You are where you live:

Food environment and obesity in Detroit

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Obesity across the globe has nearly tripled since 1975. In fact, the majority of the world's population live in nations where overweight and obesity kills more than being underweight (WHO, 2020). The proverb "you are what you eat" refers to a collective acknowledgement of diet's role in maintaining a healthy lifestyle. However, recent research has actually determined food environment to be equally–if not more–influential. Food environment is the combined physical and social factors that influence how an individual gets their nutrition. Typically, this is measured by distance to the nearest grocery store, but a more encompassing definition captures a wide range of elements that influence how we eat: subsidized meal programs at schools, affordability of nearby supermarkets, or the number of fast-food restaurants on a city block (NCCOR, 2016). The flight of high-quality grocers to the suburbs in 1980s Detroit, MI has transformed the city into a food swamp. Recent policy initiatives reprimand negative dieting behavior rather than address food environment as a driving force in obesity risk. Community-driven solutions focused more on bridging the "healthy food equity gap" are more effective policies. The complex relationship between Detroit's urban food environment and its obesity epidemic will become clearer through the following analysis of food environment models, the obesity crisis, and the influence of socioeconomic status on food equity, viewed through a lens of the historical deterioration and recent gentrification efforts that characterize the city.

"Food Desert" vs. "Food Swamp" Models

The "food desert" model views the food environment as devoid of healthy dietary options. The US Department of Agriculture characterizes "food deserts" as "regions of the country [that] often feature large proportions of households with low incomes, inadequate access

to transportation, and a limited number of food retailers providing fresh produce and healthy groceries for affordable prices" (Dutko et al., 2012, p. 1). The "food desert" model is a perfect fit in describing communities where residents live farther than 10 miles from the nearest supermarket. In fact, it was found in a cross-sectional survey that rural counties in the United States have only 3.8 grocery stores on average (Morton and Blanchard, 2007). It is clear that distance to the grocery store holds serious implications on quality of diet; research conducted in four rural Iowa counties uncovered that 45% of residents lacked adequate fresh fruit, 66% lacked vegetables, 34% lacked dairy, and 25% lacked protein (Morton and Blanchard, 2007). Indeed, rural counties are food deserts where diet quality is limited most by distance to a grocery store.

However, despite inherent similarities between the two models, urban environments are better characterized as "food swamps" than "food deserts." While food deserts emphasize distance to a grocery store as the main limitation to a healthy diet, residents of a food swamp face complex obstacles more characteristic of a bustling metropolis. In fact, "food swamps" are defined as communities where "large amounts of energy-dense foods sold in venues… 'inundate, or swamp out,' the 'relatively few' healthy food choices residents have" (Taylor et al., 2015, p. 103). Typically, these unhealthier options are more heavily advertised to demographics in urban environments. Television ratings measured in a 2014 study found that "child/adolescent exposure to food-related ads… was significantly higher in areas with higher proportions of… lower-income households" (Powell et al., 2014). Moreover, communities in food swamps, such as Detroit, MI, are restricted more by cost, rather than distance to the nearest grocery store. For a city that boasts "70 full-line, independent grocery stores," food choice is extremely limited for a large proportion of residents due to affordability. In fact, 20% of Detroit residents were unemployed and 40% lived below the poverty line in 2015 (Hill, 2015). With higher quality

grocers out of financial reach and a corner store on every block to satisfy the desires of relentless advertising, it is understandable that a less healthy diet would become the norm in the city. Upon comparison of 150 of the nation's largest cities on various health measures–consumption of fruits and vegetables being one of them–Detroit's composite score ranks lowest, according to a study conducted in 2017 (Bouffard, 2017).

While urban food environments are an emergent area of exploration across the nation, research limitations restrict progress for needed action. Indeed, Detroit and other cities are often–and incorrectly–called "food deserts" due to inconsistent research methods. Typically, studying urban food environments with the food desert mindset "place emphasis on distance to supermarkets, … efforts to bring more grocery stores to cities, and attempts to sell healthier foods in corner and convenience stores" (Taylor et al., 2015). However, omittance of small grocers, extrapolation of one city to all urban environments, or oversight of pockets of poverty when sampling too large of an area often occur when utilizing such research methods (Kolata et al., 2020). Ignorance of one or all of these factors shifts the view of the "urban food environment" even further from reality and could even mean the difference between categorization as a "food desert" or "food swamp". As our understanding of urban food environments continues to increase, more careful consideration of these factors can be taken into account during research.

History of Detroit's Food Environment

The lasting effects of discriminatory practices in the 20th century contributed to the shaping of Detroit into a food swamp over the decades. Disproportionate grocery store closings in the cities occurred as the "residential character" of urban environments began to shift. Across the nation, urban supermarket closings in the 1980s became more frequent than openings–so

much so that by the end of the 1990s “the poorest 20% of urban neighborhoods had 44% less retail supermarket space than the richest 20%” (Eisenhauer, 2001). Moreover, discriminatory redlining practices via 20th century federal housing policy contributed to disinvestment in racially homogenous communities, a consequence of which is observed in the flight of higher quality grocers to the suburbs (Eisenhauer, 2001). The occurrence of supermarket flight out of the cities and into suburbia has been coined “supermarket redlining” by food-access researchers, and the “tipping of the scales” towards higher proportions of less healthy corner stores over the years has transformed Detroit into the food swamp it is today.

Currently, Detroit residents with the luxury of transportation and time prefer to shop for their groceries outside of the city, whereas residents at or below the poverty line without such advantages are forced to frequent the most convenient–but not necessarily the healthiest–grocery options. This pattern reinforces the characterization of Detroit as a “food swamp” since “the preference for suburban grocery stores is not due to a lack of fruits and vegetables in Detroit grocery stores, but rather to better service, selection, and prices" (Hill, 2020). Indeed, the tendency of wealthier residents to migrate outside of the city limits for healthy food only emphasizes the food equity gap in urban food environments based on socio-economic status, posing serious health implications for the population of individuals without the means or time to commute for healthier groceries.

Obesity as a Public Health Problem

According to the CDC, an individual is considered “overweight” or “obese” when their weight is higher than what is considered healthy. For adults, weight-to-height^2 ratio called Body Mass Index (BMI) is typically used to screen for overweight (BMI = 25.0-30 kg/m^2) or obesity (BMI > 30 kg/m^2) (CDC, n.d.). Gender-specific growth charts are used for children and define

overweight (85-95th percentile) and obesity (>95th percentile) in consideration of natural weight fluctuations that occur during development (CDC, n.d.). Regardless of measurement, characterization as "overweight" or "obese" carries serious health implications. Type 2 diabetes, high blood pressure, kidney disease, and some forms of cancer are just a sampling of the major health problems for which excess body fat increases risk (NIDDK, n.d.). Psychosocial implications include mental health problems such as depression, eating disorders, anxiety, and substance abuse, which are rooted in discrimination which obese individuals often experience because of their weight (Sarwer and Polonsky, 2018).

Without a doubt, prevalence, economic burden, and the biological necessity for prevention rather than intervention mark obesity as a pressing public health problem. While the prevalence of overweight adults has plateaued, the prevalence of obese and extremely obese adults continue to trend upwards; in fact, the biggest among us are growing in number (Bauer, 2020). The catastrophic interplay between skyrocketing obesity rates and the occurrence of comorbidities is reflected in the analysis of the National Health and Nutrition Examination Survey (NHANES) database, which found "years of life lost were 1 to 9 for those with low BMI compared with 9 to 13 for those with a high BMI" (Pi-Sunyer, 2010). Not to mention, obesity's economic toll burdens the community as well as the individual. National spending on obesity-related diseases accounts for 20% of total U.S. medical expenditures (Bauer, 2020). In 2008, this would represent over $147 billion that could have been allocated towards other health initiatives (CDC). Moreover, "weight cycling" caused by biological barriers to weight loss suggests a specific need for preventative action. Metabolism, the rate at which we convert the food we consume into energy, slows after losing weight (Mayo Clinic, 2018). Given this added difficulty

for obese individuals to lose weight–and keep it off–primary prevention efforts would be most effective overall in addressing the obesity epidemic.

Obesity is often attributed to poor decision-making; but in reality, the social and environmental factors at play are the true influencers of diet. Prior and current national public health efforts address obesity with legislation that removes consumer autonomy. For instance, the historic New York City soda tax in 2012 spearheaded by Mayor Michael Bloomberg proposed limiting the sizes of sugary drinks. The obesity initiative sparked controversy as New Yorkers questioned "Nanny Bloomberg's" authority in controlling individual diet choices (Gostin, 2014). An additional example is Michelle Obama's "Let's Move" Campaign, the pinnacle of which implemented new nutritional standards for school meals nationwide. However, such cafeteria interventions–for instance, the 2010 Healthy, Hunger-free Kids Act–focused more on managing student diet decisions than holding food producers responsible. Granted, future research is necessary to determine the true efficacy of Obama's initiative, but childhood obesity has certainly not decreased to the impressive 5% prevalence rate that the administration projected for 2030 (Johnson, 2016). Rather, viewing this disease in light of the socio-ecological model deconstructs obesity into five spheres of influence: intrapersonal, interpersonal, institutional, community, and society (Youatt, 2020). For instance, societal factors such as availability of healthy food–or oversaturation of *unhealthy* food–impact obesity risk, as illustrated in a national study that found a positive association between food swamp prevalence and obesity rates (Cooksey-Stowers et al., 2017). An additional factor, socioeconomic status, plays a role even more critical than race or ethnicity (Springer, 2014). Clearly, the higher-level spheres of influence from the socio-ecological model, rather than just intrapersonal behaviors, play a more substantial role in obesity risk than these initiatives suggest.

Detroit's Food Swamp and the Obesity Epidemic

A critical implication of Detroit's food environment is higher obesity rates, lowering life expectancy and increasing prevalence of obesity-related illness. Analysis conducted by the 24/7 Wall Street Media Network in 2017 found that the obesity epidemic hit Detroit harder compared to the nation as a whole: 30.8% of Detroit adults were obese (3.8% higher than the national average), Detroit life expectancy at birth was 77.3 years (compared to 78.5 years nationally), and diabetes prevalence was 10.6% in Detroit (compared to 9.3% across the U.S.) (Detroit Stats, 2017). These statistics might contrast public knowledge regarding the obesity epidemic–with increasing efforts to promote healthy food equity in Detroit, why are obesity rates increasing? The answer lies in the interplay between Detroit's food swamp environment and a key social determinant of health: socio-economic status.

Recent movements to bridge Detroit's poorest to the rest of the city typically culminate in gentrification practices, such as the installment of high-end grocers downtown. However, despite the "public relations flurries" that depict urban supermarket openings as "trendy" once again, this is not the reality–national grocery store closings still outnumber openings in the city (Eisenhauer, 2001). A recent example of one such gentrification effort was the opening of Whole Foods in Detroit's Midtown neighborhood in 2013. Appeal to middle-upper class shoppers, outreach to lower-income shoppers through price cuts and educational efforts, as well as company profit were just some of Whole Foods-Detroit's goals (McMillan, 2014). However, "community-focused" branding failed to hide the obvious price increases experienced when shopping at Whole Foods–dubbed "Whole Paycheck" by critics–versus lower-end supermarkets. In a comparison of 40 common grocery item prices from King Cole, a grocer in Detroit's northern neighborhood, to Whole Foods, switching to Whole Foods cost the consumer 29% more

(McMillan, 2014). As much as Whole Foods claims to want to bridge the gap in healthy food equity among Detroiters, higher prices raise questions of whether low-income shoppers will actually make the trade-off between food quality and cost.

Therefore, merely opening another store will not improve Detroit's obesity epidemic since this solution neglects three constraints faced by individuals of a low SES that, in conjunction with food environment, play a critical role in obesity prevalence: affordability, norms, and time (Hill, 2015). As illustrated with the Whole Foods case study, the increased cost of higher-quality or organic foods presents a challenge for low-income individuals to make the most of their dollar. More often than not, the most economic choice for individuals below the poverty line is to purchase the cheapest food with the highest caloric density–often, fast food (Cooksey-Stowers et al., 2017, p. 12). Next, community norms strongly influence shopping behavior. Studies have demonstrated a higher frequency of unhealthy food advertisements in areas with proportionally higher low-income households (Powell et al., 2014). When it is more customary for neighbors–influenced by advertisements–to shop from the nearest corner store or fast-food restaurant, it becomes easier to fall into that community norm as well. Finally, the time required to shop from higher-quality grocers is more expendable for individuals of a higher SES. Low paying jobs typically require more time and energy out of the day. Moreover, accessible transportation indicates less time sacrifice for a high SES shopper to commute to the grocery store (Cooksey-Stowers et al., 2017, p. 12). Similar to cost, lower SES individuals in an urban food environment are constrained by time when it comes to shopping. A comprehensive solution to obesity in Detroit should address its food swamp environment in light of these SES barriers.

Thus, the obesity epidemic in Detroit is a clear example of a health disparity. A health disparity–or health inequity–is a measurable health difference in the health condition of a

disadvantaged group–such as low SES–in comparison to the general population. This differs drastically from a health *inequality*, which simply refers to a measurable health difference between any particular group and the general population (Youatt, 2020). The distinction between health "inequity" and "inequality" becomes especially important during the distribution of healthcare resources, for "if these terms remain vaguely defined, socially and economically advantaged groups could co-opt the terms and advocate for resources to address their advantaged social group's health needs" (Braveman, 2014). Indeed, focusing on the obesity epidemic in Detroit and other urban environments does not neglect other social groups with a high prevalence of this disease, as more advantaged subsets have a better ability to address the issue with their own resources. Solutions to the national obesity epidemic should be focused, like a triage system, allocating resources and initiatives to the groups that need it most.

Future of Food Equity in Detroit

Policy has the potential to produce meaningful change in food swamps, enticing healthier venues to replace current, unhealthy options. For instance, some zoning laws limit the number of fast-food restaurants within a certain area of the city. A zoning code established in Detroit for over two decades "prohibit[s] most fast-food restaurants from being built within 500 feet of all elementary, junior, and senior high schools" (Corporations, 2020). Despite a strong presence in city legislature, more research is needed to clearly determine the effect of city zoning restrictions on obesity rates. On the flip-side, more positive incentivization efforts indicate promising results in promoting healthier food options in the city using existing infrastructure. Food swamps are plagued by the oversaturation of unhealthy corner stores that crowd out healthier grocers. A shift away from "restriction" policy could manifest in the implementation of "monetary incentives to existing food stores to stock healthy food items [or] the… subsidization of farmers' markets… to

facilitate access to fresh fruits and vegetables" (Chen and Florax, 2010). Either policy avenue is a step in the direction of ensuring equitable access to healthy foods regardless of SES or location.

Moreover, the "food sovereignty" movement serves to bridge food equity gaps based on SES through education efforts and the promotion of urban agriculture. The food sovereignty movement consists of the joint reclaiming of land and food in the city, empowering "communities that have long been disenfranchised by corruption" (Hill, 2015). Master's student Alex Hill conducted research on Detroit's food environment in 2015, and contributed to food sovereignty efforts through the creation of the "Detroit Food Map". Essentially, the goal of this initiative is to "consistently [conduct] survey assessments of Detroit's neighborhood grocery landscape for availability, price, and quality of healthful foods" (Hill, 2015). He also explored the benefits and limitations of urban agriculture, often implemented as community gardens or other such programs. As Hill (2015) explained, the purpose of urban agriculture is threefold:

> "1. Increase access to healthy, low-cost, nutritious food,
> 2. Build a sustainable, local food system,
> 3. Foster traditional connection between food and land sovereignty" (p. 20).

There is also an important caveat of the emphasis on a community-led effort in bridging the healthy food equity gap. Education and urban agriculture opportunities further the food sovereignty movement towards a future where healthy, affordable food is equally accessible.

Thus, Detroit's complex obesity epidemic is the culmination of socioecological factors– namely its food swamp environment–rather than human behavior, creating healthy food inequity among more economically disadvantaged groups in the city. Obesity continues to plague urban food swamps such as Detroit, but community-driven initiatives: The Greening of Detroit, Michigan Urban Farming Initiative, and Michigan Community Resources, already show promise in lowering prevalence rates (Hill, 2015). Such programs in tandem with policies such as zoning

laws will hopefully create a virtuous cycle: legislation decreases obesity rates, this decrease alters community norms, and norm changes implement new policies (Warner, 2020). Comprehensive, prevention-based public health efforts in urban food environments have and will continue to make strides against obesity by narrowing the healthy food equity gap.

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