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Food Insecurity in Collegiate Athletes During the COVID-19 Pandemic

By

Elizabeth Claire Swindell

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

University, MS

March 2022

Approved By

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## DEDICATION

I would like to thank my advisor, Dr. Valliant, for helping me grow as a student, researcher, and person. I would also like to thank my parents for always supporting me.

## ACKNOWLEDGEMENTS

I would like to thank Dr. Valliant for all her support and encouragement during this process. I would like to thank Morgan Delventhal for sharing her data with me and allowing me to do this investigation. I would also like to thank the committee for all the feedback and dedication in completing this project. Finally, I would like to thank my family and friends for all the encouragement they gave me and the confidence they have had in me through this process.

## ABSTRACT

A study done by Georgetown University in 2019 found that one-fourth of NCAA, D1 collegiate athletes experience food insecurity. The study purpose was to examine food security levels in student athletes at a southern university and the impact of the COVID-19 pandemic on food security in these students. A survey was completed by student athletes to determine their food security levels during the 2020 academic year at the onset of the COVID-19 pandemic. The survey included questions relating to food security based on the USDA's food insecurity module as well as questions specifically related to the impact of food security as a result of the COVID-19 pandemic. Findings from 218 athletes suggest that the average number of athletes experiencing food insecurity was 16% in the 2020 survey. Approximately 43% of the total number of athletes completing the survey reported food insecurity related to the COVID-19 pandemic. These results suggest that colleges should screen for the food security status of athletes in order to be able to better provide programming, resources, and other forms of aid.

## PREFACE

This investigation observed the prevalence of food insecurity and the relationship between food insecurity and the COVID-19 pandemic among student athletes at a southern university.

## TABLE OF CONTENTS

LIST OF FIGURES	8
LIST OF TABLES	9
LIST OF ABBREVIATIONS	10
CHAPTER 1	11
CHAPTER 2	14
CHAPTER 3	28
CHAPTER 4	31
CHAPTER 5	39
REFERENCES	43
APPENDIX A: Food Security Survey Questions 2019-2020	52

## LIST OF FIGURES

Figure 1: Levels of Food Security (Feeding America, 2019)	15
Figure 2: Map of Mississippi Counties in the Appalachian Region	18
Figure 3: Map of Mississippi Delta Region Counties (Strait, J., 2020)	19
Figure 4: Map of prevalence of states being affected by food insecurity	20
Figure 5: United States Employment Graph Sept 2010-Sept 2020 via US Department of Labor Services	25

## LIST OF TABLES

Table 1: Responses and Percentages for Question 1.1 and 1.2	31
Table 2: Responses and Percentages for Question 2.1 and 2.2 with Correlation to Question 1.1	33
Table 3: Responses and Percentages for Question 1.1 with Correlation to Question 3.1	34
Table 4: Responses and Percentages for Question 3.1 and 3.2 with Correlation to Question 2.1	35
Table 5: Responses and Percentages for Question 4.1 and 4.2 with Correlation to Question 1.1, 3.1, and 2.1	37

## LIST OF ABBREVIATIONS

NCAA	National Collegiate Athletic Association
COVID-19	Coronavirus Disease 2019
USDA	United States Department of Agriculture
ARC	Appalachian Regional Commission
CSP-FSS	Current Population Survey Food Security Supplement
CDC	Center for Disease Control
D1	Division 1
IRB	Institutional Review Board
MS	Mississippi

## CHAPTER I. INTRODUCTION

The USDA defines food security as “...no reported indications of food-access problems or limitations” (USDA, 2021). Furthermore, the USDA defines food insecurity as “...household-level economic and social condition of limited or uncertain access to adequate food” (USDA, 2021). Prior to the pandemic, food insecurity was on a steady decline for the past ten years. (USDA, 2021) . A potential factor for food insecurity is social capital (Paul, C.J., et. al, 2019). Food insecurity can range from an individual or household having no access to food to an individual or household having to share food amongst members of the household and everywhere in between. Furthermore, food insecurity can look like not knowing where the next meal will come from, not having enough money to pay for food, and/or not being able to afford adequate nutritious food.

The Coronavirus 19 (COVID-19) pandemic is due to “...an infectious disease caused by the SARS-CoV-2 virus” (WHO, 2021). The COVID-19 pandemic began in late 2019 and by March of 2020 the disease had spread worldwide. The effects of this disease both in the United States and the rest of the world were devastating and included social capital impacts, economic downturns, and increases in food insecurity. People’s daily lives were greatly restricted in an attempt to decrease the spread of COVID-19. Colleges and universities tried to do their part in decreasing the spread of the disease. For example, at most southern universities, all students were sent home to complete the rest of the semester online midway through March of 2020.

One of the most food insecure regions, which is home to many “at risk” counties, is the Appalachian region. (ARC, 2021). Many of the university’s students are located in the Appalachian region and were at risk to be affected by food insecurity due to the pandemic. Additionally, the Delta, located in the Northwest region of the state of Mississippi, is an area of concern when it comes to food insecurity as well. Both of these regions are home to many of the university’s collegiate athletes.

One population affected by the pandemic and food insecurity, yet not typically acknowledged or discussed, is student athletes. Many student athletes are from “at risk” areas, such as areas with high food insecurity, poverty rates or unemployment. These athletes are susceptible to food insecurity just like every other student despite glamor and intrigue surrounding the college sports community. Many of these athletes come from food insecure backgrounds as evidenced by previous data collected during the Pre-Participation Physicals prior to the COVID-19 pandemic. The Pre-Participation Physical is a survey required for all athletes at this university and must be completed in order to be eligible to participate in their sport. According to Poll and colleagues, this survey has proven vital in identifying potential nutrition issues (Poll, K. L., et al, 2018). It contains information related to the diets of athletes that can help identify nutrition struggles such as food insecurity status, disordered eating, and other medical and nutritional risks. Athletes often rely on their pre-paid meal plan provided by their school to consume adequate energy for their sport.

Due to the COVID-19 pandemic, all students and athletes were sent home five weeks into the semester to households who may have been unprepared to purchase adequate foods for an additional person. The prevalence of food insecurity among athletes may be related to recommendations of weight gain from dietitians that households cannot financially support, an

increase in food quantity needed, lack of snacks and supplements that were provided on campus, or the lack of a meal plan which provided a means for regular meal consumption as these scenarios all require an increase in food costs for the individual or family of the athlete which may make it more difficult to afford.

The study purpose was to identify the effect that the COVID-19 pandemic had on food insecurity in athletes at the collegiate level. This is important because it is directly related to the health of these athletes. The survey used in this study determined whether food insecurity was prevalent during the COVID-19 pandemic in college athletes.

## CHAPTER II. REVIEW OF LITERATURE

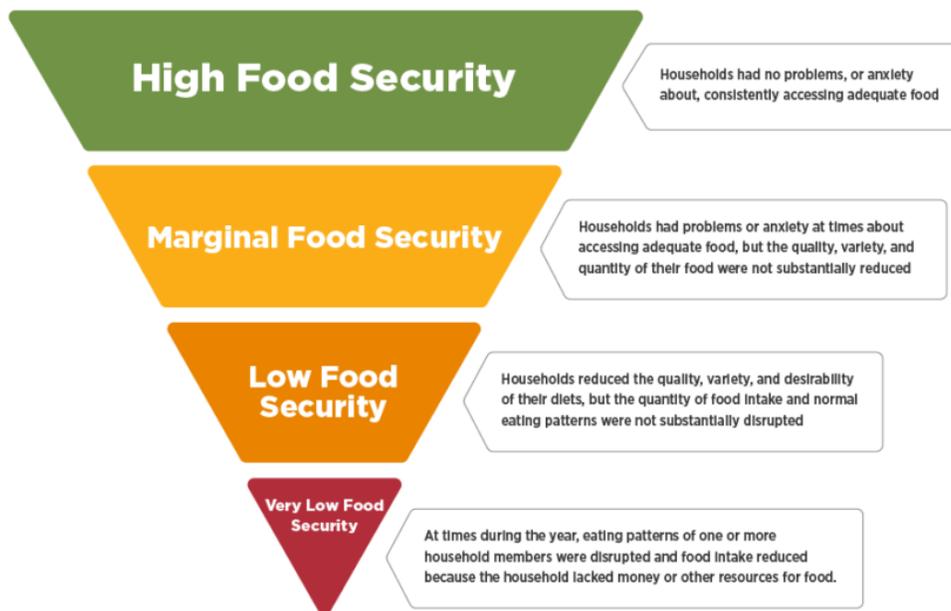
The purpose of this review of literature is to summarize the literature as it relates to food security, food insecurity causes, the COVID-19 pandemic, and the effects of the COVID-19 pandemic on food security in division 1 collegiate athletes.

### **Food Security and Food Insecurity**

#### **Definitions**

The United States Department of Agriculture (USDA) recognizes food insecurity and food security as “a household-level economic and social condition of limited or uncertain access to adequate food” and “access by all members, at all times, to enough food for an active, healthy life”, respectively (Coleman-Jensen, Rabbitt, Hales, & Gregory, 2021). Food security and food insecurity are measured in the same way and represent opposite ends of the spectrum. There are four levels of food security: high food security, marginal food security, low food security, and very low food security (Feeding America, 2019). The characteristics of each level are stated below in Figure 1.

Additionally, an individual may be food secure but live with a member of their family, such as a sibling or parent, who is not fully food secure. If anyone in the household experiences food insecurity, the household is considered not fully food secure.



Source: Adapted from the USDA Economic Research Service.

Figure 1: Levels of Food Security (Feeding America, 2019)

### Food Security in the United States

In 2020, the United States had an estimated 10.5%, or roughly 13.8 million, households experiencing food insecurity, which is the same as the percentages and household numbers from 2019. (USDA, 2019 and 2020). While the numbers have not yet been recorded for 2021, food insecurity is expected to be up to 19.4%, an increase of 8.9% since 2020 (USDA, 2021). The food insecure percentages include households with low food security and very low food security (USDA, 2021). These percentages are shown, in comparison, in Figure 3. With the exception of the 2008 recession, food insecurity has been decreasing for the twenty years prior to COVID-19 from 1995 until 2019 (USDA, 2021). The states with the highest levels of projected overall food insecurity for 2021 include Mississippi, Arkansas, and Louisiana in that order, while the states

with the lowest food insecurity include North Dakota, Minnesota, and Iowa in that order (Feeding America, 2021). Differences in prevalence of food insecurity by state is represented in Figure 4.

### **Food Security in Mississippi**

This literature review focuses on the state of Mississippi and Appalachia's food insecurity statistics for the purposes of this study. The reason for the focus on the state of Mississippi is because of the university's location (Oxford, Mississippi) and because 87 out of 308 students currently enrolled as student athletes report being from Mississippi upon their entry to college according to the university's athlete report. Similarly, the focus on the Appalachian region is due to the 86, of the 308, additional students that report their hometown being in a state that is part of the Appalachian region. The Appalachian region of the United States is known for its low food security levels. Appalachia spans thirteen states, including Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia, and encompasses 413 counties, twenty-four of which are located in Mississippi (ARC, 2021). The state of Mississippi falls into the southern sub region, designated by the Appalachian Regional Commission (ARC), of Appalachia and has many counties all of which rank as either "distressed", "at risk", or "transitional" for food insecurity according to the ARC and as seen in Figure 2 (2021). United States counties located in the Appalachian region receive a classification from the ARC which can be either distressed, at-risk, transitional, competitive, or attainment (ARC, 2021). These are also shown in Figure 2. Mississippi has a total of nineteen counties considered "at-risk" or worse by the ARC (2021). Also in the state of Mississippi is the farming region known as the Mississippi Delta, which is known to have higher levels of food insecurity compared to other regions of the state (Stuff, et.

al, 2004). The Delta includes many rural counties in the Northwest region of Mississippi as shown in Figure 2 below. The Delta includes the Bolivar, Carroll, Coahoma, DeSoto, Holmes, Humphreys, Issaquena, Leflore, Panola, Quitman, Sharkey, Sunflower, Tallahatchie, Tate, Tunica, Warren, Washington, and Yazoo counties. This region is included due to its close proximity to the university and the 11, out of the 308, of student athletes in Mississippi that are from this region. Mississippi currently ranks as the number one state for prevalence in food insecurity with an average percentage of 18.7% projected for overall food insecurity in 2021 according to Feeding America. Other states towards the bottom of the food insecurity prevalence list see a food insecurity percentage of 10% or lower on average (Feeding America, 2021).

Even outside of both of these regions, the state of Mississippi has many other counties that are classified as suffering from food insecurity as well (Haggard, R., 2017).

## County Economic Status in Appalachian Mississippi, Fiscal Year 2022

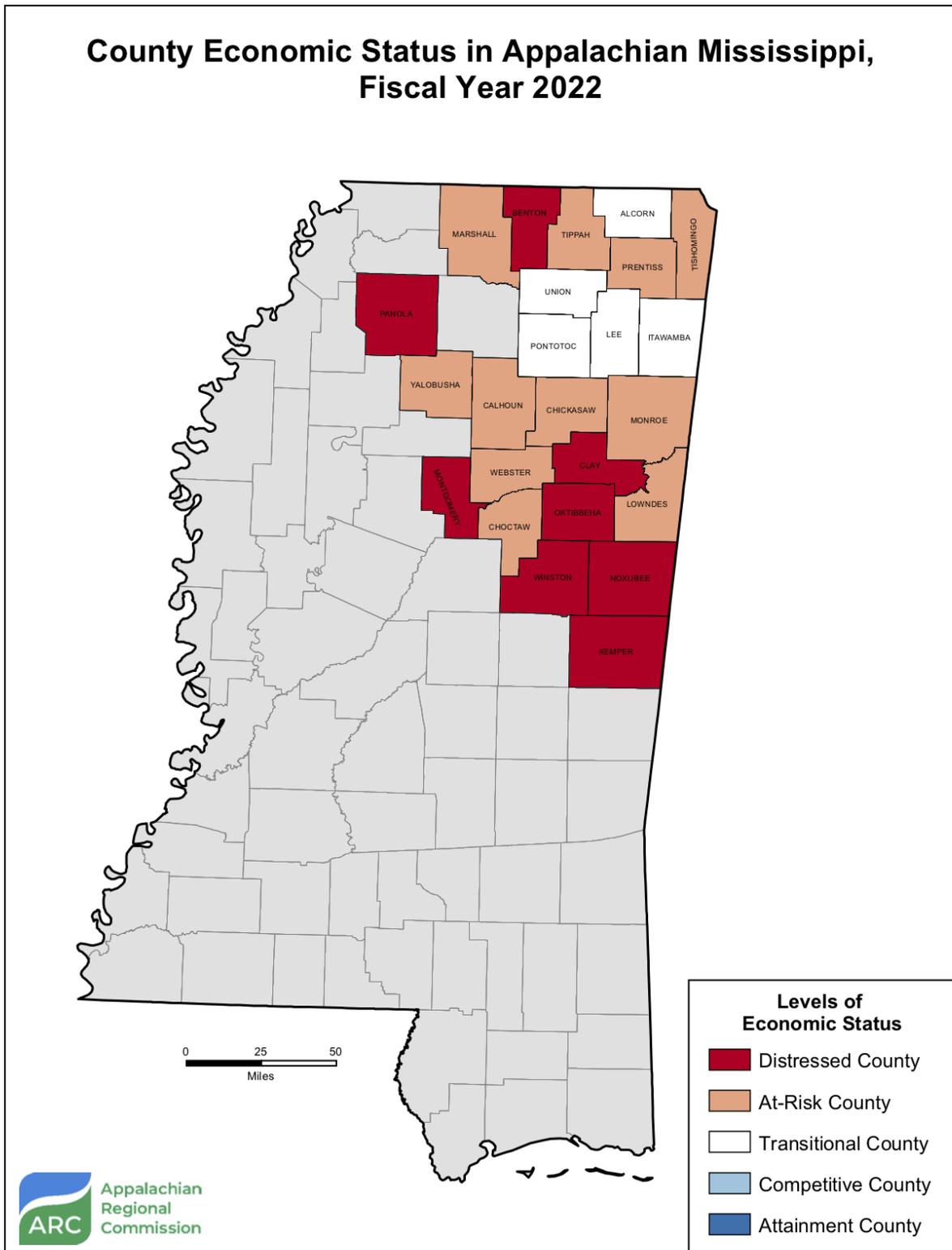


Figure 2: Map of Mississippi Counties in the Appalachian Region

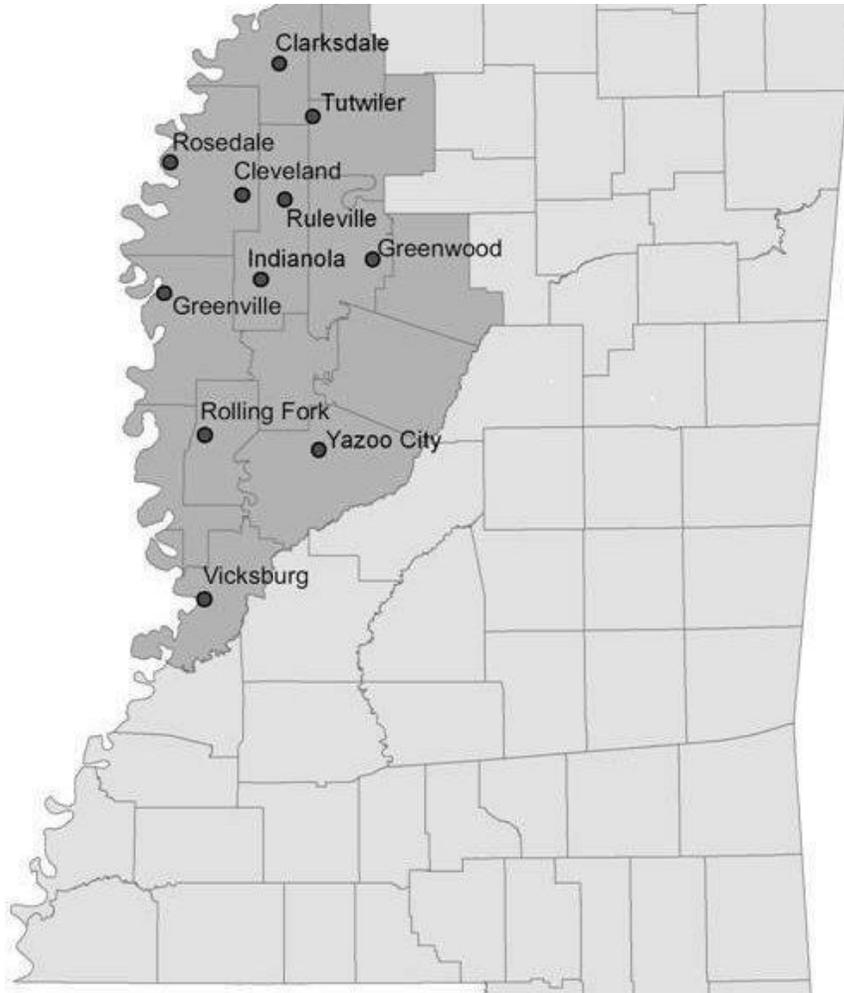
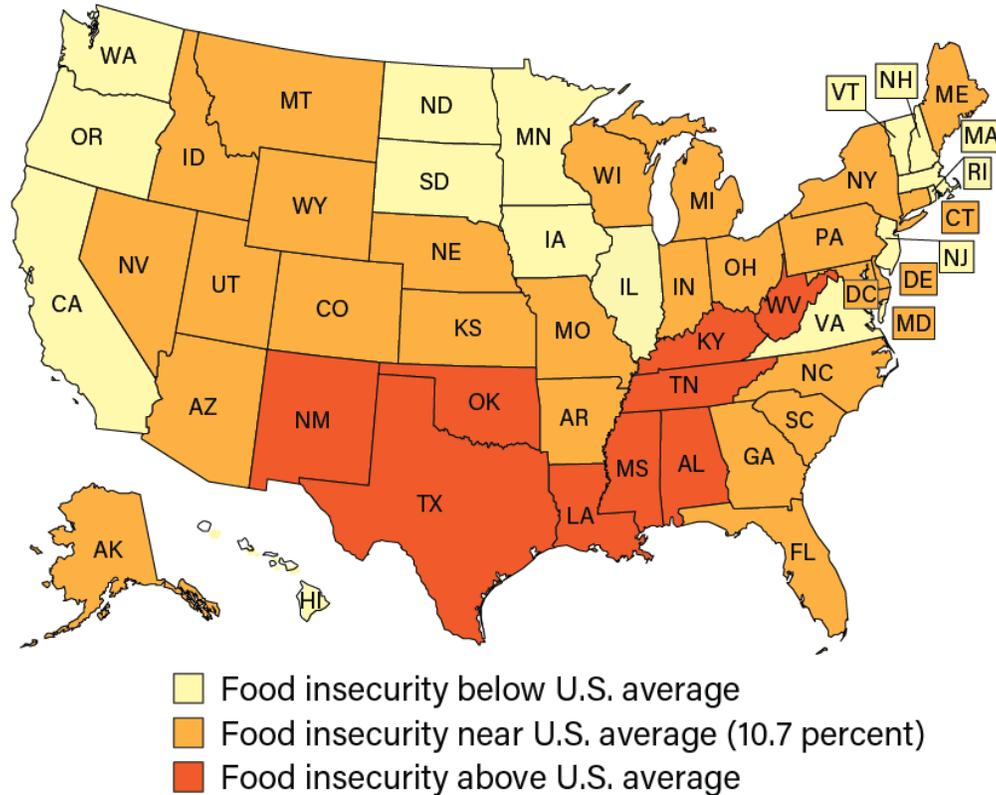


Figure 3: Map of Mississippi Delta Region Counties (Strait, J., 2020)

## Prevalence of food insecurity, average 2018–20



Source: USDA, Economic Research Service using data from the December 2018, 2019, and 2020 Current Population Survey Food Security Supplements, U.S. Census Bureau.

Figure 4: Map of prevalence of states being affected by food insecurity

### Measurements

On a national level, food insecurity and food security are measured using the same instruments from the USDA module. For U.S. households, food security, or lack thereof, is determined based on the results of the Current Population Survey Food Security Supplement (CSP-FSS) which is conducted annually (USDA, 2020). The survey has two portions: one for households with children and one for households without children (USDA, 2020). Both portions have multiple questions used to determine which category (high food security, marginal food security, low food security, and very low food security) a household falls into (USDA, 2020).

The results of the CSP-FSS, combined with the results of a survey measuring social cohesion or social capital, will determine the relationship between the two.

### **Social Capital and Food Security**

Social capital is defined as “networks together with shared norms, values and understandings that facilitate co-operation within or among groups” by the Organization for Economic Co-Operation and Development (OECD, 2021). Examples of social capital may be access to transportation, ability to maintain a job position, or the ability to utilize friends and family for favors or errands. Healthy People 2030 defines social cohesion as “strength of relationships and the sense of solidarity among members of a community” (Healthy People, 2021). Social cohesion leads to social capital. Examples of social cohesion may be how well adjusted an individual feels in their neighborhood or how comfortable is with their socioeconomic status.

Social capital has the potential to change when athletes go from college to their hometowns and vice versa. While athletes may be accustomed to being able to walk to practice, utilize their specific meal plan for meal purchase, and have many teammates to rely on campus, they might lack a car, or friends and family for support and have to adjust to a inadequate diet while at home.

### **Psychological Consequences of Food Insecurity**

If individuals live in a house experiencing any level of food insecurity, household members receiving more of their nutritional needs than other members may feel guilt. Individuals may sacrifice their personal food security to share with siblings, parents, or other members of the household by accepting less food than needed to meet their nutritional needs. An

example of this may be a mother giving their children more food than they give themselves or an older sibling giving up a meal so that a younger sibling can have more food.

Additionally, food insecurity may lead to bullying in schools. If a child must arrive at school early to receive free breakfast or stay after to receive free dinner, peers may begin to notice and react negatively.

### **Food Insecurity in College Students**

A study completed by Pamela Misener in 2020 found that, on average, approximately 33% of university students experience food insecurity. Additionally, 129 of 150 food banks polled were working directly with college students to assist with food insecurity (Feeding America, 2021). Feeding America has begun to investigate and assist with food insecurity in college students as it seems to be an increasing issue.

It has been established that food insecurity in college students is an existing problem among most universities in the U. S.. El Zein, A., et al concluded that food insecurity in collegiate students is “high” across a variety of universities in or around the Appalachian region and, therefore, this university (2019).

### **Food Insecurity in Collegiate Athletes**

Georgetown University states that approximately one-fourth of all NCAA, division 1 (D1) college athletes were experiencing food insecurity in 2019. Similarly, the Misener study found that 29% of college athletes experience food insecurity (2020). Misener also found that 21 out of 22 athletic teams at these colleges had at least one player who was experiencing food insecurity (Misener, 2020).

Food insecurity in student athletes may lead to severe nutritional risks and deficiencies. Collegiate athletes are usually following a strict training schedule that requires an adequate

amount of macro and micro nutrients (Searles, 2020). For the average student, these amounts of needed nutrients may be difficult to attain and are only made more difficult when an athlete is experiencing food insecurity as well.

## **COVID-19 Impact**

### **Definitions**

The Coronavirus pandemic, known more commonly as COVID-19, is “...an infectious disease caused by the SARS-CoV-2 virus” (WHO, 2021). The most common symptoms associated with the virus are a cough, shortness of breath, headache, and fever. COVID-19 is very contagious and affects its victims to varying degrees (WHO, 2021). College students and younger individuals typically have fewer severe cases than elderly and immunocompromised patients (WHO, 2021). The disease began in China at the beginning of January 2020 but the exact origin is unknown (WHO, 2021). In March of 2020, the President of the United States issued a national emergency due to the spread of COVID-19. This led to most, if not all, universities implementing an extended spring break and, eventually, moving to virtual classes for the remainder of the spring 2020 semester. The Center for Disease Control (CDC) is the governing body for all diseases and precautionary measures for these diseases. The CDC recommended masks, social distancing, and quarantining after exposure or contraction of COVID-19 leading to strict guidelines for how employees, students, and citizens could interact with the community (CDC, 2021).

Many businesses, schools, and other establishments shutdown completely leaving few grocery stores, convenience stores, and other essential businesses as the only establishments remaining open. The effects of the COVID-19 pandemic led to changes in social capital levels caused by the sudden economic downturn, jobs being impacted, or death of a loved one.

## **Impact Worldwide**

All countries have experienced some sort of impact from the COVID-19 pandemic since the rapid spread beginning in early 2020. The countries who have been affected the most, in terms of number of deaths, are India, the United States, Brazil, Russia, and Mexico (Pasovic, Leach-Kemon, Troeger, Paulson, & Vos, 2021). International students and student athletes had to make very difficult decisions regarding whether to stay in the US during the COVID-19 lockdown or return to their home countries.

Mental health was strongly impacted by the COVID-19 pandemic worldwide leading to an increase in suicides, antidepressant usage, and mental illness diagnoses (Panchal, Kamal, Cox, Garfield, & Chidambaram, 2020).

## **Impact in the United States**

Due to the sudden and widespread closure of businesses in the United States and worldwide, many individuals lost their jobs, were unable to be paid for an indefinite amount of time, had to find work elsewhere, or were unable to find another job. The pandemic led to the first significant economic downturn since the 2008 recession. The unemployment rate in the United States has been approximately 4.8% since April of 2020 compared to 3.5% in the 2020 months prior to the pandemic (Center on Budget and Policy Priorities, 2021). U.S. Unemployment is shown in Figure 5. Additionally, the United States government provided financial assistance to unemployed individuals through a weekly stimulus distributed due to COVID-19 (Center on Budget and Policy Priorities, 2021). This stimulus supplemented the income of individuals who were unable to work or were furloughed during the pandemic.

Mental health was another factor that was greatly affected by the pandemic in the United States. Serious thoughts of suicide were up to 11%, rates of anxiety and depression reached 31%, and prevalence of substance abuse reached 13% (CDC, 2021).

While the pandemic has not ended as of spring 2022, most businesses have reopened and are at least at 25% capacity with mask mandates in place. Some states and regions have fully reopened with full capacities and no masks required.

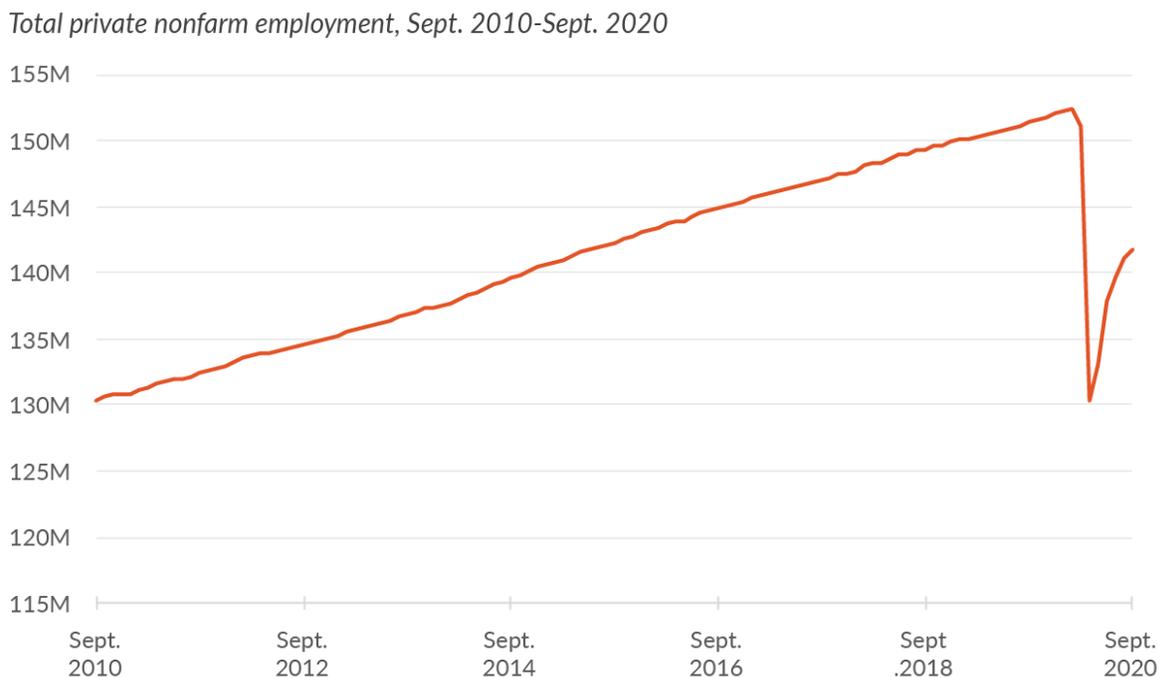


Figure 5: United States Employment Graph Sept 2010-Sept 2020 via US Department of Labor Services

### **Impact on Collegiate Students and Athletes**

College students were moved to virtual online classes and all college sports team practices were canceled due to the COVID-19 pandemic. This led to meetings, appointments, and physical training programs for athletes being moved to an online format. Zoom meetings, in

general, are typically not as effective as face-to-face meetings due to distractions and informality. At this university, the sports dietitian continued to meet online with the athletes for education and support. Due to gyms being closed and athletes not having access to weight rooms or team practices like normal, many student athletes were unable to keep up with the same caliber of training that they would have done on campus.

### **COVID-19 and Food Security**

The COVID-19 pandemic and food insecurity are relevant to social capital in many ways. It is clear that social capital and food security are directly related meaning that when one increases, so does the other (Paul, et. al, 2019). COVID-19 has led to a downturn in food security levels following many years of increased food security and a steady decrease in food insecurity in the United States.

COVID-19 caused many unexpected and sudden changes in job security, income, and health for many households. Additionally, parents and households were not anticipating college students coming home so early in the year and were likely unprepared to feed and take care of their students as they would be during a planned academic holiday. For all college students and athletes going from vibrant college campus living to unexpectedly returning home early because of COVID-19 restrictions was a huge shift. Households all over the US were dealing with these seismic societal shifts, but households that were already experiencing food insecurity prior to the COVID-19 pandemic were especially hard hit. Prior to COVID-19, the United States had a 10.9% food insecurity average percent across its citizens (Feeding America, 2018).

### **Purpose**

The purpose of this investigation was to determine the impact COVID-19 had on food security of collegiate athletes at a southern university.

## CHAPTER III. METHODS

This survey was completed electronically during the summer of 2020 as part of Pre-Participation Physicals for current student athletes at a southern university and was approved as exempt by the Institutional Review Board under the identification number 22x-017.

Responses were used to characterize the individual's food security status as either fully food secure as indicated by the "Never True" response or not fully food secure as indicated by the "Sometimes True" or "Often True" responses.

### **Survey**

The survey was conducted as a portion of the Pre-Participation Physical administered annually by the sports medicine team required for all athletes for them to be eligible to participate in their sport. Results were assessed and compiled with additional information to determine priority of nutrition consultations. Athletes who indicate that they are experiencing food insecurity are prioritized in nutrition consultations.

Eight questions were used to assess the food security status of the athletes during the COVID-19 pandemic. The questions asked about food security as a result of COVID-19 in addition to the questions about food security that appear on the survey annually. The first question stated, "Within the past 12 months I was worried whether my food would run out before I got money to buy more." This question was asked to gauge whether or not the respondent was experiencing any level of food insecurity. The second question asks, "Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?" This question was used to determine whether the respondents' food insecurity was related to

COVID-19 or not. Only respondents who answered Question 1 were able to complete this question as it pertained to the contents of Question 1. Question 3 reads, “Within the past 12 months the food I bought just didn't last and I didn't have money to get more.” This question is similar to Question 1 in that it identifies whether an individual is experiencing food insecurity or not. Finally, Question 4 asks, “Was your food not lasting and not having money to get more due to the COVID-19 pandemic?” Question 4 is similar to Question 2 in that only respondents who answered Question 3 with either “Sometimes True” or “Often True” were able to complete this question. Questions regarding the correlation of COVID-19 and food insecurity were added to the 2019-2020 survey to determine if student athletes at a southern university experienced food insecurity due to, or related to, the COVID-19 pandemic. These questions were added by a graduate student at the university and focused on the existing food insecurity questions and how the individual believed they related to the COVID-19 pandemic.

Survey responses were coded numerically and by the written-out response. Responses can be categorized as “Never True”, “Sometimes True,” or “Often True” and “Yes” or “No” or by a corresponding number. The number “0” represents the “Never True” response and the number “1” represents the “Sometimes True” and “Often True” responses. The number “0” also represents the response of “No”, while the number “1” also represents the response of “Yes”. Questions 1.1 and 1.2 are the same but their responses are coded differently: 1.1 with “Never True”, “Sometimes True”, or “Often True” and 1.2 with “0” or “1”. Questions 3.1 and 3.2 are coded in a similar fashion. For questions 2.1 and 2.2 and 4.1 and 4.2, the .1 responses code for either “No” or “Yes” while the .2 responses code for either “0” or “1”. Reference Appendix 1 for more information or to view the layout of the survey.

As mentioned previously, individuals are either fully food secure or not fully food secure depending on their level of food security. There are four levels of food security, high food security, marginal food security, low food security, and very low food security, as shown in Figure 1 (Feeding America, 2019). If an individual is experiencing marginal food security, low food security, or very low food security, they are not fully food secure. If an individual is experiencing high food security, this means that they are fully food secure. Responses of “Never True” indicate that the athlete is fully food secure while responses of “Sometimes True” or “Often True” indicate that the athlete is not fully food secure. Similarly, a response of “Never True” indicates that the athlete is experiencing food security while responses of “Sometimes True” and “Often True” indicate that the athlete may be experiencing some level of food insecurity.

## CHAPTER IV. RESULTS

The survey was completed by 218 student athletes and is detailed further in Appendix A.

Responses are explained below.

### Survey Responses

<b>Question 1.1</b> Within the past 12 months I was worried whether my food would run out before I got money to buy more.	<b>Never True</b>	<b>Sometimes True</b>	<b>Often True</b>
Responses	186	25	7
Percentage	85.3%	11.5%	3.2%
<b>Question 1.2</b> Within the past 12 months I was worried whether my food would run out before I got money to buy more.	<b>0</b>	<b>1</b>	
Responses	186	32	
Percentage	85.3%	14.7%	

Table 1: Responses and Percentages for Question 1.1 and 1.2 (Within the past 12 months I was worried whether my food would run out before I got money to buy more).

Table 1 indicates the responses to Questions 1.1 and 1.2. Questions 1.1 and 1.2 are the same question, but the responses are recorded differently. Question 1.1 differentiates between the different levels of food insecurity an individual might experience and Question 1.2 states whether or not they experienced food insecurity and does not specify to what degree.

<b>Question 2.1</b> Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?	<b>Yes</b>		<b>No</b>	
Responses	14		18	
Percentage	6.4%		8.2%	
<b>Question 2.2</b> Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?	<b>1</b>		<b>0</b>	
Responses	14		18	
Percentage	6.4%		8.2%	
<b>Correlation with Question 1.1</b>				
<b>Question 1.1</b> Within the past 12 months I was worried whether my food would run out before I got money to buy more.	<b>Sometimes True</b>	<b>Often True</b>	<b>Sometimes True</b>	<b>Often True</b>

Responses	10	4	15	3
Percentage of Q2	71.4%	28.5%	83.3%	16.6%

Table 2: Responses and Percentages for Question 2.1 and 2.2 (Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?) with Correlation to Question 1 (Within the past 12 months I was worried whether my food would run out before I got money to buy more).

Respondents were only able to respond to Question 2 if they answered “Sometimes True” or “Often True” to Question 1. If respondents answered “Yes” to Question 2, this indicates that they believe that their experience with food insecurity is directly related to the COVID-19 pandemic. Questions 2.1 and 2.2 are the same question, but the responses are recorded differently.

<b>Question 1.1</b> Within the past 12 months I was worried whether my food would run out before I got money to buy more.	<b>Never True</b>	<b>Sometimes True</b>	<b>Often True</b>
Responses	186	25	7
Percentage	85.3%	11.5%	3.2%
<b>Correlation with Question 3.1</b>			

<b>Question 3.1</b> Within the past 12 months the food I bought just didn't last and I didn't have money to get more.	<b>Sometimes True</b>	<b>Never True</b>	<b>Often True</b>	<b>Sometimes True</b>	<b>Never True</b>	<b>Often True</b>	<b>Sometimes True</b>	<b>Never True</b>	<b>Often True</b>
Responses	3	183	0	3	10	2	4	1	2
Percentage of Q1	1.6	98.3	0	23.1	76.9	13.3	57.1	14.3	28.6

Table 3: Responses and Percentages for Question 1.1 (Within the past 12 months I was worried whether my food would run out before I got money to buy more) with Correlation to Question 3.1 (Within the past 12 months the food I bought just didn't last and I didn't have money to get more).

Respondents were able to answer Questions 3.1 and 3.2 regardless of their response to Questions 1.1 and 1.2. Both of these questions are used to identify whether or not the individual is experiencing food insecurity, in what way they are experiencing it, and to what degree.

<b>Question 3.1</b> Within the past 12 months the food I bought just didn't last and I didn't have money to get more.	<b>Never True</b>	<b>Sometimes True</b>	<b>Often True</b>
Responses	11	17	4
Percentage	34.4	53.1	12.5

<b>Question 3.2</b> Within the past 12 months the food I bought just didn't last and I didn't have money to get more.	<b>0</b>		<b>1</b>			
Responses	11		21			
Percentage	34.4		65.6			
<b>Correlation with Question 2.1</b>						
<b>Question 2.1</b> Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
Responses	2	9	9	8	3	1
Percentage of Q3	18.1	81.8	52.9	47.1	75	25

Table 4: Responses and Percentages for Question 3.1 and 3.2 (Within the past 12 months the food I bought just didn't last and I didn't have money to get more) with Correlation to Question 2.1 (Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?)

Table 4 compares responses to Question 2.1 with Questions 3.1 and 3.2 in an effort to identify whether or not individuals who identified as having experienced food insecurity, and were therefore able to answer Questions 2.1 and 2.2, also identified with experiencing the type of food insecurity suggested in Questions 3.1 and 3.2. Respondents were able to answer Questions 3.1 and 3.2 regardless of their response to Questions 2.1 and 2.2.

<b>Question 4.1</b> Was your food not lasting and not having money to get more due to the COVID-19 pandemic?	<b>Yes</b>		<b>No</b>			
Responses	12		12			
Percentage	50		50			
<b>Question 4.2</b> Was your food not lasting and not having money to get more due to the COVID-19 pandemic?	<b>1</b>		<b>0</b>			
Responses	12		12			
Percentage	50		50			
<b>Correlation with Question 3.1</b>						
<b>Question 3.1</b> Within the past 12 months the food I bought just didn't last and I didn't have money to get more.	<b>Some times True</b>	<b>Never True</b>	<b>Often True</b>	<b>Sometimes True</b>	<b>Never True</b>	<b>Often True</b>
Responses	10	0	2	10	0	2
Percentage of Q4	83.3	0	16.6	83.3	0	16.6
<b>Correlation with Question 1.1</b>						
<b>Question 1.1</b> Within the past 12 months I was worried whether my food would run out before I got money to buy more.	<b>Some times True</b>	<b>Never True</b>	<b>Often True</b>	<b>Sometimes True</b>	<b>Never True</b>	<b>Often True</b>
Responses	8	0	4	7	3	2
Percentage of Q4	66.7	0	33.3	58.3	25	16.6

Correlation with Question 2.1				
Question 2.1 Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?	Yes	No	Yes	No
Responses	11	1	1	8
Percentage of Q4	88.8	11.1	8.33	66.7

Table 5: Responses and Percentages for Question 4.1 and 4.2 (Was your food not lasting and not having money to get more due to the COVID-19 pandemic?) with Correlation to Question 1.1 (Within the past 12 months I was worried whether my food would run out before I got money to buy more), 3.1 (Within the past 12 months the food I bought just didn't last and I didn't have money to get more), and 2.1 (Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?)

Table 5 examines the responses of all four questions and how they compared to responses of each of the other questions.

### Summary

Based on the survey, it can be determined that 35 athletes, or 16%, of the survey respondents experienced some level of food insecurity during the COVID-19 pandemic. One hundred eighty three respondents, or 84%, of athletes responded indicating that they are fully food secure while 16% of athletes responded indicating that they are not fully food secure. In other words, 16% of athletes responded indicating that they experienced some level of food insecurity while 84% of athletes responded indicating that they did not experience food insecurity during the COVID-19 pandemic. Out of the 16% of the athletes that responded

indicating some level of food insecurity, 15 athletes, or approximately 43%, responded to at least one question of the two food insecurity and COVID-19 relationship questions saying that they believed their experience with food insecurity in 2020 to be directly related to COVID-19.

## CHAPTER V. CONCLUSION AND DISCUSSION

This investigation examined the impact that the COVID-19 pandemic had on food insecurity in college athletes at a southern university. Ultimately, it was determined from this data that 16% of the athletes at this university experienced some level of food insecurity during, and related to, the COVID-19 pandemic.

As discussed previously from the Misener study, other NCAA college athletic teams experience an average of 25% of athletes experiencing food insecurity (Misener, 2020). From the results of this investigation, it can be concluded that this university's student athlete population is experiencing approximately 10% less food insecurity, even during the COVID-19 pandemic, compared to other NCAA teams.

Furthermore, this investigation confers that screening for food insecurity in student athletes is an important piece of the puzzle when addressing nutrition-related issues in these college athletes. Based on the Poll study, it is evident that food insecurity heightens the risk of disordered eating behaviors such as hoarding which could be a serious issue with the intense and large amounts of physical activity being done by collegiate athletes (Poll, K. L., 2018). Similar surveys should be used at other institutions to identify the athletes' needs. It could also be reworked and transitioned to be ready to give the student population prior to attending the university. Whether required or not, it is likely to still provide some indication which could help researchers to better understand the climate and struggles of the university in real time.

As previously mentioned, this university experienced 16% of the athletic population admitting to struggling with food insecurity during the 2020 COVID-19 pandemic. Additionally,

a large portion (approximately 43%) of these food insecure athletes at this university believed that they were experiencing food insecurity related to COVID-19.

Searles' study highlights the importance of addressing food insecurity in collegiate athletes. It is important to address food insecurity in collegiate athletics because of the increased risk of injury, mental disorders, and other things that may impact an athletes' performance in their sport. If gone untreated or addressed, food insecurity may lead to long term physical and mental issues (Searles, 2020). The goal of the sports dietitian is to create a meal plan for athletes that will result in adequate nutrition and, therefore, will not negatively affect their athletic performance.

Some limitations of this investigation may include that the Pre-Participation Survey is a self-report format. Because of this, some respondents may not honestly answer the questions. Additionally, the population that is included in this observational study are all male and female students at a southern university between the ages of 18 and 25 and thus may not be representative of other groups. Similarly, if more resources were provided and included food banks, food pantries, or other options for free food, student athletes may not feel comfortable utilizing them due to the stigma surrounding these types of facilities. Other accommodations may need to be explored to help accommodate these athletes and students still be able to help accommodate these athletes and students. Food insecurity research could also be expanded to other states and regions, besides the Appalachian region and the Delta, that are common hometowns among the athletes at the university such as Texas or some of the Midwestern and Northern states.

Mississippi is ranked as one of the highest states in prevalence for food insecurity (Feeding America, 2021). This may be a limitation in that a college in another, more food secure,

state may see lower levels of food insecurity because it is less common in their state and community and, therefore, on their campus as well.

College campuses have programs and resources in place to assist students with food insecurity and other nutritional needs. Some universities have their own food pantries which are available to all students with no questions asked. This is a popular model among many colleges. Some campuses also utilize a meal swipe donation program in which students with excess meal swipes are able to donate the swipes to a student in need. Additionally, if a student has transportation access, they can utilize the resources and programs of the community their college is located in.

Dietitians can provide resources and help to athletes experiencing food insecurity. It is also important to note that athletes were sent prepaid dining cards and additional funds during the pandemic according to one of the University's sports dietitians (Personal communication, November, 2021). However, in the event of a situation like the COVID-19 pandemic, nutritional knowledge and access to on campus resources are not as useful. An option for future disasters may be for the university to partner with food banks, restaurants, or organizations in the town of any of their athletes experiencing food insecurity so that they can still have access to the same amount of food that they would be consuming with their on-campus meal plan. The university may be able to continue to provide meals to students living close to campus but by partnering with other companies, they will be able to reach athletes who live in another state or more than a drivable distance from their campus. This method could also be utilized during winter, fall, spring, and summer breaks as some athletes may be experiencing food insecurity that is not related to COVID-19.

If this university concludes that a certain percentage of students, for example one-third, are affected by food insecurity, it may be cause to look into petitioning for government aid for students, utilizing the on campus food bank for supplemental meal plans, or some other form of nutritional compensation. Additionally, another survey may be conducted halfway through the school year to assess how many athletes are still experiencing food insecurity or identify those whose food security status has changed. The survey should still include questions regarding COVID-19 as the pandemic is still affecting some areas of the economy. In the years following the pandemic, the survey could transition from the addition of the COVID-19 questions to questions regarding the individual's social capital. This may help the university better understand and determine the best ways to assist food insecure students.

It could be to the benefit of universities to conduct a campus-wide survey to see how many students, in general, are affected by food insecurity in a normal year. From there, researchers could compare the number seen in the student body at large to the athletes to see if the numbers are comparable and are similar, worse, or better than that of the athletes. This could lead to an appended meal plan, more funding for the on-campus food bank, or increased meal assistance for students experiencing food insecurity.

The battle against food insecurity in the collegiate athletic community has only begun. As long as food insecurity is prevalent in the United States, it will be prevalent in college athletics regardless of division and caliber. It will be interesting to see how long the COVID-19 pandemic continues to have an adverse effect on food insecurity in not only Mississippi but the United States, and the world.

## REFERENCES

- AJMC Staff. (2021). *A timeline of covid-19 developments in 2020*. AJMC. Retrieved November 3, 2021, from <https://www.ajmc.com/view/a-timeline-of-covid19-developments-in-2020>.
- Brown, M. L., Karpinski, C., Bragdon, M., Mackenzie, M., & Abbey, E. (2021). Prevalence of food insecurity in NCAA Division III collegiate athletes. *Journal of American College Health*, 1–7. <https://doi.org/10.1080/07448481.2021.1942886>
- Centers for Disease Control and Prevention. (n.d.). *Coronavirus disease 2019 (covid-19)*. Centers for Disease Control and Prevention. Retrieved December 5, 2021, from <https://www.cdc.gov/coronavirus/2019-ncov/index.html>.
- Centers for Disease Control and Prevention. (n.d.). *Coronavirus disease 2019 (covid-19)*. Centers for Disease Control and Prevention. Retrieved December 5, 2021, from <https://www.cdc.gov/coronavirus/2019-ncov/index.html>.
- Coleman-Jensen, A., Rabbitt, M. P., Hales, L., & Gregory, C. A. (2021, September 8). *Definitions of Food Security*. USDA ERS - Definitions of Food Security. Retrieved November 5, 2021, from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx>.

*College student hunger statistics and research*. Feeding America. (n.d.). Retrieved December 5, 2021, from <https://www.feedingamerica.org/research/college-hunger-research>.

*County economic status in Appalachian ... - arc.gov*. Appalachian Regional Commission. (n.d.). Retrieved November 6, 2021, from <https://www.arc.gov/wp-content/uploads/2021/06/CountyEconomicStatusFY2022Mississippi.pdf>.

Davitt, E. D., Heer, M. M., Winham, D. M., Knoblauch, S. T., & Shelley, M. C. (2021). Effects of COVID-19 on University Student Food Security. *Nutrients*, *13*(6), 1932. <https://doi.org/10.3390/nu13061932>

El Zein, A., Shelnutt, K. P., Colby, S., Vilaro, M. J., Zhou, W., Greene, G., Olfert, M. D., Riggsbee, K., Morrell, J. S., & Mathews, A. E. (2019). Prevalence and correlates of food insecurity among U.S. college students: A multi-institutional study. *BMC Public Health*, *19*(1). <https://doi.org/10.1186/s12889-019-6943-6>

Feeding America. (2021, March). *The Impact of the Coronavirus on Food Insecurity in 2020 & 2021*. Feeding America. Retrieved September 10, 2021, from [https://www.feedingamerica.org/sites/default/files/2021-03/National%20Projections%20Brief\\_3.9.2021\\_0.pdf](https://www.feedingamerica.org/sites/default/files/2021-03/National%20Projections%20Brief_3.9.2021_0.pdf).

Feeding America. (2021, March). *The Impact of the Coronavirus on Local Food Insecurity*. Feeding America. Retrieved September 10, 2021, from

[https://www.feedingamerica.org/sites/default/files/2021-03/Local%20Projections%20Brief\\_3.31.2021.pdf](https://www.feedingamerica.org/sites/default/files/2021-03/Local%20Projections%20Brief_3.31.2021.pdf).

Feeding America. (2019, October 7). *What is food insecurity in America?* Hunger and Health. Retrieved November 3, 2021, from <https://hungerandhealth.feedingamerica.org/understand-food-insecurity/>.

*Food insecurity and poverty in the US - Feeding America.* (2021). Retrieved December 5, 2021, from [https://www.feedingamerica.org/sites/default/files/2021-03/Local%20Projections%20Brief\\_3.31.2021.pdf](https://www.feedingamerica.org/sites/default/files/2021-03/Local%20Projections%20Brief_3.31.2021.pdf).

*Food insecurity to increase in 2021 at a higher rate in lower income countries.* USDA ERS - IFSA. (2021, September 7). Retrieved December 5, 2021, from <https://www.ers.usda.gov/amber-waves/2021/september/food-insecurity-to-increase-in-2021-at-a-higher-rate-in-lower-income-countries/>.

Haggard, R., Cafer, A., & Green, J. (2017). *MS Health & Hunger Atlas 2017 - Ole miss.* MISSISSIPPI HEALTH & HUNGER ATLAS 2017. Retrieved April 20, 2022, from <https://socanth.olemiss.edu/wp-content/uploads/sites/154/2017/05/Hunger-Atlas-2017.pdf>

High prevalence of food insecurity and hunger in households in the rural lower Mississippi Delta. (2004). *The Journal of Rural Health*, 20(2), 173–181. <https://doi.org/10.1111/j.1748-0361.2004.tb00025.x>

Horsley, S. (2020, July 20). *The end of \$600 unemployment benefits will hit millions of households and the economy*. NPR. Retrieved November 3, 2021, from <https://www.npr.org/sections/coronavirus-live-updates/2020/07/20/892476371/the-end-of-600-unemployment-benefits-will-hit-millions-of-households-and-the-economy>.

*How we got the map data*. Feeding America. (2018). Retrieved December 5, 2021, from <https://map.feedingamerica.org/county/2017/overall>.

Huber, B. C., Steffen, J., Schlichtiger, J., & Brunner, S. (2020). Altered nutrition behavior during COVID-19 pandemic lockdown in young adults. *European Journal of Nutrition*, 60(5), 2593–2602. <https://doi.org/10.1007/s00394-020-02435-6>

Jaime, P. C. (2021). The Covid-19 pandemic: implications for food and nutrition (in)security. *Sci Flo Brazil*. <https://doi.org/10.1590/1413-81232020257.12852020>

Johnson, G. (2021, February 16). *Pandemic continues to impact student-athlete mental health*. NCAA.org - the official site of the NCAA. Retrieved September 10, 2021, from <https://www.ncaa.org/about/resources/media-center/news/pandemic-continues-impact-student-athlete-mental-health>.

*Key Statistics & Graphics*. USDA ERS - Key Statistics & Graphics. (2021, September 8). Retrieved December 5, 2021, from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx>.

- Leddy, A. M., Whittle, H. J., Shieh, J., Ramirez, C., Ofotokun, I., & Weiser, S. D. (2020). Exploring the role of social capital in managing food insecurity among older women in the United States. *Social Science & Medicine*, 265, 113492. <https://doi.org/10.1016/j.socscimed.2020.113492>.
- Leonard, T., Hughes, A. E., Donegan, C., Santillan, A., & Pruitt, S. L. (2018). Overlapping geographic clusters of food security and health: Where do social determinants and health outcomes converge in the U.S? *SSM - Population Health*, 5, 160–170. <https://doi.org/10.1016/j.ssmph.2018.06.006>
- Many student-athletes were already food-insecure. covid-19 could make it worse.* THE FEED. (2020, April 27). Retrieved December 5, 2021, from <https://feed.georgetown.edu/access-affordability/many-student-athletes-were-already-food-insecure-covid-19-could-make-it-worse/>.
- Mialki, K., House, L. A., Mathews, A. E., & Shelnett, K. P. (2021). Covid-19 and college STUDENTS: Food security status before and after the onset of a pandemic. *Nutrients*, 13(2), 628. <https://doi.org/10.3390/nu13020628>
- Misener, P. (2020). Food Insecurity and College Athletes: A Study on Food Insecurity/Hunger among Division III Athletes. *ProQuest*. <https://doi.org/https://www.proquest.com/openview/5316b2bf1529113f34a0b6966d6a1d27/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Mississippi.* Appalachian Regional Commission. (2021, June 29). Retrieved November 6, 2021, from <https://www.arc.gov/mississippi/>.

- NCAA. (2021). *NCAA Student-Athlete Well-Being Study (Fall 2020)*. NCAA Research. Retrieved September 10, 2021, from [https://ncaaorg.s3.amazonaws.com/research/other/2020/2021RES\\_NCAA-SA-Well-BeingSurveyPPT.pdf](https://ncaaorg.s3.amazonaws.com/research/other/2020/2021RES_NCAA-SA-Well-BeingSurveyPPT.pdf).
- OECD insights: Human capital*. OECD. (n.d.). Retrieved December 8, 2021, from <https://www.oecd.org/insights/37966934.pdf>.
- Owens, M. R., Brito-Silva, F., Kirkland, T., Moore, C. E., Davis, K. E., Patterson, M. A., Miketinas, D. C., & Tucker, W. J. (2020). Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. *Nutrients*, *12*(9), 2515. <https://doi.org/10.3390/nu12092515>
- Panchal, N., Kamal, R., Cox, C., Garfield, R., & Chidambaram, P. (2020). Mental health considerations in children and adolescents during the COVID-19 pandemic: A literature review. *KFF*. <https://doi.org/10.31234/osf.io/kx4g2>
- Pasovic, M., Leach-Kemon, K., Troeger, C., Paulson, K., & Vos, T. (2021, May 27). *Countries hit hardest by COVID-19: Think global health*. Council on Foreign Relations. Retrieved November 5, 2021, from <https://www.thinkglobalhealth.org/article/countries-hit-hardest-covid-19>.
- Paul, C. J., Paul, J. E., & Anderson, R. S. (2019). The local food environment and Food Security: The health behavior role of social capital. *International Journal of Environmental Research and Public Health*, *16*(24), 5045. <https://doi.org/10.3390/ijerph16245045>

- Payne-Sturges, D. C., Tjaden, A., Caldeira, K. M., Vincent, K. B., & Arria, A. M. (2017). Student hunger on campus: Food insecurity among college students and implications for academic institutions. *American Journal of Health Promotion*, 32(2), 349–354. <https://doi.org/10.1177/0890117117719620>
- Poll, K. L., Holben, D. H., Valliant, M., & Joung, H.-W. (D. (2018). Food insecurity is associated with Disordered eating behaviors in NCAA Division 1 MALE collegiate athletes. *Journal of American College Health*, 68(2), 105–109. <https://doi.org/10.1080/07448481.2018.1529035>
- Searles, K. (2020, July). *How food insecurity impacts student athletes*. Academy of Nutrition & Dietetics Spots Cardiovascular & Wellness Nutrition (SCAN) Group. Retrieved February 22, 2022, from <https://www.nata.org/sites/default/files/july-nata-news-food-insecurity.pdf>
- Social cohesion*. Social Cohesion - Healthy People 2030. (n.d.). Retrieved December 8, 2021, from <https://health.gov/healthypeople/objectives-and-data/social-determinants-health/literature-summaries/social-cohesion>.
- Strait, J. (2020, May). *Map of modern Mississippi River Delta ... - researchgate.net*. Mississippi Delta Map. Retrieved April 20, 2022, from [https://www.researchgate.net/figure/Map-of-modern-Mississippi-River-Delta-in-vicinity-of-New-Orleans-which-lies-between\\_fig1\\_255619286](https://www.researchgate.net/figure/Map-of-modern-Mississippi-River-Delta-in-vicinity-of-New-Orleans-which-lies-between_fig1_255619286)

Strait, J. B. (2020). The Voice of the Southern Diaspora: Muddy Waters and the multi-layered influences associated with the diffusion of blues culture. *The International Social Sciences Review*, 2, 39–52.  
<https://doi.org/10.37467/gka-socialrev.v2.2330>

*Subregions in appalachia - arc.gov*. (2021). Retrieved December 5, 2021, from [https://www.arc.gov/wp-content/uploads/2021/11/Subregions-in-Appalachia\\_2021\\_Map.pdf](https://www.arc.gov/wp-content/uploads/2021/11/Subregions-in-Appalachia_2021_Map.pdf).

Thomas, D. T., Erdman, K. A., & Burke, L. M. (2016). Position of the Academy of Nutrition and Dietetics, dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *Journal of the Academy of Nutrition and Dietetics*, 116(3), 501–528. <https://doi.org/10.1016/j.jand.2015.12.006>

*Tracking the COVID-19 economy's effects on food, housing, and employment hardships*. Center on Budget and Policy Priorities. (n.d.). Retrieved December 5, 2021, from <https://www.cbpp.org/research/poverty-and-inequality/tracking-the-covid-19-economy-effects-on-food-housing-and>.

U.S. Bureau of Labor Statistics. (2020). *Charts related to the latest "The employment situation" news release | more chart packages*. U.S. Bureau of Labor Statistics. Retrieved February 8, 2022, from <https://www.bls.gov/charts/employment-situation/employment-levels-by-industry.htm>

Walker, J. L., Holben, D. H., Kropf, M. L., Holcomb, J. P., & Anderson, H. (2007).

Household food insecurity is inversely associated with social capital and health in females from a special supplemental nutrition program for women, infants, and children households in Appalachian Ohio. *Journal of the American Dietetic Association, 107*(11), 1989–1993. <https://doi.org/10.1016/j.jada.2007.08.004>

Wolfson, J. A., & Leung, C. W. (2020). Food insecurity and covid-19: Disparities in early effects for US adults. *Nutrients, 12*(6), 1648. <https://doi.org/10.3390/nu12061648>

World Health Organization. (2021). *Coronavirus*. World Health Organization. Retrieved November 3, 2021, from [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1).

APPENDIX A.

Food security survey questions 2020

**Survey Items**

The following questions were used on the 2020 academic year survey to assess the individual's food security status and the impact of COVID-19 on the individual's food security status. Answer choices were presented in random order.

1.1 Within the past 12 months I was worried whether my food would run out before I got money to buy more.		
Never True	Sometimes True	Often True

1.2 Within the past 12 months I was worried whether my food would run out before I got money to buy more.		
0	1	1

2.1 Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?	
Yes	No

2.2 Was your worry whether food would run out before you got money to buy more due to the COVID-19 pandemic?	
1	0

3.1 Within the past 12 months the food I bought just didn't last and I didn't have money to get more.
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Never True	Sometimes True	Often True
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3.2 Within the past 12 months the food I bought just didn't last and I didn't have money to get more.		
0	1	1

4.1 Was your food not lasting and not having money to get more due to the COVID-19 pandemic?	
Yes	No

4.2 Was your food not lasting and not having money to get more due to the COVID-19 pandemic?	
1	0

### **Interpreting the Questions to Determine the Individual's Food Security Status**

Individual respondents reported their athlete ID number prior to beginning of the survey for identification purposes. This was a free response question and had no answer choice options. No immediately recognizable personal information, such as name or date of birth, was required to complete this survey.

For both parts of questions 1 and 3, individuals selected the response that they felt best represented their food security status. The options were “Never True”, “Sometimes True”, and “Often True”. Respondents were able to select one option.

Both parts of questions 2 and 4 were not required unless the individual indicated that they were not fully food secure in a previous question. Responses could either be “Yes” or “No”. Respondents were able to select one option.

For both parts of questions 2 and 4, individuals determined whether or not they felt the statement reflected their security status. They were able to select one option. These questions were not required unless the individual indicated that they were not fully food secure in a previous question. Respondents were able to select one option.

### **Coding the Responses**

For both parts of questions 1 and 3, a response of “Never True” indicates that the individual is fully food secure, a response of “Sometimes True” indicates that the individual is not fully food secure but may not consider themselves to be food insecure, and a response of “Often True” indicates that an individual is struggling with food security and, potentially, from very low food security. “Sometimes True” and “Often True” were both coded as the number “1”, because they are both indicative of the individual being not fully food secure. “Never True” was coded as the number “0”, because it is indicative of an individual that is fully food secure.

For questions 2.2 and 4.2, the response “Yes” was coded as the number “1” and the response “No” was coded as the number “0”.