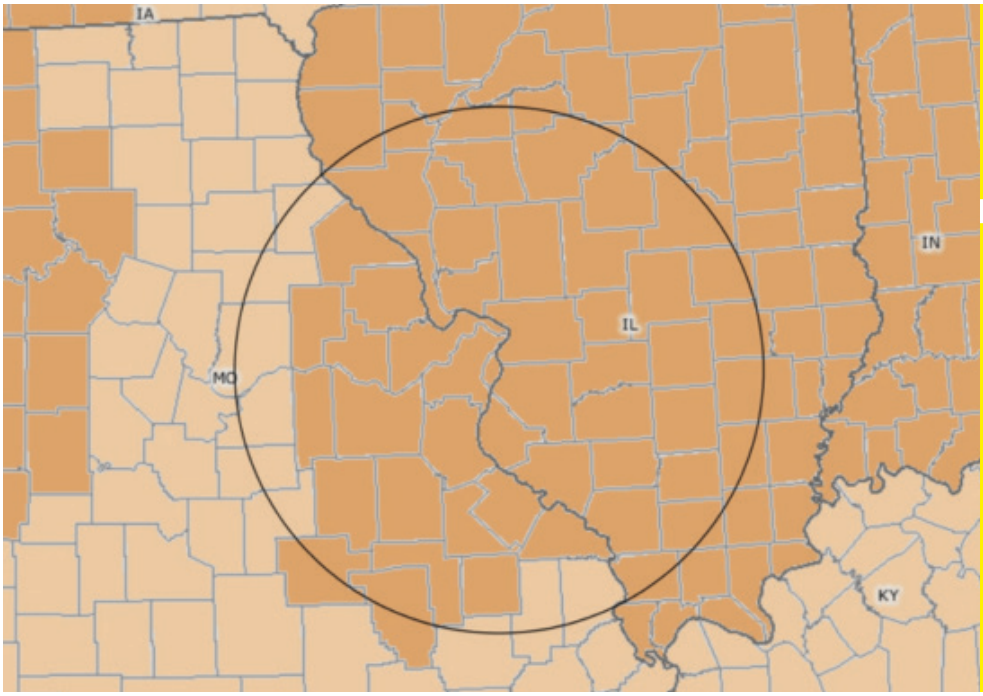
TABLE 2-4 TRENDS AFFECTING HEALTH: FRUIT AND VEGETABLE CONSUMPTION

Food Product	USDA recommended consumption per capital (lbs./person/yr)	1950-1959 averaged annual consumption per capita (lbs./person/yr)	2009 Estimated annual consumption per capita (lbs./person/yr)	2009 Estimated total consumption by foodshed population (lbs.)
Vegetables (total)	375 - 547.5 (2-3 cups per day)	338.8	390.9	1,592,810,002.5
Fruits (total)	273.75-365 (1.5-2 cups per day)	248.7	257.0	1,047,204,325.0

Fruits and Vegetables

The USDA recommends consuming 2-3 cups of vegetables per day[51] and 1.5-2 cups of fruit per day.[52] According to the 2009 national average consumption data, while we consume the recommended amount of vegetables per capita, Americans on average fail to eat the minimum 1.5 cups of fruit per day. These numbers do not reflect the types of fruits and vegetables consumed.

[51] U.S. Dep't of Agric., *How Many Vegetables are Needed Daily or Weekly?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/vegetables_amount_table.html (last modified June 4, 2011).
[52] U.S. Dep't of Agric., *How Much Fruit is Needed Daily?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/fruits_amount_table.html (last modified June 4, 2011).



MAP 2-3.

CONSUMPTIONPERCAPITAOFPREPAREDFOODS, 2006

LEGEND

- 2010 State Boundaries
- 2010 County Boundaries

Prepared Food Consumption, (Pounds per Capita), 2006

- 0 Lbs. Prepared Foods, per Capita
- 0 – 285 Lbs. Prepared Foods, per Capita
- 285 – 300 Lbs. Prepared Foods, per Capita
- 300-315 Lbs. Prepared Foods, per Capita
- >315 Lbs. Prepared Foods, per Capita
- Unknown

All fruits and vegetables are not created equal, however. From a health perspective, potatoes do not pack the same health values as spinach, though they are both vegetables. As seen in Graph 2-1, half of the fruits and vegetables we consume are processed (frozen, dried, canned or juiced), which means that Americans are missing out on the nutrients and fiber in these foods that are lost as a result of processing.[53] The data also indicate that we are doing less of our food preparation at home, which has nutrition implications.

Prepared Foods Consumption

In a world where time equals money and convenience rules many of our daily decisions, more and more prepared foods (ready to eat from stores or restaurants) find their way into Americans' diets. Nutrition is last on many people's minds when making food consumption choices. We often focus less on nourishing our bodies and more on satisfying our taste buds - quickly.

The ritual of sharing meals with others and mindful eating have for many of us been replaced with pre-prepared meals eaten on the go or mindless eating in front of the television or computer. Frozen, pre-cut, or single serving-size food items have become staples in our homes. When people lack the time, skills, or experience to chop vegetables and boil pasta, many buy frozen meals, instant noodles or phone for take-out.

When there is little time to prepare a snack or make a lunch, we often grab a hot dog, candy bar, or chips at the convenience store. Thus as families are pressed for time, we see the increase in the consumption of prepared food.

Prepared foods are often higher in sodium, fat, calories, and sugar and lower in fiber and nutrients than those prepared fresh at home. Even grocery stores feature "food bars" of prepared foods, though these may be nutritionally closer to foods made at home. Despite the growing popularity of chef competitions, ethnic and regional cuisine, and cooking shows on television, many of us are, ironically, enjoying those shows with a microwavable dinner or frozen pizza rather than recreating in our own kitchens the food we see in media.

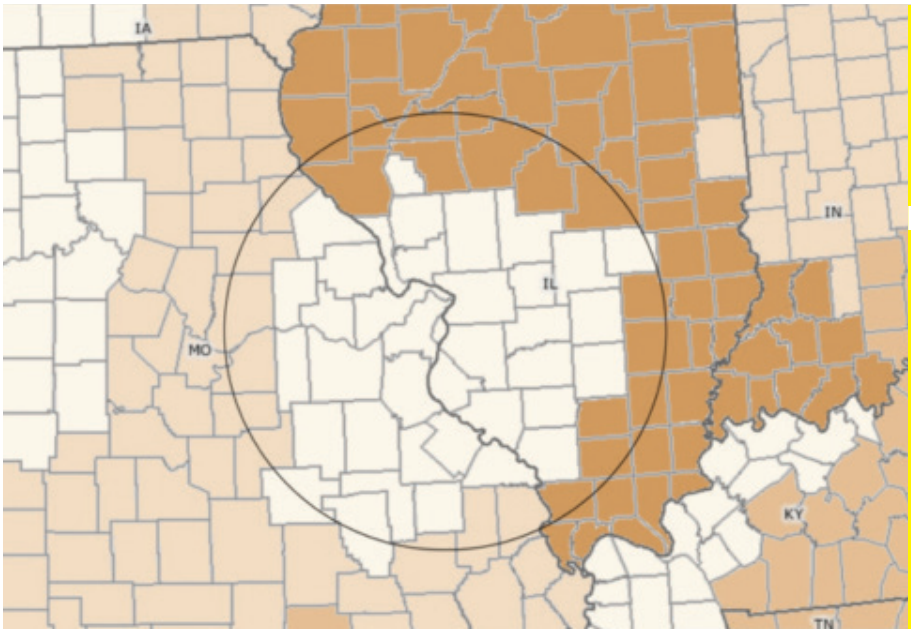
[53] *Section 3. Health and Nutrition*, *supra* note 13, at 142.

Based on the per capita consumption estimates for the Nonmetro West North Central Group, the Metro Midwest 2 Market Group, and the Nonmetro East North Central Group, most of the people in the Saint Louis Regional Foodshed consumed between 300 and 315 lbs. of prepared foods at home in 2006 (Map 2-3). [54]

Per capita consumption data in the Saint Louis Regional Foodshed is based on three different groups representing the western, central and eastern portions of the Foodshed.

The Nonmetro West North Central group including the western edge of the foodshed consumed an estimated average of 174 pounds of fruits and vegetables per capita and 315 pounds of prepared foods per capita, for a ratio of 55%.[55] The Metro Midwest 2 Market Group including the urban core and its surrounding counties consumed an estimated average of 169 pounds of fruits and vegetables per capita and 298 pounds of prepared foods per capita, or a ratio of 57%.[56] Lastly, the Nonmetro East North Central group inculding the far eastern edge of the Foodshed in central Illinois consumed an estimated average of 188 pounds of fruits of prepared foods per capita, or a ratio of 61% of fresh fruits and vegetables (typically prepared at home) to prepared foods (purchased from stores and restaurants).[57]

Comparing the amount of prepared foods consumed per capita to the amount of fruits and vegetables consumed per capita, Map 3-4 illustrates that the Saint Louis Foodshed, as well as the entire nation, consumed more prepared food than fruits and vegetables in 2006.[58]



MAP 2-4.

RELATIVE CONSUMPTION OF FRUITS & VEGETABLES (COMPARED TO PREPARED FOODS), 2006

LEGEND

2010 State Boundaries
2010 County Boundaries

Ratio per Capita of Fruits and Vegetables by Prepared Foods (2006, USDA)

0% Fruits/Vegetables by Prepared Foods, per Capita
0 – 56% Fruits/Vegetables by Prepared Foods, per Capita
56 – 58% Fruits/Vegetables by Prepared Foods, per Capita
58 – 60% Fruits/Vegetables by Prepared Foods, per Capita
>60% Fruits/Vegetables by Prepared Foods, per Capita
Unknown

While our fruit and vegetable consumption is below the USDA recommended consumption, about half of the fruits and vegetables we consume are processed, as illustrated at the beginning of this chapter in Graph 2-1.

Processed fruits or vegetables often take the form of pre-packaged juice products. Many Americans consume juices daily.

Juice consumption trends are shown by reviewing one popular fruit, the apple. Graph 2-3 illustrates the national change in per capita availability of all apple food products between 1970 and 2009. Apple juice had the largest increase in availability since 1970, increasing from 6.4 to 25 lbs., and ranked as the apple product with the most per capita availability in 2009 meaning that more Americans had access to apple juice than to fresh apples.[59]

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[54] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" and follow "Food Eaten at Home" hyperlink; then select "Prepared Food Consumption, (Pounds per Capita), 2006" and select "Make Map" button).

[55] *Id.*

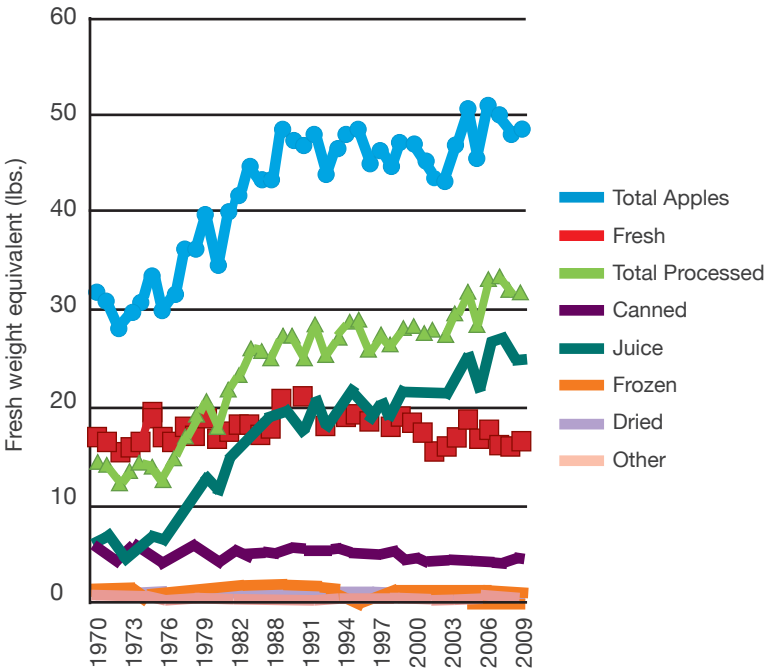
[56] *Id.*

[57] *Id.*

[58] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" and follow "Food Eaten at Home" hyperlink; then select "Relative Consumption of Fruits & Vegetables (Compared to Prepared Foods), 2006, and select "Make Map" button).

[59] *Food Availability (Per Capita) Data System*, USDA ERS, (July 5, 2012) http://www.ers.usda.gov/data-products/food-availability-(per-capita)-data-system.aspx (follow "Fruits (all uses)" hyperlink and view "Apples" data sheet.).

GRAPH 2-3. U.S. PER CAPITA AVAILABILITY OF APPLES BY TYPE, 1970-2009



While per capita availability of total apples increased from 32 lbs. in 1970 to 48 lbs. in 2009, the availability of fresh apples remained relatively the same (17 to 16.4 lbs.) and the availability of total processed apples increased dramatically from 14.5 lbs. to 31.8 lbs.[60] Processing apples and grapes into juices results in fewer nutrients and more condensed sugar content in the final product compared to the fresh fruits in their natural form.

USDA recommends that Americans consume mostly "whole or cut-up fruit" as opposed to juice because much of the dietary fiber of fresh fruit is lost when made into juice.[61] The major advantage to consuming fresh rather than juiced fruits and vegetables is that "[d]iets rich in foods containing fiber, such as some vegetables and fruits, may reduce the risk of heart disease, obesity, and type 2 diabetes."[62] Purchased juice will lack some of fiber, and available naturally occurring anti-oxidants[63] and phytochemicals[64] found in the whole fruit.[65] However, without further analysis of the actual fruit, the extent of any loss of antioxidants is uncertain.

The apple data suggest that Americans are getting their apples but not all of the nutrients and fiber found in fresh apples. Some consumers have begun juicing fresh fruit at home in order to maximize the nutritional value often lost in the juice canning and packaging processes. From a nutritional perspective, fresh fruit and vegetables have no adequate substitutes.

The "levels for fiber were lower in 2004 than in 1909," with decreased dietary fiber "in 2004 [being] attributable to decreased consumption of grains, fresh vegetables (mainly potatoes), and non-citrus fresh fruits since 1909"[66].

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60 *Id.*

61 U.S. Dep't of Agric., *Tips to Help you Eat Fruit*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/fruits-tips.html (last visited Aug. 8, 2012).

62 U.S. Dep't of Agric., *Why is it so Important to Eat Fruit?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/fruits-why.html (last visited Aug. 8, 2012).

63 "Antioxidants are a handful of vitamins and minerals, carotenoids, and polyphenols present in a variety of foods that . . . prevent or repair damage to your body cells." Roberta Larson Duyff, MS, RD, CFCS, Am. Dietetic Ass'n, *Complete Food and Nutrition Guide* 136 (4th ed. 2012).

64 "Phytochemicals are substances that plans naturally produce to protect themselves against viruses, bacteria, and fungi . . . . Certain phytochemicals may help protect against some cancers, heart disease, and other chronic health conditions." Roberta Larson Duyff, M.S., R.D., CFCS, Am. Dietetic Ass'n, *Complete Food and Nutrition Guide* 92 (1st ed. 1998).

65 Interview with Martha Vatterott, R.D., L.D., Saint Louis Behavioral Med. Inst., by Melissa Vatterott, Mo. Coal. for the Env't, May 31, 2013.

66 Hiza, H.A.B., & Bente, L., U.S. Dep't of Agric., *Nutrient Content of the U.S. Food Supply, 1909-2004: A Summary Report* iii, 4 (2007) http://www.cnpp.usda.gov/publications/foodsupply/foodsupply1909-2004report.pdf.

Note the decreased grain consumption referenced here is likely from decreased whole grain consumption since whole grains are a major source of insoluble fiber, one of the "two major types of dietary fiber."[67] The increased availability of juice has likely contributed to the decreased role fruits and vegetables play in fiber consumption. Potatoes are a unique exception. Potato consumption has increased since 1900s with the rise of the fast food industry and the increased availability of processed foods.

However, the decreased consumption of fresh whole potatoes with fiber-filled skin[68] and more consumption of fried and processed potato products, such as french fries and potato chips may account for the decrease in fiber from vegetables.

Per capita consumption of fresh potatoes has fallen 14% since 1909 and "has been more than offset by a steady growth in consumption of processed products." [69]

On a farm-weight basis, consumption of processed potato products increased 200% from 1960 to 1990, most of which is due the increased consumption of frozen potato products "from 6.6 pounds . . . in 1960 to 49.9 pounds . . . in 1990."[70]

This is not surprising given the availability of french fries in both restaurants and the grocer's freezer section. Consumers choosing processed potatoes miss out on the nutrients and fiber that fresh potatoes provide.

[67] *Id.* at iii, 4. While Hiza et al. does not distinguish between refined grains and whole grains, based on other data collected for this report, consumption of flour and wheat products have increased even in the last thirty years; thus it is possible that Hiza et al. is referring to decreased consumption of whole grains.

[68] *See Is Potato Skin the Most Nutritious Part of Potatoes?*, Acad. Nutrition & Dietetics, http://www.eatright.org/Public/content.aspx?id=6442459089 (last visited Aug. 8, 2012).

[69] *Commercial Potato Production in North America* 8 (William H. Bohl & Steven B. Johnson eds., 2010) http://vric.ucdavis.edu/pdf/POTATOES/Commercial%20Potato%20Production%20in%20North%20America%202010.pdf.

[70] *Id.*

A healthy diet contains a wide variety of all vegetables to provide a complete profile of produce-based vitamins, minerals, and antioxidants.

Table 2-5 lists common leafy vegetables and their nutrient content. Table 2-6 illustrates the phytochemicals and health benefits associated with them from various fruits.

TABLE 2-5. LIST OF GREEN VEGETABLES, RANKED IN ORDER OF NUTRIENT COTENT[71]

Type of Leafy Green Vegetable	Key Nutrients
Kale	Vitamins, A, B6, C, & K; iron, fiber, niacin, folate, calcium
Collard Greens	Vitamins, A, B6, C, & K; folate, choline, manganese, potassium, calcium, fiber
Turnip Greens	Vitamins, A, B6, C, & K; iron, folate, copper, manganese, potassium, calcium, fiber
Swiss Chard	Vitamins, A, B6, C, & K; iron, folate, choline, phosphorus, maganese, magnesium, potassium, calcium
Spinach	Vitamins, A, B6, C, & K; fiber, folate, calcium, riboflavin, magnese, magnesium, phosphorus, potassium, iron
Mustard Green	Vitamins, A, B6, C, & K; iron, fiber, folate, calcium, mag-nese, magnesium, potassium, riboflavin, thiamin
Broccoli	Vitamins C & A; potassium, folate
Romaine Lettuce	Vitamins A, C & K; iron, folate, choline, calcium, maganese, magnesium, phosphorus, potassium, fiber
Cabbage	Vitamin C

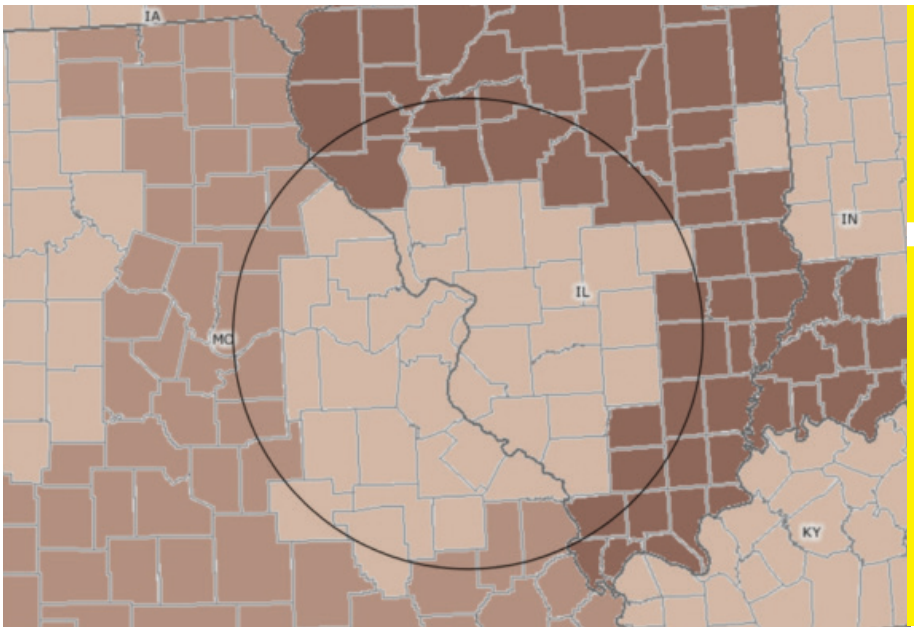
[71] *See* Cari Nierenberg, *Leafy Greens: Ranked and Rated*, WebMD (Mar. 1, 2011) http://www.webmd.com/diet/healthy-kitchen-11/leafy-greens-rated (providing list of top ten green vegetables based on nutrient content); Catherine Droessler, *My Smoothie Approach*, Almost Raw Vegan: Adventures & Inspirations in Plant-based Eating (Feb. 1, 2012), http://almostrawvegan.com/2012/02/01/cats-smoothy-approach/ (listing nutrient content in green leafy vegetables).

TABLE 2-6. HEALTH BENEFITS FROM PHYTOCHEMICALS, INCLUDING VITAMINS AND MINERALS, FOUND IN COMMON FRUITS AND VEGETABLES.[72]

Color	Phytochemical	Health Benefits	Fruits and Vegetables
Red	Lycopene	Reduces risk of many cancers, particularly prostate cancer.	Pink grapefruit, tomato, watermelon
	Anthocyanins	Protect against cell damage (aging) and heart disease. Protects urinary tract health.	Grapes, rasberries, strawberries
			Others: apples, cranberries, cherries, pomegranates, beets, red cabbage, radishes
Orange/ Yellow	Beta-carotene	Supports eye health and mucous membrane health. Reduces risk for heart disease, certain cancers. Can enhance Immune system function.	Pumpkins, carrots, sweet potatoes
	Folate	Reduces risk of birth defects.	Citrus fruits
	Vitamin C	Prevents bruising, maintaining capillary wall integrity, increases iron absorption. Also promotes Immune health and wound healing.	Citrus fruits
			Others: apricots, yellow pepper, yellow squash, yellow tomatoes, nectarines, pears
Green	Lutein	Works with "**********" found in grapes, oranges, corn and red peppers to promote eye health, and protect against macular degeneration associated with age.	Celery, cucumber, green peppers, peas, dark leafy greens such as spinach
	Indoles	Reduces risk of some cancers.	Broccoli, cabbage, cauliflower
	Vitamin C & folate	Reduces risk of birth defects.	Spinach and broccoli
			Others: asparagus, brussel sprouts, green pepper, zucchini, green apples, green grapes
Blue/ Purple	Anthocyanins	Protect against cell damage (aging). Reduces risk of cancer, heart disease, stroke.	Blueberries and grapes
			Others: blackberries, eggplant, plums, prunes
White/ Brown	Allicin	Helps to reduce cholesterol and blood pressure. Reduces risk of some cancers and heart disease.	
	Potassium		Bananas and potatoes
			Others: coconut, dates, white peaches, white nectarines, figs, mushrooms, cauliflower, turnips, parsnips, garlic, ginger

[72] *See* Julie Garden-Robinson, Ph.D., L.R.D., N.D. State Univ. Extension Serv., *What Color is Your Food? Taste a Rainbow of Fruits and Vegetables for Better Health* 2-5 (May 2011) http://www.ag.ndsu.edu/pubs/yf/foods/fn595.pdf; *see* Donnia Behrends & Jamie Goffena, Univ. of Neb.–Lincoln Extension, *MyPlate: Food Group*, NebGuide (June 2012) http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=373.

The most recent national per capita consumption data from 2009 suggests that the people of the Saint Louis Regional Foodshed are eating the recommended amount of vegetables. However, it is highly possible that we are eating more starchy vegetables than leafy greens and other colorful vegetables, especially when price is a factor. Price may play a role in consumer choices for varieties of vegetables. For most of the Saint Louis Regional Foodshed, leafy green vegetables were 60% more expensive than starchy vegetables in 2006 (Map 2-5).[73]



MAP 2-5.

RELATIVE PRICE OF GREEN-LEAFY VEGETABLES (COMPARED TO STARCHY VEGETABLES) 2006

LEGEND

2010 State Boundaries
2010 County Boundaries

Price Ratio of Green-Leafy per Starchy Vegetables (2006, USDA)

No Price Difference
Between $0.01 – 1.50 to $1.0
Between $1.5 – 1.55 to $1.0
Between $1.56 – 1.60 to $1.0
Between $1.61 – 10.0 to $1.0
Unknown

Fats and Dairy

TABLE 2-7. FAT AND DAIRY CONSUMPTION

Food Product	USDA recommended consumption per capita (lbs./person/yr)	1950-1959 averaged annual consumption per capita (lbs./person/yr.)	2009 Estimated annual consumption per capita (lbs./person/yr.)	2009 Estimated total consumption by foodshed per population (lbs.)
Added fats and oil (fat content only)	22.81 (6 teaspoons per day)	44.6	78.6	320,273,385.0
All dairy products	547.5 (3 cups per day)	703	607.1	2,473,765,547.5

The USDA allows roughly 6 teaspoons of oils per day, but points out that "[s]ome Americans consume enough oil in the foods they eat, such as: nuts, fish, cooking oil, salad dressings" and "[o]thers could easily consume the recommended allowance by substituting oils for some solid fats they eat."[74] Lastly, the USDA recommends 3 cups of dairy per day.[75]

[73] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" option and follow "Relative Food Prices" hyperlink; select "Relative Price of Green-Leafy Vegetables (Compared to Starchy Vegetables), 2006" and select "Make Map" button).

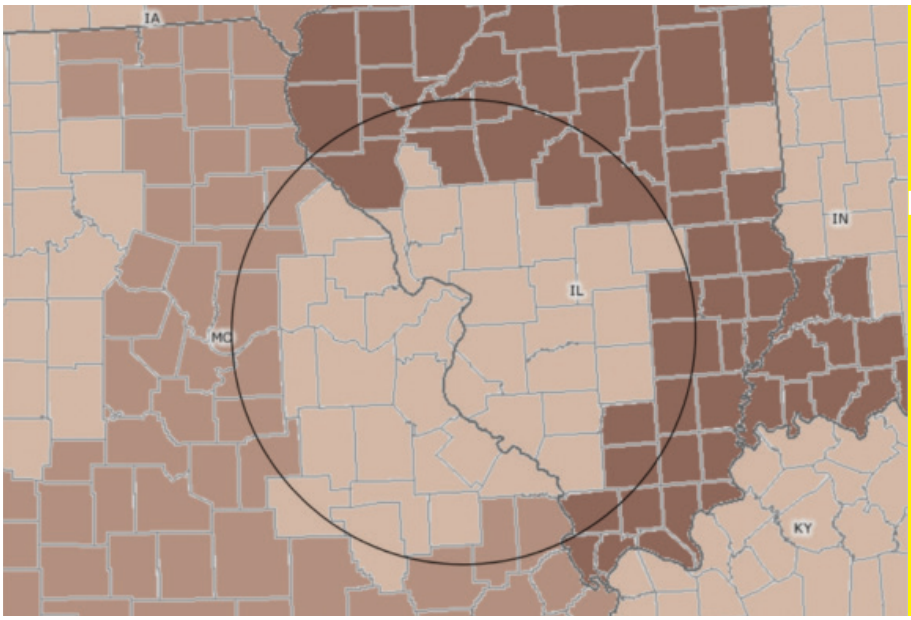
In 2009, Americans exceeded the USDA recommended per capita consumption of dairy and added fats and oil by 10% and breath-taking 250%, respectively.[76] Inhabitants of our Foodshed are not among the biggest consumers of these though, at least when eating at home (Map 2-6).

As Map 2-6 illustrates, in 2006, most people in the Metro Midwest 2 Market Group which includes most of the counties in the Saint Louis Regional Foodshed, consumed between 17 and 19 lbs. per capita of solid fats, such as butter and margarine.[78]

The counties along the Foodshed outskirts consumed greater amounts of solid fats at home in 2006. The Nonmetro East North Central group (including the Illinois outskirts) consumed more than 21 lbs. per capita and the Nonmetro West North Central group (including the Missouri outskirts) consumed between 19 and 21 lbs. per capita.[79]

However, this might be contrasted with increased intake in prepared foods (Map 2-3). It is likely that the fats consumed in the Urban Core are masked in the take-out box or restaurant dining and not necessarily a sign of healthier eating.

While the excess dairy consumption in 2009 was lower than other states, the nutritional value of the products consumed is less than ideal. USDA recommends consuming reduced-fat, low-fat, or fat-free products;[80] however, the dairy food group includes all ranges of milk products, cream, sour cream, all cheeses, and all frozen dairy products (including ice creams, sherbets, frozen yogurts), which include high-fat options.[81]



MAP 2-6.

CONSUMPTION PER CAPITA OF SOLID FATS, 2006

LEGEND

- 2010 State Boundaries
- 2010 County Boundaries

Solid Fat Consumption (Pounds per Capita), 2006

- 0 Lbs. Solid Fats, per Capita
- 0 – 17 Lbs. Solid Fats, per Capita
- 17 – 19 Lbs. Solid Fats, per Capita
- 19 – 21 Lbs. Solid Fats, per Capita
- >21 Lbs. Solid Fats, per Capita
- Unknown

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74 U.S. Dep't of Agric., *How Much is my Allowance for Oils?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/oils_allowance_table.html (last modified June 30, 2011).

75 U.S. Dep't of Agric., *How Much Food from the Dairy Group is Needed Daily?*, ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/dairy-amount.html (last visited June 6, 2013).

76 *Section 3. Health and Nutrition*, *supra* note 13, at 141.

77 Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" drop down menu, select "USDA Food Environmental Atlas" and follow "Food Eaten at Home" hyperlink; then select "Solid Fat Consumption (Pounds per Capita), 2006" and select "Make Map" button) (last visited July 25, 2013).

78 *Id.*

79 *Id.*

80 U.S. Dep't of Agric., *What Foods Are Included in the Dairy Group?* ChooseMyPlate.gov, http://www.choosemyplate.gov/food-groups/dairy.html (last visited July 22, 2013).

81 *Section 3. Health and Nutrition*, *supra* note 13, at 141.

FIGURE 2-2.
THE MINI, REGULAR, AND LARGE SIZE CONCRETE CUPS AT TED DREWES

The smallest custard size, the mini, is eight ounces of custard and contains twice the ½ cup portion, delivering 400 calories per serving. All of these sizes are larger than a ½ cup portion, therefore contributing a significant amount of sugar and fat while still categorized as a dairy food group product.[84] Ted Drewes is typical of other frozen custards.

> "Ted Drewes is an amazing cultural tradition that enjoys fierce loyalty among St. Louisans. Few customers limit themselves to the mini size serving."

Therefore, the dairy consumption data should not be read to suggest Americans consume only healthy dairy products. For example, residents of the Saint Louis Regional Foodshed are likely to be familiar with a favorite local dairy treat: Ted Drewes Frozen Custard.

A ½ cup portion of the Ted Drewes' Vanilla Frozen Custard treat has 200 calories, 90 of which are from fat; 21 grams of sugar; and 10 grams of fat, 7 of which are saturated fat. Ted Drewes' website states "[b]y definition, frozen custard must have at least 10% butterfat and 1.4% egg yolk."[82] This ½ cup portion contains 8% of a 2,000 calorie diet's daily value of Vitamin A, no Vitamin C, and 15% of the daily value of calcium.[83] The dairy treat store's "Frozen Concrete" is served in three sizes: large, regular, and mini (Figure 2-2), and its sundaes are served in four sizes: super, jumbo, regular, and kiddie.

Low fat milk provides a healthier beverage alternative than soda (for those without lactose intolerance) and yet it fares poorly in consumption competition with soda in our region. "In 2001, the average American consumed 49 gallons of soft drinks" and consumed 22 gallons of milk per capita.[86] Price differences between milk and sugary sodas do not appear to be contributing to the difference in consumption levels. In 2006, the price ratio of low-fat milk per soda in the region was less than 1:1 in all counties (Map 2-7). Nevertheless, as shown previously in Map 2-2, the majority in our region consume between 65 and 70 gallons of soft drinks each year.

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82 *What is Frozen Custard*, Ted Drewes, http://www.teddrewes.com/sitecontent/dynamiccontent.aspx?pid=76&uid=D18D6B6C-7948-4C04-8F59-12F77F9F3F49 (last visited Aug. 7, 2012).

83 *Vanilla Frozen Custard Nutritional Information*, Ted Drewes Frozen Custard, http://www.teddrewes.com/sitecontent/dynamiccontent.aspx?pid=94&uid=40E26FCC-32D2-4AA6-8A89-7A3ADE0A6946 (last visited Aug. 7, 2012).

84 *Custard & More*, Ted Drewes Frozen Custard, http://www.teddrewes.com/sitecontent/CustardNMore.aspx (last visited Aug. 7, 2012).

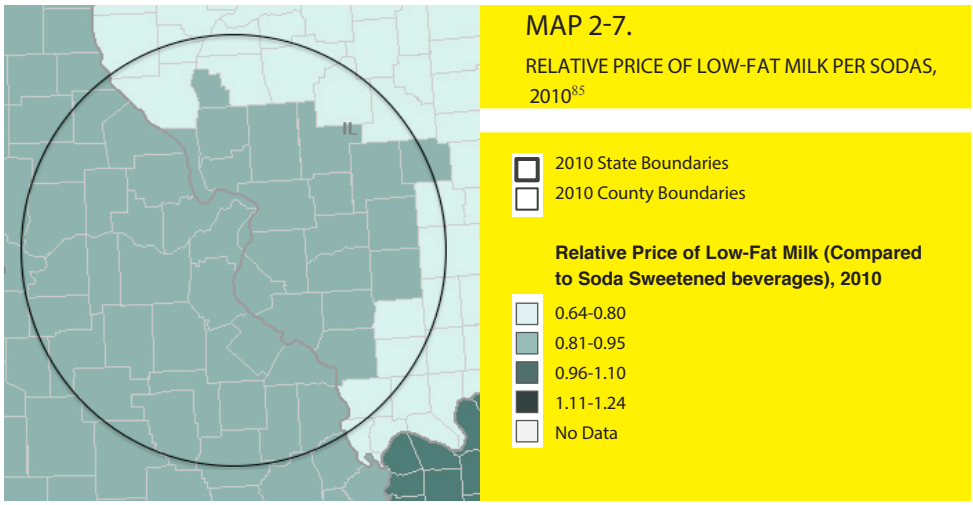
85 *Food Environment Atlas*, USDA ERS (July 11, 2012), http://ers.usda.gov/data-products/food-environment-atlas/go-to-the-atlas.aspx (click "Display a different map" button, select "Food Prices and Taxes" menu, and follow "Price of low-fat milk/price of sodas, 2010**" hyperlink; use the zoom-in feature to view counties in the Saint Louis Regional Foodshed.).

86 Ctr. for Sustainable Sys., Univ. of Mich., *U.S. Environmental Footprint Factsheets* 1 (2011) http://css.snre.umich.edu/css_doc/CSS08-08.pdf.

Therefore, while the price of low-fat milk fortunately does not discourage low-fat milk consumption, consumption of sugary drinks is still excessive and far exceeds milk consumption. For comparison, in 2010, consumption of vegetable and fruit juice was about 8 gallons per capita.[87]

Whole milk provides additional fat in the diet, and the USDA does not recommend whole milk for the general population. Americans seem to have heeded the guidelines and moved away from whole milk. Whole milk consumption has decreased from 21.3 gallons in 1972-76 to 8.2 gallons in 1997.[88] During the same time span, 2%-,1%-, and skim milk consumption increased from 4.5, 1.0, and 1.5 gallons to 7.7, 2.6, and 4.0 gallons, respectively.[89] "Annual per capita consumption of milk fat from all fluid milk and cream products declined by 37 percent in 1970-97, from 9.1 pounds to 5.8 pounds per person."[90]

While Americans have become more conscious of our fat-intake in milk beverages, consumption of total cheeses doubled during that time span.[91] "From 1970 to 1997, consumption of Cheddar cheese, America's favorite cheese, increased 65 percent to 9.6 pounds per capita."[92] Consumption of yogurt more than tripled (3.0 1/2 pints to 9.5 1/2 pints) and consumption of frozen dairy products has remained nearly the same (28.0 to 28.7 pounds).[93] According to the International Dairy Foods Association, reduced-fat, low-fat, and non-fat cheeses' share of supermarket sales of cheese increased from 19 percent in 1999 to 25 percent in 2005, suggesting that 75 percent of cheese consumption still comes from regular or full-fat cheese products. While Americans are gradually increasing our intake of lower fat cheeses, our consumption of full fat cheeses pushes our fat intake beyond dietary recommendations.[94]



87 Agric. & Agri-Food Can., *Fruit Juices in the United States* 2 (2011) http://www.ats-sea.agr.gc.ca/amr/pdf/6069-eng.pdf.

88 Judith Jones Putnam & Jane E. Allshouse, U.S. Dep't of Agric., *Food Consumption, Prices, and Expenditures, 1970-97*, 63 (1999) http://www.ers.usda.gov/media/286054/sb965_1_.pdf.

89 *Id.*

90 *Id.* at 20.

91 *Id.* at 63.

92 *Id.* at 20.

93 *Id.* at 63.

94 Hodan Farah Wells & Jean C. Buzby, U.S. Dep't of Agric., *Dietary Assessment of Major Trends in U.S. Food Consumption, 1970-2005*, 11 (2008) http://www.ers.usda.gov/media/210681/eib33_1_.pdf. For the most recently published Dietary Guidelines for Americans, *see* Dietary Guidelines for Americans, U.S. Dep't of Health & Human Servs., www.dietaryguidelines.gov.

Food Related Health Trends

Our food consumption patterns demonstrate that Americans, including those in the Saint Louis Regional Foodshed, are consuming far more sugar, sodium, meat, soda, and high fat dairy than recommended for good health while consuming less fiber and nutrient dense food. Good health requires eating more of foods that are good for us – and fewer of those that are not. This next section demonstrates the importance of decreasing consumption of processed and high-sugar and high-fat food because of the link between a poor diet and increased health problems. Maps 2-8 through 2-11 show rates of diabetes and obesity in the Saint Louis Regional Foodshed, both health conditions that are associated with overconsumption of processed foods.

Diabetes is a disease categorized into type I and type II diabetes. People with type I diabetes are unable to produce insulin in their bodies, which is needed to move sugar and other nutrients into cells of tissues for tissue function.[95] The bodies of type II diabetics produce insulin, but they are insulin-resistant, which means either the pancreas makes too little insulin or the body has difficulty using it properly.[96] "While not everyone with type 2 diabetes is overweight, obesity and lack of physical activity are two of the most common causes of this form of diabetes."[97] Type 2 diabetes "affect[s] 90 to 95% of the 26 million American" diabetics.[98]

Rates of diagnosed diabetes may not reflect all instances of diabetes on the region. If untreated, diabetes can cause complications of "the heart and blood vessels, the eyes, the kidney, the nerves, the gums and teeth."[99] The most common complications of uncontrolled diabetes are heart disease and blood vessel disease.[100] Diabetes can also lead to poor blood circulation in legs and feet; blood vessel damage and nerve damage can also impair feet and can lead to amputation.[101]

High blood sugar can cause nerve damage, which in turn can cause loss of sensation or pain and burning of the feet as well as "pain in the legs, arms, and hands, and can cause problems with digestion, going to the bathroom, or having sex."[102] "Adults with diabetes have heart disease death rates about two to four times higher than adults without diabetes. The risk for stroke is two to four times higher."[103] In addition, "diabetes is the leading cause of new blindness in the U.S. in adults ages 20-74"; it can lead to eye problems, such as cataracts and glaucoma, which can cause blindness if unaddressed.[104] "Diabetes is the leading cause of kidney failure in adults in the U.S., accounting for 44% of new cases in 2008."[105] Lastly, diabetics have a high risk for gum disease.[106]

In 2009, 285,940 people, or 9.5% of the Saint Louis Regional Foodshed population, were diabetic.[108] Saint Louis City had the highest percentage of adults with diabetes (Map 2-8), with 11.8% of the adult population diagnosed with diabetes.[109]

> "Saint Louis City had the highest percentage of adults with diabetes"

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[95] *Type 1 Diabetes*, WebMD, http://diabetes.webmd.com/guide/type-1-diabetes (last updated May 7, 2012).

[96] *Type 2 Diabetes Overview*, WebMD, http://diabetes.webmd.com/guide/type-2-diabetes [herinafter: *Type 2 Diabetes Overview*],(last updated May 16, 2012).

[97] *Causes of Type 2 Diabetes*, WebMD, http://diabetes.webmd.com/guide/diabetes-causes (last updated Aug. 4, 2012).

[98] *Type 2 Diabetes Overview*, *supra* note 96.

[99] *Effects of Uncontrolled Diabetes on Eyes, Kidneys, Heart and More*, WebMD, http://diabetes.webmd.com/risks-complications-uncontrolled-diabetes [herinafter: *Effects of Uncontrolled Diabetes on Eyes, Kidneys, Heart and More].* (last updated May 18, 2012).

[100] *Id.*

[101] *Id.*; *see also* U.S. Dep't of Health & Human Servs., Ctrs. for Disease Control & Prevention, *National Diabetes Fact Sheet: National Estimates and General Information on Diabetes and Prediabetes in the United States, 2011*, 8-9 (2011), http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2011.pdf (discussing complications of diabetes in the United States generally).

[102] *Effects of Uncontrolled Diabetes on Eyes, Kidneys, Heart and More*, *supra* note 99.

[103] *Id.*

[104] *Id.*

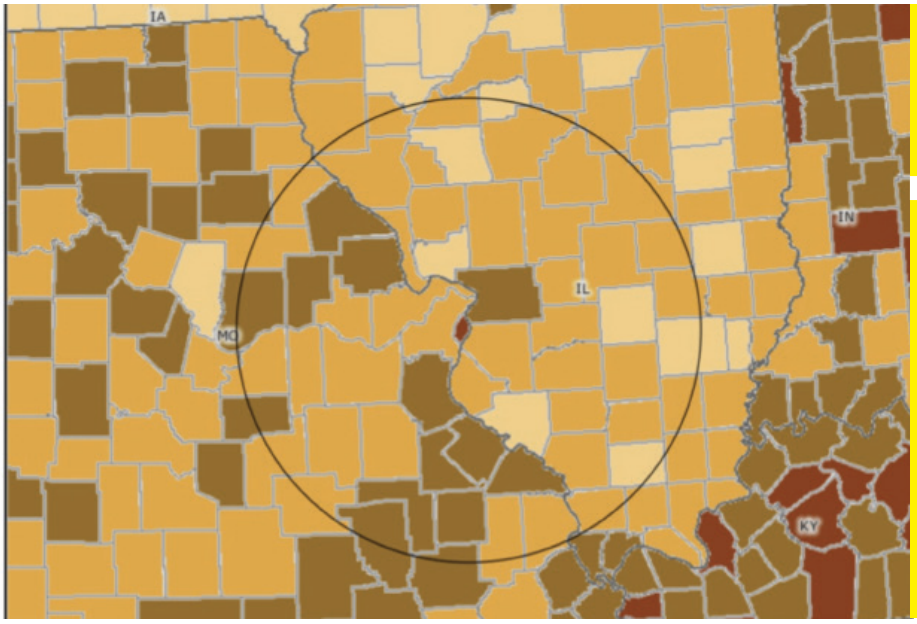
[105] *Id.*

[106] *Id.*

[107] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Health" menu and follow "Obesity and Diabetes" hyperlink; then select "Adults (Age 20 and Up) - Pct. Diagnosed with Diabetes, 2009," and select "Make Map" button) (last visited July 14, 2013).

[108] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Health" menu and follow "Obesity and Diabetes" hyperlink; then select "Adults (Age 20 and Up) - Pct. Diagnosed with Diabetes, 2009," and select "Make Map" button) (last visited July 14, 2013).

[109] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Health" menu and follow "Obesity and Diabetes" hyperlink; then select "Adults (Age 20 and Up) - Pct. Diagnosed with Diabetes, 2009," and select "Make Map" button; select the "identify features" tool in the tool bar, click within the boundary of Saint Louis City on the map and obtain "Estimated Pct. with Diabetes (Age-adjusted Rate)" data for Saint Louis City.) (last visited July 14, 2013).



MAP 2-8.

PERCENTAGE OF ADULT POPULATION DIAGNOSED WITH DIABETES, 2009

LEGEND

2010 State Boundaries
2010 County Boundaries

Estimated Pct. of Adults with Diagnosed Diabetes, Age-Adjusted (2009, CDC)

Over 10.5%
9.1% - 10.5%
7.6% - 9.0%
6.1% - 7.5%
Under 6.1%
No Data

"Early treatment for a complication and keeping . . . blood sugar levels within a safe range can help slow the progression of [a] complication and may prevent other complications from developing."[110] Treatments of diabetes-related complications include medication and surgery.[111] The key to slowing the progression of such complications is to tightly control blood sugar levels and concurrently "to treat high blood pressure and high cholesterol."[112]

Now we are compelled to ask our readers to consider whether the 60-70 gallons of soda and other soft drinks consumed per capita per year in the Saint Louis Regional Foodshed really worth the price we pay in terms of our health?

In its July 2011 article, Livestrong.com references two studies that correlate the increased risk of type II diabetes with fast food consumption.[113]

The first study conducted by the National Institutes of Health reported that the increased risk is especially true when fast food consumption exceeds "more than twice per week."[114] In addition, "[s]cientists at the University of Minnesota School of Public Health in Minneapolis conducted a 15-year prospective research study on the association between fast food consumption and changes in body weight and development of insulin resistance and type 2 diabetes."[115]

The results showed that not only does increased fast food consumption heighten the risk of adult diabetes, but also it is "associated with increased body weight and insulin resistance."[116] The relationship between diabetes and obesity is a strong one, spawning a new term: 'diabesity.'

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[110] *Id.*
[111] *Id.*
[112] *Id.*
[113] Jeffrey Traister, *Effects of Fast Food Restaurants on Diabetes*, Livestrong.com (Jul. 30, 2011), http://www.livestrong.com/article/505881-effects-of-fast-food-restaurants-on-diabetes/.
[114] *Id.*
[115] *Id.*

MAP 2-9.

PERCENTAGE OF ADULT POPULATION DECLARED OBESE, 2009

LEGEND

2010 State Boundaries
2010 County Boundaries

Estimated Pct. of Adults Obese, Age-Adjusted (2009, CDC)

Over 31 %
27% - 31%
24% - 27%
20% - 24%
Under 20%
No Data

In 2009, 913,592 people in the Saint Louis Regional Foodshed, or 30.4% of its total population, were obese (Map 2-9). Missouri is home to 587,785 of the obese people in the Foodshed and Illinois is home to the remaining 325,907.

Researchers can calculate the costs of health related problems from poor diets in our Foodshed (we have not done so here), and we encourage this calculation. In any case, families struggling with diabetes and obesity are well aware of the toll it takes on their mobility, their budgets, their employment, and their families.

Obesity is particularly problematic for children because of the risk of long term health problems. Extreme weight being supported by a growing musculoskeletal system and the strain it adds to the developing cardiovascular system are areas of concern.

There are no clear links between childhood obesity and increased musculoskeletal problems in adult life, though health specialists recognize the importance of further research into such correlation. "[T]he delineation of the effects of childhood obesity on musculoskeletal structure in terms of mass, adiposity, anthropometry, metabolic effects or physical inactivity, or their combination, has not been investigated."[119]

> "However, "high levels of body fat plus increased loading of the musculoskeletal system have the potential to lead to pain and discomfort, inefficient body mechanics and further reductions in mobility.[120]"

[116] *Id.*

[117] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Health" menu and follow "Obesity and Diabetes" hyperlink; then select"Adults (Age 20 and Up) - Pct. Obese, 2009," and select "Make Map" button) (last visited July 14, 2013).

[118] *See* Gary Taubes, *When I Grow up I'm Going to Weigh 300 Lbs. Help!*, Newsweek, May 14, 2012, at 32.

[119] S.C. Wearing et al., *The Impact of Childhood Obesity on Musculoskeletal Form*, 7 Obesity Reviews, 209, 215 (2006), http://www.sochob.cl/pdf/obesidad_infantil/The%20impact%20of%20childhood%20obesity%20on%20musculoskeletal%20form.pdf.

[120] *Id.*

FIGURE 2-3.

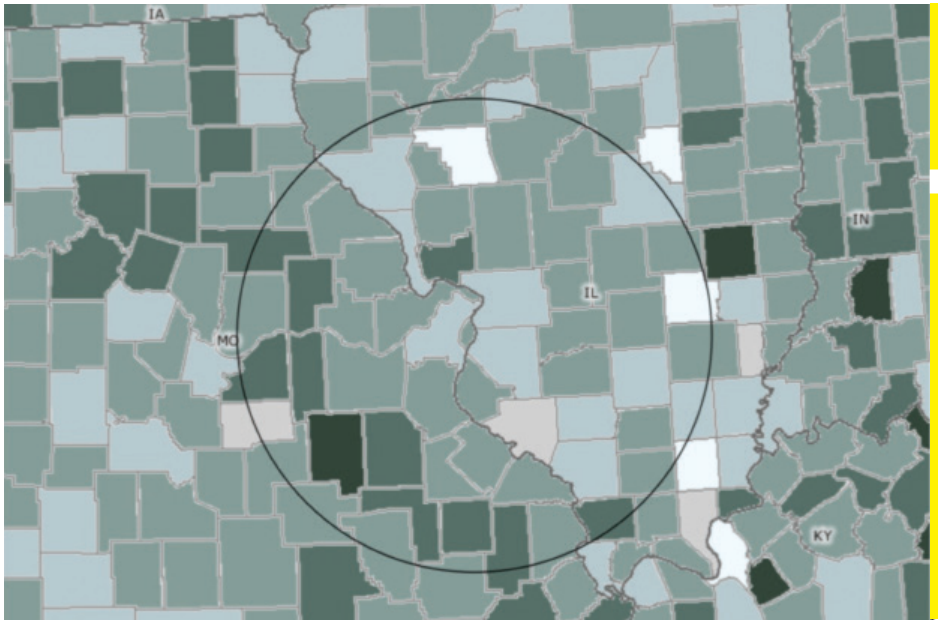
NEWSWEEK MAGAZINE COVER FROM MAY 14, 2012[118]

Studies have shown that childhood obesity increases the chances of developing several health problems, particularly related to the cardiovascular system, "including high levels of blood pressure, blood sugar and cholesterol, and abdominal obesity, which together greatly increase the risk of cardiovascular disease and type 2 diabetes."[121]

In addition, childhood obesity has led to increasing prevalence of type 2 diabetes in children, which was once a disease associated only with adulthood.[122] "The onset of diabetes in youth increases the risk in early adulthood of advanced complications of the disorder - cardiovascular disease, kidney failure, visual impairment and need for limb amputations."[123]

Although childhood obesity brings a number of additional problems in its train – hyperinsulinaemia, poor glucose tolerance and a raised risk of type 2 diabetes, hypertension, sleep [apnea], social exclusion and depression – the greatest health problems will be seen in the next generation of adults as the present childhood obesity epidemic passes through to adulthood.

> "Greatly increased rates of heart disease, diabetes, certain cancers, gall bladder disease, osteoarthritis, endocrine disorders and other obesity related conditions will be found in young adult populations, and their need for medical treatment may last for their remaining lifetimes."[124]



MAP 2-10.

PERCENTAGE OF LOW-INCOME PRESCHOOLERS DECLARED OBESE, 2008-2010[125]

LEGEND

2010 State Boundaries

2010 County Boundaries

Pct. Low Income Preschoolers Obese, By County (2008 – 2010, USDA)

8.0% or Less

8.1 – 12.0%

12.1 – 16.0%

16.1 – 20.0%

20.1% Or More

No Data

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[121] British Med. Ass'n Board of Sci., *Preventing Childhood Obesity* 7 (2005), http://www.iaso.org/site_media/uploads/Preventing_childhood_obesity_2005.pdf.

[122] *Id.*

[123] *Id.*

[124] Tim Lobstein et al., *Obesity in Children and Young People: a Crisis in Public Health*, 5 Obesity Reviews 4, 4 (2004), http://www.iaso.org/site_media/uploads/Report.pdf.

[125] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu, select "USDA Food Environmental Atlas" menu; then follow "Health and Physical Activity" hyperlink, select "Pct. Children Obese (Low Income, Age 2-4), 2008-2010," and select "Make Map" button).

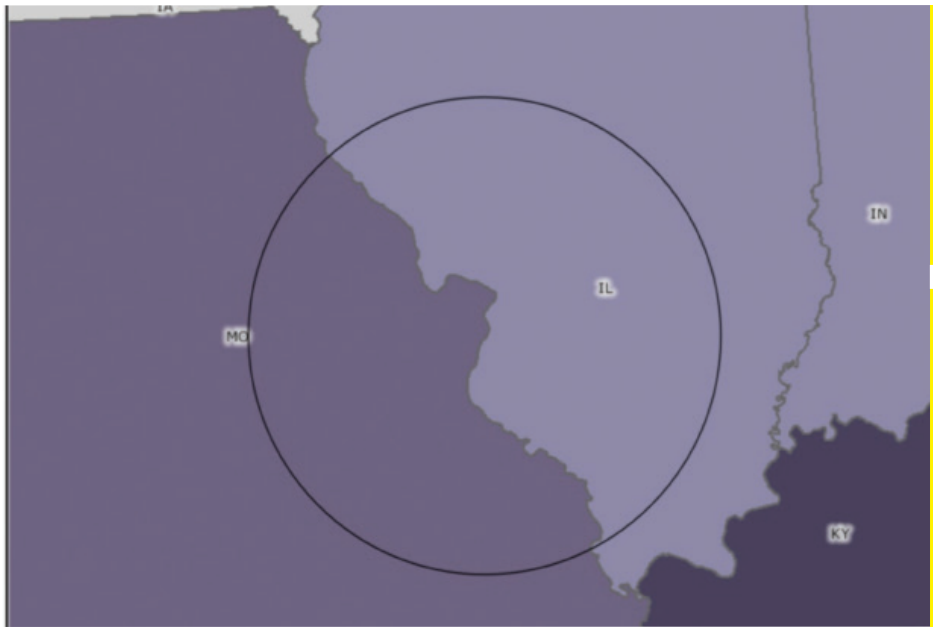
Children in the Saint Louis Regional Foodshed are at risk of the hardships linked to childhood obesity, including physical and psychological health problems. In Illinois in 2009, 15.5% of high school children were declared overweight and 11.95% of were declared obese.[126] Likewise, 14.4% of Missouri high school children were declared overweight and 14.4% were declared obese in 2009.[127]

In addition, sixteen counties in the Saint Louis Regional Foodshed had greater than 15% of low-income preschool children declared obese between 2008-2010. All such counties except Jersey County, Illinois are counties outside of the Urban Metropolitan Core. Thus, it seems that low-income individuals in the foodshed's more rural counties may be at higher risk for obesity than those in the urban counties and counties with a high number of commuters to urban areas.

The Missouri portion of the Saint Louis Regional Foodshed has higher obesity rates for adults in 2009 and low-income preschool children in 2008-2010 than the Illinois portion (Maps 2-9 & 2-10). In addition, the statewide rate for high school children with obesity is higher in Missouri than in Illinois in 2009 (Map 2-11). The data here show rates of obesity observed in pre-school children from low-income families. The data are unavailable for obesity rates among pre-schoolers from more affluent families, however all children are at risk for obesity.

How can we as residents of the region, restructure our food system to support good health for ourselves and for all our children?

"More deprived communities can often be described as having food deserts. One study assessed the impact of introducing supermarkets in order to make produce more accessible and cheaper than that provided by the smaller local shops like convenience stores. The change was found to have a positive effect on the diets of a third of the local community. Accessibility to affordable healthy food is one of the factors that can contribute to a healthy diet, in addition to other factors such as education.[129]"



MAP 2-11.
PERCENTAGE OF HIGH SCHOOL CHILDREN DECLARED OBESE, 2009[128]

LEGEND
2010 State Boundaries
2010 County Boundaries
Obesity in High School Children (2009)
15% Or More
13% - 15%
10% - 13%
10% Or Less
0 Or No Data

[126] *See id.*; Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Health" menu, select "Obesity & Diabetes" and follow hyperlink; select "Percent Overweight in High School Children (2009)" and "Percent Obesity in High School Children (2009)" and select "Make Map" button) (last visited July 14, 2013).
[127] *Id.*
[128] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Health" menu, select "Obesity & Diabetes" and follow hyperlink; select "Percent Obesity in High School Children (2009) Percent Obesity in High School Children (2009)" and select "Make Map" button).
[129] British Med. Ass'n Board of Sci., *supra* note 121, at 6.

Most consumers know that in order to prevent health problems like diabetes and obesity, people must reduce their calorie consumption and choose foods with higher nutrient content to satisfy hunger while increasing physical activity. Unfortunately, there are several factors that make the healthy choice more complicated: most notably, food availability and income.

According to "the United Nations Voluntary Guidelines that build on the Rome Declaration on World Food Security, Plan of Action . . . 'The four pillars of food security are availability, stability of supply, access and utilization.'"[130] Regardless of our personal preferences, a key factor to eating healthier is first having the option to purchase healthy food. Farmers' markets are a good source of a variety of nutritious, fresh foods such as dark leafy greens and lean chicken and grass-fed beef. However, farmers' markets are rarely open year-round and typically have very limited days and hours when they operate. While grocery stores and supercenters offer ample processed (and often less healthy) food options, they also provide fresh, nutritious food options.

Health advocates often advise shopping the store's perimeter where the fresh produce, meat and dairy cases are located, while avoiding the store's center where chips, soda, and processed foods predominate. Convenience stores, with more locations and longer hours, typically stock a variety of processed, high-sugar, high-fat foods with extremely limited fresh food options (maybe a handful of apples, oranges, and bananas).

Unfortunately for most Americans in the Midwest, the best sources of the most nutritious food are less accessible than sources providing less healthy food. To tilt the scales further from healthy choices, in food stores that provide both fresh healthy food and processed and/or non-nutritious food, processed foods are often ready to eat from the package and cost less- making it more difficult for people to make the best choice for their bodies when their time and money budgets are spread thin. Thus, for some people in our Foodshed, changing eating habits is a substantial challenge.

These issues of limited food access and limited consumer choice are at the center of the problem of food deserts, discussed in Chapter 3 - Food Economy and which are defined as "urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food,"[131]

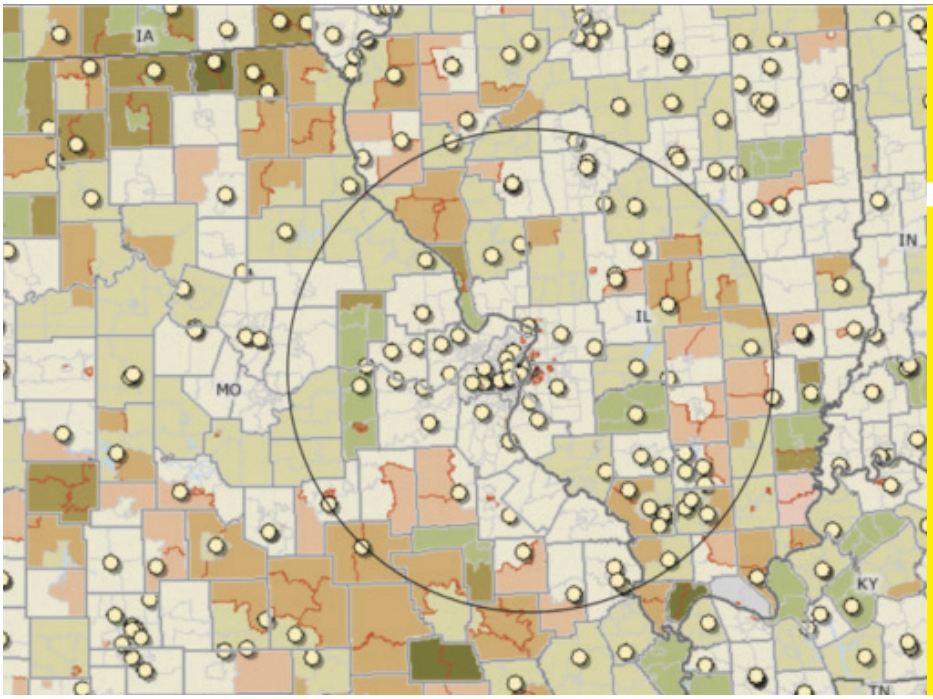
A Food Desert Tract is an area where "over 33% of the population or over 500 people have low access to healthy food."[132] "Low access to food" is a term used by the USDA and "is determined by estimating the number of people in the census tract that lives more than one mile from a supermarket or large grocery store (urban tracts) or more than 10 miles from a supermarket or large grocery store (rural tracts)."[133]

Map 2-12 shows the number of grocery stores per 100,000 people, by county in 2009, the locations of farmers' markets in 2011, and the distribution of food deserts in 2006 in the Saint Louis Regional Foodshed. Though these data originate from different years, the map remains valuable because it illustrates general trends about the location of food sources and the prevalence of food deserts. In 2011, the Saint Louis Regional Foodshed contained 78 farmers' markets.[134]

In 2006, there were 130 food desert tracts; interestingly, only four farmers' markets in Missouri and three farmers' markets in Illinois were located within a food desert.[135] Only seven of 125 food desert tracts recognized by the USDA in the Saint Louis Regional Foodshed contain farmers' markets, suggesting that access to farmers' markets may help alleviate food deserts.

> "The four pillars of food security are availability, stability of supply, access and utilization."

[130] *Toward a Healthy, Sustainable Food System*, Am. Public Health Ass'n, (Nov. 6, 2007), http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1361.
[131] Ctr. Applied Research & Envtl. Sys., *supra* note 28
[132] *Id.* (emphasis added).
[133] *Id.*
[134] *Id. See also Find a Market*, Mo. Farmers' Market Directory, http://agebb.missouri.edu/fmktdir/view.htm (provides a list of farmers' markets in Missouri that includes currently existing and possibly no longer existing farmers' markets in the Missouri portion of the Saint Louis Regional Foodshed); *Illinois Farmer's Markets*, Il. Dep't of Agric., http://www.agr.state.il.us/gis2/googlemap/agrihappenings/farmers.php (providing a map and list of all farmers' markets in Illinois).



MAP 2-12.

RATE OF GROCERY STORES PER 100,000 PERSONS, BY COUNTY (2009), LOCATION OF FARMERS' MARKETS (2011), AND LOCATION OF FOOD DESERTS (2006)[136]

LEGEND

- 2010 State Boundaries
- 2010 County Boundaries
- Locations of Farmers Markets, Nationwide (USDA 2011) Food Deserts, by Tract, 2006
- Food Desert
- Not Food Desert

Grocery Store Rate (per 100,000 Pop.), 2009

- 0
- 20.0 Or Less
- 20.1 – 40.0
- 40.1 – 80.0
- 80.1 Or More
- No Data

The 130 food desert tracts in 2006 were distributed over 35 counties, which are home to 497,816 people, or 12.2% of the Saint Louis Regional Foodshed population. Approximately 213,845 people living in those 130 food desert tracts had low access to food stores.[137] It is important to recognize the presence of grocery stores compared to existence of food deserts. For example, Pike County, IL had between 20.1 and 40 grocery stores per 100,000 persons in 2009, yet almost the entire county was categorized as a food desert in 2006 (Map 2-12).

In 2009, Pike County had a total of 5 grocery stores and a population of 16,430;[138] therefore, if the 16,000 people were widely dispersed across the county, five grocery stores were likely not highly accessible for the majority of the county's population.

Compare Pike County, IL to the entire Urban Core of Saint Louis (Saint Louis, St. Charles, and Jefferson, Missouri counties and Monroe, St. Clair, and Madison, Illinois counties), which has fewer fruit and grocery stores - 20.0 or less fruit and grocery stores per 100,000 persons - and yet has only a few food deserts - and those are very small.

Several factors other than merely the number or location of food sources contribute to the existence and size of food deserts. Other factors include population density, income levels and access to vehicles or transportation.

In areas where convenience stores outnumber farmers' markets and grocery stores, the distance from home to the nearest fresh food outlet may be a deterrent to shopping there.

For example, in Saint Louis City, in 2011 there were 344 fast food restaurants compared to 108 grocery stores and three farmers' markets.[139]

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[135] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu and follow "Access to Food" hyperlink; then select info button beside "Locations of Farmers' Markets, Nationwide (USDA 2011)."). Missouri counties with farmers' markets located in food deserts: Dent, Madison, Saint Louis City and Madison/Saint Louis border; Illinois counties with farmers' markets located in food deserts: Franklin, Jackson and Fayette.

[136] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu, and follow "Access to Food" hyperlink; select "Locations of Farmers Market, Nationwide (USDA 2011)," and select "Food Desert Census Tracts (USDA 2006)"; select "Food Environment" menu, select "USDA Food Environmental Atlas" and follow "Food Store Availability" hyperlink; select "Grocery Store Rate (per 100,000 Pop.), 2009"; then select "Make Map" button) (last visited Aug. 9, 2013).

[137] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu and follow "Access to Food" hyperlink; then select info button beside "Locations of Farmers' Markets, Nationwide (USDA 2011)") (last visited July 14, 2013).

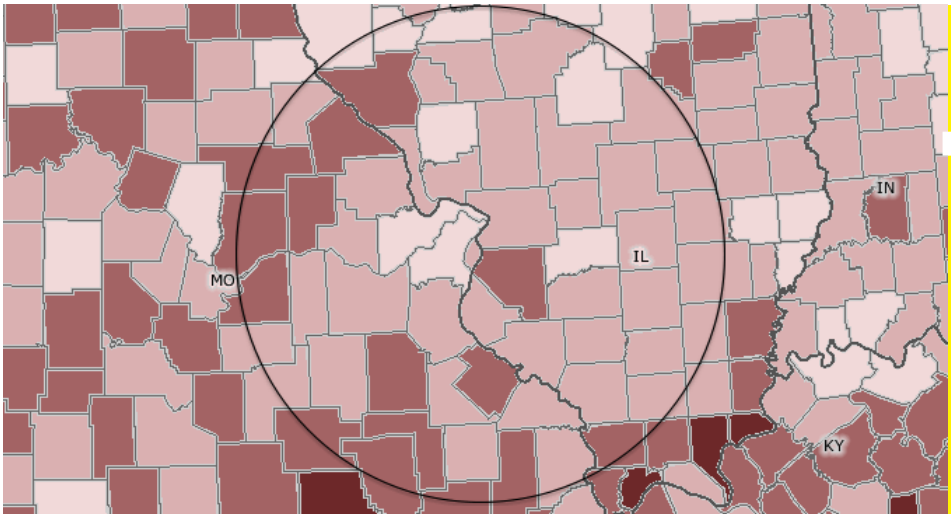
[138] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu, select "USDA Food Environmental Atlas" and follow "Food Store Availability" hyperlink; select "Grocery Store Rate (per 100,000 Pop.), 2009"; then select "Make Map" button) (last visited Aug. 9, 2013).

[139] Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu and follow "Access to Food" hyperlink; select "Locations of Farmers Markets, Nationwide (USDA 2011)," "Grocery Stores," and "Fast Food Restaurants,"; then select "Make Map" button) (last visited July 14, 2013).

Thus, while Saint Louis City has only three food deserts and they are very small in size relative to the other regional food deserts, Saint Louis City ranks high in obesity and diabetes, which may be attributed to the high ratio of unhealthy food sources to healthy food sources. More research is needed to explore this issue. In addition, where a greater number of people live at or near the poverty line, even if grocery stores are accessible, individuals are more likely to choose foods that are processed and ready to eat, instead of fresh, more nutritious foods because of the price tag, demands of time, or lack of food preparation skills and experience.

The hours of operation of stores or farmers' markets that provide the healthiest food may also limit the ability for some people to access healthy food. For example, farmers' markets that are open only on Saturday mornings may be inaccessible for some. In addition, for people who have more than one job or work late shifts, by the time they finish a work day, their neighborhood grocery store may have closed for the night, may feel unsafe to visit, or may be out of reach of public transportation for people without a car.

As a result, convenience stores or fast food may be their most accessible food source. Even though some food prices may be higher at convenience stores compared to conventional grocery stores, people will buy foods that are accessible, affordable, and ready to eat. Paula Dutko et al. of the Economic Research Service of the USDA studied the characteristics associated with food deserts and determined that "[c]ensus tracts with higher poverty rates are more likely to be food deserts than otherwise similar low-income census tracts in rural and in very dense (highly populated) urban areas."[140]



MAP 2-13.
PERCENTAGE OF HOUSEHOLDS WITH NO CAR AND LOW ACCESS TO A FOOD STORE, 2010

LEGEND
2010 State Boundaries
2010 County Boundaries
Percent of Households with No Car Living over 1 Mile from Store
0
0.1 - 2.0%
2.1 - 4.0%
4.1 - 8.0%
8.1% Or More
No Data

[140] Paula Dutko et al., U.S. Dep't of Agric., Econ. Research Serv., *Characteristics and Influential Factors of Food Deserts* i (2012) http://ers.usda.gov/media/883903/err140.pdf.

In addition, "comparisons between food desert tracts and other areas suggest that the disadvantaged status of food deserts is also reflected in lower vehicle access rates."[141]

The Saint Louis Regional Foodshed has food deserts in both the rural and urban areas. Many of the people who live in food deserts may be burdened with the socioeconomic attributes of food deserts. Map 2-13[142] illustrates a general trend in the Saint Louis Regional Foodshed: where a greater proportion of households have no vehicle and have low access to food, they are more likely to live in a food desert. This underscores the importance of having access to a vehicle in order to access food regardless of the number of stores in a county.

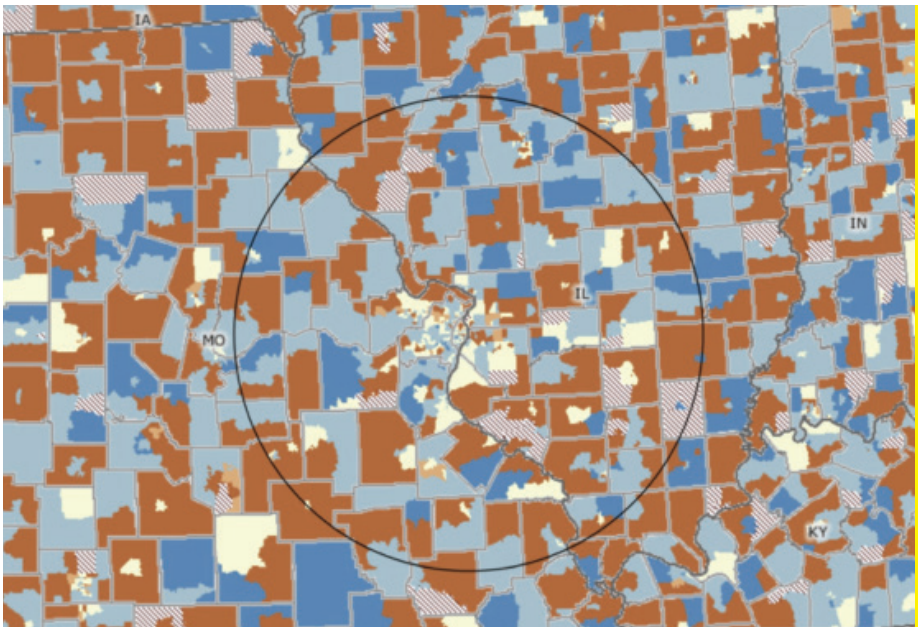
In addition, the Map 2-14 illustrates the Modified Retail Food Environment Index (mRFEI) Scores by Census Tract for 2011,[143]

"a new indicator released by the Center for Disease Control's (CDC) Division of Nutrition, Physical Activity and Obesity, which evaluates the availability of quality, nutritious retail foods."[144] "mRFEI[] is a way of measuring the number of healthy and less healthy food retailers in an area using a single number. Out of the total number of food retailers in that area considered either healthy or less healthy, the mRFEI represents the percentage that are healthy."[145]

An mRFEI "score of zero generally represents a food desert" according to the CDC's definition of a food desert and a "score of 10 means that only 10 out of every 100 of these stores were likely to offer healthy foods such as fruits and vegetables, low-fat dairy items, meat products, and whole grain foods [and] a score of zero generally represents a food desert."[146]

The mFREI index determined that the stores likely to provide healthy food choices "include the supermarkets, produce stores, and supercenters" and the stores less likely to provide access to healthy food include fast food restaurants, conveniencestores, and small grocery stores.[147]

Map 2-14 shows that roughly half of the Saint Louis Regional Foodshed has "no healthy retail food outlet," which essentially constitutes a "food desert" in USDA terms. In addition, the map highlights with red diagonal lines that the census tracts in the Saint Louis Regional Foodshed with no access to any food outlets. Greater access to healthy food in the Saint Louis Regional Foodshed, may require the opening of new grocery stores and farmers markets in food deserts, and healthier food in existing grocery outlets throughout the Foodshed.



MAP 2-14.
MODIFIED RETAIL FOOD ENVIRONMENT INDEX (MRFEI) SCORES, BY TRACT, 2011

LEGEND
2010 State Boundaries
2010 County Boundaries

Retail Food Environment Index Scores by Census Tract

No Retail Food Outlets Present (Food Desert)
No Healthy Retail Food Outlet (No Access)
Index Score 0.01 – 5.0 (Poor Access)
Index Score 5.0 – 10 (Fair Access)
Index Score 10 – 25 (Good Access)
Index Score >25 (High Access)

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141 *Id.* at 13.

142 *Food Environment Atlas*, USDA ERS, http://ers.usda.gov/data-products/food-environment-atlas/go-to-the-atlas.aspx#UbD46L80TvQ (click on "display a different map" button, select "Access and Proximity to Grocery Store" subheading and check the box titled "households, no car & low access to store (%), 2010").

143 Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu and follow "Access to Food" hyperlink; then select "Modified Retail Food Environment Index Scores (CDC 2011)"; then select "Make Map" button) (last visited June 7, 2013).

144 Ctr. Applied Research & Envtl. Sys., *supra* note 28 (select "Food Environment" menu and follow "Access to Food" hyperlink; then select info button next to "Modified Retail Food Environment Index Scores (CDC 2011).)

145 *Id.*

146 *Id.*

147 *Id.*

Consumer Demand: One Tool in the Toolbox for a Healthier Foodshed

One of the primary benefits of farmers' markets over any other food source is its ability to provide fresh nutritious food from local sources that contribute to the local economy, engage the community and can be more nutritious than conventional produce. Consumer demand and voicing food choice preferences to local grocery stores can play a role in making locally sourced food more available and affordable beyond the farmers' markets.

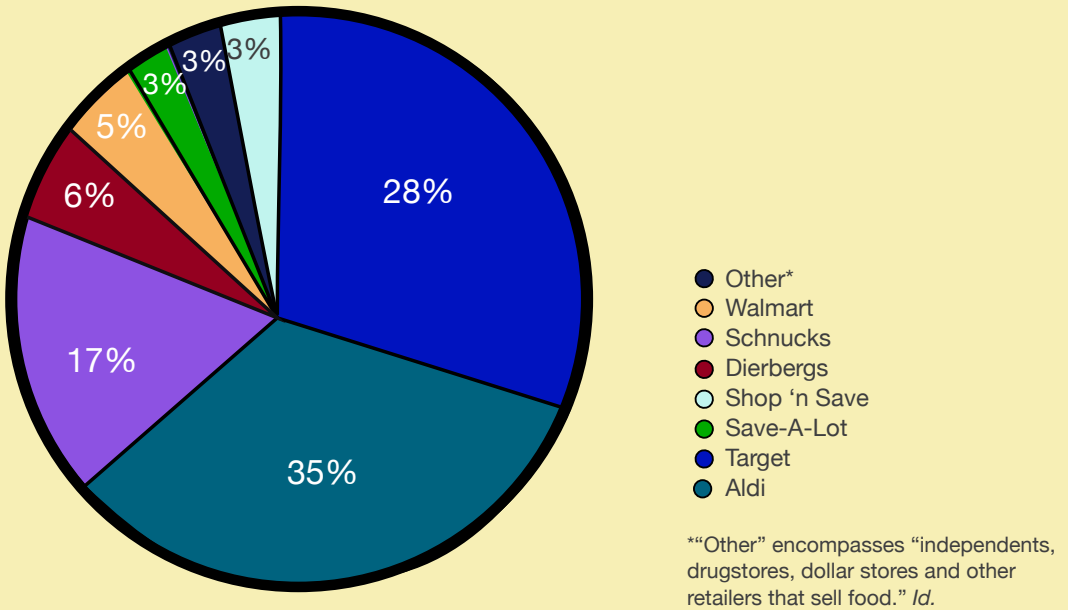
One such success-in-progress story comes from Columbia, Missouri, just 20 miles outside of the Saint Louis Regional Foodshed, where three Walmart locations, a Hy-Vee, and the most western Schnucks location all compete for grocery consumers.

Columbia Missourian reporter Lydia Mulvany stated in her December 2010 article that "[w]hile the two Columbia-based farmers markets remain vibrant," local stores such as Schnucks and Hy-Vee have increased their source of local products.[148] Walmart's plan, part of a broader national initiative, is to "[d]ouble the percentage of food on its shelves that is produced in-state, reaching 9 percent by 2015."[149]

The manager at the Conley Road Walmart in Columbia stated that online surveys from consumers demanded local produce, which led him to increase his store's local food supply.[150] Farris Fruit & Vegetable Market is a "secondary supplier in Camdenton," Missouri and supplies most of the "Missouri-grown produce" found in the Conley Walmart.[151]

"Owner Herman Farris ... buys produce from about 50 farmers, mostly small growers across the state, and supplies about 20 Walmarts, including the three in Columbia."[152] According to the Missourian's article, the Columbia Schnucks grocery store had increased its local supply "significantly" since 2005, buying from many central Missouri farmers.[153] The store also seizes the opportunity to buy regionally sourced food when available, such as produce from the Saint Louis Regional Foodshed's Eckert's Farms.[154]

The positive response to consumer demand for local food received from local and national grocery store chains provides insight into the potential in the Saint Louis Regional Foodshed to successfully strengthen the local food system.



*"Other" encompasses "independents, drugstores, dollar stores and other retailers that sell food." *Id.*

GRAPH 2-4.
SAINT LOUIS GROCERY MARKET, 2012

[148] Lydia Mulvany, *Walmart, Other Major Retailers Increase Offering of Locally Grown Food*, Columbia Missourian (Dec. 19, 2010), http://www.columbiamissourian.com/stories/2010/12/19/columbia-grocery-store-chains-expand-local-food-initiatives/.
[149] *Id.*
[150] *Id.*
[151] *Id.*
[152] *Id.*
[153] *Id.*
[154] *Id.*

Examples of large chain stores that supply much of the Saint Louis Regional Foodshed include locally-based grocery chains such as Dierbergs, Schnucks, Save-A-Lot, and Shop 'n Save and the national chain, Target. International corporations such as Walmart and Aldi have several locations throughout the region as well. In July 2012, Saint Louis Post Dispatch journalist Georgina Gustin wrote an article revealing the area market share of the major grocers. She showed that Walmart, with its global reach, had displaced local grocers (Graph 2-4).[155]

Two of the metro area's grocery stores based in Saint Louis, Shop 'n Save and Save-A-Lot, have since been acquired by the "Minnesota-based . . . Supervalu, the country's third-largest grocery business."[156] Gustin reported that Supervalu was considering options to sell "all or part of the company."[157] Shop 'n Save and Save-A-Lot have approximately 27 and 48 locations, respectively, in the Saint Louis Regional Foodshed [158] (Google Maps) and comprise a combined 8% total of the Saint Louis Metro area grocery market share.[159] The largest grocery retailers in Saint Louis were Walmart (35%), Schnucks' (17%) and Other (28%).[160] The "Other" portion of the Saint Louis grocery market "includes independents, drugstores, dollar stores, and other retailers that sell food."[161]

This portion of the grocery market includes the region's 78 farmers' markets (an ever-growing number) in addition to the several convenience and drug stores such as Walgreen's and CVS pharmacies, specialized-food markets, and gas stations, like QuikTrip. Therefore, aside from the farmers' markets, almost all the "Other" market share retailers provide limited fresh food but abundant processed and pre-prepared foods, and are unlikely to provide locally-sourced food.

Fortunately, grocery retailers, both local chains, like Dierbergs and Schnucks, and national corporations, like Walmart, Aldi and Supervalu, have already begun to adapt to growing demands for local food. If the Saint Louis Regional Foodshed consumers collaborate and demand fresh, healthy, unprocessed and locally sourced food from all stores in the region, our grocery retailers will respond. We invite St. Louis Regional Foodshed communities to explore how we can obtain more of our nutritional needs from resources within the Foodshed.

The health data suggest that our nutritional needs in the Saint Louis Regional Foodshed are not being well met. In order to provide greater access to healthy food we must encourage the opening of new grocery stores and farmers markets in food deserts, while we also encourage existing grocery stores throughout the Foodshed to provide healthier food, and particularly locally sourced food in order maximize nutrition.

In Chapter 3 we pose these questions:

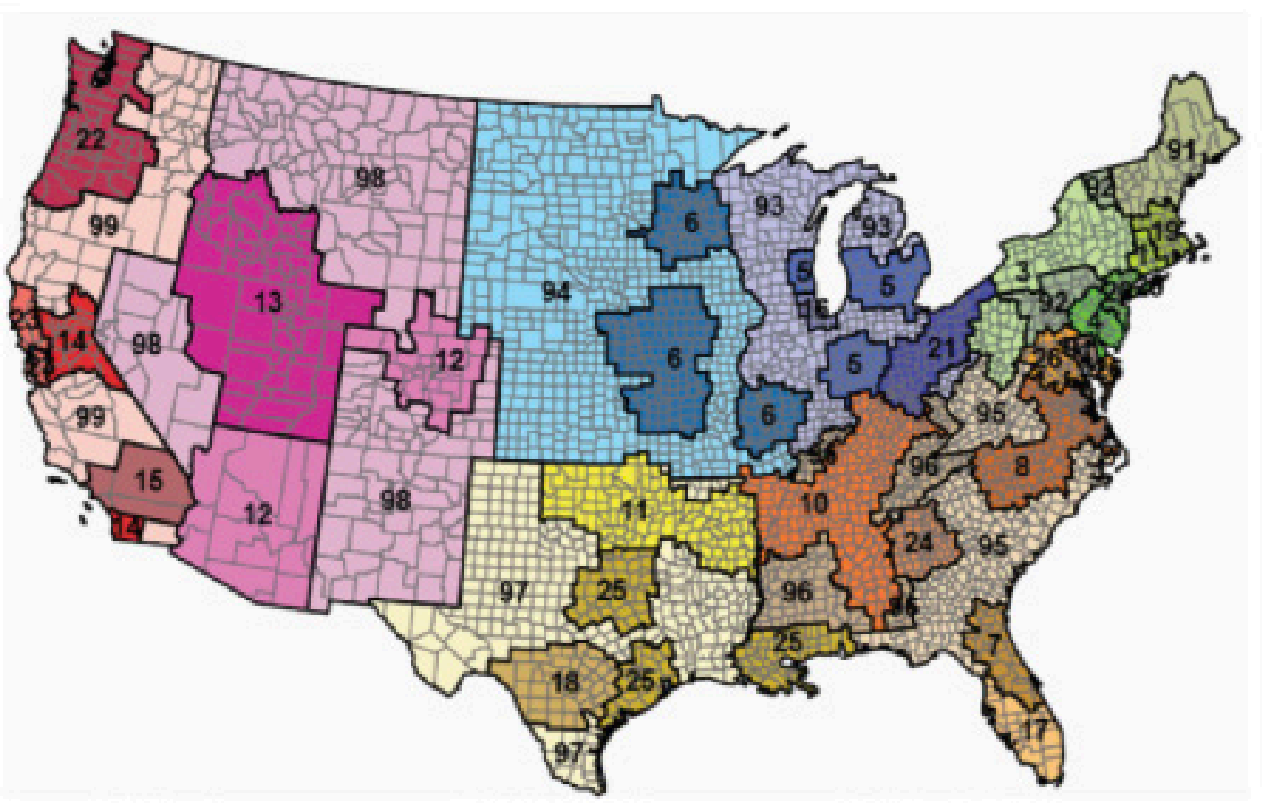
What are we spending on food?
What would the economic benefits be if we restructured our food system to grow more food in our region?
Can we increase food access and create jobs in communities that lack both?
What are some examples of local food initiatives that are underway?

[155] Georgina Gustin, *Local Chains Wait in the Limbo Lane*, St. Louis Post Dispatch, July 13, 2012, at B1.
[156] *Id.*
[157] *Id.*
[158] *Id.* at B6.
[159] *Id.*
[160] *Id.*

Appendix A:

DISTRIBUTION OF 35 GROUPS STUDIED TO DETERMINE PER CAPITA CONSUMPTION FIGURES IN 2006.[1]

The urban core counties and counties with a high number of commuters to the urban core are part of the Metro Midwest 2 Market Group, which contains the metropolitan areas of Kansas City, Minneapolis, St. Louis, Des Moines, and Omaha. The Missouri counties on the outskirts of the Foodshed are part of the Nonmetro West North Central, which contains the nonmetro areas of Missouri, Kansas, Iowa, and Minnesota, as well as all of Nebraska, North Dakota, and South Dakota. The Illinois counties on the outskirts of the Foodshed are part of the Nonmetro East North Central, which contains most of Illinois and Wisconsin, and portions of Indiana and Michigan.



1 Hartford
2 Urban NY
3 Western NY/PA
4 Philadelphia
5 Metro Midwest1
6 Metro Midwest2
7 North Florida
8 Metro South 1
9 Baltimore
10 Metro South 2
11 Metro South 3
12 Metro Mountain
13 Salt Lake City
14 Metro California
15 Los Angeles
16 Chicago
17 South Florida
18 San Antonio
19 Boston
20 Other NY
21 Metro Ohio
22 North Pacific
23 San Francisco
24 Atlanta
25 Metro South 4
26 Washington, DC
91 Nonmetro New England
92 Nonmetro Middle Atlantic
93 Nonmetro East North Central
94 Nonmetro West North Central
95 Nonmetro South Atlantic
96 Nonmetro East South Central
97 Nonmetro West South Central
98 Nonmetro Mountain
99 Nonmetro Pacific

[1] Jessica Todd, Lisa Mancino, Ephraim Leibtag, & Christina Tripodo, U.S. Dep't of Agric., Econ. Research Serv., Methodology Behind the Quarterly Food-at- Home Price Database 12 (2010) http://www.ers.usda.gov/publications/tb-technical- bulletin/tb1926.aspx#.UhydWhaChgI (follow "Entire report" hyperlink).