

# Perpetua: The UAH Journal of Undergraduate Research

---

Volume 6 | Issue 1

Article 3

---

5-1-2022

## Healthy Diet Affordability in North Alabama During COVID-19

Nicholas Knighten

Follow this and additional works at: <https://louis.uah.edu/perpetua>

---

### Recommended Citation

Knighten, Nicholas (2022) "Healthy Diet Affordability in North Alabama During COVID-19," *Perpetua: The UAH Journal of Undergraduate Research*. Vol. 6: Iss. 1, Article 3.  
Available at: <https://louis.uah.edu/perpetua/vol6/iss1/3>

This Article is brought to you for free and open access by LOUIS. It has been accepted for inclusion in Perpetua: The UAH Journal of Undergraduate Research by an authorized editor of LOUIS.

# Healthy Diet Affordability in North Alabama During COVID-19

---

Knighten, Nicholas  
Department of Economics

## *Abstract*

Previous research has shown that nutrient dense, low-calorie foods are bought at higher rates by those with higher incomes.<sup>1</sup> These types of studies have engulfed common knowledge on healthy diet affordability. However, a recent study of the Mechoopda Indian Tribe of Chico, California, found a healthy diet filled with popular foods can be afforded by all members of the community.<sup>2</sup> By focusing on healthy foods people want to eat and their localized affordability, research applicability in policy clearly increases.

This study uses a framework similar to the California study while tweaking a few aspects to better suit a more regional research effort. Aside from being conducted in Huntsville, Alabama, the National Institutes of Health's (NIH) healthy southern diet was used as a framework, price data was collected online as opposed to in-store, and the study was conducted during COVID-19.

The data collected suggests that a healthy Southern diet is realistically affordable. Since some calculations required its usage, the cost analysis can also be used for policy guidance on future Supplemental Nutrition Assistance Program (SNAP) benefit apportionment.

---

## **1. Literature Review / Introduction**

There is a collection of research on how affordable a healthy diet is; however, cost analysis and affordability evaluations on localized healthy diets is scarce. Only one other study (Jetter, et al. 2019) has pin-pointed culturally and regionally popular 'healthy' diets and it seems that studying the affordability of healthy diets that are popular within a region would yield a more applicable result. This assumption is rooted in the understanding that the diet whose affordability is being tested is more likely to be adopted by the particular inhabitants of a certain area and thus any decision on affordability would be much more accurate than a randomized selection of healthy foods. For instance, a nutritious diet that affords a glass of sweet tea during dinner may not be popular for members of the Pacific Northwest, so including that in a diet cost analysis would detriment the applicability of the designed diet and its

total cost. This makes discovering whether low-income individuals in North Alabama can bear the cost of the NIH's healthy southern diet during the COVID-19 pandemic pertinent to fully understanding healthy diet affordability on a localized scale.

The lenses through which the issue of healthy diet affordability is viewed are multifaceted. The United States Department of Agriculture (USDA) study by Golan et al, states that "Low-income households that receive maximum benefits from SNAP usually have the purchasing power necessary to afford healthy diets; others may not." (Golan, et al. 2008) This study, however, could be viewed as a de facto defense of the necessity of the federal SNAP program. The Golan paper uses a market basket approach and collects data from across the country to justify what level of SNAP assistance the USDA provides and why a diet similar to the thrifty meal plan will be affordable so long as the recipient is

not in the lowest income group in an area with the highest possible food costs. This paper has some drawbacks: it is a report created by the federal government used to explain a governmental program and it takes food price averages and consumer spending averages for the entire country when creating its argument. Neither of these factors make the paper in any ways necessarily flawed, but the former issue creates an opportunity for skepticism from readers and the latter disrupts the applicability of the findings on any particular consumer.

Two other studies dive a bit deeper into the issue of healthy diet affordability. One paper examines the dietary habits of members of Kings County, Washington, and their subsequent diet score and cost. “Are socio-economic disparities in diet quality explained by diet cost?” (Monsivais, et al. 2012) collected information from individuals about their socioeconomic standing and what they consume. The survey was restricted to only Kings County, Washington and analyzed correlations between socioeconomic labels and diet quality. They found “Socioeconomic differences in nutrient intake [to] be substantially explained by the monetary cost of the diet.” (Monsivais, et al. 2012) This paper goes on to assert that a higher monetary cost of diet correlated with a higher nutrient score. The correlation seems defensible from a layman perspective but the regional significance may play a big part in the conclusions since that area of the United States is notoriously more expensive and more white than a lot of the country. (Mayo & Turnbull 2011; Guy 2019) This study also

only proves a correlation between price and healthiness of diet which, while more precise and informative than the USDA study, is not truly answering whether or not any income level can afford a healthy diet.

Another study, similar to the one in Kings County, was conducted by David Kern who found “Healthier foods cost nearly twice as much as unhealthier foods per serving on average.” (Kern, et al. 2019) This second study was a bit different in that it used a sample of individuals from different cities across the country. The food price data for the second study was collected from 11 different states. This was more comprehensive in scope than the study conducted in Washington however it did not answer directly whether or not a healthy diet is affordable across income levels. A study focusing on the prices of foods in a particular area eaten by a certain people group that lives there would be much more adequate in its measurement of the affordability. While the Kings County paper does address localized food costs, again, their location is significantly different than that of the rest of the country and simply noting a correlation cannot be used as a decision variable on the affordability of a given diet to individuals across certain income groups.

Both studies utilized a food frequency questionnaire to determine what their participants frequently consumed and then used different means upon which to score the diets. However, they didn’t answer the bigger question of healthy diet affordability for what people eat in a certain region. From the study of Kings County and the paper from David Kern, we find a much

higher level of analysis than the USDA. We also now know that in one county in Washington and in a selection of various cities across the county, healthier food is more expensive and more likely to be consumed by those in a higher socioeconomic population. The latter two studies, however, don't address the issue that the USDA was pursuing: how affordable is the healthy diet.

The market basket approach seems to be the best way to approach a study of affordability between SNAP and non-SNAP customers. However, the USDA collected data far too broad to address the preferences of any particular region. Both the Kings County and Kern papers found a correlation in the geographical areas that they studied and provided analytics that the USDA paper didn't. But, they did not address the larger issue at hand which is affordability of a healthy diet at any income level.

Jetter et al, in a study *Yes we can. Eating healthy on a limited budget*. uses a market basket approach to measure diet affordability at all income levels - since, if the lowest income level can afford it, any subsequently higher income level should also be able to afford it (Jetter, et al. 2019). The use of a menu that conforms to the region is one of the most unique things about this paper and could be replicated in other regions in order to make a more realistic determination of whether eating healthily is affordable.

There are also a collection of papers that may seem to contradict some of the findings in this paper. However, it should be noted that their correlations only point out a possible outcome of diet choice. Therefore,

as this paper implicitly suggests, diet choice and adherence to said diet is very important. Some of the studies referred to earlier include a French national food consumption survey that found, "Participants in the lowest quartile of energy cost had the highest energy intakes, the most energy-dense diets and the lowest daily intakes of key vitamins and micronutrients. Participants in the highest quartile of energy cost had lower energy intakes, and diets that were higher in nutrients and lower in energy density" (Andrieu & Drewnowski 2006). The findings in this paper are evidence of the current predicament of the nutritional and wage gap. It should be noted that what is currently happening is not the necessary permanent circumstance, nor does it suggest that changing the current predicament will be unconquerable or unrealistically difficult to change. A key finding in another paper may also make the findings within this paper a bit more difficult to digest and so should be addressed here. A list of 372 foods and beverages in Seattle, WA, were recorded for price and it was found that "High-energy-density foods provided the most dietary energy at least cost." The researchers later noted that, "The sharp price increase for the low-energy-density foods suggests that economic factors may pose a barrier to the adoption of more healthful diets and so limit the impact of dietary guidance." Aside from the studies being conducted in two different regions, we can address whether economic factors do pose a barrier to the adoption of more healthful diets. A key finding in this study is that these correlations are not necessarily indicators of the feasibility of diets if their

costs are lower than the current expenditure on food by those in the lowest income and high energy consumption groups.

Research in this field has found a couple of possible paths to increase the frequency of healthy diet consumption outside of addressing perceived affordability restrictions. For instance, Tiwari et al found that “frequent meals away from home were associated with lower-quality diets and higher self-reported food expenditures,” when compared to those meals made at home. Therefore, “Lack of time, nutrition knowledge, and cooking skills are powerful deterrents to cooking at home.” (Tiwari, et al. 2017) If we assume that those in the lowest socioeconomic groups are eating a higher frequency of meals away from home, we could pinpoint that as a more likely cause of their relatively poorer health indicators. Similarly, lack of time, nutrition knowledge, and cooking skills could also explain why adoption of a healthy southern diet could still be difficult even after an affordability barrier is disproven.

This paper will apply the usage of a localized menu for the south, and more specifically, northern Alabama. The study utilizes the NIH’s healthy southern diet as the menu of choice and creates monthly shopping lists from online grocers. These tweaks will allow for the most applicable philosophy of a realistic healthy diet affordability, determined by “Yes we can.”, to understand whether or not a healthy southern diet is affordable. The diet will also consist of 1,600 calories. This may seem to be misleading when making claims about the findings of this paper, however, this diet is still suggested by the NIH and can be used

as a weight loss diet. This does not, however, necessarily mean that it is a weight loss diet. These two seemingly contradictory facts are resolved by *Diet in the management of weight loss* which concluded that gradually calorically restrictive diets “are well-tolerated and characterize successful strategies in maintaining significant weight loss over a 5-year period” (Strychar 2006).

A healthy southern diet is affordable for the vast majority of Americans living in North Alabama. A healthy southern diet must be affordable for the vast majority of North Alabamians if all the components of the diet cost less, on average, than what is currently spent on food by those with the lowest food expenditures. We also know that COVID-19 has highlighted, in at least one way, the accessibility of affordable diets for the vast majority of North Alabamians. We can be certain that this is true if the inclusion of the food delivery cost to the diet’s cost is still less than the food spending of the group with the least spending on food on average.

## 2. Data Collection

The study was conducted between September and October of 2020 in North Alabama. This time period is significant because it was during the COVID-19 pandemic. Prices were recorded online and this, along with restrictions and consumer sentiment over safety concerns from the pandemic, may have had an effect on product prices. Any comparative tables using consumer expenditure data are sourced from the U.S. Bureau of Labor

Statistics' "Average expenditure, share, and standard error tables."

### **Menu Selection**

To have a centralized point of measurement of multiple different grocers, the NIH's "Aim for a Healthy Weight - Southern Cuisine" diet plan was used as the source of the shopping list at each local grocery store. This allowed the use of a market basket approach by measuring price and availability of foods acknowledged by the National Institute of Health as commonly consumed by a certain group of people. This menu was selected because it was created by the NIH, so its assertion of "healthiness" and applicability as a cuisine common to a certain region is most likely accurate. Also, because it is created by the NIH, it is easy to access for any readers of this paper for reference.

### **Menu Assumptions**

The NIH's diet has two different caloric plans, 1,600 and 1,200 daily calories and the 1,600 calorie plan was used. The caloric amount may seem startlingly low, however, it should be noted that the meal plan is a weight loss plan and eating less calories from more nutrient-dense sources is a scientifically supported method of weight loss (Strychar 2006). This issue is also further addressed toward the end of the literature review/introduction section.

The menu was also tweaked to include alternatives to some foods to make the expectation of consumption more realistic. This included the morning glass of milk being substitutable with yogurt, either

plain and lowfat or a smaller amount of an artificially sweetened option. Orange juice could be exchanged for strawberries or blueberries. If someone did not want skinless baked chicken for lunch they instead could have turkey breast or a fish filet. Brown rice was not required with lunch, a baked potato or corn could suffice. For dinner, lean roast beef or pork tenderloin could equally constitute the meat for the meal. Similarly, both sweet and white potatoes were interchangeable. For dessert, honeydew melon, an apple, a peach, or a banana were all options. All exchange options were provided according to the NIH's Food Exchange Lists (National Heart, Lung, and Blood Institute).

### **Price Recording and Product Selection**

A handful of changes to the textual specifics of the NIH's diet plan were also necessary because of the logistical challenges presented by specific product availability and the need for measurement consistency. Firstly, it should be acknowledged that since the diet plan allowed for substitutions, substitutions were included at random to ensure the highest level of diet applicability. For each store, the cheapest item that matched the description provided by the meal plan was recorded. Meat was fresh and the price of the lowest unit amount needed to suffice the monthly diet amount was recorded. Raw vegetable weights were recorded using the Food and Nutrient Database for Dietary Studies for consistency. Outside of English muffins and sweet tea, if an item on the diet was commonly prepared using a mix, the mix was recorded. Rice weight was presumed to

be dry, rather than cooked, weight. Baking powder biscuits were substituted with "Pillsbury Junior Biscuits" at Kroger and Walmart. Publix did not have that product so "Pillsbury Grand Biscuits" were used - assuming half of one of the replacements would suffice for the small baking powder biscuit called for. Brown sugar package measurements were not consistent, so the amount for each store is calculated based on the specific packages measurements. It was assumed one pan of cornbread made 5 medium slices.

### Store Cost Calculations

The cost of diet for each store first required store site selection. Each specific store was selected based on the closest choice in reference to the University of Alabama in Huntsville campus. Then, the cost of enough of each good to only cover the exact needs for a month for one person were selected. The average price per meal per store was calculated from the grocery list resulting from the previous step. This resulted in a per meal per store cost that could then be used for various calculations.

### 3. Data Analysis

|               | Kroger | Walmart | Publix |
|---------------|--------|---------|--------|
| Breakfast     | 1.43   | 1.32    | 2.03   |
| Lunch         | 1.68   | 1.5     | 2.33   |
| Dinner        | 3.49   | 2.78    | 4.3    |
| Snack         | 0.32   | 0.24    | 0.45   |
| Daily Total   | 6.92   | 5.84    | 9.11   |
| Weekly Total  | 48.44  | 40.91   | 63.74  |
| Monthly Total | 214.5  | 181.17  | 282.28 |

#### Average Per Meal and Daily Food Costs

To bring value to the collection of price data from three major grocers, we must consider the total costs. We can see that Walmart has the lowest average daily total price, followed by Kroger and finally Publix. This ranking also translates into weekly and monthly total costs. Dinner was significantly more expensive than any other meal throughout the day, constituting 50, 48 and 47% for each grocer, respectively. The

snack category only consisted of saltine crackers and mozzarella cheese, which explain its drastically lower average daily cost.

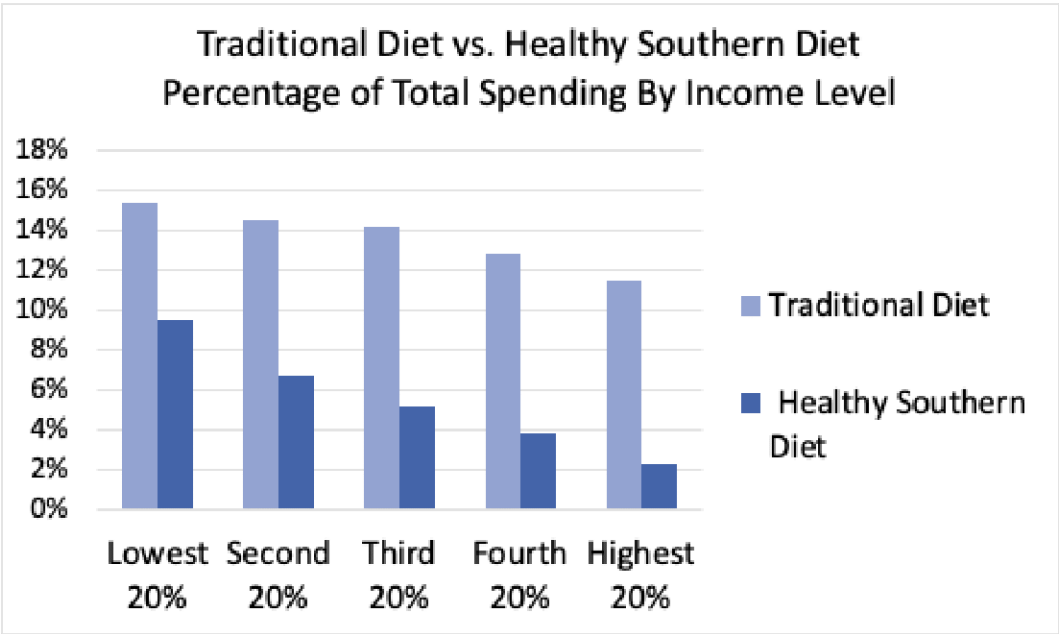
#### Significance of Lean Meat in Diet Cost

The cost differences between dinner and all other meals are largely due to the frequency of lean roast beef which can be more frequently substituted with pork tenderloin to reduce cost further and still be

in compliance with the NIH diet guidelines. The lean meat chosen during lunch and dinner were either the first or second most costly item in each meal possibility. This places great significance on the frequency of particular lean meat choices. During lunch, fish was the most expensive lean meat option on average across all three grocers, followed by baked chicken and finally turkey breast. During dinner, lean roast beef was more expensive than its only substitute,

pork tenderloin. This means that an even lower cost diet could be found by increasing the frequency of cheaper lean meats. We can also see how the price of lean meat also affects the rankings of total diet cost. Publix always has the most expensive average lean meat option across all categories, followed by Kroger and then Walmart. This is the exact same order found for total diet costs.

4. Results



Here, all U.S. spending on food on average as a percent of total spending is split between five different income levels. These income levels range from the lowest 20% up through the highest 20% of wage earners. The healthy southern diet’s cost makes up less of the total spending of even the lowest 20% of income earners in the country. The percentage declines as we move to higher and higher income levels, as well. This

makes sense since as people make more money, they tend to have a higher level of spending and the cost of the healthy southern diet is constant. A traditional diet makes up 6% more of total spending for the bottom 20th percentile and 10% more for the top 20th percentile.

If we isolate the results for only the most affordable of the grocery options, Walmart, the results become even more



drastic. At the bottom 20th percentile, individuals would cut their spending on food by more than half. This results in a savings of more than \$2,000 per year, or 8% of total spending for this percentile. This would result in a de facto addition of \$150 per month for every single person, not household, in the lowest socioeconomic group. The results grow substantially as we move up the income groups. If we were to see the highest 20th percentile consume the healthy southern diet at Walmart, they could realize a saving of almost \$1,000 per month per person on their food spending.

## 5. Conclusion

These results largely disagree with the popular sentiment in society and a lot of the common knowledge about the correlation between healthy diet cost and the health of the poorest citizens. A healthy southern diet is not just affordable, it is cheaper than what every single income level spends on food on average. This conclusion still holds when including the cost of delivery for the meals. It seems clear that COVID-19 did not have an effect on the affordability of a healthy southern diet since the diet still cost less than what the group with the least spending on food already spends, regardless of need for delivery. The diet is also filled with foods that are popular among people in the area and are therefore logically more familiar, easier to prepare, and more desired than traditional diet foods. This points instead to the necessity of knowledge for improving the diets of those in the lower socioeconomic levels. As previous papers have noted, there is

evidence that seeing caloric information about high calorie foods does not actually deter those in poor socioeconomic areas from consuming high calorie fast food (Elbel, et al. 2009). It would make sense that this sentiment is a motivator for why this diet is still not applicable for many disadvantaged people. The level of knowledge of how to prepare the foods in this diet, how to use SNAP funding to access the food even more affordably, and how to compare and appreciate the nutrient density of the foods people are consuming seem to be a much more worthwhile avenue to investigate as to the cause of poor nutrition and subsequent health conditions among lower socioeconomic communities. These changes, in combination with the adoption of regionally-specific variants of the healthy southern diet if similarly affordable, could have serious positive implications. The increased knowledge of food preparation methods and nutritional information could help increase diet adherence through the ability to substitute foods to create diverse meal plans that appease personal taste and become relatively quick to make, two other commonly cited issues (Tiwari, et al. 2017). Similarly, with the knowledge of SNAP benefits usefulness to the administration of the diet, we could see additional savings on food for those in the lower percentile groups on top of the already nearly 50% decline experienced through the diet change. This could lead to a greater increase in spending power among the poorest members of society than any other group and could have an unimaginably positive impact on their quality of life.

## 6. References

- Andrieu, E., Darmon, N. & Drewnowski, A. Low-cost diets: more energy, fewer nutrients. *Eur J Clin Nutr* 60, 434–436 (2006). <https://doi.org/10.1038/sj.ejcn.1602331>
- Elbel, Brian, et al. "Calorie Labeling and Food Choices: A First Look at the Effects on Low-Income People in New York City." *Health Affairs*, vol. 28, no. 6, 2009, pp. W1110-W1121. *ProQuest*, <https://elib.uah.edu/login?url=https://www-proquest-com.elib.uah.edu/scholarly-journals/calorie-labeling-food-choices-first-look-at/docview/852799333/se-2?accountid=14476>, doi:<http://dx.doi.org.elib.uah.edu/10.1377/hlthaff.28.6.w1110>.
- Golan, Elise, et al. "Can low-income Americans afford a healthy diet?." *Amber Waves* 6.5 (2008): 26.
- Guy, G. (2019, August 05). Seattle now most expensive city for renters outside California, census data shows. Retrieved January 30, 2021, from <https://www.seattletimes.com/seattle-news/data/seattle-now-most-expensive-city-for-renters-outside-california-census-data-shows/>
- Jetter, Karen M., et al. "Yes We Can: Eating Healthy on a Limited Budget." *Journal of Nutrition Education and Behavior*, Elsevier, 6 Mar. 2019, [www.sciencedirect.com/science/article/abs/pii/S1499404618309060](http://www.sciencedirect.com/science/article/abs/pii/S1499404618309060).
- Kern, David M et al. "Neighborhood Prices of Healthier and Unhealthier Foods and Associations with Diet Quality: Evidence from the Multi-Ethnic Study of Atherosclerosis." *International journal of environmental research and public health* vol. 14,11 1394. 16 Nov. 2017, doi:10.3390/ijerph14111394
- Mayo, J., & Turnbull, L. (2011, April 24). Census ranks Seattle among whitest big cities. Retrieved January 30, 2021, from <https://www.seattletimes.com/seattle-news/census-ranks-seattle-among-whitest-big-cities/>

Monsivais, Pablo et al. “Are socio-economic disparities in diet quality explained by diet cost?.”

*Journal of epidemiology and community health* vol. 66,6 (2012): 530-5.

doi:10.1136/jech.2010.122333

National Heart, Lung, and Blood Institute. *Aim for a Healthy Weight: Food Exchange Lists*.

Retrieved from [https://www.nhlbi.nih.gov/health/educational/lose\\_wt/eat/fd\\_exch.htm](https://www.nhlbi.nih.gov/health/educational/lose_wt/eat/fd_exch.htm)

Strychar I. (2006). Diet in the management of weight loss. *CMAJ : Canadian Medical*

*Association journal = journal de l'Association medicale canadienne*, 174(1), 56–63.

<https://doi.org/10.1503/cmaj.045037>

Tiwari, Arpita, et al. “Cooking at Home: A Strategy to Comply With U.S. Dietary Guidelines at

No Extra Cost.” *American Journal of Preventive Medicine*, vol. 52, no. 5, Elsevier Inc,

2017, pp. 616–24, doi:10.1016/j.amepre.2017.01.017.