



**NAVAL  
POSTGRADUATE  
SCHOOL**

**MONTEREY, CALIFORNIA**

**THESIS**

**FOOD INSECURITY IN THE AIR FORCE**

by

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March 2023

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<b>REPORT DOCUMENTATION PAGE</b>			<i>Form Approved OMB No. 0704-0188</i>
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC, 20503.			
<b>1. AGENCY USE ONLY (Leave blank)</b>	<b>2. REPORT DATE</b> March 2023	<b>3. REPORT TYPE AND DATES COVERED</b> Master's thesis	
<b>4. TITLE AND SUBTITLE</b> FOOD INSECURITY IN THE AIR FORCE		<b>5. FUNDING NUMBERS</b>	
<b>6. AUTHOR(S)</b> Darryl Weaver			
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Naval Postgraduate School Monterey, CA 93943-5000		<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> N/A		<b>10. SPONSORING / MONITORING AGENCY REPORT NUMBER</b>	
<b>11. SUPPLEMENTARY NOTES</b> The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.			
<b>12a. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for public release. Distribution is unlimited.		<b>12b. DISTRIBUTION CODE</b> A	
<b>13. ABSTRACT (maximum 200 words)</b>  The problem of food insecurity among Air Force service members and their families is the main topic of this thesis. Food insecurity among U.S. veterans and military families is a national security concern: it multiplies stress on active-duty personnel, diminishes well-being among service members and their children and may hinder recruitment for the armed services. Additionally, food insecurity increases risk of health conditions that may decrease military readiness.  The goal is to determine who is most at risk, determine whether food insecurity is a significant problem in the Air Force, and if additional entitlements can be provided to reduce those at risk. This study uses data from the Annual Social and Economic Supplement (ASEC), the Food Security Supplement (FSS), the Defense Enrollment Eligibility Reporting System (DEERS), annual data from the U.S. Census Bureau and Current Population Survey, as well as information from the Defense Manpower Data Center (DMDC).  The study's findings show that being married, having a college degree, and age all decrease the likelihood of being food insecure, while being divorced, increasing the number of people in the household, and being a military family are related to a lower chance of being food insecure. The thesis offers suggestions for further research and policy recommendations to address the issue of food insecurity in the Air Force.			
<b>14. SUBJECT TERMS</b> food insecurity, Air Force, Defense Enrollment Eligibility Reporting System, DEERS, Annual Social and Economic Supplement, ASEC, Defense Manpower Data Center, DMDC, Food Security Supplement, FSS		<b>15. NUMBER OF PAGES</b> 47	
		<b>16. PRICE CODE</b>	
<b>17. SECURITY CLASSIFICATION OF REPORT</b> Unclassified	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> Unclassified	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b> Unclassified	<b>20. LIMITATION OF ABSTRACT</b> UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)  
Prescribed by ANSI Std. Z39-18

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**FOOD INSECURITY IN THE AIR FORCE**

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Submitted in partial fulfillment of the  
requirements for the degree of

**MASTER OF SCIENCE IN MANAGEMENT**

from the

**NAVAL POSTGRADUATE SCHOOL  
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## ABSTRACT

The problem of food insecurity among Air Force service members and their families is the main topic of this thesis. Food insecurity among U.S. veterans and military families is a national security concern: it multiplies stress on active-duty personnel, diminishes well-being among service members and their children and may hinder recruitment for the armed services. Additionally, food insecurity increases risk of health conditions that may decrease military readiness.

The goal is to determine who is most at risk, determine whether food insecurity is a significant problem in the Air Force, and if additional entitlements can be provided to reduce those at risk. This study uses data from the Annual Social and Economic Supplement (ASEC), the Food Security Supplement (FSS), the Defense Enrollment Eligibility Reporting System (DEERS), annual data from the U.S. Census Bureau and Current Population Survey, as well as information from the Defense Manpower Data Center (DMDC).

The study's findings show that being married, having a college degree, and age all decrease the likelihood of being food insecure, while being divorced, increasing the number of people in the household, and being a military family are related to a lower chance of being food insecure. The thesis offers suggestions for further research and policy recommendations to address the issue of food insecurity in the Air Force.

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## LIST OF ACRONYMS AND ABBREVIATIONS

ADSS	Active-Duty Spouse Survey
ASEC	Annual Social and Economic Supplement
DEERS	Defense Enrollment Eligibility Reporting System
BAH	Basic Allowance for Housing
BAS	Basic Allowance for Subsistence
BNA	Basic Needs Allowance
COLA	Cost of Living Allowance
COOL	Credentialing Opportunities On-Line
CPS-FSS	Current Population Survey – Food Security Supplement
DMDC	Defense Manpower Data Center
DOD	Department of Defense
FIS	Food Insecurity
FPG	Federal Poverty Guidelines
FPL	Federal Poverty Line
FSS	Food Security Supplement
FSSA	Family Subsistence Supplemental Allowance
NDAA	National Defense Authorization Act
PCS	Permanent Change of Station
SNAP	Supplemental Nutrition Assistance Program
SOFS-A	Status of Forces Survey of Active-Duty Members
SSI	Supplemental Security Income
TAP	Transition Assistance Program
USDA	United States Department of Agriculture
VA	Veterans Administration

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## ACKNOWLEDGMENTS

I would like to thank my wife, Amber, for her steadfast support through this whole process. You are my guiding light, and I am forever grateful to have you as my partner. I love you.

I would also like to thank my boys, Aiden and Dylan. You two are the reason I am here, and you both serve as my inspiration to do better. I am so proud of you both and I love you so much.

Finally, I would like to thank my advisor, Dr. Jennifer Heissel, for her patience, understanding, and guidance. Your words and understanding meant more to me than you could ever know, so thank you. Go Irish!

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# I. INTRODUCTION

## A. BACKGROUND

Food insecurity among veterans and military families in the United States is a threat to national security as it increases stress on active service members, decreases the well-being of both service members and their children, and could potentially affect the ability to recruit for the armed services. Additionally, food insecurity also raises the risk of health issues that can lower the readiness of military personnel. FY2022 NDAA has a provision on a basic needs allowance, driven by concerns about the risk of food insecurity among U.S. military personnel and their families. However, it is difficult to understand the solution to this problem without clear definitions.

## B. PURPOSE

The purpose of this analysis is to better understand if food insecurity is a major issue the Air Force, and if so, who is at highest risk. As with the general civilian population, the main cause of food insecurity among U.S. military families seems to affect low-income households. Further, even though the salaries of enlisted service members are competitive compared to their civilian counterparts with similar levels of education and experience, they are not enough to support a family. When service members get married and have children, their spouses often need to work to supplement their income and meet the needs of the family. Spousal employment, however, can be difficult to obtain due to deployment rates, operation tempos, and constant PCS/TDY demands. This thesis will seek to find out what individual-level characteristics affect food insecurity.

To better tailor solutions to food insecurity in the Air Force, it is essential to understand who is being impacted. In a message released by the Under Secretary of Defense for Personnel and Readiness, the DOD is focusing on six lines of effort to strengthen food insecurity among active-duty troops: increase access to healthy food, enhance spouse economic opportunities, review service member pay and benefits, reinforce financial resources and awareness, encourage service members and families to seek available resources, and expand data collections and reporting (OUSD P&R, 2022).

This shows an increased demand from leadership to fix this problem and this study will work to identify those service members who need it most.

### **C. RESEARCH QUESTIONS**

1. Is 150% above poverty, as specified in the NDAA, an effective measure of preventing food insecurity and how many members are below that threshold? Are there members above 150% of the FPL that would still be considered food insecure?
2. Does adding a BAS supplement for dependents prevent members from being predicted as food insecure?

### **D. ORGANIZATION OF STUDY**

This thesis consists of five chapters. Chapter I gives background and introduction to food insecurity in the military and provides the research questions addressed. Chapter II provides a literature review on food insecurity for both civilians and military personnel. This chapter also defines food insecurity as well as its causes and prevalence. Chapter III offers the data as well as defines the methodology used to answer the research questions. Chapter IV presents the findings that came from using the data and methodology. Chapter V poses conclusions drawn from the results as well as provides policy recommendations.

## II. LITERATURE REVIEW

This chapter reviews the literature on food security as it pertains to the Air Force. I will discuss the prevalence of food insecurity, the causes of food insecurity (i.e., food deserts, income, childcare costs), the effects of food insecurity on civilian and military families, current programs currently that address food insecurity including the Supplemental Nutrition Assistance Program (SNAP) and Family Subsistence Supplemental Allowance (FSSA) including whether these programs help both civilian and military families mitigate food insecurity.

### A. WHAT IS FOOD INSECURITY?

For the purposes of this study, I will be using the USDA definition of food insecurity which states that food security refers to everyone having access to enough food for an active, healthy existence at all times (USDA, 2019).

### B. PREVALENCE OF FOOD INSECURITY

This section explores the prevalence of food insecurity.

One way to assess the prevalence of food insecurity is through the take up of food assistance programs. The Supplemental Nutrition Assistance Program (SNAP)—the most expensive food assistance program in the U.S.—tries to improve nutrition by reducing food insecurity among low-income households (Gregory & Todd, 2021). One of the primary risk indicators for food insecurity among military families is the increased use of SNAP benefits. Wax and Stankorb (2016) found that approximately \$103.6 million of groceries were purchased using SNAP benefits. According to USDA, there was a 5% increase in the usage of SNAP between 2012 and 2016 (Wax & Stankorb, 2016). The high participation in government assistance programs indicates rising food insecurity, and the increased take-up of SNAP benefits among military families suggests they are struggling to acquire adequate and nutritious food.

In 2019, a United States Department of Agriculture (USDA) report stated that approximately 13.7 million households experienced food insecurity. Nearly 2% (5.6

million) of U.S. citizens were considered in the lowest food security tier, i.e., at least one household member had to change their eating pattern or reduce food intake due to insufficient food resources (Gregory & Todd, 2021). At the individual level, studies find that household size, gender, and age composition (such as younger, female-headed households), and lower earned income levels are more likely to experience food insecurity (Ratcliffe et al., 2011).

The Status of Forces Survey of Active-Duty Members (SOFS-A) and the Active-Duty Spouse Survey (ADSS) estimate that in fiscal years 2020 and 2021, 25% of service members experienced food insecurity. Members who are junior enlisted, enlisted in the Navy or Army, are a member of a minority group, have households with children, have an unemployed spouse, are unmarried, or are living on base all responded higher to having low and very low food insecurity (Active-Duty Spouse Survey, 2021; Status of Forces Survey, 2020). As would be expected, service members who are financially unstable were more likely to report food insecurity, further confirming the strong connection between food insecurity and economic stability.

Another factor indicating high food insecurity is the increased take-up of Family Subsistence Supplemental Allowance (FSSA). The FSSA was established in 2001 by the DOD to eliminate the need for military families to apply for SNAP benefits (The Pentagon, 2020). FSSA is a voluntary financial benefits program for the military. Their main goal is to assist military members and their families that are relying solely on SNAP benefits (Wax & Stankorb, 2016). As military personnel promote and their income becomes too high to qualify for SNAP, they can supplement with FSSA assistance in order to continue providing for their families.

Qualification for FSSA involves a service member getting a basic allowance for subsistence (BAS), having at least one military dependent and incorporating the member's military income and other household income at less than 130% of the poverty level (The Pentagon, 2020). FSSA eligibility depends on gross income only and does not refer to any deductions or asset considerations. However, FSSA has a strict requirement involving the value of in-kind housing included in income valuation, reducing the number of eligible members for FSSA in significant numbers compared to SNAP.

In 2013 there was a significant increase in military members' applications for FSSA. In 2010, roughly 510 FSSA participants and approximately 1000 SNAP participants were grouped as active-duty military being the primary source of employment (Wax & Stankorb, 2016). About 8486 military service members applied for FSSA in 2013. However, only 285 received approval across all Department of Defense (DOD) branches. The research by Wax and Stankorb also found a prevalence of 14.9% of food insecurity across the whole sample and 14.1% among households with active-duty military members. This suggests military members are experiencing difficulties to access specific military-related resources and food insecurity is continuously on the rise. Additionally, Wan and Stankorb (2016) argue that U.S. military and veterans in Iraq and Afghanistan experience food insecurity at twice the rate experienced in the overall U.S. population. This shows that military members are not keeping pace with the civilian sector as it pertains to living wage and an equal standard of living.

### **C. CAUSES OF FOOD INSECURITY**

This section explores the causes of food insecurity in the Air Force, which include financial strain and inadequate family support.

One of the main causes of food insecurity is financial strain. Many service members are faced with the inflated cost of living, including housing, childcare, and transportation which can leave little room for food. A survey conducted by the Military Family Advisory Network (2022) found

like many Americans, military families are struggling financially. More than 40% reported having a total household income of \$25,000 to \$75,000, the lower amounts being below the poverty line in the U.S. for a family of four, at \$26,500, and more than 50% said they spend more than half their monthly income, including their housing allowances, on housing and utilities.

Food insecurity is associated with military households' economic conditions with vital trends in unemployment and food prices—food security is a broader issue beyond the inability to afford food (Niles et al., 2020). While the impact of food insecurity among military households was already on the rise, the coronavirus pandemic caused further

threats incorporating food costs and infrastructure that involved changes in public transit access, food assistance distribution, and shortages of products. The disrupted supply chain affects commodity prices, causing vulnerability among military households facing low food security.

Adding to the financial strain is the issue of spousal employment and lack of support. A 2020 Blues Star Families survey found that among active-duty families who reported financial stress, 41% pointed to partner underemployment or unemployment as the main cause. The same survey found

the unemployment rate of military spouse respondents was seven times the rate of similar civilian peers (20 percent compared to just 3 percent). The DOD's 2019 Survey of Active-Duty Spouses found that a PCS move within the last year more than doubles the odds that a civilian active-duty spouse was unemployed (Blue Star Families, 2020).

#### **D. IMPACTS OF FOOD INSECURITY ON FAMILIES**

Food insecurities pose negative retention rates in today's military. In the long term, the defense department must incur significant costs in training new military personnel. According to Lutz and Welsh (2022), food insecurity plays a vital role in service members quitting the military due to increased depression, anxiety, and suicidal ideation. The current talent pool in the military is diverse, indicating that food insecurity concerns should be addressed to retain them in the future. Family challenges are among the vital issues associated with military personnel separating. Data from the Army's 2021 exit surveys show that the top reasons troops cited for leaving were the effects that military service and deployments had on families (Winkie, 2021). In a 2019 RAND study by Kimberly Hall, "women in the Coast Guard were more likely than men to say that family considerations could drive them to leave the military. Food security is one mechanism by which to improve families' experiences and quality of life, thereby reducing the number of families who choose to leave the armed forces." Food security then is a mechanism for improving families' quality of life and experiences thus improving retention.

The National Military Family Association survey in 2021 indicates that roughly 65% of military teens plan on serving in the military in comparison to 13% of the overall

U.S. citizens between 16 and 24 years old in the 2019 DOD poll (Lutz & Welsh, 2022). However, the recent experience of food insecurities has long-term challenges concerning future recruitment. Food insecurity is related to obesity among the youth due to the lack of access to high-quality, nutritional foods and instead rely on heavily processed foods that are cheaply made and readily accessible at convenience stores. Lutz and Welsh (2022) assert that approximately 21% of U.S. adolescents were unfit for meeting standards in the U.S. military accession due to obesity. This creates one more barrier for future generations wanting and being able to join the military.

Further, Niles et al. (2020) found that the chances of families experiencing food insecurity were higher in households with children. Nearly 38% of military children are below 10 years of age. Food insecurity among military families is related to the low employment of military spouses and children in the household was a factor that directly affected that in a significant way. Children in the household—especially the younger age groups characterized in the military—increase food insecurity as they affect waged labor hours while increasing household food requirements. The Committee on Rules (2021) identifies military food insecurity factors: high rates of unemployment among military spouses, limited availability of childcare, increasing costs of childcare, and out-of-pocket housing expenses. The high childcare costs are a challenge, as approximately 37.8% of military children are five years old or younger (Garamone, 2016).

Food insecurity contributes to physical and mental health problems, which in turn pose long-term challenges beyond the food insecurity period. Children in food-insecure households experience higher risks for poor health, iron-deficiency anemia, chronic illnesses, asthma, psychosocial issues, and obesity (Wax & Stankorb, 2016). In addition, children will have declining mental proficiency in concept attainment, reasoning and problem-solving, memory, and expressive and receptive vocabulary. In young adults, food insecurity is related to poor sleep, depression, diabetes, and anxiety (Nagata et al., 2019). The factors related to children and adults directly affect vulnerable military families, causing an increase in healthcare resource utilization and negatively impacting overall performance and mental and physical well-being. In turn, military resilience and readiness decrease.

Niles et al. (2020) emphasize that food insecurity causes adverse health outcomes, including coronary heart disease, increased risk of mortality, and mental health problems. Zhang et al. (2021) argues that food insecurity is associated with birth defects, lower nutrients intakes, suicidal ideation, mental health problems, diabetes, hyperlipidemia, behavioral problems, and aggregation. Food insecurity among the military is related to increased healthcare use leading to higher costs that exacerbate the situation.

## **E. CURRENT POLICIES**

Although there are many issues that the military faces, there are current policies and efforts in place to try and address food insecurity. In this section I review several policies and efforts to try and address food insecurity.

Nutrition Assistance Program (SNAP) is the U.S.'s largest food assistance program aiming to lessen food insecurity and improve overall nutrition in low-income households (Gregory & Todd, 2021). SNAP eligibility is based on the military households' net income, assets, and gross income (The Pentagon, 2020). States can use federal guidelines to screen military households or use the automatic approval of eligibility involving the individual's past qualification to receive benefits from other assistance programs, including Temporary Assistance for Needy Families and Supplemental Security Income (The Pentagon, 2020). Similarly, eligibility is not considered until the household reaches 130% gross income of the U.S. poverty level (London & Heflin, 2015). The poverty level is estimated at approximately \$2500 monthly in a household of four with gross incomes below 185% of poverty and participating in a state General Assistance, TANF program, or Supplemental Security Income (SSI).

The accurate range of SNAP users can be calculated using the least restrictive and most restrictive assumptions. Using the most restrictive assumptions at the lower bound, roughly 0.1% and 0.08% of military service members were enrolled in the SNAP program in May and August—representing approximately 880 to 1100 military members (The Pentagon, 2020). New military recruits are not eligible for SNAP, implying the percentage of eligible members qualifying for SNAP is less than 0.1. The least restrictive assumptions on SNAP eligibility estimates at 0.4% and 0.2% for May and August—representing 4620

and 1980 members (The Pentagon, 2020). The most restrictive assumptions provide the most accurate results on the number of SNAP users. While the Army represents 50% of SNAP recipients, the Air Force is the second largest, with 28% indicating a considerable number of members experiencing food insecurity under this definition.

Ractliffe et al. (2011) found that SNAP program participation reduced the possibility of household food insecurity, food insufficiency, and lowest food insecurity. According to their study, participation in SNAP lowers food insecurity likelihood by 31.2% and reduces the possibility of the lowest food insecurity by 20.2%. Additionally, SNAP receipts lessen food insufficiency by approximately 20%. Although the results follow assumptions of the bivariate probit model and have restricted SNAP's effect on food security to be constant across households, the estimates indicate the effectiveness of SNAP in reducing food insecurity.

Further, the military has the Basic Allowance for Subsistence (BAS). BAS is intended to help cover the expense of a service member's meals, but not to be used by family members (National Military Family Association, 2021). Essentially no matter how many dependents a military member has, the amount of BAS provided remains the same. Congress found that as the number of service members with families increased, BAS may have become insufficient to cover a household's food costs.

The newest attempt at addressing food insecurity in the military was created in the FY2023 NDAA and the new Military Hunger Prevention Act. The FY2023 NDAA (2022) requires the DOD to institute a Basic Needs Allowance (BNA) for "service members whose household income falls at or below 150% of the federal poverty guidelines (FPG), in the amount of 150% of the FPG minus their gross household income." As shown previously, BAH calculations have skewed the numbers for those eligible, so the NDAA provides the Secretary of Defense the discretion to assess BAH in the calculations for the purposes of the BNA. How BAH calculations are considered will have large implications as to which service members are eligible for this assistance.

The implications and impact of food insecurity among the military, which directly affects Air Force members, goes beyond the inability to pay for adequate food. The issue

has adverse effects on the physical and mental health of the entire household and threatens the future of the U.S. defense with an unhealthy generation. Solving this problem is of the utmost importance to National Security and the future of our Nation.

### **III. DATA AND METHODOLOGY**

In this chapter, I provide an overview of the data sources used for this study and the methodology employed to analyze the data. The data sources are described in detail, including the type of data, the collection process, and the measures used to ensure data quality.

The methodology section will outline the research design, data analysis techniques, and statistical methods used to answer the study's research questions. The aim of this chapter is to provide a clear understanding of the data and methods used in this study to ensure transparency and reproducibility of the results.

#### **A. DATA**

This thesis uses DOD personnel data obtained from the Defense Manpower Data Center (DMDC). It will include monthly pay and BAH. This data is then merged with Defense Enrollment Eligibility Reporting System (DEERS) which provides, rating (grade), marital status, and count of dependents by age, state, and zip code. While this data does not provide spousal employment, I will make an estimate of spousal employment at 20% in order to try and build a more accurate prediction for the current state as well as a future benefit of any further policy suggestions.

For the civilian comparison, I obtained data from the Annual Social and Economic Supplement (ASEC) and Food Security Supplement (FSS) and annual data from the U.S. Census Bureau, and Current Population Survey (Annual Social and Economic Supplement and Food Security Supplement). This comprehensive source of food insecurity data provides both national and state-level views of income and demographic information. Table 1 provides a list and definitions for all the variables used and created for this study.

Table 1. Definition of Variables

<b>Variable Name</b>	<b>Variable Description</b>
n hh	Number in household
n child	Child in household
n childu18	Children<18 in household
n childu5	Children <5 in household
age	Age
female	Female
married	Married
divorced	Divorced, legally separated, annulled, interlocutory decree
i.educ	Dummy variables indicating the respondent's level of education
somecol	Some college
college	College degree
officer	Officer
fis hh1	Food Insecurity Prediction
labforce_mil	In the military
meal_cost	Avg. meal cost
pov_130	<130% fed pvty
pov_150	<150% fed pvty
age2	Age-squared
black	Black
hispan	Hispanic
white	Non-Hispanic white
other	Other race/ethnicity
l.race	Dummy variables indicating the respondent's race
estfdins	Estimated food insecurity for Air Force
yhat_fpl100	Food Insecurity (FIS) for 100% Federal Poverty Line (FPL)
yhat_fpl110	FIS for 110% FPL
yhat_fpl120	FIS for 120% FPL
yhat_fpl130	FIS for 130% FPL
yhat_fpl140	FIS for 140% FPL
yhat_fpl150	FIS for 150% FPL
yhat_hspouse	FIS with spouse getting 50% Basic Allowance Subsistence (BAS)
yhat_hkid	FIS with dependents under 18 getting 50% BAS
yhat_hspousekid	FIS with all dependents getting 50% BAS
yhat_fspouse	FIS with spouse getting 100% BAS
yhat_fkid	FIS with dependents under 18 getting 100% BAS
yhat_fspousekid	FIS with all dependents getting 100% BAS
yhat_fspousekid_jren	FIS for \$'bas fspousekid_jren
yhat_dspousekid	FIS with all dependents getting 200% BAS
yhat_tspousekid	FIS with all dependents getting 300% BAS
yhat_qspousekid	FIS with all dependents getting 300% BAS

## B. METHODOLOGY

I began by looking at the overall estimate of food insecurity by demographic to better understand who is most likely to be food insecure. I was able to better understand where I would need to try and target improved entitlements to alleviate predicted food insecurity by using these variables.

### 1. Research Question 1

I first analyze whether using 150% of the poverty line will be an effective measure to prevent food insecurity and how many members are currently making below the 150%. I identify risk factors for food insecurity using civilian data. The risk of food insecurity is between zero and one, so I created a predictive model using a logistic regression. The logistic regression of the risk of food insecurity is:

$$P(\text{Risk of Food Insecurity} = 1 | x) = \frac{e^z}{(1 + e^z)}$$

where  $Z$  is defined as:

$$Z_{it} = A_i\alpha + B_i\beta + X_i\delta + \varepsilon_{it}$$

$A_i$  represents a set of variables on household characteristics, i.e., size of household, number of children, number of children under the age of 5, and presence of military member in household.  $B_i$  represents a set of variables that measure the income and economy level of the household, which includes the number of household members in the labor force, number of employed household members, average meal cost, and fair market rent cost.  $X_i$  includes all the individual control variables, such as gender, marital status, age, age-squared, and education level.  $\varepsilon_{it}$  is the error term. I then apply the predicted probabilities to the military population using parallel variables for household, income, and individual characteristics. I considered using a more complicated model with more interaction terms between the variables. The results were largely unchanged, so I used this simplified version.

I simulate the change in food insecurity on the Airman who are anticipated to be food insecure to assess the efficacy of the new NDAA. I raised the gross household income

of the Airmen whose household demographics and income make them eligible for the Basic Needs Allowance to a range between 130% and 150% of the federal poverty line. In order to determine the revised rate and risk of food insecurity, I ran the prediction model over the modified Air Force data.

## **2. Research Question 2**

Estimates from my logistic regression model reveal a higher risk of food insecurity in military families with multiple dependents and no college education. Using the logistic regression results, I decided to provide BAS to spouses and dependents under the age of 18.

I simulate the change in food insecurity on all Airmen with dependents in order to gauge the effectiveness of introducing a BAS supplement. I started by simulating the vulnerable Airmen with spouses and increasing their gross household income by 1/2 BAS. The BAS supplement was then added to every dependent under the age of 18 in a separate simulation that I then conducted. In the third simulation, the spouse and all dependents who were under the age of 18 were added to the person's gross income. Finally, I raised the BAS to 2, 3, and 4 times the previously stated regular BAS rate. I then used the newly revised Air Force data and the prediction model to determine the new rate and risk of food insecurity.

## IV. RESULTS

This chapter presents the study's findings, which were obtained through data analysis, logit model results, and simulations. The results are presented in the order in which the study questions from the previous chapter were posed. The goal of this chapter is to provide a thorough analysis of the findings to address the research questions and create better policies.

### A. RESEARCH QUESTION 1

First, I assess if 150% above poverty, as specified in the NDAA, is an effective measure of preventing food insecurity. Figure 1 illustrates how the number in the household increases the number of persons considered at risk at 150% of the FPL. This graph clearly shows that the number of persons in your household drives up the cost of living to remain at the 150% line. For every person added to the household, approximately \$6,000 more was needed to get to the 150% cutoff of FPL.

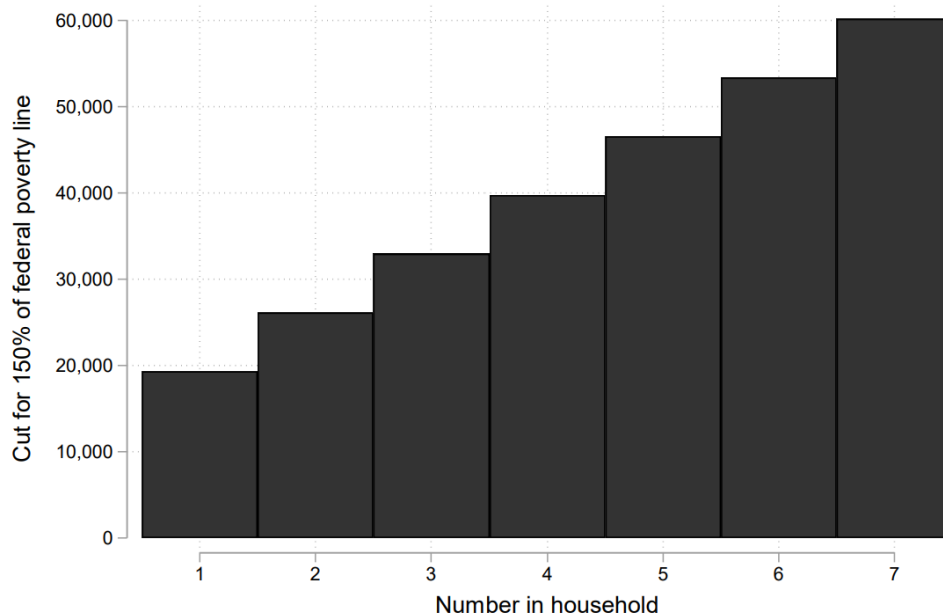


Figure 1. Federal Poverty by Number in Household

Table 2 reports the regression results with a variety of demographic and family characteristic variables. Given collinearity across many of these variables, I am cautious about interpreting the individual coefficients. The main purpose of this analysis is to predict the outcome (probability of being food insecure). Briefly, being married, having a college degree, and being a military family are all associated with a lower likelihood you would be food insecure. Being divorced, increasing the number of people in your household, and increasing the number of children increase your chances of being food insecure.

Table 2. Logistic Regression

Logistic regression		Number of obs = 93,530				
Log likelihood = -1.311e+08		LR chi2(48) = 5.65e+07				
		Prob > chi2 = 0.0000				
		Pseudo R2 = 0.1772				
Variables	Coefficient	Std. Err.	z	P> z	[95% Conf. Interval]	
Number of Children	.987168	.0002702	365.33	0.000	.0981871	.0992464
Female	.268443	.0003265	822.06	0.000	.2678033	.2690834
Married	-.364103	.0013295	273.86	0.000	-.3667086	-.3614969
Divorced	.118364	.0004843	244.42	0.000	.1174145	.1193128
<b>Race</b>						
Black	.411122	.0004270	962.93	0.000	.4102853	.4119590
Hispanic	.121473	.0004089	297.09	0.000	.1206718	.1222746
Other	.060373	.0005595	107.91	0.000	.0592768	.0614699
<b>Education</b>						
High School	-.098181	.0005652	-173.72	0.000	-.0992983	-.0970827
Some College	-.043343	.0006201	-69.89	0.000	-.0445580	-.0421272
Bachelor's or Higher	-.645840	.0006450	1001.32	0.000	-.6471039	-.6445756
Age	.029791	.0001385	215.15	0.000	-.0003819	-.0003749
Age Squared	-.000378	.0000018	-212.58	0.000	-.0003819	-.0003749
Military Family	-.511856	.0015489	-330.46	0.000	-.5148913	-.5088197
In the Labor Force	-.134244	.0004278	-313.80	0.000	-.1350825	-.1334055
Meal Costs	-.125886	.0004056	-310.36	0.000	-.1266809	-.1250909
<b>Number in House</b>						
2	.277831	.0004929	563.63	0.000	.2768647	.2787969
3	.509779	.0006129	831.70	0.000	.5085775	.5109802
4	.568934	.0007691	739.78	0.000	.5674261	.5704408
5	.785458	.0009796	801.82	0.000	.7835383	.7873782
6	.876480	.0012804	684.54	0.000	.8739772	.8789962
7	1.043327	.0017302	603.02	0.000	1.0399360	1.0467180
8	.997260	.0024493	407.16	0.000	.9924604	1.0020610
<b>Number of Children 5 and Under</b>						
1	-.013669	.0005108	-26.76	0.000	-.0146706	-.0126681
2	-.091978	.0008673	-106.05	0.000	-.093678	-.090278
3	-.127380	.0024076	-52.91	0.000	-.1320999	-.1226624
4	-.330110	.0075630	-43.65	0.000	-.3449380	-.3152917
Constant	-.540231	.0028914	-186.84	0.000	-.5458976	-.5345637

When I apply these coefficients to the military, this model predicts that 10.5 percent of the Air Force is food insecure.

To see how many people are below the 150% threshold, I analyzed various population groupings. Figure 2 provides a visual of predicted food insecurity broken out by the cost of living, grade, family size, and marital status. This shows that there is a very small number of Air Force members predicted as food insecure.

The highest numbers come from Junior Enlisted and families with 9 or more in their household. There are slight differences in the CPS prediction by COLA, whether higher-cost states have a lower probability. Family size is linked to what is discussed in Figure 1, the cutoffs go up as you add more people to the household. This means only very large families have 150% FPL cutoffs above military pay. There are slight differences in the CPS prediction by COLA, where higher-cost states have a lower probability.

The CPS data also shows a much higher probability for junior enlisted, however, that comparison is for a similar wage in the civilian sector. Most junior enlisted will have access to dining facilities and dormitories to reduce the risk of them being food insecure.

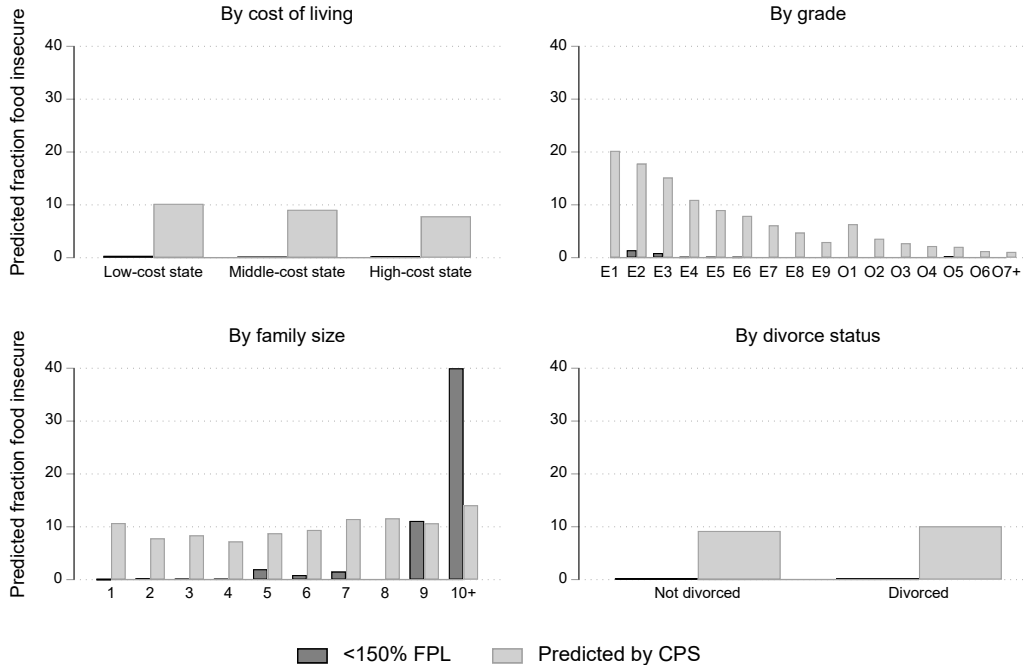


Figure 2. Predicted Air Force Food Insecurity

Table 3 shows the simulations for all the observations from 2012 through 2021 with a focus on the percentage of the FPL and the estimated food insecurity. It shows that the predicted food insecurity for Air Force members is 10.5% and changes only .0055 percentage points at the 150% line because there are not many members making below the 150%.

Table 3. Federal Poverty Line Simulation Results

<b>Variable</b>	<b>Mean</b>	<b>Std. dev.</b>	<b>Min</b>	<b>Max</b>
FPL 100%	0.107811	0.06073	0.004193	0.516664
FPL 110%	0.107809	0.060725	0.004193	0.508506
FPL 120%	0.107807	0.060716	0.004193	0.472617
FPL 130%	0.107798	0.060691	0.004193	0.472617
FPL 140%	0.107789	0.060671	0.004193	0.472617
FPL 150%	0.107756	0.060604	0.004193	0.472617

## **B. RESEARCH QUESTION 2**

Next, I assess whether adding a BAS supplement for dependents prevents members from being predicted as food insecure. Table 4 shows all the simulations for all the observations from 2019 which were picked to eliminate issues that arose during the COVID-19 pandemic. Families were given half BAS to spouses, kids, and both. I then increase the BAS to full. Finally, I gave each family double, triple, and quadruple BAS.

Providing spouses with BAS reduces food insecurity risk by .45 percentage points. Every child receiving BAS reduces the risk by .56 percentage points. Families receiving BAS reduced food insecurity risk by .96 percentage points. For the double, triple, and quadruple BAS simulations, food insecurity risk was reduced by 1.67, 2.15, and 2.53 percentage points respectively.

Table 4. 2019 BAS Bonus Simulation Results

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. dev.</b>	<b>Min</b>	<b>Max</b>
Estimated Food Insecurity	230,833	0.1047	0.059610	0.004383	0.533728
Spouse Half BAS	230,830	0.1025	0.060314	0.004383	0.533728
Child Half BAS	230,830	0.1017	0.059087	0.004383	0.497019
Spouse and Child Half BAS	230,830	0.0995	0.058793	0.004383	0.497019
Spouse Full BAS	230,830	0.1002	0.059939	0.004383	0.497019
Child Full BAS	230,830	0.0991	0.058127	0.004383	0.497019
Spouse and Child Full BAS	230,830	0.0951	0.057973	0.004383	0.497019
Spouse and Child Double BAS	230,830	0.0880	0.058213	0.004383	0.497019
Spouse and Child Triple BAS	230,830	0.0832	0.059149	0.004383	0.497019
Spouse and Child Quadruple BAS	230,830	0.0794	0.060208	0.004383	0.497019

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## V. CONCLUSIONS AND RECOMMENDATIONS

### A. SUMMARY

The primary findings of the study are outlined in this chapter, and inferences are made considering the findings. The implications of food insecurity in the Air Force are highlighted in this summary, along with any constraints or presumptions. Based on the findings and restrictions of the current study, this chapter also offers suggestions for further research. This chapter's objectives are to present a succinct and understandable summary of the study's findings and to offer policy suggestions and ways forward. To achieve my results, I used logistic regression and simulation techniques. I first looked at the overall estimation of food insecurity by different demographic to better gauge who is most likely to be considered food insecure.

Using these variables, I was able to better understand where I would need to try and target improved entitlements to ease predicted food insecurity. Estimates from my logistic regression model showed an increased risk for food insecurity in military families who claim several dependents and are not college educated. Using the information from the logistic regression that having a larger family increased the likelihood of being predicted as food insecure, I made the decision to provide BAS to spouses and to dependents under the age of 18.

I ran simulations for different percentages above the Federal Poverty Line from 100% to 150%. I found the change in predicted food insecurity for those who received the extra entitlements was very low compared to the number of funds the Air Force would have to provide. First, the fact that the DOD moved from recognizing 150% above the FPL from 130% only accounted for a .0055 percentage point change in who would be affected.

Further, I focused on 2019 (pre-COVID) to test my BAS "bonus" simulations. I found that providing BAS for spouses provided a .24 percentage point decrease while providing BAS to every dependent resulted in a .34 percentage point decrease in predicted food insecurity.

Finally, I wanted to gauge if I could provide outsized amounts of resources in the form of BAS to get a larger decrease in food insecurity. I first doubled BAS, then I tripled it, and finally quadrupled the amount of BAS each spouse and dependent would receive. My findings showed that even the most generous entitlement package of 400% BAS for every spouse and dependent resulted in 7.9% of the Air Force still being predicted as food insecure which is only a 2.6 percentage point decrease from the baseline. That would mean an average family of four would be provided an additional \$2800 per month and it would still be predicted that food insecurity in the Air Force is at almost 8%.

This study clearly shows that there are other underlying factors that contribute to food insecurity. Providing substantial entitlements to families does not solve the issue, so more must be done. While we may not have the highest rates of food insecurity when compared with other branches or civilian equivalents, one family being food insecure is one too many.

## **B. RECOMMENDATIONS**

### **1. Improve Military Spouse Employment Support**

It's crucial for military spouses who want or need to work to have career advancement chances that are comparable to those available to their peers in the civilian workforce. The DOD can help achieve this goal by collaborating with state-based professional boards to increase reciprocity in professional licensing when a military family relocates to a new state and by offering more assistance and incentives to private sector employers who want to keep their military spouse employees after a PCS move.

### **2. Increase Flexibility for Permanent Change of Station (PCS)**

The Air Force should review the frequency of PCS moves when such moves are not essential to a service member's mission readiness and training to cut personnel costs and avoidable financial strain on military families. So that service members who choose to voluntarily remain in one place for a longer amount of time are not treated differently in terms of pay and promotion, military leaders should work for homesteading to lose its

stigma. When families do relocate, the DOD may offer more support during the adjustment time, such as increased moving expense reimbursements.

### **3. Economic Security Training**

Simply upping entitlements does not get at the heart of this issue. At important career and life inflection points, Air Force members presently take part in financial literacy training related to the Blended Retirement System. They also receive information, tools, and resources through the Transition Assistance Program (TAP) (Jeseck & Todisco, 2019) as they get ready to transition to civilian life. In addition to these, I think it would be beneficial for the Air Force to provide information on economic security earlier and more frequently so that every military family has access to the tools and knowledge they require to succeed, such as details on household financial management, investing and saving strategies, and the DOD Credentialing Opportunities On-Line (COOL) program.

### **4. Improved Data Sharing**

The data sets used seemed overly complicated and required a lot of manhours just to become workable. The VA gathers information on veterans who visit its facilities and request services, the DOD gathers information on its service members throughout their time in the military, and the USDA gathers information on households that utilize government nutrition assistance. To make the issues and solutions clearer these three agencies ought to work together to share their data sets more effectively while keeping all necessary data privacy safeguards. This would ensure comparison could be more readily identified and problems fixed at a much higher rate.

### **5. Continue Expanding the Survey Process**

The findings lead me to believe there may be a need to improve upon the current survey system. An expanded data set has the potential to better capture food insecurity issues across the Air Force. Questions could explore factors such as income, family size, and location to better understand the challenges faced by Air Force members when it comes to accessing adequate and nutritious food. I recommend the surveys be more deliberate and

would try to target the service members and spouses at the junior enlisted and Non-commissioned Officer ranks.

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