

Food Insecurity in Butler County, Pennsylvania: A Case Study on the BHS Food Institute

by

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Abstract

This paper is a case study on the BHS Food Institute and its ability to alleviate food insecurity and the challenges associated with this public health crisis. Butler Health System's Butler Memorial Hospital is in Butler City, PA, which is considered a food desert. A food desert lacks easy access to affordable fresh fruits and vegetables and other nutritious foods, causing food insecurity and poor health outcomes. The COVID-19 pandemic also negatively impacted the health of the Butler community and contributed to the food insecurity issue. The goal of the BHS Food Institute is to improve the healthcare status of its people generationally and serve as a model for other communities, health systems, and hospitals around the country that have food deserts, high prevalence of food insecurity, and chronic illness. Eligible patients receive basic nutrition education from the BHS Food Institute's Nutrition Liaison ranging from demonstrations on healthy food preparation, label reading, portion control, and menu planning on a budget. The best practices to find and address food insecurity are establishing strong and diverse partnerships with local community organizations and conducting a community health needs assessment to investigate what gaps and barriers are present in the community. These best practices were identified by the BHS Food Institute Administrative Team. Next steps for the BHS Food Institute include hiring more staff, applying for more grants, tracking patient biometric data, expanding its services to other community members, and securing reimbursement through health plans to improve the Food Institute.

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1.0 Introduction

The Social Determinants of Health (SDOH) are “conditions in the places where people live, learn, work, and play that affect a wide range of health risks and outcomes,” according to the Centers for Disease Control and Prevention (Social Determinants of Health, 2021). The five key SDOH areas are Health Access and Quality, Education Access and Quality, Social and Community Context, Economic Stability, and Neighborhood and Built Environment. Food insecurity falls within the Economic Stability domain, defined as "the connection between the financial resources people have - income, cost of living, and socioeconomic status and their health" (Food Insecurity, 2022). However, food insecurity can stem from the other four domains because of the lack of access to grocery stores, healthcare, and education. (Food Insecurity, 2022). Therefore, addressing SDOH can significantly improve a population's overall health because of the resources organizations can provide.

Food insecurity is a significant public health issue across the United States. According to the United States Department of Agriculture (USDA), food insecurity is "a household-level economic and social condition of limited or uncertain access to adequate food" (Definitions of Food Insecurity, 2021). There are two different levels of food insecurity: low food security and very low food security. Low food security equates to having a reduced quality, variety, or desirability diet with minimal indication of eating pattern disruption. Very low food security is when household eating patterns are disrupted and have a reduced food intake due to the lack of funds and other necessary resources (Definitions of Food Insecurity, 2021). Food insecurity causes households to consume a diet that is not adequately balanced because of the need to pay other expenses like rent, medication, and transportation. This lack of adequate nutrition contributes to

chronic diseases, including heart disease, diabetes, obesity, hypertension, and mental health issues (e.g., depression and anxiety) (Definitions of food insecurity, 2021). The COVID-19 pandemic has amplified food insecurity due to high rates of unemployment, increased hospitalizations, and a lack of access to food pantries (State-by-state, 2021).

Butler Health System (BHS) has developed a new initiative to address food insecurity, the BHS Food Institute. This program introduces nutrition and health education to patients that are food insecure. BHS is working to provide new resources for individuals and families to maximize their food budget and increase their knowledge about nutrition and chronic illness management while providing them with healthy foods. The institute's goal is to deliver nutrition education and provide healthy foods to mitigate food insecurity and reduce chronic disease. In addition, as they identify other social needs and services, BHS refers clients to other community organizations in Butler County.

1.1 Food Insecurity Rates in the United States

Food insecurity rates vary across the United States. The rates differ due to the characteristics of the population and state-level policies and economic conditions. Feeding America projected that in 2021, 42 million people (12.9% of the US population), including 13 million children, would be food insecure (Impact, 2021). In addition, urban and rural areas have higher food insecurity by approximately 5% to 10% due to higher crime rates, lack of financial support, and lack of reliable transportation to grocery stores and farmers' markets (Impact, 2021).

In 2021, Black and Hispanic households saw a dramatic increase in food insecurity compared to White households by more than 20% (Food insecurity and nutrition assistance, 2021).

The Black population in the United States has an annual projected food insecurity rate of 21.3% in 2021, while the White population rate is 11.1% (Impact, 2021). In 2020, the Hispanic population had a food insecurity rate of 19%, 2.5x more than White households, which is the most up-to-date data (Impact, 2021).

1.2 Food Insecurity Rates in Pennsylvania

Pennsylvania has a population of approximately 12.96 million with a poverty rate of 10%; 17% of children live in poverty. The population demographics are 76% White, 11% Black, 8% Hispanic, 4% Asian, and 2% mixed. The median age is 40.8, with a median per capita income of almost \$36k (Quick facts, 2021). As a result of COVID-19, approximately 1.8 million individuals living in Pennsylvania became food insecure. However, government food assistance programs efforts decreased food insecurity rates (Food security, 2021). In 2021, Pennsylvania's food insecurity rate was 12%, equating to 1,540,900 individuals (Figure 1) (Food insecurity Pennsylvania, n.d.).

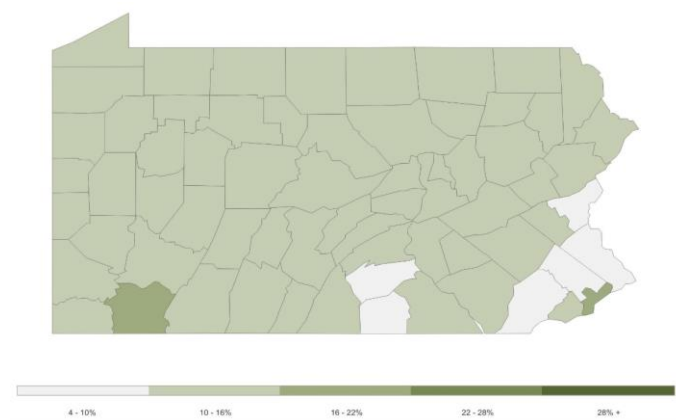


Figure 1. Food Insecurity Prevalence in Pennsylvania (2021) (State-by-state, 2021)

1.3 Food Insecurity Rates in Butler County and Butler City

In 2021, Butler County had a total population of 194,723; 7.4% lived in poverty. The county demographics are 95.8% White, 1.4% Black, 1.5% Asian, 1.6% Hispanic, and 1.2% mixed (Quick facts, 2021). The median age for Butler County is 43.3 years based on 2019 data (Census place, 2019). The median household income in 2020 was \$72,642 (Quick facts, 2021). The Food insecurity rate in Butler County is 10.1%; such rate is 12.1% for children in Butler County (State-by-state, 2021).

Butler Memorial Hospital is located in Butler City (16001 zip code). Most of the patients referred to the BHS Food Institute are Butler City residents. In 2020, Butler City had a population of 13,502, with 20.7% under 18 years old and 12.3% 65 or older (Quick facts, 2021). The demographics are 90.4% Caucasian, 2.5% Black, 3.7% Hispanic, 4.7% two or more races, and 1.0% Asian. The population with a bachelor's degree or higher is 22.7%, while 91.0% have a high school diploma. In Butler City, 20.5% of people under 65 have a disability, and 6.1% are without health insurance. The median household income in Butler City is \$32,746, and the poverty rate is above the national and state level at 24.2% (Quick facts, 2021). Downtown Butler is a food desert because there are no grocery stores within a 5 miles radius. Transportation is a major barrier to accessing these stores, so these residents rely on Dollar General and Rite Aid for groceries because they are within walking distance of Downtown Butler.

Table 1 shows the demographic disparities between different townships in Butler County based on 2016 to 2020 data. Butler City is approximately six times more impoverished than its county counterparts; Adams, Cranberry, and Center Township. Cranberry and Adams Township have more than a \$75,000/year difference in median household income compared to Butler City (Quick facts, 2021). Also, Center Township has approximately a \$43,000/year difference in

median household income compared to Butler City (Quick facts, 2021). Based on these statistics, the residents of Butler City are more likely to be susceptible to food insecurity.

Table 1. Demographic Disparity in Butler County (Quick facts, 2021)

	Adams Township (16046)	Cranberry Township (16066)	Butler City (16001)	Center Township (16061)
High School Graduate or higher, percent	98.8%	97.3%	91.0%	96.8%
Bachelor's Degree or higher	66.1%	62.0%	22.7%	36.1%
Median Household Income, 2016-2020	\$124,982	\$108,160	\$32,746	\$76,100
Per Capita Income Past 12 months, 2016-2020	\$69,935	\$53,744	\$22,127	\$42,109
Persons in Poverty, Percent	3.6%	3.1%	24.2%	4.1%
Percent with a Disability, Under age 65, 2016-2020	3.8%	4.7%	20.4%	10.8%
Persons without health insurance	0.8%	2.2%	6.1%	2.6%
Households with broadband internet subscription, 2016-2020	93.3%	94.9%	78.5%	85.3%

1.4 Correlation Between Food Insecurity and the COVID-19 Pandemic

The COVID-19 pandemic has significantly affected all aspects of life in the United States. The individuals and households hit the hardest by the pandemic already lived below the poverty line. Due to COVID-19, nearly 15% of US households and nearly 20% of households with children found it difficult to supply food (Parekh et al., 2021).

Before the COVID-19 pandemic, food insecurity was at its lowest rate in almost 20 years. In 2019, approximately 1 in 9 individuals (10.9%) and 1 in 7 children (14.6%) were food insecure and receiving government food assistance programs, equating to more than 35 million individuals and 11 million children. Also, in 2019, the US unemployment rate was 3.7%, and the US poverty rate was 10.5%. These two factors heavily influence food insecurity rates (Map, 2021).

The COVID-19 pandemic caused supply chain shortages throughout the United States. Supply chain shortages are happening more frequently due to individual behaviors and the overall disruption the pandemic has caused. People are stockpiling everything from food to paper goods. In addition, the COVID-19 pandemic has triggered a fight or flight response due to fear. This leads individuals or households to hoard products, causing supermarkets, grocery stores, and convenience stores to see a decline in products stocked on the shelves (Food price outlook, 2022).

Consumer price inflation has significantly risen for these everyday goods and services. According to the USDA, restaurant food prices have increased by 6.8% since January 2021 and are predicted to increase by another 5.5% to 6.5% in 2022 (Food price outlook, 2022). Also, the USDA states that food prices at grocery stores and supermarkets have increased by 8.6% since February 2021 and are predicted to increase by another 3% to 4% in 2022 (Food price outlook, 2022). These increases make it even harder for families already struggling with their food budget. Families living below the poverty line or hovering right above it will face more financial strain,

choosing between rent or food for their family. From this inflation caused by COVID-19, the United States has seen a higher prevalence of food insecurity (figure 2).

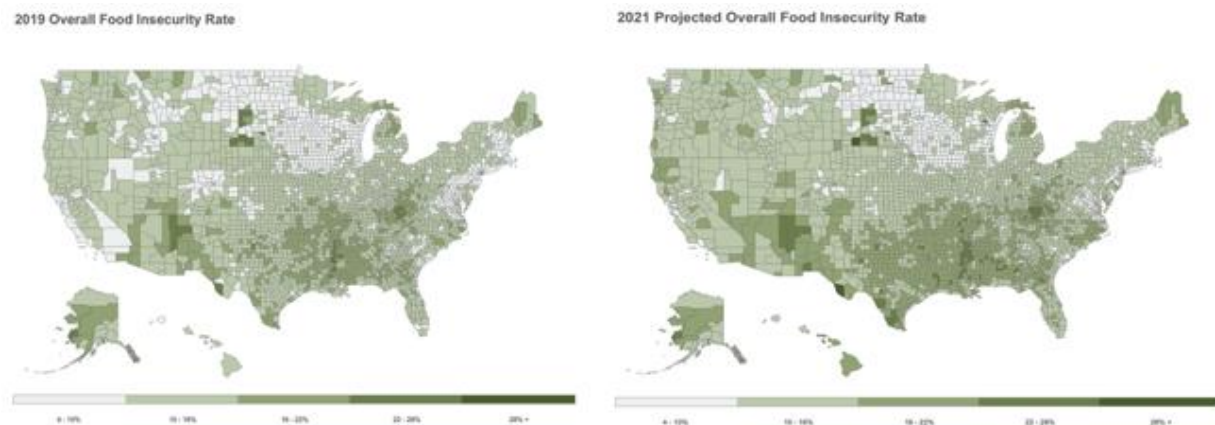


Figure 2. Before and After COVID-19 Food Insecurity Comparison (State-by-state, 2021)

1.5 Federal Nutrition Assistance Programs

The U.S. Government has multiple federal programs to respond to food insecurity. These federal programs include the Supplemental Nutrition Assistance Program (SNAP); the National School Lunch Program; and the Women, Infants, and Children (WIC) program. Approximately 7% of all US households in 2020 used a food pantry or food assistance program (Coleman-Jensen & Rabbitt, 2021). Unfortunately, for many families, these food assistance programs are their primary source of food, which may not provide them with the best nutritional options. The absence of balanced food options can lead to serious health issues and lower quality of life.

The first nutrition assistance program discussed is SNAP. SNAP provides a monthly allowance to food-insecure individuals or households to purchase healthy foods to increase their self-sufficiency for providing basic life essentials (Food assistance, n.d.). As of November 2021,

over 41.2 million people in the US receive assistance from SNAP (Food assistance, n.d.). Eligibility for this program differs from state to state. For example, in Pennsylvania, the individual must be a current resident and have a current bank balance of less than \$2,001 (\$3,001 depending on if it is a shared bank account with a person over 60 or who has a disability). The last requirement is the household's income before taxes (Table 2) (SNAP, 2022). This nutrition assistance program allows any eligible household that meets the federal poverty line requirement, including any children of these eligible households.

Table 2. Annual Income Limits - SNAP Eligible (Before Taxes) (SNAP, 2022)

Household Size*	Maximum Income Level (Per Year)
1	\$17,667
2	\$23,803
3	\$29,939
4	\$36,075
5	\$42,211
6	\$48,347
7	\$54,483
8	\$60,619

The National School Breakfast Program/National School Lunch Program (NSBP/NSLP) provides meals at little to no cost to students in public and nonprofit private schools of low-income families (Food assistance, n.d.) These well-balanced meals are given to students every day during school during lunch. The program was signed into law by President Harry Truman in 1946. Currently, in the US, over 30 million children participate in this program (Food assistance, n.d.). These children are eligible to participate in this program based on their household status in SNAP or other food assistance programs. The general income eligibility for free lunch is below the 130%

poverty line, and students get a discounted lunch below the 185% poverty line (Food assistance, n.d.). During the peak of COVID-19, schools closed, which caused an abrupt stop to this program. However, the USDA issued waivers to continue the support of child nutrition programs through school food authorities and other community organizations that were eligible to provide meals. The USDA issued waivers on a state-to-state basis (Food assistance, n.d.).

The Women, Infants, and Children (WIC) program was created in 1974 to increase the health of women, infants, and children (up to 5 years old) to address the issues of food insecurity and access to nutritious meals (Food assistance, n.d.). The program's main objective is to provide healthy foods, supplements, nutrition education, and other resources to this population. The goal of providing these resources was to increase the health outcomes of pregnancy, decrease the number of premature births and infant deaths, and improve the dietary habits of the targeted population. Eating a more well-balanced diet will improve children's school performance and other everyday activities (Food assistance, n.d.). WIC participants have shown an increase in healthcare savings due to the decreased number of health issues stemming from food insecurity (Food assistance, n.d.). Individuals that do not meet the requirements for federal food assistance programs can utilize food banks and food pantries.

1.6 Food Banks and Food Pantries

The Feeding America Network is a nonprofit organization with a national network of 200 food banks and over 60,000 food pantries and meal programs (Feeding America network, 2022). The mission of Feeding America is to end hunger in the United States and Puerto Rico. A food bank is a warehouse where large amounts of food and other household items are for community use. A food pantry is the physical location individuals go to access food in their time of need.

These food banks and pantries are usually located in high-need areas (Feeding America network, 2022). The Feeding America Network is the largest domestic hunger-relief organization that offers hands-on help to needy communities.

1.7 Butler Health System

Butler Health System (BHS) is a community-based health system located in Butler and Clarion counties in Pennsylvania. BHS consists of Butler Memorial Hospital (BMH) and Clarion Hospital as well as a robust medical provider group, Butler Medical Provider (BMP). BMH is located within the 16001-zip code in Butler County and is within proximity to the downtown Butler City. Clarion Hospital is located in Clarion County, was acquired by BHS in December 2019, and brings a new patient population in a more rural community.

BMH, founded in 1898 and provides comprehensive health care for its community. Its mission statement is "BHS is privileged to be a healing presence in the communities we serve. We exist to make a positive difference in people's lives by providing compassionate, high-quality care and comfort and inspiring health and well-being" (Mission, 2022). BHS is dedicated to serving its community, which includes innovative initiatives to improve the health and well-being of the community. One initiative was the development of the BHS Food Institute to address food insecurity, nutrition education, and their impact on the development of chronic illness.

2.0 The Association Between Food Insecurity and Health Outcomes

Individuals who are food insecure are at higher risk for poor health outcomes. The relationship between food insecurity and health outcomes is complex because individuals from low-income households may lack a basic understanding of nutrition and/or access to healthy foods (Food insecurity, 2022). The lack of knowledge about nutrition and available resources causes food-insecure individuals to consume a nutrient-poor diet frequently, leading to chronic illnesses. Chronic illnesses associated with food insecurity are diabetes, obesity, heart disease, hypertension, cancer, and many others (Nagata et al., 2020). Research finds that food-insecure households are, on average, 18% more likely to have a chronic illness than food-secure households (Gregory, C. & Coleman-Jensen, A., 2017).

Chronic conditions diminish the quality of life and employment opportunities and may result in death in severe cases (Gregory & Coleman-Jensen, 2017). Individuals diagnosed with a chronic illness contribute 2.5 times more to healthcare expenditures than individuals with no chronic diseases (Gregory & Coleman-Jensen, 2017). Healthcare spending is higher because chronic disease leads to more hospital visits and medications to manage the diagnosis (Gunderson & Seligman, 2017).

The number of people affected by food insecurity makes this matter a nationwide public health issue. As a direct response, healthcare organizations and other community organizations, outside of government nutrition assistance programs, are implementing nutrition interventions to alleviate food insecurity and poor health outcomes.

Due to the significant correlation between food insecurity and health outcomes, many healthcare organizations have developed clinic-led food pantries or “Food Pharmacies” that provide

healthy foods to food-insecure individuals. These “Food Pharmacies” aim to treat patients with healthy foods because eating an adequately balanced diet plays a vital role in preventing or managing the patient’s health (White, 2020). Another aim of this care model is to change the health behaviors and attitudes towards eating healthier and creating access to healthy food.

Some programs specifically focus on food-insecure patients who suffer from a specific chronic disease, offering chronic disease management classes. In addition, some programs require participants to take the nutrition education classes, but most are based voluntarily. Several organizations provide a nutrition assistance program: Geisinger Health, Allegheny Health Network, Nashville General Hospital, Children’s Hospital of Philadelphia, and Intermountain Healthcare. Hospital-based food pantries and food assistance programs allow patients to feel more comfortable because of the trusting environment, high-quality, healthy foods offered, and the lack of stigma associated with accessing free food (Greenthal et al., 2019).

BHS saw the urgent need to implement a similar hospital-based nutrition assistance program because of the high prevalence of food insecurity in Butler County and the associated adverse health outcomes. To address these concerns, BHS developed the BHS Food Institute, a six-month referral that provides healthy foods and nutrition education to food-insecure BHS patients.

3.0 BHS Food Institute

The BHS Food Institute is a new health system initiative, led by the Chief Community Health Officer, that focuses on food insecurity. The development of the BHS Food Institute came from the 2019 Butler Community Health Needs Assessment (CNHA) findings. The CHNA identified that a knowledge deficit in understanding, implementing, and leading a healthy lifestyle was prevalent in the local community (16001 zip code). As a result, a rise in chronic diseases like diabetes, obesity, and hypertension was straining the community's healthcare resources. Table 3 (all rates per 100,000 people) shows that heart disease, lung disease, diabetes, and obesity are the most prevalent chronic illnesses in Butler County.

Table 3. Disease-Specific Mortality and Incidence (2020) (PA health, 2020)

Chronic Illness	Butler County	Pennsylvania
Heart Disease	203.41	172.91
Lung Disease	43.69	35.34
Diabetes	23.60	20.37
Obesity	29%	29%

In addition, downtown Butler City is a food desert, meaning it has limited options for fresh fruits and vegetables. Thus, the BHS Food Institute was created, where Food Institute employees educate food-insecure patients about nutrition and accessing healthy foods, with the ultimate goal of reducing food insecurity and chronic illness.

To participate in the BHS Food Institute, BHS patients are asked the hunger vital sign questions approved by the Centers for Medicare and Medicaid Services (CMS). If they answer yes to any of the three questions, they are referred to the Food Institute. Once approved, the provider will enter a workload message to the BHS Food Institute. After the workload message is received, the patient will set up an appointment with the BHS Food Institute Nutrition Liaison. The patient attends an appointment once a month for six months with a Nutrition Liaison at the Food Institute located at Butler Memorial Hospital. During each visit, nutrition education is provided on various topics, including MyPlate, menu planning, and low sodium and glucose diets, to name a few. At each forty-five-minute visit, the patient receives ten healthy meals for a family of four with attached recipes. The patient also receives kitchen utensils if needed, so they can adequately prepare the meals provided.

The patients are then directed to Lifestyle Coaching classes based on identified chronic disease(s) and encouraged to participate via Zoom or in person. Registered dietitians and other Lifestyle Medicine employees teach the BHS Lifestyle Coaching classes. The Lifestyle Coaching Program offers evidence-based lifestyle education to manage and prevent chronic diseases, including diabetes, obesity, and heart disease. The program also offers supportive education, such as Menu Planning and Self-Care, to help patients reach health goals. This platform allows the patients to receive disease-specific education and nutrition education at no additional cost. Figure 3 shows the classes offered from January 2022 to June 2022.

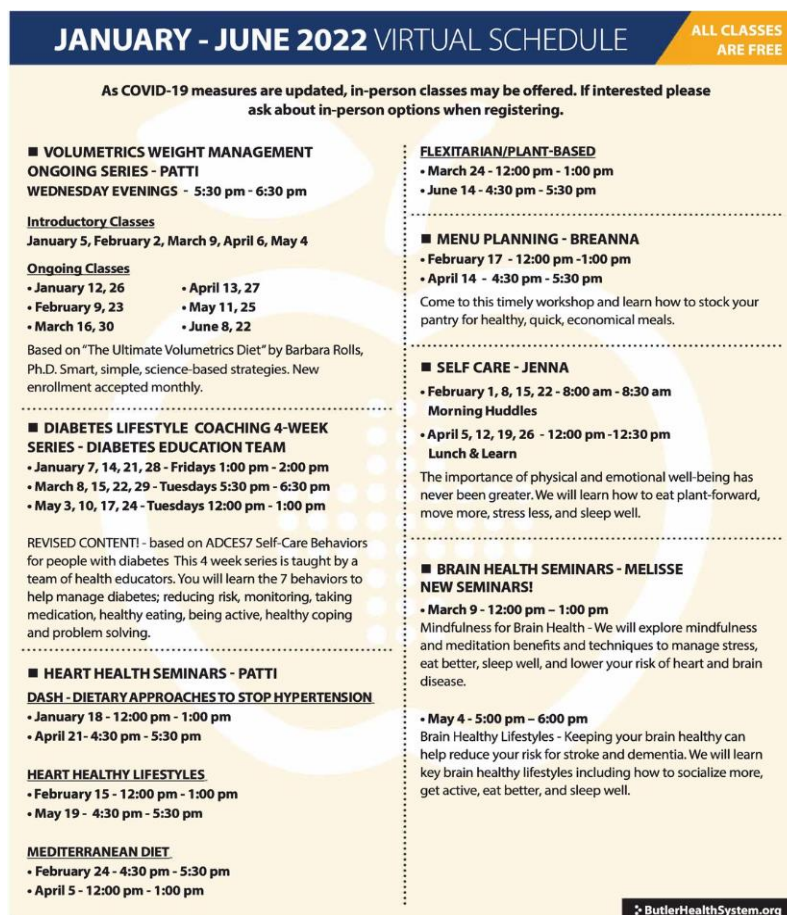


Figure 3. Lifestyle Coaching Class Schedule

The Food Institute patients are empowered to improve chronic disease management by learning healthy food choices, cooking skills, and menu planning on a budget, leading to healthier individuals within the Butler community. This program emphasizes nutrition education because the most common theme of food insecurity and chronic illness is the lack of education on what to eat, how to access those healthy foods, and how to maximize their food budget. The BHS Food Institute helps guide these patients and gives them the correct tools to be self-sufficient to improve their overall lifestyle and health. Figure 4 below shows a BHS Food Institute sample recipe.

Mediterranean Pita Pizza

Total Servings: 4 servings

Total Time: 30 minutes

Ingredients:

- 4 small whole-grain pitas
- 1 cup tomato sauce (lower sodium)
- ½ cup mozzarella cheese (shredded)
- 1 cup mushrooms (sliced)
- 2 cup zucchini (diced)
- 1 cup yellow squash (diced)
- 4 teaspoons extra- virgin olive oil

Directions:

1. Heat the oven to 350 Degrees Fahrenheit. Arrange the pita rounds on a baking sheet.
2. Using the back of a spoon, spread about ¼ cup tomato sauce evenly on top of each pita.
3. Top each pizza with some grated cheese. Arrange the vegetables on top, then drizzle with olive oil.
4. Bake for 15 to 20 minutes, or until the cheese is lightly browned.



Figure 4. BHS Food Institute Sample Recipe

4.0 Methodology

The case study on the BHS Food Institute uses a mixed-methods approach utilizing both qualitative and quantitative data. The several surveys collect data that consist of nutrition education knowledge, patient satisfaction, patient testimonials, Food Institute appointment participation, referrals, general demographics, and other process and performance measures.

The author and BHS employees gathered the information collected from April 1, 2021 to February 28, 2022. In all data collections and conversations, the following topics were discussed:

1. Food Insecurity: Food Assistance Programs and Accessibility
2. Nutrition Education and Dietary Needs
3. Transportation to and from the BHS Food Institute
4. Food consumption and waste
5. Chronic Illness and Biometrics
6. Social Services and Other Community Resources

To get a referral into the program, patients must answer yes to at least one of the following questions. These questions are from a hunger vital sign questionnaire that is CMS-approved and by a healthcare provider to the patient to identify if they are food insecure. Once asked, the answers get entered in Expanse (EMR system).

1. Within the past 12 months, we were worried whether our food would run out before we got money to buy more?
2. Do you have reliable access to fresh fruits and vegetables?
3. Do you rely on food banks, food pantries, or other food assistance programs for you/your family to get food?

The initial survey questions (Appendix A), based on the intake form at Allegheny Health Network's food assistance program, are asked at the beginning of the first appointment to better understand the patient's level of nutrition education and create a baseline of data (only relevant, non-patient identifying questions are presented).

The final survey questions (Appendix B) are asked at the beginning of the sixth appointment to better understand how much the patient's nutrition education improved over the six months (only relevant, non-patient identifying questions are presented). These questions were also based on the Allegheny Health Network's intake form but were adjusted to meet the BHS Food Institute's requirements.

The patient satisfaction survey questions are asked at the beginning of the second to the sixth appointment. The feedback provides on how the Food Institute can improve the gaps and barriers in the nutrition lessons/appointments:

1. Are you satisfied with the services and products provided by the BHS Food Institute today?
2. Please explain your answer to question number one.
3. How much of the food did you end up using for you and/or for your immediate family?

These surveys are structured to get an idea of how much nutrition education patient had initially and how throughout the six months, they improved their knowledge of why it is important to eat healthy and how healthy eating can improve their chronic condition (if applicable). The information above is used to find the efficiency and effectiveness of the BHS Food Institute.

5.0 Case Study of the BHS Food Institute

The impact of the BHS Food Institute is based on the three surveys, patient participation tracking, and patient demographics to help determine the impact the program has made on the patients before and after the program. The three surveys administered are the initial intake form, the recurring patient satisfaction survey, and the sixth-month appointment survey. These surveys track nutrition and wellness education changes to measure the initiative's impact. In addition, each patient gets asked a variety of questions for BHS to gauge the severity of food insecurity, the levels of food education these eligible individuals have, and their satisfaction with the program. Project staff surveyed participants between April 1, 2021, and February 28, 2022

5.1 BHS Food Institute Patient Demographics

Before getting into the impact that the BHS Food Institute has made in the community, it is essential to understand the Food Institute patient demographic. The following graphs show nutrition assistance program participation, legally disabled status, reliable transportation, transportation type, gender, kitchen tools needed, and government health insurance holders. The majority of BHS Food Institute patients are female (74%), and have a legal disability (48%) (Figures 5 and 6). Figure 5 shows that 11% of patients were not comfortable disclosing their disability status.

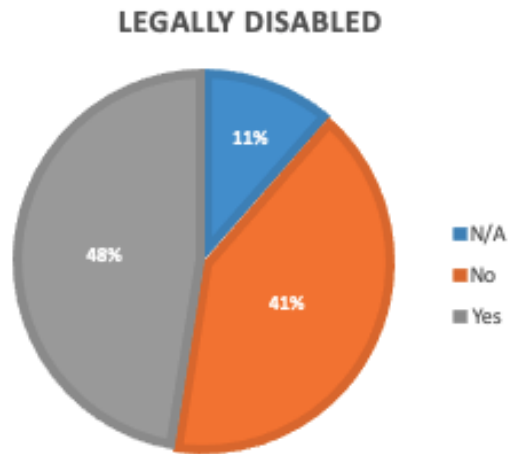


Figure 5. Patient Legal Disability Status

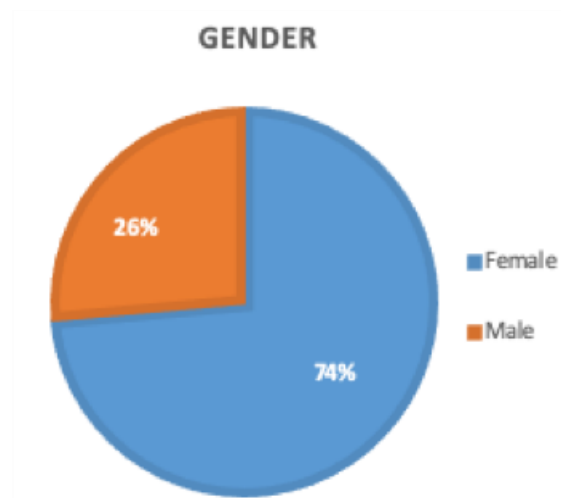


Figure 6. Patient Gender

Figure 7 shows what type of nutrition assistance programs the Food Institute patients receive. These programs include SNAP, WIC, NSBP/NSPL, and food pantries. The most utilized food assistance programs are SNAP (59.7% of patients) and food pantries (49.7% of patients). The total number of patients exceeds 159 because patients might use more than one service.

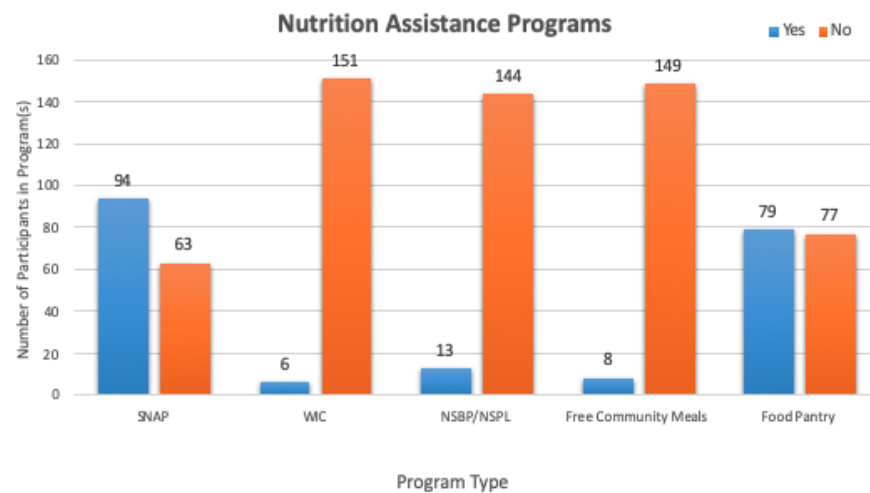


Figure 7. Nutrition Assistance Program Utilization

Figure 8 shows that 88 patients have Medicare health coverage, and 92 patients have Medicaid health coverage. The other patients may be self-insured, uninsured, or have a commercial health insurance plan. Government-based health plans cover most patients seen at the Food Institute.

The Food Institute tracked the patients' need for kitchen utensils (Figure 9) and found that 75% of the patients needed one or more kitchen utensils. The BHS Food Institute created a Utensil Drive on Amazon to support the cost through donations to keep up with the need for kitchen utensils (bowls, plates, utensils, and pots/pans). Without needed utensils, such as a can opener, patients would not be prepare the provided food.

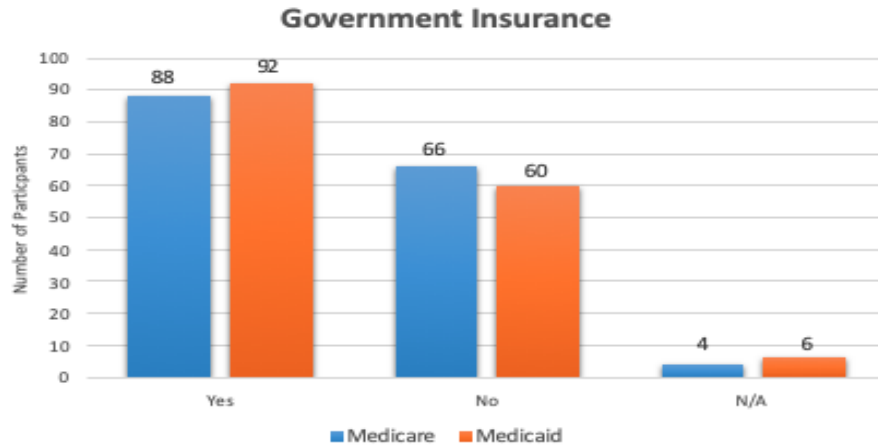


Figure 8. Covered by Government Health Insurance

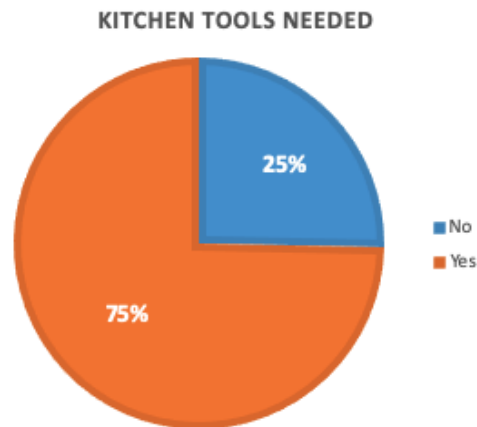


Figure 9. Kitchen Tools Needed

Figure 10 shows if the patients have a reliable mode of transportation, and Figure 11 indicates the type of transportation they use to get to and from the Food Institute. 105 people use a car and 37 utilize a friend or family member, while the others rely on public transportation or other (walking). 88% of patients have reliable transportation, while 12% do not. To conquer the barrier of transportation for patients, BHS developed a relationship with the community

organizations ANR Transportation and North Pittsburgh Air Ride. These services offer transportation to and from the Food Institute.

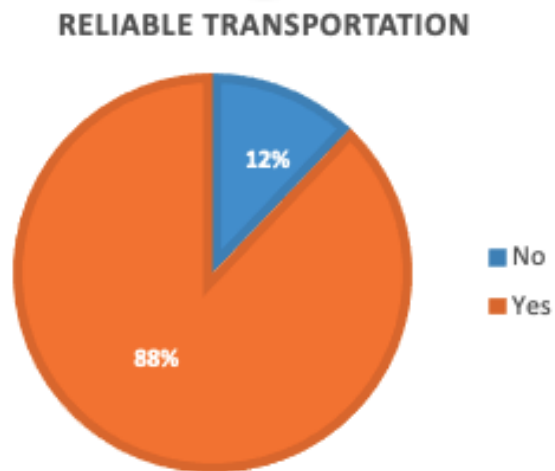


Figure 10. Reliable Transportation

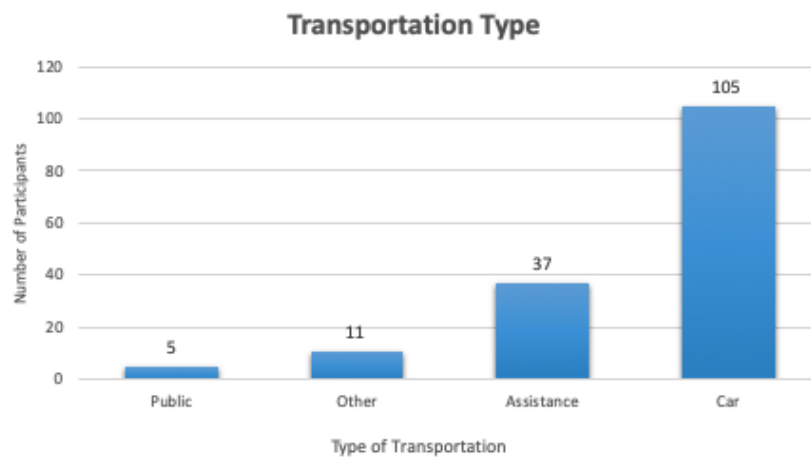


Figure 11. Types of Transportation Patients Use

5.2 BHS Food Institute Survey Results

The first administered survey was the Food Institute Initial Survey, which had 159 respondents from April 1, 2021 to February 28, 2022. This initial survey (Figure 12) shows three key findings: food/money resources, struggling with health, and nutrition knowledge. The first key finding is that most patients have difficulty sourcing healthy foods. The initial survey shows that 32% of patients cannot afford to feed themselves and/or their children healthy meals. Out of 159 individuals, 31% of individuals are worried about running out of food and 42% of individuals had to skip or cut the size of their meals because they did not have the money for food. 30% of individuals did not have enough money to eat well-balanced meals in the past twelve months. The second key finding is that the Food Institute patients have difficulty with their health, as. 60% of eligible patients struggle with their health routine, and 36% of eligible patients have trouble managing their health. Also, 56% of individuals eat when they are stressed. The last key finding is the extent of knowledge on nutrition. Out of 159 patients, 18% did not know out to prepare healthy meals and 23% were neutral. Lastly, 9% of individuals are not comfortable preparing fruits and vegetables, and 18% of patients were neutral.

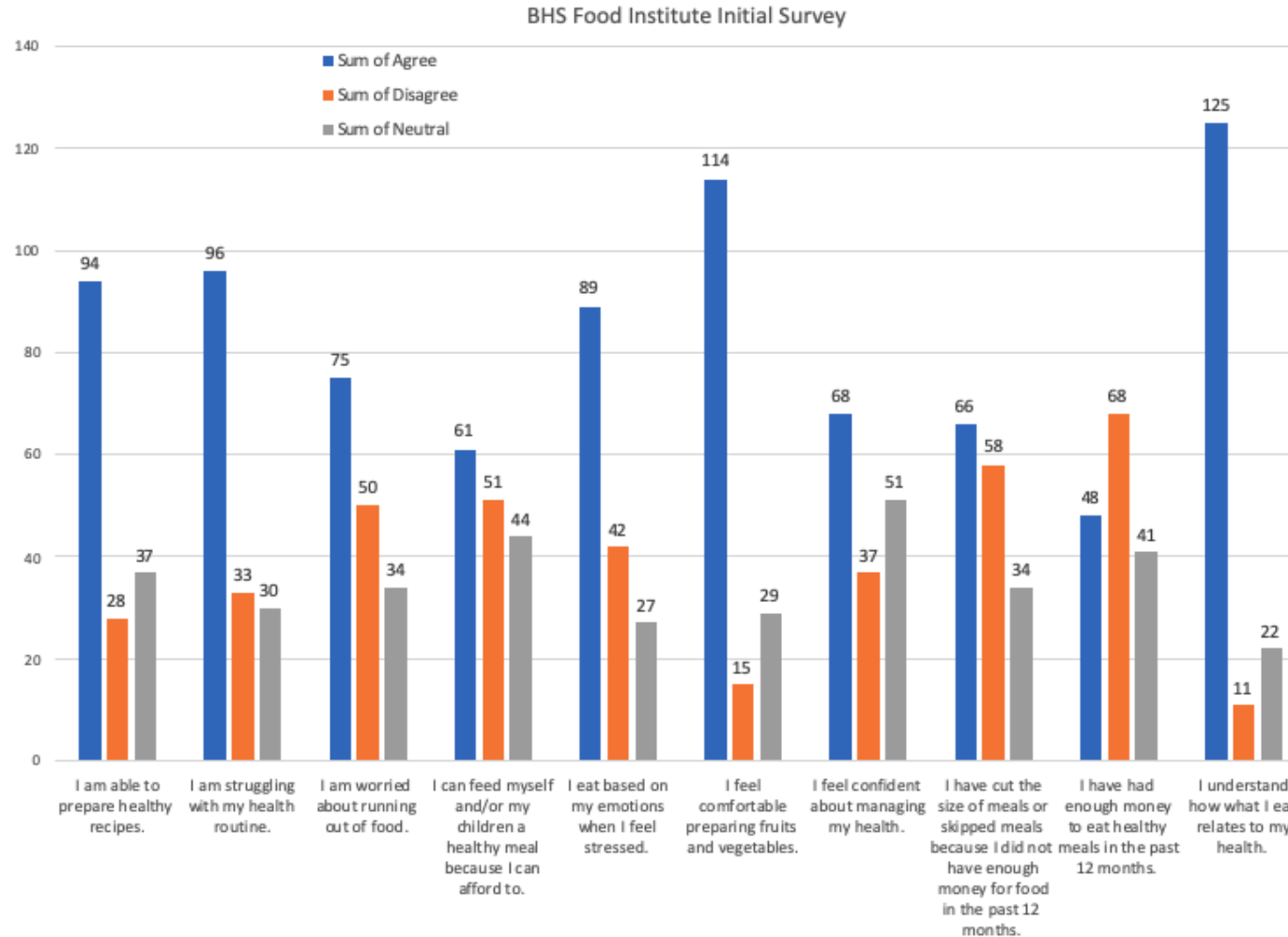


Figure 12. BHS Food Institute Initial Survey Results

During the last appointment, the patient takes a final survey to assess the program's impact. The final survey, the Food Institute 6-Month Survey (Figure 13). It is used to measure the Food Institute's performance through a series of questions created to find how beneficial the education and provided meals were. The final survey has 28 responses, indicating that 28 patients finished the Food Institute program. The results (Figure 13) show an improvement in the patients' nutrition and health knowledge.

All 28 patients had no issue preparing healthy meals, which significantly improved from the initial survey and they were more confident in managing their health and preparing fresh produce. All patients agreed that the Food Institute's services and products helped them understand how food correlates with health outcomes, and the patients were satisfied with the program. Out of 28 responses, 82% of patients saw an improvement in stress eating due to the program's efforts. It is important to note that the questions about money still saw unfavorable outcomes. Approximately, 14% of patients were still worried about running out of food and 21% of patients could not afford to feed themselves and/or their children healthy meals. The BHS Food Institute cannot solve the economic factor of food insecurity. However, they can provide patients with the skills and knowledge to support a healthier lifestyle in hopes of changing the generational eating patterns leading to decreased chronic illness in Butler County.

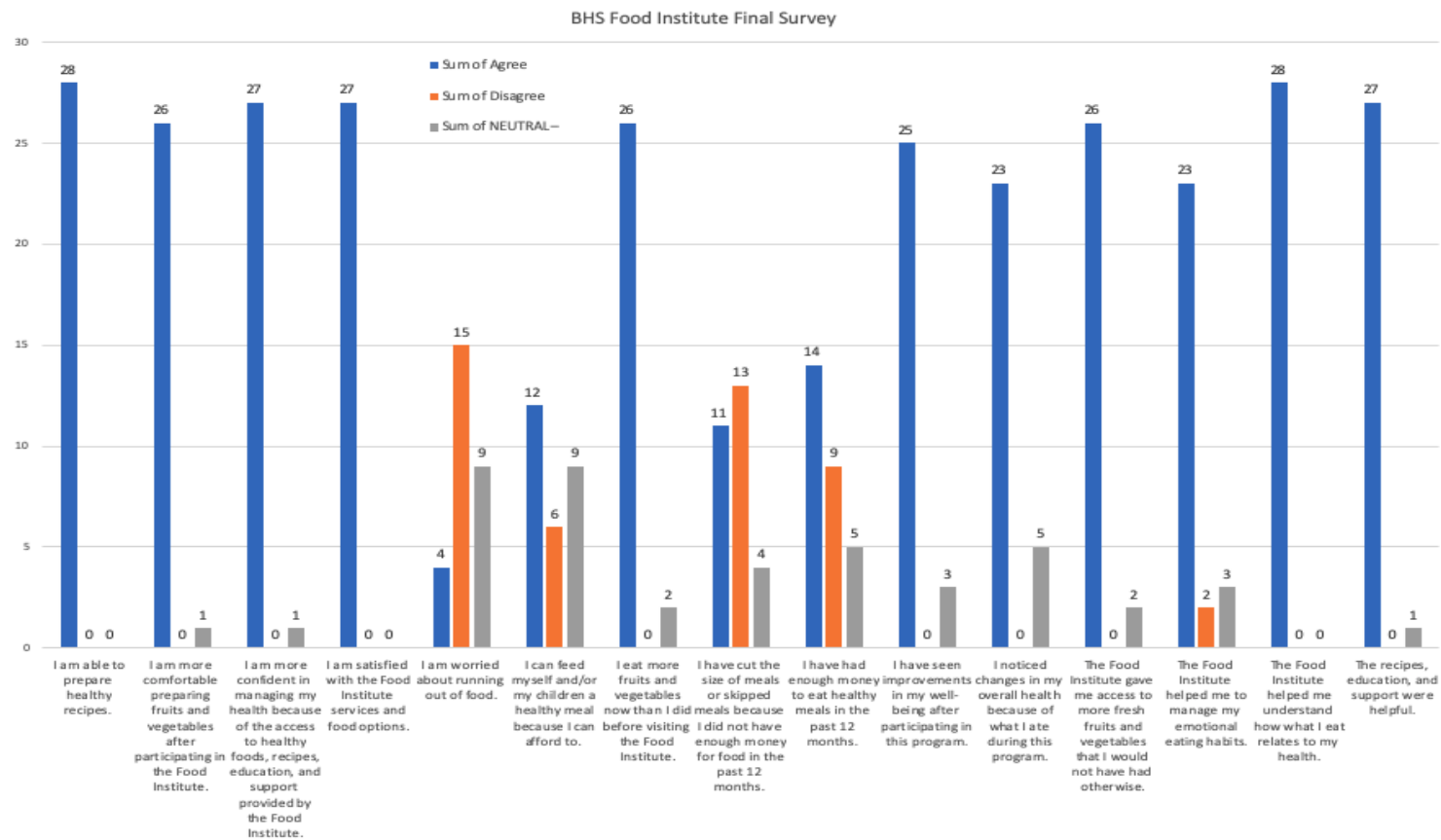


Figure 13. BHS Food Institute Final Survey Results

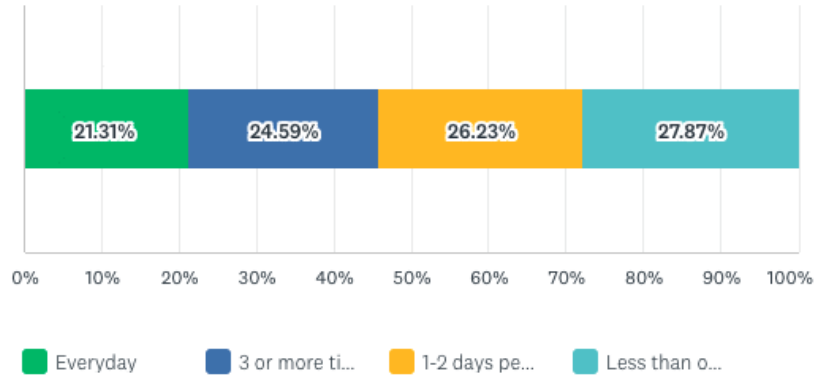


Figure 14. Initial Survey - Fruit and Vegetable Consumption

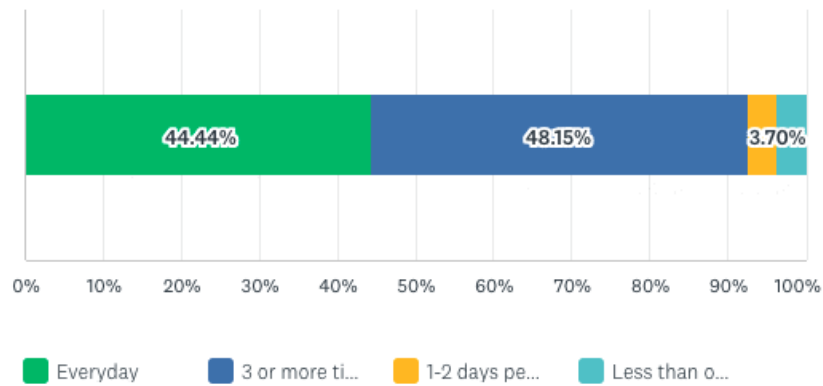


Figure 15. Final Survey - Fruit and Vegetable Consumption

Figures 14 and 15 ask, “How often do you (patient) eat five or more fruits and vegetables?” This question gets asked in both the initial and final Food Institute surveys administered. Figure 14 shows the initial survey results: 28% of patients eat fresh produce less than once a week, ~26% eat fresh produce one to two times per week, ~25% of patients eat fresh produce three or more times per week, and ~21% eat fresh produce every day. Figure 15 shows the final survey results: approximately 93% of patients eat fruits and vegetables three or more times a week and/or every day. This concludes that patients of the Food Institute increased their consumption of fresh produce after completing the program.

The final survey also asks if the patients participated in the Lifestyle Coaching classes. Approximately 38.5% of patients participated in the supplemental nutrition education classes (Figure 16). However, approximately 61.5% of patients did not participate in these classes.

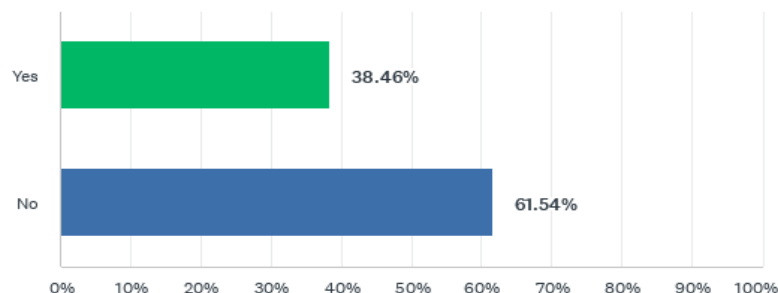


Figure 16. Final Survey - Participated in Lifestyle Coaching Classes

The last survey administered is a recurring patient satisfaction survey. The author created this survey to track food utilization and the overall patient satisfaction with the services and products that the Food Institute provides. This survey had 254 total responses, and 99.61% of patients were satisfied with the services and products provided by the BHS Food Institute (Figure 17). This overwhelmingly positive response regarding satisfaction solidifies the program's impact on the patients. Figure 18 shows that 94.12% of the patients ate most or all of the food the Food Institute provided. BHS stands by its mission of making a positive difference in people's lives – which can be seen directly through the work done within the Food Institute.

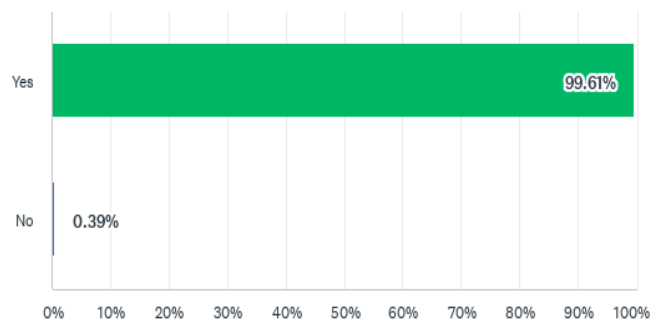


Figure 17. Patient Satisfaction Survey - Services and Products Satisfaction Rate

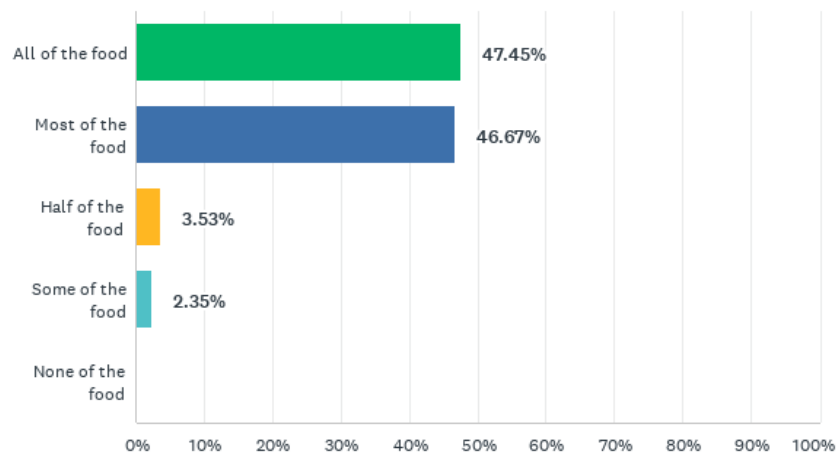


Figure 18. Patient Satisfaction Survey - Food Utilization

To understand existing food insecurity in the Butler Community, BHS formulated these three surveys. Ultimately, these questions evaluate the program's impact. Thus, allowing the BHS Food Institute Administrative Team to understand whether or not patients ended in a better place than they began in terms of knowledge, health literacy, and food insecurity. In addition, BHS can understand the basics and the complexity of food insecurity and healthy living through responses beyond the surveys. Many responses truly display the hardships and uncertainties that patients face daily. Testimonials from patients of the BHS Food Institute:

- “I was not expecting to like the recipes as much as I do. I definitely am eating more fruits and vegetables than I ever have before.”
- “I was drinking a 6 pack of the big (16.9 fl oz) Pepsis a day but now I am down to one small (7.5 fl oz) can a day. Now I'm mostly drinking water and tea without any sugar, just lemon.”
- “My sugar is down to 250 after just a few days of eating the recipes. I can't remember the last time my sugar was below 300”
- “I had my A1C checked this month and for the first time ever it was below 7. Before I started coming to the Food Institute four months ago it was 9.5. Now its 6.3.”

- “Coming in for the monthly visits and doing the zoom classes (lifestyle coaching) has really kept me on track. I can definitely tell that I have more energy and am feeling better than I ever have”
- “3 months in and I already lost 20 pounds, My A1C went from 11.6 to 6.5, and no longer considered diabetic and off diabetic medication. My blood pressure and cholesterol are better than before!”
- “I was very worried about not having enough food to get by. This definitely made me feel better and made me not worry about food for a bit. Thank you so much, you have no idea how much this is actually helping me”
- “I have found that using these recipes has made a difference in my glucose readings.”
- “I have started using skim milk instead of whole milk and I haven’t missed whole milk at all”
- “I have lost ten pounds and have stopped eating Wendy’s French fries every day.”

These testimonies represent the voices of a large portion of the population and their lack of access to healthy, affordable meals. Ultimately, knowing barriers, such as lack of access to safe and affordable food, allows BHS to alleviate those barriers so those individuals in the community can achieve and maintain a healthy.

6.0 Discussion

BHS started the BHS Food Institute in April 2021 to address the food insecurity issues within Butler County. Through a series of surveys, BHS received feedback on the offerings of the Food Institute and the barriers that still exist regarding transportation and accessing the Food Institute. The survey questions show the impact that the Food Institute has on the patients' lives. The offerings of the program allow for most patients to:

- Understand the impacts of what they eat and how it impacts their health
- Prepare healthy recipes
- Become comfortably preparing fruits and vegetables after participation in the program
- Access to more fresh fruits and vegetables
- Change in overall health, with an improvement in well-being
- Recipes, educatory materials, and support to maintain a healthy lifestyle
- Confidence in managing health and emotional eating

As SDOH initiatives are relatively new to health systems and similar organizations, best practices are emerging. The BHS Food Institute was and continues to be an investment for the health system. A project of this size needs to be operationalized accordingly. One best practice identified by the BHS Food Institute Administrative Team is to conduct a community health needs assessment (CHNA) (Heath, 2019). A CHNA allows an organization to dive deeper into the social determinants of health and see what the community needs. This assessment finds the gaps and barriers in resources and services through surveys, focus groups, and other readily available data (EHR). Once identifying the gaps and barriers, remediation plans are made and are put into action, then reassessed in three years. BHS conducted a CHNA in 2019 and found that food insecurity, health education, and chronic illness were key issues within Butler County, which ultimately led to the creation of the BHS Food Institute and the expansion of lifestyle coaching classes.

Another best practice for an SDOH initiative that the BHS Food Institute Administrative Team identified is to have positive relationships with local community members and organizations, which BHS and the Food Institute demonstrate throughout developing and operating the program (Heath, 2019). Having strong relationships with community leaders and organizations can provide resources to the SDOH program, making them more efficient and credible. BHS is a well-connected organization, and they can use their partnerships to benefit Butler residents and patients of the Food Institute to start closing the gaps in food insecurity.

The lifestyle coaching classes are well received within the community by all stakeholders. They have made a significant contribution to educating more community members on health and nutrition to close the gap in access and nutrition education. Butler County schools and churches are the BHS Food Institute's most impactful partnerships to spread awareness and education that BHS is here to help their community and improve their quality of life. Table 5 shows the community partnerships BHS and BHS Food Institute have developed to bring SDOH to the forefront and solve the health disparities within the community. The goal of BHS is to expand these services to more community members. BHS Food Institute will reach more food-insecure people with continued support from current and future community organizations.

Table 4. BHS Food Institute Partnerships with Community Organizations

Community Organization	Relationship with BHS Food Institute
Butler County Community Resources	Social Worker/Case Management
ANR Transportation	Offers transportation to patients in need to get to and from appointment
North Pittsburgh Air Ride	Offers transportation to patients in need to get to and from appointment
Pittsburgh Food Bank	Thrive Boxes: healthy food options
Butler Food Bank	Offer assistance and provides food to community members
Churches: Covenant Presbyterian Church	Hybrid Lifestyle Coaching and Nutrition Education and Food Bank
Butler Area School District	Lifestyle Coaching Classes and Nutrition Education
ACT Team (Mental Health)	Offer referral to qualifying mentally ill community members
Jean Purvis Community Center (Free Clinic)	Offer services and potential referrals
Slippery Rock University	Grant Writing, Student Engagement, and VISTA Program

7.0 Next Steps

The second phase of the BHS Food Institute is to expand the same products and services into Clarion County at Clarion Hospital. Clarion County sees similar SDOH issues proportional to Butler County. However, since Clarion County is more rural than Butler County, the community members are more susceptible to food insecurity and the challenges that come along with it. The poverty rate in Clarion County is 30.6%, which is substantially higher than the national average (11.4%), and Butler County (7.4%) (Census place, 2019). In addition, the food insecurity rate in Clarion County is 13.3%, and the food insecurity prevalence among children is 17.4% (Counties, 2021). Due to these high rates of food insecurity, Clarion County would benefit from a Food Institute. The BHS Food Institute 2.0 is currently under construction and is funded through grants and donations to the health system to mitigate food insecurity and other SDOH issues. BHS Food Institute in Clarion will hold appointments, food demonstrations, and lifestyle coaching classes similar to the original program..

Once COVID-19 hospital restrictions are lifted or become more lenient, the BHS Food Institute will initiate group classes in-person at the Food Institute(s). These classes will offer more in-depth nutrition education and provide food demonstrations and health management courses. The Food Institute is creating this group class offering after finding the extensive need and interest for its services. Past Food Institute patients enjoyed their experience with the BHS Food Institute, and they want to continue being a participant in the program to learn more about health management and nutrition. The BHS Food Institute and its dedicated team are starting to change its community members' health behaviors and attitudes towards nutrition to secure a healthier Butler County for future generations.

8.0 Recommendations to Enhance the Current Program

The BHS Food Institute is constantly thinking of new ways to improve and expand the program. By utilizing the intake form and the three surveys (initial, final, and patient satisfaction given by the Nutrition Liaison during the patients' appointments), the BHS Food Institute administrative team and author came up with several recommendations to enhance the current program. Recommendations include hiring more employees, securing more funding through grants and reimbursement, tracking biometric measures of patients, and expanding the services to all community members.

Increasing the number of employees who work in the BHS Food Institute will allow BHS to see more food insecure patients. The Food Institute has two full-time employees and three if counting the Chief Community Health Officer. However, among those three employees, there is only one nutrition liaison. This essential person is the one that can provide patients with nutrition counseling. Due to patient volume, it would be beneficial to employ another Nutrition Liaison. Currently, a social worker from Butler County Community Resources assists patients who need extra help outside of food insecurity issues, such as housing, transportation, employment, and other healthcare-related services. After discovering this need, it would be beneficial to implement a full-time social worker within the department to deal with disparity issues outside of the food insecurity scope. BHS and the Food Institute will need to secure more funding to hire more employees for the Food Institute.

Another recommendation for the BHS Food Institute is to apply for more grants and secure referral reimbursement. Receiving grants will increase the Food Institute's financial means, thus allowing it to open the doors to more possibilities, such as staff, food, nutrition education, and

kitchen supplies; therefore, increasing the number of people BHS can serve. However, employee bandwidth is spread thin, hindering the expansion opportunity. Therefore, this program must find additional funding to hire more employees to continue expanding the program.

Securing financial reimbursement for the referrals will help alleviate the financial burden that products and services place on BHS. Partnering up with a health plan, such as UPMC Health Plan, can pay for its patients to come to the Food Institute. The Food Institute would benefit from a health plan partnership because it will also lower its costs due to the lower utilization of health services. The Food Institute will need to collect data on how many patients within their health plan are utilizing this program and their health outcomes after six months to secure the partnership. This partnership will take time as the BHS Food Institute does not currently have a year's worth of data. The data will need to show improvements in the patients' biometric data to make it worthwhile for UPMC Health Plan or other health plans.

To prove the quality of results, the Food Institute will need to start tracking biometric data from the patients. Biometric measures BHS should collect are blood pressure, cholesterol, BMI, HbA1C, and weight. BHS has the data available to them, but again it comes down to the employees' bandwidth, which BHS does not currently possess. This data will not only increase credibility, it will also assist BHS in its efforts to secure more funding. If the biometric data shows a positive impact on the patients' health, it will enable BHS to receive more money through grants and partnerships, allowing the Food Institute to expand its outreach within the community.

Expansion of the BHS Food Institute's services to all community members, not just BHS patients, will increase access to necessary resources that will allow improvements in their mental and physical well-being. A long-term goal of BHS is to expand the availability of this program to a larger population to continue its efforts in mitigating food insecurity. Securing partnerships with

key players in the community will be necessary to acquire the resources to make this change possible.

9.0 Conclusion

While the last two years have yielded so many uncertainties due to the novel coronavirus, BHS has sought to provide at least one certainty to the people of Butler – the ability to obtain a better lifestyle through coaching and other significant tools to increase their knowledge on nutrition to become food secure. The Food Institute was designed and opened to aid in alleviating food insecurity within the Butler community, a community they have served for over a century and a place near and dear to BHS. Food Insecurity is a significant public health issue that affects many households across the United States because of the negative health outcomes and quality of life associated with it. Hospital-based nutrition assistance programs are still relatively new, but hopefully, in the future, more healthcare organizations will adopt this model of care to alleviate this public health crisis by increasing access to healthy foods to improve their community's quality of life.

While still in the very early stages of its life, the BHS Food Institute has made a tremendous impact on the Butler community. The Food Institute aims to provide members of the community who suffer from food insecurity with nutrition education and access to healthy foods to develop and maintain a healthier lifestyle. The survey results prove that the BHS Food Institute has a positive impact on the community regarding food insecurity. As BHS continues to collect more data, it is the hope that food insecurity decreases within Butler County, as well as chronic illnesses of its residents.

The BHS Food Institute has provided a sense of relief to the community through lifestyle coaching, nutrition and health education, and advocacy. The future of the Food Institute is

expanding as BHS has received positive feedback from the community's stakeholders and patients in a short timeframe. BHS Food Institute seeks to improve the Social Determinants of Health to create an overall healthier community by first tackling food insecurity and the issues associated in hopes to create a domino effect that will subsequently lead to a healthier population. BHS will continue to recommend and provide continuing education and advocate for a vulnerable population that faces many barriers and lacks access to many necessities of life. BHS Food Institute strives to improve the health status of its people generationally and serve as a model for other communities, health systems, and hospitals around the country that have food deserts, a high prevalence of food insecurity, and poor health.

Appendix A Methodology – Initial Survey Questions

1. Are you wanting to participate in the Lifestyle Coaching classes while in the program?
2. How often do you eat 5 or more fruits and vegetables?
3. Please select if you disagree or agree with the following statements.
 - A. I have had enough money to eat healthy meals in the past 12 months.
 - B. I have cut the size of my meals or skipped meals because I did not have enough money for food in the past 12 months.
 - C. I can feed myself and/or my children a healthy meal because I can afford to.
 - D. I understand how what I eat relates to my health.
 - E. I feel confident about managing my health.
 - F. I am able to prepare healthy recipes.
 - G. I feel comfortable preparing fruits and vegetables.
 - H. I am worried about running out of food.
 - I. I am struggling with my health routine.
 - J. I eat based on my emotions when I feel stressed.

Appendix B Methodology – Final Survey Questions

APPENDIX A Did you participate in the Lifestyle Coaching classes while you were in this program?

APPENDIX B How often do you eat 5 or more fruits and vegetables?

APPENDIX C Please select if you disagree or agree with the following statements.

- A. I have had enough money to eat healthy meals in the past 12 months.
- B. I have cut the size of my meals or skipped meals because I did not have enough money for food in the past 12 months.
- C. I can feed myself and/or my children a healthy meal because I can afford to.
- D. The Food Institute helped me understand how what I eat relates to my health.
- E. I am able to prepare healthy recipes.
- F. I am more comfortable preparing fruits and vegetables after participating in the Food Institute.
- G. The Food Institute gave me access to more fresh fruits and vegetables that I would not have had otherwise.
- H. I eat more fruits and vegetables now than I did before visiting the Food Institute.
- I. I noticed changes in my overall health because of what I ate during this program.
- J. The recipes, education, and support were helpful.
- K. I have seen improvements in my well-being after participating in this program.
- L. I am more confident in managing my health because of the access to healthy foods, recipes, education, and support provided by the Food Institute.
- M. I am worried about running out of food.
- N. The Food Institute helped me manage my emotional eating habits.
- O. I am satisfied with the Food Institute services and food options.

APPENDIX D How has the Food Institute helped you?

APPENDIX E What can we improve about the Food Institute?

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