Food Access in Elyria-Swansea: A Review

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I. Background of Elyria-Swansea

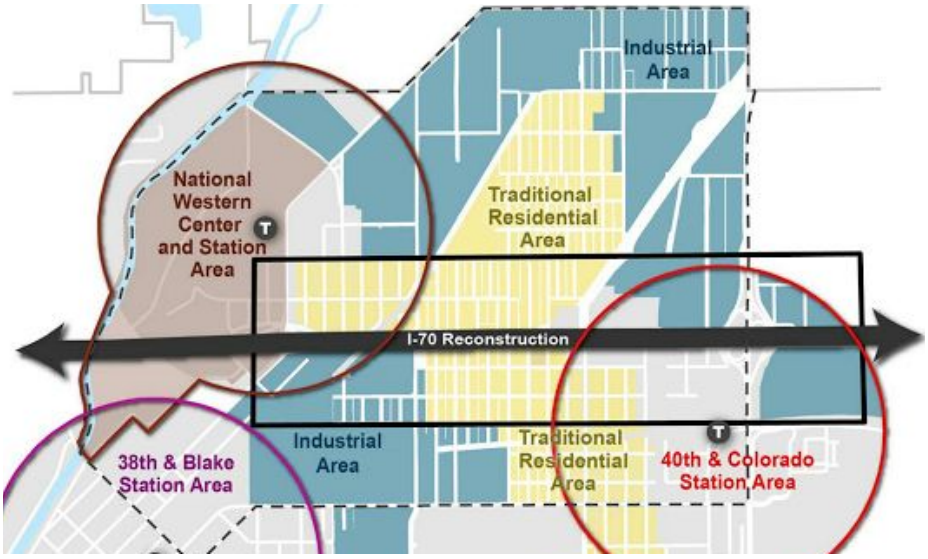
A. History and Physical Environment

Elyria-Swansea, located in the northeast region of Denver, Colorado, has a storied history of contribution to Denver's rapid growth, yet also an isolation from greater Denver. Initially founded as two separate communities, early settlers were attracted to the area's close proximity to the South Platte river and its flat land [27]. Swansea was settled first, in 1870's, by Welsh immigrants. Elyria was founded in 1881 by the President and Treasurer of the Denver Land and Improvement Company, and it served as a cultural and political hub for nearby Denverites [27]. The settlements' close proximity to the South Platte river served as a catalyst for heavy industry, which propelled Colorado's economy [12]. Eastern European and Slavic immigrants constituted the majority of residents. Elyria and Swansea were annexed by Denver in the early 1900's, but they retained a sense of independence driven by containment of work and social life in the area. Elyria and Swansea boasted saloons, shops, and churches that, combined with the booming industrial economy, formed the foundation for future economic self-sufficiency. Elyria-Swansea continued its growth until 1964, when the construction of Interstate-70 (I-70) bisected the neighborhoods.[12] The highway was constructed through the most vibrant economic hub in the area against the protests of thousands of people, shuttering many resident-owned small businesses, and Elyria-Swansea has never regained the economic vibrancy that the I-70 project halted.

Despite the encroachment of I-70, the physical character of Elyria-Swansea has remained essentially stable since the end of World War II [27]. Elyria and Swansea are referred to as separate neighborhoods, even though they share the same library, schools, recreation, churches, and other important facilities [7]. The neighborhoods still remain isolated physically from Denver due to train tracks, large industrial sites, and the South Platte River [11]. Industry is

vital to the economy; 500 of Elyria-Swansea's 1,600 acres of land is zoned for industrial use[7]. The tax revenue and jobs that Elyria-Swansea's industry creates are vital not only to Elyria-Swansea but also to Denver as a whole [7]. Small sections of well-maintained, single-family homes are interspersed with larger areas of commercial and industrial development such as Denver Union Stockyards, Cudahy Meatpacking, Denver Pepsi Cola Bottlers, and numerous other firms. The neighborhood still largely retains its working class identity formed from its early roots; 49% of residents work blue collar jobs[1]. Figure 1, below, illustrates the mix of residential and industrial land as well as I-70's central location in the neighborhood.

Figure 1: Elyria and Swansea Study Area



Source: City and County of Denver, 2015.

The physical environment in Elyria-Swansea has been identified as a major issue by residents[5,7]. Elyria-Swansea is part of the Vasquez-I-70 Superfund site, an area the EPA identified as contaminated with pollutants and hazardous material. While the EPA made multiple efforts to clean the soil in the area and subsequently cleared the area for use, above average levels of metal in the soil may persist[31] and residents express concern about the overall quality of the air in the neighborhood[7]. Although average annual air pollution levels are not higher in

Elyria-Swansea than the rest of Denver, the neighborhood experiences spikes in pollution at times[11]. As a result, residents report they experience health symptoms such as throat irritation, watery eyes, and reduced ability to exercise outdoors[11]. Major sources of air toxic emissions include two refineries, a bulk petroleum terminal, a coal fired power plant, a furniture manufacturer, and many solvent-based industries[42]. All of these industrial facilities, as well as emissions from traffic on I-70, contribute to Elyria-Swansea being named by the Toxic Release Inventory as a part of the most polluted zip code (80216) for toxic emissions in Colorado[42]. In addition, many residents report that they routinely smell odors from surrounding industry that negatively affect their life[11]. While odors such as the smell of dog food from the Purina factory do not directly affect the long-term health of residents, they can detract from quality of life and decrease residents' desires to exercise outdoors[11].

Next, residents feel that their neighborhood infrastructure could be improved. Elyria-Swansea lacks sufficient bike lanes and sidewalks are absent in half of the neighborhood, forcing residents to walk in the street[7,11]. When sidewalks are installed, they tend to not be in good condition and can be disconnected from each other. As a result, the neighborhood is fragmented and difficult to transverse by foot[7], limiting opportunities for outdoor recreation and physical activity[11]. In addition, Elyria-Swansea lacks many facilities that residents need to complete daily needs, and residents must travel outside their area to find banks, pharmacies, childcare, and healthcare[11]. The public park system in the neighborhood is not consistently maintained either[11], and residents desire more spaces for children's recreation and public gathering[7]. Focus groups in the neighborhood reveal that community members worry about safety and may not feel safe leaving their homes at times[7,23]. While Elyria-Swansea has some of the lowest rates of crime in their district (District 9), crime may also be underreported, suggesting that the statistics on criminal activity may not be representative of the state of

Elyria-Swansea[11]. Some community members say they do not report all the crime they see out of fear of retribution from the perpetrator[7], and others may not call the police due to language barriers[11] or fear of revealing the undocumented status of themselves or family members.

B. Demographics

There are an estimated 6,940 people living in Elyria-Swansea[27], and the neighborhood sustained a consistent growth rate of 2% since 1990 due mostly to a slowly increasing household size[1]. Recently the population decreased slightly, in sharp contrast to the population boom that surrounding Denver neighborhoods experienced[7]. The population is no longer primarily Eastern European and Slavic, but instead is largely Hispanic (84% of residents)[31]; the majority of Hispanic citizens are of Mexican descent[7]. In addition, education levels in Elyria-Swansea are generally lower than greater Denver, with 32.1%-54% of adults lacking a high school degree[2]. Through anecdotes and one-on-one interviews it is postulated that many households in the neighborhood are mixed status (containing undocumented immigrants living with US citizens); thus, it is probable that many demographic statistics fail to include the portion of Elyria Swansea consisting of community members who are not legalized citizens. For this reason, it is critical to view statistics about Elyria-Swansea as estimates rather than absolute descriptions.

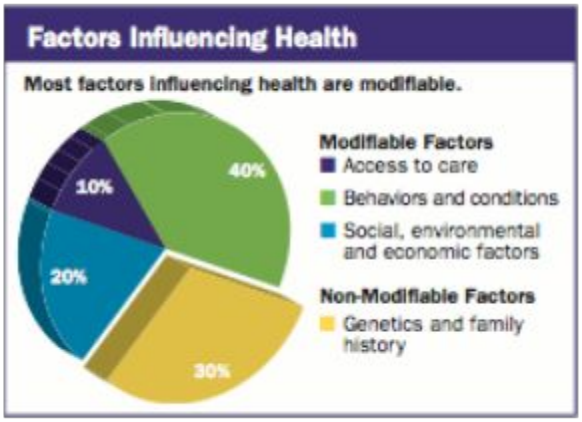
Many Elyria-Swansea residents struggle with economic security. Over ⅓ of the population lives in poverty. In 2013 the average household size was 4 people[7], with a 2015 median household income of $32,342[55], in stark contrast to Denver's 2013 average household size of 3 people[7], and 2015 median household income of 68,118[55]. The 2015 self-sufficiency standard (the amount of money necessary to live without public or private assistance) for 4 people in Denver County is $63,069[37]. Food costs within the self-sufficiency standard are calculated by the USDA in order to meet minimal nutritional standards; these costs not include

any take-out or restaurant prepared meals and are admittedly strict[37]. The average household income in Elyria-Swansea is significantly lower than Denver's self-sufficiency standard, suggesting that many households struggle to afford basic necessities. Food insecurity, which is a lack of money or resources forcing a change or reduction in food consumption, is faced by 34% of Elyria-Swansea by the estimates of a survey, more than double the rate of food insecurity in greater Denver[11]. Over half of survey respondents in northeast Denver agree that they worry everyday about being able to afford nutritious food for their family[25].

C. Health

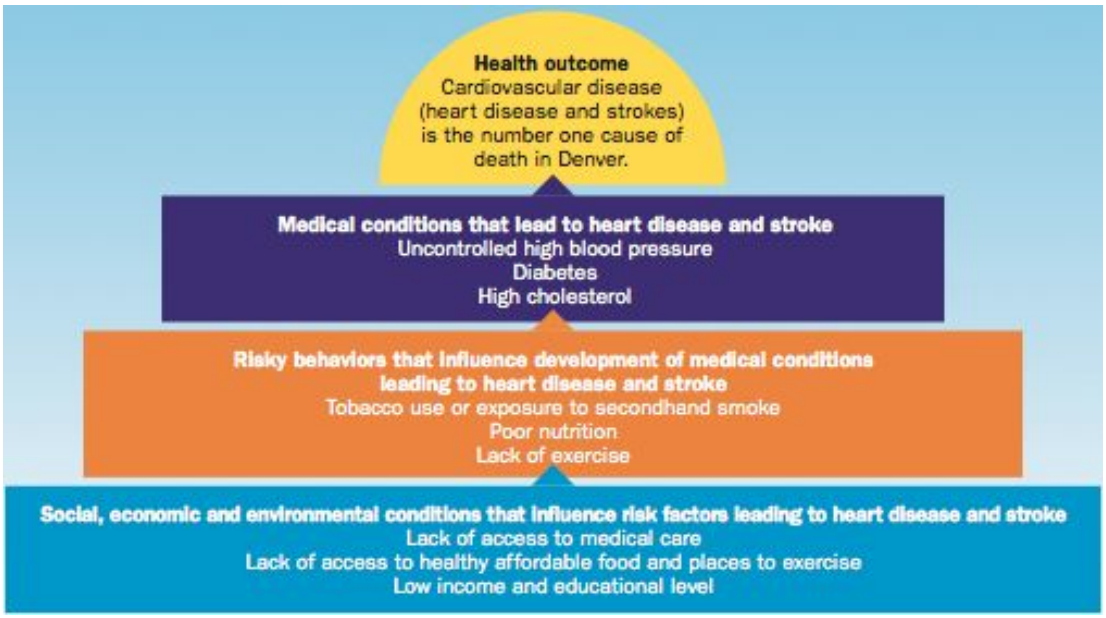
Approximately 70% (Figure 2) of an individual's health is impacted by modifiable factors, which include access to health care, behaviors and conditions, and social, environmental and economic factors[2]. The environment in which one lives contributes to all of the modifiable factors that affect one's health, indicating that it can be a more powerful factor than genetics in affecting individuals' health. Living in an environment replete with or depleted of resources, incentives, and infrastructure has clear effects on health[11]. Be Healthy Denver proposed a clear model for understanding how the modifiable factors in one's physical environment can alter a health outcome, using cardiovascular disease as an example (Figure 3). As will be described throughout this review, Elyria-Swansea has many modifiable factors that contribute to their residents' health, both in a positive and negative fashion.

Figure 2: Factors Influencing Health



Source: Be Healthy Denver (2014)

Figure 3: Modifiable Factors and Health Outcomes.



Source: Be Healthy Denver (2014)[2]

Juxtaposing the health statistics of Elyria-Swansea with those of greater Denver further confirms the importance of modifiable factors; it shows how two different environments have very different health outcomes. Elyria-Swansea children have 38% more visits to the Emergency Room for asthma exacerbations than children across all of Denver; a statistic that is thought to be a result Elyria-Swansea's location in the most polluted zip code in Colorado, and poor access to clinical care and asthma management[11]. The childhood obesity rate in Elyria-Swansea is 20-24%[2] (more than double the rate in some areas of Denver[44]), and the neighborhood has increased rates of chronic diseases such as cardiovascular disease and type 2 diabetes[11]. Obesity can shorten life expectancy by up to 5 years, and it is speculated that for the first time in 200 years the current generation of children could have a shorter life expectancy than their parents due to rising rates of obesity; it is therefore of the utmost concern that Elyria Swansea's childhood obesity rate is higher than other neighborhoods[2]. Obesity is also affecting

adults; across Colorado, 21.3% of adults are obese. While this is the lowest rate in the nation, it has increased almost every year since 1990[44]. Further illustrating the epidemic-like growth in the prevalence of obesity, in 1990 no state in the US had adult obesity rates over 20%[43]. Finally, it is notable that in Colorado and across the nation, rates of obesity are significantly higher in the Latino population when compared to non-Hispanic Caucasians[44]. This is manifest in Elyria Swansea residents having a higher rate of obesity than the rest of the city[11]. Obesity leads to many detrimental health outcomes, and childhood obesity takes on extra importance because it predisposes to obesity in adulthood, as eating habits are formed during childhood[2].

Health is also greatly impacted by immigration, a critical factor in Elyria-Swansea where 33.8% of people are foreign-born (in the 7 county Denver region the rate is 12.02%)[27]. Foreign-born immigrants have better overall health and improved life expectancy when compared to subsequent generations that are born in the United States[38]. This means that the high percentage of foreign-born residents could be capitalized on as a positive driving force for the health of Elyria Swansea. As an example of how immigration affects health, US-born Mexicans are three times more likely to have chronic diseases compared to recent Mexican immigrants, indicating that chronic disease rates dramatically escalate as immigrants spend more time in the United States[38]. Since 45% of births in Elyria-Swansea are to foreign born mothers[27], the worsening health trends will be borne out in these children and impact a large number of families in this neighborhood. There are multiple proposed explanations as to why immigrants may be healthier before moving to a new country. Theories include that only the healthiest people are able to immigrate, contributing to their improved life expectancies, or that immigrants begin with lower rates of obesity, drinking, smoking, and generally eat better diets (observed in both the US and Canada[38]). Additionally, immigrants face increased discrimination once they move to the United States, which is known to contribute to worse health outcomes[38].

Additionally, in the United States immigrants have lower percentages of health insurance coverage and are less likely to use preventative health services (such as cancer screenings). The pattern was replicated in both Australia and Canada, countries that offer universal health coverage, intimating that reduced usage of preventative health services is attributable to immigration rather than country of destination[38].

Finally, residents of Elyria-Swansea struggle with a lack of health insurance. Before the institution of the Affordable Care Act (ACA), over 30% of the population was uninsured, which was significantly higher than the rates across Denver[2]. The rate of uninsured individuals is almost certainly lower post-ACA implementation. However, undocumented immigrants remain uninsured despite coverage expansion, which acts as yet another barrier to immigrants' health after moving to Elyria-Swansea. Access to health insurance is critical to improving health outcomes, as at least 10% of an individual's health is affected by access to clinical care (Figure 2). The impact of health coverage could be even greater when taking into consideration that health care professionals are able to provide counseling regarding modifiable behaviors and conditions, which account for 40% of a person's overall health.

D. Utilization of Resources

Paradoxically, even though 34% of Elyria-Swansea residents experience food insecurity[11], SNAP (Supplemental Nutrition Assistance Program) is severely underutilized. As of 2011, more than 1,200 people who were eligible for SNAP benefits in Elyria-Swansea were not enrolled in the program[8]. This equates to a fifth of the entire neighborhood's population who is eligible for benefits but does not receive them, and this data does not include undocumented community members. In addition, it is the only Northeast Denver neighborhood that has lower SNAP participation rates than greater Denver or Colorado[25]. It is probable that the need for assistance buying food is even greater than the SNAP underutilizer data indicates, since a

significant amount of the neighborhood is made of mixed-status families. In addition, only 42% of Elyria-Swansea survey respondents knew where to sign up for SNAP if they wanted to enroll[24]. Denver has augmented its efforts to maximize SNAP enrollment in Elyria-Swansea since 2011 and, while no new SNAP data has been published, is likely that SNAP participation has increased. However, Elyria-Swansea is still underserved by SNAP. It is critical to address this inequality because increased use of SNAP benefits is associated with increased consumption of fruit and vegetables[34]. This is an outcome that is especially relevant to Elyria-Swansea because the neighborhood faces a multitude of obstacles to accessing healthy food, as explained in following sections.

E. Assets of Elyria-Swansea

While this review is primarily concerned with the issues surrounding food access in Elyria-Swansea, it is important to note that food access is not representative of the neighborhood as a whole; it is only part of Elyria-Swansea's story. The community has many intrinsic strengths that drive it forward and give it value to its residents. Residents identify that they like the neighborhood's sense of community, which is created by friendly neighbors, long-term residents, many families and children, and diverse demographics. The people who live in the neighborhood are generally long-term residents, and they are invested in improving their community so they can enjoy the benefits[7]. Elyria-Swansea maintains a unique and close-knit identity, in contrast with greater Denver's rapid gentrification, which is maintained by a growing Hispanic community in which members support one another. Community members are largely resilient, resourceful, and family oriented. More than half of all households have at least one child living at home[27] and 36% of all Elyria-Swansea residents are children, which is more than double the rate of greater Denver[7]. Residents value and utilize the community resources that are present in the neighborhood. For example, the Valdez-Perry branch of Denver Public

Library is appreciated by many community members for their childrens' programming. As this review dives deeper into the complexities of food access, these deeply ingrained community assets will serve as access points for change and vehicles for overcoming the challenges this neighborhood faces.

II. Elyria-Swansea is a Food Swamp

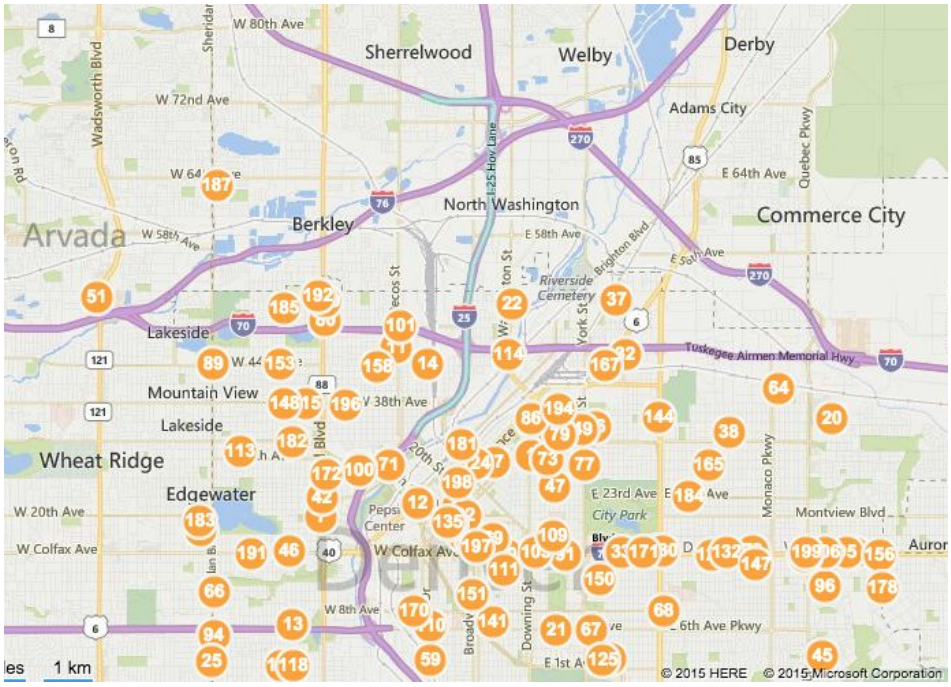
A. Background and Context

In the United States, food deserts are disproportionately a problem for low income and minority populations[15,34]. A food desert is a neighborhood where residents live at least one mile from a full-service grocery store[31], and for the purposes of this paper "food desert" will only refer to urban areas. In the 1960's and 1970's, primarily white, middle and upper-class Americans left urban centers and moved to the suburbs, a trend that was reflected in Denver. As affluent community members left, grocery stores followed, leaving poor, urban, largely minority neighborhoods without easy access to large fresh food outlets. Today, more than 50 years after the suburbanization movement, these neighborhoods are still underserved by grocery stores because they typically cannot meet the purchasing power that many chains seek for new locations[31].

However, Elyria-Swansea is not a food desert; it is a food swamp[25]. A food swamp is a neighborhood that lacks access to healthy food but is saturated with unhealthy options such as fast food and convenience stores[16]. They are the modern versions of food deserts; when grocery stores moved out of urban neighborhoods, convenience stores and fast food outlets filled the need for easy food access. There is not a single full-service grocery store in the 80216 zip code. Elyria-Swansea has 4 convenience/corner stores that sell food (7-eleven, Jerry's

Round the Corner, Swansea Corner Store, and C store). There are 2 additional convenience/corner stores in the 80216 zip code but outside of Elyria-Swansea (Western Convenience and Tres Rios Agricultural Co-Op)[39]. Figure 4 is a map of grocery, corner, and convenience stores in the Denver area. The density of food outlets of all types drops off sharply in the 80216 zip code (approximately north of I-70).

Figure 4: Map of food stores in Denver.



Source: City and County of Denver, 2015[39].

Convenience stores, which are much smaller than grocery stores, typically do not have the purchasing power or foot traffic to purchase fresh foods. They cannot buy in bulk, creating higher prices for the store and the consumer, and any fresh food is much more likely to go bad due to lack of expensive refrigeration systems and a short shelf life[25]. As a result, the food they sell is typically more expensive[34]. This data is not intended to implicate convenience store owners as perpetrators of the disparities of food access. The owners are typically community members who are equally as invested in the health and prosperity of the neighborhood as their

patrons, but they do not have the resources on their own to provide ample healthy options to their neighbors. Maintaining a large selection of high quality, low price produce requires expensive refrigeration equipment and selling a large volume to make up for fresh foods' low profit margin[15,25]. It is important to note that most corner stores in northeast Denver sell at least some fresh fruits and vegetables and this food is typically fit for consumption, although the prices are higher and there is only about a third of the fruit and vegetable variety compared to larger grocery stores[25].

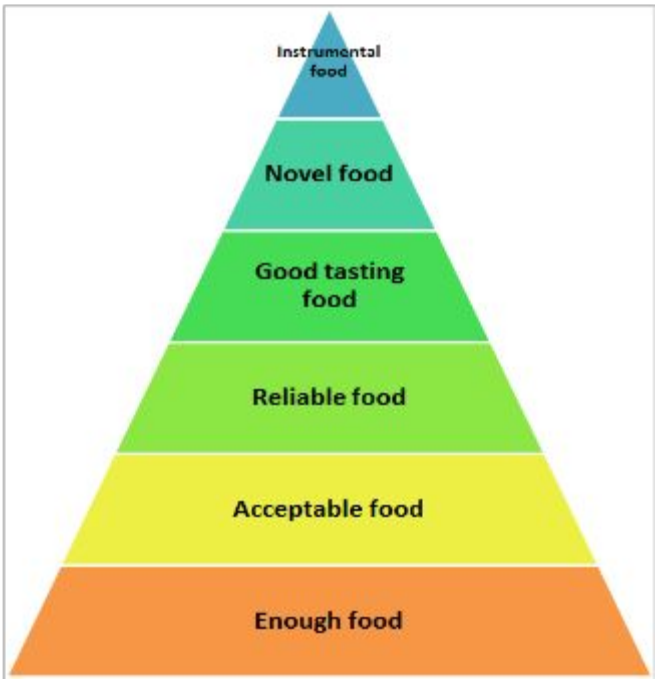
B. Health and Income

Food swamps affect health outcomes: among adults living near abundant convenience stores, they have a 20 percent higher prevalence of obesity and a 23 percent higher prevalence of diabetes when compared to those who live near supermarkets and produce vendors[33]. Individuals who live in food swamps eat less fruits and vegetables than those who live in close proximity to grocery stores[34,47,48]. However, the association between proximity to convenience/grocery stores and fruit/vegetable consumption is not causative; there are many other factors that modify consumption of fresh produce. For example, education and income are both positively correlated with fruit and vegetable consumption[25]. In addition, in northeast Denver Hispanics are significantly more likely than other races to eat only one or two servings of fruit and vegetables per week[25]. Low intake of fruits and vegetables disproportionately affects low-income residents and people of color, suggesting low consumption of fresh produce is a social justice issue[31], not just a problem with proximity.

Living in a food swamp magnifies the health-diminishing effects of poverty because it contributes to a cycle of hunger and seeking calorically rich food. The hierarchy of food needs (Figure 5) is a schematic proposed by the Ellyn Satter Institute that explains how these concepts are related. The bottom tiers of the pyramid in Figure 5 must be fulfilled before

attaining the higher levels. Individuals who are severely food insecure struggle to fulfill the lower levels of this pyramid. They are primarily concerned with finding enough food to ensure their family is full. These people are driven by hunger and anxiety about going hungry; thus, they are more likely to choose calorie-dense, nutritionally poor items that they know will make them feel full. Once enough food is established, acceptable food becomes a priority. This is typically socially and culturally determined and is very subjective. For example, some individuals may find it unacceptable to eat food from a food pantry, while others may not consider a meal acceptable unless it contains key basic ingredients such as rice or potatoes. Next, individuals who are reasonably sure they have enough acceptable food can seek reliable food. They can begin to accumulate a food stash or purchase enough food to last for multiple meals. Once food security is adequately established, the how food tastes become more salient and play a larger role in a family's food selection. Next, individuals begin to explore novel food; they are able to explore new items without fearing the consequences of wasting food that they or their families may not like. Finally, at the top of the pyramid, instrumental food is acquired in order to complete a physical, spiritual, or cognitive outcome. Qualities such as healthy, sustainable, locally sourced, and organic fall into the instrumental category.

Figure 5: Hierarchy of food needs[13]



Individuals who cannot satisfy the bottom three tiers of the hierarchy of food needs are considered food insecure. Therefore, according to this framework, prioritizing healthy food is a privilege restricted to those who establish food security. These sentiments were echoed in a focus group: “Matters around how clean the food is (organic, GMO), how it was processed (humanely, safely), or where it was grown (local or not) are a distant consideration – if considered at all. These values feel like a luxury, and although participants were eager to learn more, they acknowledged that it would be difficult to factor these considerations into their existing buying habits[25].” Of course, Figure 5 is not representative of every individual who faces food insecurity. In Elyria-Swansea, for example, there are some residents in poverty who prioritize eating organic food. The food hierarchy of needs is not meant to be an absolute description of how individuals interact with food. Rather, it illustrates that when facing food insecurity, people make careful decisions about what they eat based on the values and needs that are most important to each individual. An example of this point is found in considering what values drive people’s food choices, namely: perceived value (price and portion size), taste, and perceived nutrition. The emphasis placed on each of these three values fluctuates depending on the individual and their socioeconomic status (SES); individuals with a lower SES may decide that perceived value is the most important, whereas individuals with a higher SES would be more concerned with nutrition. Furthermore, even if nutrition is important it may be compromised when it has to be considered along with perceived value and taste (e.g. buying a delicious food that is less nutritious)[52].

Individuals who experience poverty and food insecurity are known to suffer higher rates of obesity and diabetes[31,52,53]. While it may seem paradoxical that reduced ability to purchase food is associated with overconsumption, the food hierarchy details how being trapped at the bottom levels of the hierarchy contribute to obesity. People in poverty cycle between hunger and

seeking out inexpensive, high calorie food because they want to ensure the limited food they purchase will keep them full, which makes them prone to over-consumption. These periods of starvation and overindulgence may also be detrimental to the metabolism[53]. Foods such as grains, fats, and sweets are a cheaper source of immediate energy than meat, vegetables, and fruits. The issue with these foods being they are connected to the heightening rates of obesity[53]. Unsurprisingly, the end effect of the food insecurity cycle is often obesity. A factor in the rising consumption of these unhealthy foods is the existing trend in the United States of unhealthier food becoming cheaper than healthier food. Between 1985 and 2000 the percent retail price for fresh fruit and vegetables went up by 118%, yet the price of fats and oils went up by only 35%, and the price of soft drinks increased by a mere 20%[53].

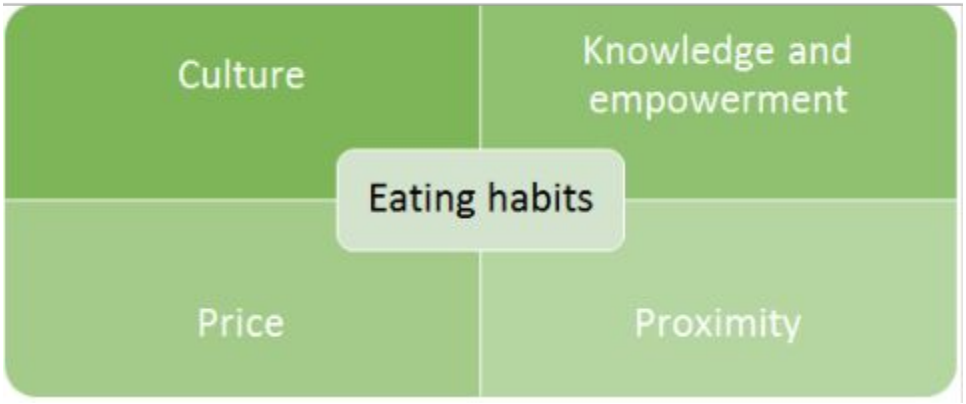
Finally, one theory on how food swamps affect health suggests that a reason that individuals experience increased rates of obesity when living in a food swamp is because they have easy access to all foods, rather than reduced access to specific healthy foods. Increasing consumption of healthy food has not consistently shown to lower BMI because people do not replace their habitual diet with healthy food. Instead, when trying to make a healthy lifestyle change they supplement their habitual diet with additional healthy food, which increases total calorie consumption instead of decreasing it. For this reason, when addressing how food access affects health outcomes it is critical not only to add healthy options but also to remove or disincentivize unhealthy options.[34]

III. The Driving Forces that Shape the Reality of Food Access

While the literature is clear that living in a food desert or food swamp is associated with poor fruit and vegetable consumption, low income, and high rates of obesity, cardiovascular disease, and diabetes[9,31,34], the way in which individuals interact with food cannot be generalized using wide-reaching data. Each food desert/swamp is unique because proximity to healthy food

is not the primary issue in food insecure neighborhoods. Instead, habits around food are formed by a complex interaction between cultural and environmental factors[36], and these elements differ not only between Colorado and the rest of the United States, but also between Elyria-Swansea and other northeast Denver neighborhoods. Figure 7 illustrates the interplay between the driving forces that determine eating habits.

Figure : Driving Forces on Eating Habits



A. Culture

There are three aspects of culture that we will address in terms of their relation to eating habits: social norms, ancestral culture, and family dynamics.

Social norms are the set of behaviors and beliefs that a neighborhood holds, and they determine what is acceptable and not acceptable for individuals to do. In regards to food consumption, a meta-analysis has shown that social norms do affect eating habits. The choice to have a higher or lower-calorie food is directly influenced by the food choice of surrounding people[29]. Among residents of Elyria-Swansea, there is not a strong social tradition of purchasing, preparing, or eating healthy food. Without a network of social support, it can be difficult to undertake a change in how a family purchases food. For this reason, even if a resident does want to consume a healthier diet, the lack of social norms surrounding the change

acts as an impediment towards making a healthy change. When considering how social norms affect eating habits, it can be useful to compare the situation to a small town where most residents stay in the town after high school instead of leaving to attend college. There is not a strong social tradition surrounding college; it can be difficult for some people to see the value in attending college, and some individuals may not consider it a realistic option for them at all. If an individual decides to attend college, they will struggle against the social norms and perceptions of their town, ultimately making their goal much harder to achieve than if they lived in a town where every individual was heavily encouraged to attend college. Living in a neighborhood that does not value healthy eating presents a similar challenge. Eating more nutritious food becomes more difficult when an individual must "rebel" against the social norms in order to change the way he or she eats.

Social norms may take on additional weight for children in Elyria-Swansea; 13/16 schools in near northeast Denver (including Elyria-Swansea) are within a quarter mile of a gas, convenience, or dollar store. Children and parents often stop at these places before, during, or after school for snacks[25], which contributes to unhealthy eating habits. Children traveling in groups to these stores would be susceptible to social norm impacts when deciding what food to purchase. Furthermore, over 94% of children in Elyria-Swansea are receiving free or reduced lunch[7] in 2015; they eat a significant amount of their meals at school, and the choices about what food to eat are made in a cafeteria surrounded by their peers, an environment highly vulnerable to social norm effects. Furthermore, if children stop at convenience stores on the way home from school to purchase junk food type snacks they minimize the impact of any healthy choices they may have made with school breakfasts, lunches, and snacks. It is also notable that while schools have improved the nutritional quality of the food they serve students since the institution of revamped nutritional standards for the National School Lunch Program in 2012[46],

some doubt remains about the nutritional quality of school lunches and the quality of calories that children consume while at school[51].

Additionally, the dynamics in each family contribute significantly to how a family eats. In general, Elyria-Swansea is a very family-centered neighborhood[11]; the average household size is 3.8[27]. The matriarch is typically the primary food shopper for the family. However, focus groups through Livewell reveal that her decisions regarding what food to purchase are largely dependent upon her children and husband's wishes; this dynamic was strongest among Latinas[25]. Therefore, even if a woman wants to shop for healthier food, if her husband and children do not like the food, it will become wasted, a huge risk in a financially strained family[25].

Ancestral culture is a very important driving force on food consumption in Elyria-Swansea. Almost half of survey respondents indicate that family preference is a deciding factor on where to shop for food, and while 62% of northeast Denver respondents indicate cultural relevance is a very important factor in deciding where to shop for food[25], it likely takes on additional importance in Elyria-Swansea due to the neighborhood's high density of foreign-born individuals. Using data from the 1995 and 1996 U.S. Consumer Expenditure Diary Survey, Paulin (2001) compared food expenditure patterns in Hispanics and non-Hispanic Caucasian people. Hispanics purchased more beans and rice (especially low income Hispanics), meat products, fish, eggs, and produce (fresh, frozen, and canned) than their non-Hispanic white counterparts. The food that Hispanics purchased proportionally more often was typically representative of their native culture, and this association held true across all Hispanic cultures analyzed. However, it is notable that acculturation affects Hispanic immigrants' food habits, causing their rates of obesity to increase and their consumption of native foods to decrease[30]. It has been found that acculturation is associated with a change from purchasing corn tortillas to buying processed flour tortillas, higher intake of cookies and high-fat

salad dressings, and a reduction in consuming beans and fruit drinks[40]. It is necessary to keep in mind that the native diet of immigrants is typically healthier than their Americanized one[38], and that this can serve as a point for future change and education regarding healthy eating.

B. Knowledge and Empowerment

Knowledge and empowerment shape food habits habits because it is essential to know how to shop for food, even with time or budget limitations, and to understand how food affects health. Knowledge refers to people's understanding about how food affects their body, how to prepare food, and where to purchase items. A poorer dietary knowledge is linked to a generally less healthy diet[50]. An eye-opening example of a knowledge gap is a resident who revealed in a focus group that she used to throw away bananas when they had a single brown spot because she thought they had rotted[25]. Empowerment includes individuals' ability to afford food, confidence to prepare dishes, time available to dedicate to food preparation, and willingness to incorporate novel ingredients or cooking methods into their routines. Empowered community members will be more likely to advocate for their own food needs[31], making initiatives to increase neighborhood health more sustainable. Elyria-Swansea residents generally grasp what food is unhealthy, but they struggle with how to shop for and cook healthy food on a budget; focus groups and surveys reveal the desire for more advice and strategies in this area[25]. In general, a person must know what food is healthy, how and where to buy it, and then how to cook it in a way that is appealing to that individual or family. Without one of these pieces, it is challenging to make healthy eating a reality.

A healthy corner store initiative in St. Louis, Missouri increases the knowledge and empowerment of both customers and store owners in order to make small corner stores more healthy places to shop. A local store is nominated by a group of community members, who build

community support, act as a liaison between the neighborhood and the corner store, and organize health and wellness events inside the store. These leaders receive courses on nutrition basics, preparing healthy foods, and shopping on a budget. The corner stores must meet requirements for selling a minimum of health food options and are incentivized to create store displays that encourage customers to buy that food with the help of a store mentor skilled in product positioning and displays. As a result, stores are stocking an average of 12 to 25% more healthy options and the community is more empowered to make healthy choices when they shop[33].

Not having time to cook healthy meals acts as a detriment to a family's empowerment to make healthy choices. While many people in Elyria-Swansea prefer to shop at grocery stores, oftentimes a home cooked meal is not a feasible option and fast food becomes an easy, family-pleasing fallback. Focus groups of northeast Denver residents reveal that many households struggle to find time to prepare food at home[25]. 72% of northeast Denver residents eat fast food three times per week, which is higher than the national average, and of all of the northeast Denver neighborhoods, fast food consumption is highest in Elyria-Swansea[25]. However, fast food consumption, much like grocery store access, is not directly correlated with proximity to or density of fast food restaurants[25], indicating that its convenience and affordability are strong draws independent of how close the outlet is to a neighborhood. Low income is significantly associated with increased fast food consumption[25], much like fruit and vegetable intake[25,34]. Not surprisingly, people who frequently eat fast food eat fewer fruits and vegetables and consume increased sodium, fat, and sugar[34,41]. Yet, people do not eat fast food because they lack knowledge about its health detriments[25]. Elyria-Swansea residents realize that fast food is not healthy for their family[25], but health is not a strong motivating factor when pitted against the myriad of barriers that push community members toward seeking fast food[13].

C. Income and Proximity

Income is one of the most important driving forces on fruit and vegetable consumption[25,50]. As discussed above, Elyria-Swansea largely struggles with poverty and food insecurity, and their fruit and vegetable consumption is significantly lower than that of more affluent individuals in greater Denver[25]. Living in poverty forces individuals to make careful choices about what foods to purchase based on the values they hold surrounding food. While the other elements in Figure 6 are very important, if an individual can not afford to buy a product, they will not purchase it. With so many households living in poverty and a median income below the self-sufficiency standard, it easily follows that money and resources an important component of food habits. In one large study in London, disadvantaged survey respondents cited both cost and proximity as their main factors in choosing where to shop for food (versus the higher SES group which valued range of foods available and quality)[50].

While there are no grocery stores in Elyria-Swansea, surveys, studies, and focus groups indicate that residents still shop at grocery stores. Low-income people are much more likely to live in a food desert than more affluent individuals, yet 90% of all low-income people across the United States use supermarkets as their primary source of groceries[34]. A small 2010 survey of Elyria-Swansea residents found that 80% of respondents use large supermarkets as their primary source of groceries[18]. While this survey alone is not sufficient to conclude that residents seek out grocery stores for most of their food, a strong preference for grocery stores was echoed in Livewell's 2015 northeast Denver food access analysis.Not surprisingly, northeast Denver survey respondents who report shopping more often at grocery stores also report eating more fruits and vegetables per day[25]. In addition, USDA's 2009 analysis of food deserts similarly showed that when communities do not have access to grocery stores, the seek them out by all means possible.

One explanation for why Elyria-Swansea residents choose to commute to grocery stores is that grocery stores consistently offer lower prices than smaller food outlets that might be more prevalent inside of a neighborhood[34]. Families purchase food from convenience stores largely when items go on sale or promotion, but rarely shop at these stores otherwise. The food tends to be more expensive, and while it is more convenient, families can not afford to buy it at full convenience store prices. For example, cereal costs 25% more at convenience stores than grocery stores, and 67% of all cereal sold at convenience stores was purchased during a sale[34]. Outside of these sales, the low prices that grocery stores offer are more valuable than the distance individuals have to travel to access them.

Yet, proximity to grocery store is typically not the most important factor that decides where people shop for groceries. While SNAP participants live an average of 1.8 miles from the nearest supermarket, the distance to the store that participants and eligible nonparticipants use most is an average of 4.9 miles. On a global scale, a study in England concluded that food deserts only exist on an individual (versus a neighborhood) basis due to individuals' ability to travel to purchase food. This study was conducted in a city of 260,000 people, with some neighborhoods being socio-economically deprived, and others being more affluent neighborhoods; a total of 5,044 people completed the survey. 84.5% of people reported traveling outside of their immediate locale to purchase food, and 12% travel on foot to buy food. The authors hypothesize that because most people travel to purchase groceries, food deserts are only a reality for those who cannot or will not travel to buy their food while also living in an area of poor food retail. So, food deserts only apply to a minority of the population who lives in a low food access neighborhood. The study also finds that the most important factors in eating a healthy diet are as follows, "dietary knowledge, relative affluence and a 'healthy' lifestyle". Once again, simple proximity is not thought to be the main barrier to eating a healthier diet[50].

Residents of northeast Denver choose where to shop based on the values they hold around food and food outlets, and these values consistently line up with what grocery stores offer. The top three values that people hold when choosing where to shop for food are quality, selection, and price[24]. Residents desire a precise mixture of quality and affordability, and they are less likely to shop at an outlet that does not have what they want to purchase, charges too much, or offers an inferior quality product[25]. Because residents value grocery stores so highly due to the low prices, large selection, and high quality of foods they offer, they utilize any means possible to get there. Most people drive, carpool, or use public transportation[24], as the alternatives include purchasing unaffordable convenience store fare or seeking fast food.

Next, 64% of northeast Denver respondents state that proximity to a food outlet is one of the most important factors in where they shop for food[24]. Proximity was found to be less important than quality, selection, and price, but people value having easy access to food that they can enjoy and afford. However, it is important that even though Elyria-Swansea residents utilize grocery stores, their access to stores that provide fresh, affordable food is not sufficient. Elyria-Swansea residents believe there are not enough grocery stores in their neighborhood. They see this as a serious detriment to the health of their neighborhood, and they believe the neighborhood's health would improve if there were more grocery stores[25]. The USDA classifies Elyria-Swansea as a low-income/low-access neighborhood even when accounting for vehicle access[45]. While vehicle ownership across northeast Denver is higher than across all of Denver[15], this is not the case in Elyria-Swansea[11]. 17.7% of households, a relatively high number, do not have access to a vehicle and live more than 1/2 mile from a grocery store[45].

However, increasing healthy food options in neighborhoods has not been consistently shown to increase fresh food consumption. Among northeast Denver survey respondents, neighborhoods with an abundance of fast food and few if any full-service grocery stores report

very similar amounts of daily fruit and vegetables consumption as other neighborhoods in the study area[25]. Only a few studies have been conducted looking at how adding healthy food options to a food desert can impact consumption of fruits and vegetables. For example, a Canadian food desert saw an increase in the availability of fresh produce and a moderate (12%) decrease in overall houesehold food cost after a farmer's market opened[21]. Next, two international studies assessed the impact of a full-service grocery store in a food desert and found mixed results.

A 2003 study in Leeds, England reports a small, significant increase in fruit and vegetable consumption (2.88 to 2.92 servings per day) when adding a full-service grocery store to a food desert. While it is difficult to determine if increasing fruit and vegetable consumption by only 0.04 servings per day will have lasting or measurable effects on how people purchase and consume food, the effect is magnified in persons who have poorer diets initially. This change was measured via a seven day food consumption diary (interviewers also collected information on "household composition; welfare benefits and income; education and work status; disabilities and long-term health problems; smoking habits; attitudes to healthy eating; food-store choice; mode of travel to stores; car ownership or access; perceived constraints on choice of foods bought, etc."). One set of surveys was administered 5 months before the new store opened, and one set was administered 7-8 months after it had opened. 1009 people completed set one, 615 of those people also completed set 2, and 394 persons were lost to follow-up (the total population of the neighborhood was approximately n=38,000 at the time). Interestingly, only about 45% of people (from the n=615 group) switched to using the new grocery store (largely due to convenience), while those who did not switch cited concerns about expensiveness of a store with larger size and layout. A limitation of this study is the lack of a control group, although the researchers feel confident in their findings due to their undertaking of a repeatability study

during part 2 of the study. Part 2 includes 140 people and intends “to measure the extent of random or systematic error in the information being reported by respondents within the seven-day food consumption diaries, and to assess the likely effect of this on our findings.” The repeatability study confirms that the questionnaire itself did not change people’s habits surrounding food (e.g. if a person becomes more aware of their fruit and vegetable consumption as a result of the survey, they may be prone to alter their habits). The authors also bring up the salient point that habits surrounding food purchasing are more complex than simple distance-measured access, and in reality adding a grocery store is intended to simply open the possibility of healthy food for some people. Other barriers such as social and cultural norms, nutritional knowledge, and motivation surrounding health cannot be solved with proximity to a store[36].

Another study, which did include a control group (another nearby neighborhood which received no intervention), finds no effect on fruit and vegetable consumption in Glasgow, Scotland after adding a full-service grocery store to a food desert[9,49]. The data for this study was collected via survey (asking how many fruit/vegetable portions are eaten per day), and surveys were given before the new grocery store opened with follow-up 10 months after opening. Data was adjusted for age, sex, educational attainment, and employment status. A total of 412 persons completed the pre and post-intervention study (221 from the control group, and 191 from the intervention group). Of the people in the intervention area, only 58 switched to using the new store. The limitations of this study were professed to be a low survey response rate (a total of 3,975 surveys were mailed in the pre-intervention phase), low power, and possible over-reporting due to unusually high rates of fruit and vegetable consumption reported in the pre-intervention phase.

A third study assesses the impact of a new supermarket in a food desert in Philadelphia (part of the Fresh Food Financing Initiative) on fruit/vegetable consumption, body mass index (BMI), and perceptions of food access. Similar to the study in Glasgow, the study compares two neighborhoods, both considered “food deserts”; a grocery store opened in one neighborhood, while the control neighborhood did not have any new food retail stores. The baseline information was gathered in June-September 2006, and the follow-up period was June-November 2010 (the new supermarket opened in December 2009), so the new store was open for about 6 months before collecting follow-up data. The baseline sample had 1,440 respondents (intervention group n=723, and comparison group n=717). A total of 656 people completed both waves of the survey (intervention n=311, comparison n=345). To assess fruit and vegetable consumption, the Block Food frequency questionnaire, which claims to have good concurrent validity in comparison to diet records, was used. The questionnaire asked about the consumption of 10 fruits and 12 vegetables in the previous 1 month. BMI was calculated with a standard formula, and was based on self-reported height and weight. Finally, perceptions of food access were determined the by examining “the extent to which each respondent considered grocery stores, and the fruit and vegetables sold in his or her neighborhood, to be expensive, of good quality, and of sufficient variety. Possible values ranged from 5 to 25, with higher values representing better access.” Other variables taken into account include: age, sex, race/ethnicity, children in the household, household income, high school graduate, employment status, and transportation used for food shopping. The professed limitations of this study were its status as a pilot study, the largely black population (which limits external validity), small sample size, the possibility of the study being underpowered, a long follow-up period between baseline and follow-up data collection, and the food consumption questionnaire maybe not including all culturally relevant fruits and vegetables. In addition, BMI and food-buying habits may take longer to change than

was allowed for in the follow-up period. The results report that 26.7% of people in the intervention area switched to using the new grocery store as their main source of groceries, and that 51.4% used it for any food purchasing at all. The supermarket did significantly improve perceptions of food access, but it did not significantly impact either fruit and vegetable consumption or BMI. The authors postulate that changing perceptions of food access may be a necessary first step to finding effects in fruit and vegetable consumption or BMI further down the road[9].

These studies illustrate the complexity of food deserts/swamps and demonstrate that simply adding full-service grocery stores to low-access neighborhoods does not seem to have noticeable effects on fruit and vegetable consumption. It is important to keep in mind that while physical access to healthy plays a role in food consumption, it is also accompanied by elements of economic access, knowledge, and ethnic/cultural forces. Also, there are barriers that exist to residents of food deserts switching to using new supermarkets, such as fear of over-spending in an environment, with a larger selection or preference for previously habituated stores, losing benefits (such as membership cards) at old stores, or simply feeling more comfortable with older stores[9]. Furthermore, even if fruit and vegetable consumption increases, the rates of fast food intake and amount of restaurant meals continue to impact eating habits and intake of fruits and vegetables[34]; healthy food consumption cannot be easily disentangled from unhealthy dietary habits.

IV. Conclusion

It is clear from data on food deserts, food swamps, food insecurity, and Elyria-Swansea that disparities in food access are a much broader problem than proximity to healthy food. In studies across northeast Denver, the United States, and internationally, simply adding healthy options to a food desert is not sufficient to change how people eat or their health outcomes.

Efforts to add grocery stores or farmers' markets to neighborhoods with poor food access fail to significantly alter people's eating habits because their habits are formed by a complex interaction of factors that has been solidified over years and reinforced by social norms. Faced with sudden increased access to healthy food, residents are not motivated to change their customs. Grocery stores, especially, fail to change eating habits because they do not offer exclusively healthy options; they also sell unhealthy items. Community members are not inspired to change from buying calorie-dense snacks to buying fruit; unhealthy options must be removed and fresher options must be incentivized to be effective. However, the method to effect change in Elyria-Swansea's food access must be undertaken specifically for the neighborhood and effected using the assets and existing infrastructure of Elyria-Swansea.

Change can be effected when all of the tenets of eating habits are addressed: culture, knowledge and empowerment, proximity, and affordability.

V. Works Cited

[1]ArLand Land Use Economics. (2008, September). *Elyria-Swansea grocery store market analysis*.

[2]Be Healthy Denver. (2014). *2014 health of Denver report: community health assessment*. Denver, CO.

[3]Black, C., Moon, G., Baird, J. (2014). Dietary inequalities: What is the evidence for the effect of the neighbourhood food environment?. *Health & place, 27*, 229-242.

[4]ChangeLab Solutions, California Department of Public Health. (2014). *Taking stock: creating healthy changes at grocery stores and small markets*.

[5]City and County of Denver. (2003). *Elyria/Swansea neighborhood assessment*. Denver, CO.

[6]California Center for Public Health Advocacy, PolicyLink, UCLA Center for Health Policy Research. (2008). *Designed for disease: the link between local food environments and obesity and diabetes*. Davis, CA.

[7]City and County of Denver. (2015). *Elyria & Swansea neighborhoods plan*. Denver, CO.

[8]Colorado Department of Local Affairs. (2011). *SNAP: Eligible but not enrolled* [Data set]. Retrieved from http://dola.colorado.gov.

[9]Cummins, S., Flint, E., & Matthews, S. A. (2014). New neighborhood grocery store increased awareness of food access but did not alter dietary habits or obesity. *Health Affairs, 33*(2), 283-291.

[10]Daley, J. (2015). Colorado's adults are lean, but its kids in poverty struggle with obesity. *Colorado Public Radio*. Retrieved from http://www.cpr.org

[11]Denver Department of Environmental Health. (2014). *How neighborhood planning affects health in Globeville and Elyria-Swansea*. Denver, CO.

[12]Dierschow, B. *What's next for Elyria-Swansea*. Accessed on http://www.historicdenver.org
[13]Satter, E. (2007). Hierarchy of food needs. *J Nutr Educ Behav*, *39*, S187-S188. Accessed on http://www.ellynsaterinstitute.org.
[14]Fiene, E., Guzy, L., Howard, N., Jeong, H., Nadolny, S., Sadler, B. (?). *Northwest Stock Show: Health impact assessment for the Elyria-Swansea neighborhood*. Denver, CO: GES Livewell.
[15]Bell, J., Mora, G., Hagan, E., Rubin, V., & Karpyn, A. (2013). *Access to healthy food and why it matters: A review of the research*. Philadelphia, PA: The Food Trust.
[16]Fielding, J. E., & Simon, P. A. (2011). Food deserts or food swamps?: Comment on "Fast food restaurants and food stores". *Archives of Internal Medicine, 171*(13), 1171-1172.
[17]Gittelsohn, J., Rowan, M., & Gadhoke, P. (2012). Interventions in small food stores to change the food environment, improve diet, and reduce risk of chronic disease. *Preventing Chronic Disease*, *9*, E59.
[18]Hohl, P. (2010). *Food access in Denver communities: The case for urban agriculture in Elyria-Swansea-Globeville neighborhoods as a method to improve diets through increased access to local and affordable fresh produce.* Unpublished manuscript.
[19]Kliff, S. (2012, June 8). Will Philadelphia's experiment in eradicating 'food deserts' work?. *The Washington Post*. Accessed on http:///www.washingtonpost.com
[20]Lang, B., Kim, E., & Denver Department of Environmental Health. (2011). *Healthy food for all: Encouraging grocery investment in colorado*. Denver, CO: Denver Department of Environmental Health, Denver Food Access Task Force.
[21]Larsen, K., & Gilliland, J. (2009). A farmers' market in a food desert: Evaluating impacts on the price and availability of healthy food. *Health and Place, 15*(4), 1158-1162.
[22]Lewis, L. B., Galloway-Gilliam, L., Flynn, G., Nomachi, J., Keener, L. C., & Sloane, D. C. (2011). Transforming the urban food desert from the grassroots up: A model for community change. *Family & Community Health, 34* Suppl S1(1), S92-S101.
[23]Livewell. (2013). Unity Fiesta. Unpublished raw data.
[24]Livewell. (2014). *NE Denver community food assessment: preliminary findings*.
[25]Livewell. (2015). *Near Northeast Denver community food assessment.* Manuscript in progress.
[26]Paulin, G. D. (2001). Variation in food purchases: A study of inter-ethnic and intra-ethnic group patterns involving the Hispanic community. *Family and Consumer Sciences Research Journal*, *29*(4), 336-381.
[27]The Piton Foundation. (2015). *Community Facts*. Retrieved from http://www.denvermetrodata.org.
[28]Powell, L. M., & Chaloupka, F. J. (2009). Food prices and obesity: Evidence and policy implications for taxes and subsidies. *The Milbank Quarterly*, *87*(1), 229-257.
[29]Robinson, E., Thomas, J., Aveyard, P., & Higgs, S. (2014). What everyone else is eating: A systematic review and meta-analysis of the effect of informational eating norms on eating behavior. *Journal of the Academy of Nutrition and Dietetics, 114*(3), 414-429.
[30]Seth, J. G., Evans, A. E., Harris, K. K., Loyo, J. J., Ray, T. C., Spaulding, C., & Gottlieb, N. H. (2007). Preschooler feeding practices and beliefs: differences among Spanish-and English-speaking WIC clients. *Family & community health*,*30*(3), 257-270.
[31]The Share Network and Partners. (2014). *Northeast Denver Food Systems Assessment Report and Findings*.
[32]Singh, Maanvi. (2015, May 14). Why a Philadelphia grocery chain is thriving in food deserts. *National Public Radio*. Retrieved from http://www.npr.org.
[33]Sustainable Cities Institute. (2014). *Bringing nutritious, affordable food to underserved communities*. Retrieved from http://www.sustainablecitiesinstitute.org.

[34]United States. Department of Agriculture. Economic Research Service. (2009). *Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences: Report to congress*. Washington, D.C.: U.S. Dept. of Agriculture, Economic Research Service.
[35]Walker, R. E., Keane, C.R., Burke, J. G. (2010). Disparities and access to healthy food in the United States: a review of food deserts literature. *Health & place, 16*(5): 876-884.
[36]Wrigley, N., Warm, D., & Margetts, B. (2003). Deprivation, diet, and food-retail access: findings from the Leeds' 'food deserts' study. *Environment and Planning A*, *35*(1), 151-188.
[37]Pearce, D. M. (2015, June). *The self-sufficiency standard for Colorado 2015*. University of Washington School of Social Work. Prepared for Colorado Center on Law and Policy.
[38]Singh, G. K., & Miller, B. A. (2004). Health, life expectancy, and mortality patterns among immigrant populations in the United States. *Canadian Journal of Public Health*, *95*, 114-121.
[39]Denver Office of Economic Development. (2015, May). Open data catalog: food stores [Data file]. Retrieved from http://www/data.denvergov.org/
[40]Unger, J. B., Reynolds, K., Shakib, S., Spruijt-Metz, D., Sun, P., & Johnson, C. A. (2004). Acculturation, physical activity, and fast-food consumption among Asian-American and Hispanic adolescents. *Journal of community health*, *29*(6), 467-481.
[41]Bowman, S. A., & Vinyard, B. T. (2004). Fast food consumption of US adults: impact on energy and nutrient intakes and overweight status. *Journal of the American College of Nutrition*, *23*(2), 163-168.
[42]Reyes, D. (2008). *Healthy air for North Denver: CARE Grant Final Report*. Denver, CO: Environmental Protection Agency.
[43]Salguero, L. E. (2011). *The influences of acculturation on obesity in hispanic adolescents*. (Doctoral dissertation).
[44]Trust for America's Health and Robert Wood Johnson Foundation. (2014). *The state of obesity in Colorado*. Washington, D.C. Retrieved from http://www.stateofobesity.org.
[45]United States Department of Agriculture. (2015). *Food access research atlas*. Retrieved from http://www.ers.usda.gov.
[46]Food and Nutrition Service (FNS), USDA. (2012). Nutrition standards in the national school lunch and school breakfast programs. final rule*. Federal Register, 77*(17), 4088.
[47]Diez-Roux, A. V., Nieto, F. J., Caulfield, L., Tyroler, H. A., Watson, R. L., & Szklo, M. (1999). Neighbourhood differences in diet: The atherosclerosis risk in communities (ARIC) study. *Journal of Epidemiology and Community Health, 53*(1), 55-63.
[48]Ellaway, A., & Macintyre, S. (1996). Does where you live predict health related behaviours?: A case study in glasgow. *Health Bulletin, 54*(6), 443.
[49]Cummins, S., Petticrew, M., Higgins, C., Findlay, A., & Sparks, L. (2005). Large scale food retailing as an intervention for diet and health: quasi-experimental evaluation of a natural experiment. *Journal of Epidemiology and Community Health*, *59*(12), 1035-1040.
[50]White, M., Bunting, J., Williams, L., Raybould, S., Adamson, A., & Mathers, J. (2004). Do food deserts exist? A multi-level, geographical analysis of the relationship between retail food access, socio-economic position and dietary intake. *Food Standards Authority, London*.
[51]Cohen, J. F., Richardson, S., Austin, S. B., Economos, C. D., & Rimm, E. B. (2013). School lunch waste among middle school students: nutrients consumed and costs. *American journal of preventive medicine*, *44*(2), 114-121.
[52] French, S. A. (2003). Pricing effects on food choices. *The Journal of nutrition*,*133*(3), 841S-843S.

[53] Drewnowski, A. (2004). Obesity and the food environment: dietary energy density and diet costs. *American journal of preventive medicine*, *27*(3), 154-162.

[54]Bittman, M. (2011). Is junk food really cheaper. *The New York Times*, *24*.

[55]Data from Census 2015. http://www.realtor.com/local/Elyria-Swansea_Denver_CO/lifestyle.

http://www.bing.com/maps/?mapurl=http://data.denvergov.org/download/gis/food_stores/kml/food_stores.kmz