ABSTRACT

Title: **VALIDATING THE EXPANDED FOOD SECURITY SCREENER AND HOME-DELIVERED MEAL PRIORITIZATION TOOL FOR ELIGIBLE INDIVIDUALS**

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The Expanded Food Security Screener (FSS-Exp) is a screening tool for determining food insecurity risk based on individuals' physical, economic, and social access to food. The FSS-Exp is the only tool that provides a simple and quick method for identifying which home-delivered meal (HDM) applicants are most vulnerable. However, further testing is required to determine the tool's validity when compared with health and food-related measures associated with food security. Therefore, this study aimed to validate the FSS-Exp and HDM prioritization tool using concurrent and construct validity methods. To evaluate the concurrent validity, we examined the correlations between the FSS-Exp and other health and food-related tools such as SF-36, MOS-SSS, SWFL, SNAQ, and DST, which were associated with economic food insecurity and physical limitation To determine construct validity using the known-groups approach, we compared those health and food-related scores among participants grouped by different access barriers to food (priority levels). The results showed that the FSS-Exp correlated moderately (r=*0.20 to 0.33)* with other "gold standard" measures: SF-36, MOS-SSS, and SWFL. Furthermore, our results showed that individuals categorized as priority level A and B had significantly lower mean scores than priority level E for the SF-36 (HRQL) summary measures

($p<0.05$), SWFL ($p<0.05$), and the tangible social support ($p<0.01$). Thus, the FSS-Exp was shown to be a valid measure in identifying and prioritizing older adults with physical and/or economic access to food, which is especially important for HDM programs with limited resources experiencing increased demand for services. For HDM programs which exist to serve vulnerable older adults, using the validated FSS-Exp tool can help identify those who are most vulnerable and in need of immediate service.

VALIDATING THE EXPANDED FOOD SECURITY SCREENER AND HOME-DELIVERED MEAL PRIORITIZATION TOOL FOR ELIGIBLE INDIVIDUALS

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Chapter 1: Introduction

The number of food insecure older adults in the U.S. has doubled over the past decade.[1] According to Feeding America's 2019 State of Senior Hunger report, 5.2 million seniors were food insecure and 1.9 million were very low food secure.[2] Food security is defined as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".[3] The reported prevalence of food insecurity may be an underestimate in older adults as it is measured based only on economic access to food and does not measure physical or social access to food. Food insecurity is associated with unfavorable nutrition and non-nutrition related outcomes that affect their health and well-being.[4] Previous research indicates that food insecurity among older adults is associated with poor health outcomes, social isolation, functional impairment, financial vulnerability, poor diet quality and quality of life.[1,5,6] With the number of adults aged 65 and over expected to surpass those under the age of 18 by 2034, the percentage of older adults living in food insecure households will likely rise in the absence of improved interventions.[7,8]

One existing intervention is the Older Americans Act Nutrition Program (OAANP) which is the nation's largest and oldest community-based food and nutrition assistance program. The OAANP aims at providing services to promote healthy aging and reduce food insecurity in older adults.[9] It includes various nutritional health services and programs such as, home-delivered meals (HDM) authorized under the Older Americans Act (OAA).[9] The HDM program provides prepared meals to individuals who are unable to leave home without assistance due to illness, disability, or geographic isolation and to those with the greatest economic or social need.[10] Many HDM services have limited resources and are dependent upon donations and often

rely on volunteers to deliver meals.[11] Struggling to meet demands, programs have created long waitlists for HDM applicants.[12] Previously, it was estimated that less than 5% of eligible older adults received meals.[13] Due to COVID-19, home delivered meal programs have received 74% more new requests for meal services per week and waitlists have grown 26%.[14] Programs with waiting lists need ways to quickly determine who is at higher risk of malnutrition and can benefit most with immediate HDM service.

In 2015, the University of Maryland in collaboration with the Maryland Department on Aging created a prioritization tool (FSS-Exp) that HDM programs could use for assessing food insecurity and for quickly determining who is most in need of prepared meal.[15] The Expanded Food Security Screener (FSS-Exp) is a screening tool for determining food insecurity risk based on individuals' ability to afford food in addition to their ability to obtain groceries and prepare hot meals (including any social support they may have for grocery and meal preparation).[15] As mentioned earlier, current food security tools such as the US Department of Agriculture Household Food Security Survey Module (HFSSM) only measure the economic access dimension and do not measure the physical and social access dimensions of food security.[16] The HFSSM asks questions related to insufficient food quantity, inadequate food quality, and uncertainty and worry about food. It has been validated as a measure of food security, but it may not fully capture the experience of food insecurity by all households.[16] In older populations, food insecurity results from more than the ability to afford food; physical limitations can prevent food shopping and cooking especially without adequate social support systems.[6,17] The FSS-Exp tool measures the economic, physical and social access dimensions of food insecurity utilizing a combination of a preexisting tool and two original questions.[15] To measure the economic access dimension, the FSS-Exp uses the preexisting modified 6-item HFSSM, which was validated for

use in older adults.[4] Furthermore, the FSS-Exp measures the physical and social dimensions using two questions to assess difficulty with getting groceries into the home and preparing hot meals (with or without help).[15] Depending on the applicant's responses, they are assigned a priority level ranging from highest priority to lowest (Priority level A to E).[15]

To our knowledge the FSS-Exp is the only tool that provides a simple and quick method for identifying which specific access (economic, physical, social) barriers an HDM applicant is experiencing.[15] To confirm that a large majority of the priority levels assigned using the FSS-Exp tool are appropriate, it was pilot tested from April to July 2015.[15] The results of this pilot test confirmed that 75.3% of the priority levels assigned using the FSS-Exp tool were appropriate.[15] However, further testing is required to determine the validity of this tool when compared with measures that were previously associated with economic food security and physical function. These measures include physical and mental health status, social support and food-related factors of health status.[15] Studies have shown that there is an association between economic food security, physical functioning, and health-related quality of life (HRQOL), satisfaction with food-related life (SWFL), diet quality, appetite/malnutrition risk, social support, and the use of coping strategies related to obtaining food.[6,18-23] Below the health and food-related constructs and measures used to validate the FSS-Exp are further expanded upon.

Health-related quality of life (HRQOL):

In a nationally representative study, economic food insecurity was strongly associated with lower health-related quality of life (HRQOL).[18] HRQOL provides a means of identifying and monitoring the perceived impact of disease and interventions on the physical and mental health of older adults.[24] For older adults physical functioning, such as having the ability to independently perform basic activities of daily living (ADL) together with the absence of

loneliness, were associated with better HRQOL outcomes.[25] The most commonly used HRQOL instrument is the 36-Item Short Form Health Survey (SF-36) developed by the RAND Corporation as part of the Medical Outcomes Study (MOS). This two-year study measured quality of life in patients with prevalent and treatable chronic conditions.[26] This SF-36 tool examines the mental and physical components of HRQOL separately using 8 domains. These domains include: physical functioning, physical role, pain, general health, vitality, social function, emotional role, and mental health. This tool has been validated for use in postal surveys of older people living at home.[26]

Satisfaction with food-related life (SWFL):

Lower satisfaction with food-related life (SWFL) among older adults was found to be associated with lower income, worse health measures and less social support.[28] SWFL is a person's overall assessment regarding their food and eating habits.[29] The SWFL scale was validated by Grunert et al. (2007) in older adults and measures the overall satisfaction of a person's life related to the procurement, preparation, and consumption of food/meals.[30,31] For older adults, decreased SWFL during mealtimes may be factors contributing to a decline in food intake.[30] Having higher levels of SWFL has been associated with better eating habits.[32]

Diet quality:

Food security has been frequently associated with diet quality in older adults.[1] Diet quality is defined as a dietary pattern relative to those recommended in dietary guidelines.[33] The Dietary Screening Tool (DST) measures diet quality and was validated by Bailey et al. (2007) in older adults over the ages of 65 years and older.[34] In older adults, high diet quality reflects achieving more optimal nutrient intake profiles and a lower risk of malnutrition.[35]

Appetite/Risk of Malnutrition:

Previous research has associated malnutrition and food insecurity among older adults.[36] In older adults poor appetite is associated with the risk of malnutrition.[37-39] Hence, current appetite measures such as the Simplified Nutritional Appetite Questionnaire (SNAQ) are used to identify persons with anorexia (poor appetite) at risk of significant weight loss and malnutrition.[40] The SNAQ tool was validated by Wilson et al. (2005) in community-dwelling older adults and long-term care residents.[40] Older adults living alone can have reduced appetite and have less motivation to cook/eat, due to difficulties with shopping, cooking, and lack of social support.[41]

Social Support:

Studies have shown that social support plays an effective role in the management of food security.[42,43] Social support refers more specifically to emotional or tangible assistance provided to individuals, the frequency of contact with others, and the perceived adequacy of that support.[44,45] The Medical Outcomes Study (MOS) Social Support Survey is a tool that measures social support, which was validated for use among older adults.[46] For vulnerable older adults in need of caregiving, social support may directly influence the type/amount of food intake due to reliance on others for help with grocery shopping and meal preparation.[47] Social support can serve as a coping strategy against food insecurity.[48]

Coping Strategies:

Coping strategies are widely used to measure food security.[49-51] The use of coping strategies serves as both an indicator of difficulty, and the resources selected for coping.[52] Given the absence of a gold standard tool for measuring coping strategies related to acquiring, using, and affording food, this current study adapted a mix of coping practices obtained from

qualitative studies.[53-55] Monitoring coping strategies can provide insight into the unmet needs and resources utilized in older adults.

Therefore, this present study aimed to validate the *FSS-Exp* tool which uses a prioritization system to assess individuals at greatest need for HDM services. Concurrent and construct validity measures were used. To evaluate the concurrent validity, the correlations between the FSS-Exp results and the results of other established tools were examined. To determine construct validity, the known-groups approach was used to compare the health and food-related scores between groups of participants with different access barriers to food security (HDM prioritization levels).[56] The FSS-Exp tool and HDM prioritization levels were investigated in six different contexts: 1) perceived social support, 2) HRQOL, 3) SWFL, 4) appetite/risk of malnutrition, 5) diet-quality and 6) use of coping strategies for dealing with difficulty obtaining and eating food.

Chapter 2: Methods

Participants/ study design

We collected cross-sectional data from a convenience sample of older adults recruited from local service providers (LSP) of HDM in several geographical areas: Maryland (*n=39)*, Georgia (*n=85)*, Oregon (*n=39*), North Carolina (*n=13)*, Washington D.C. (*n=8)*, Colorado (*n=10)*, Vermont (*n=5)*, Florida (*n=2)*, New Jersey (*n=1)* and Michigan (*n=1)*. These LSPs distributed informational flyers about the study to individuals on their waiting lists and to participants receiving HDM for one month or less. Weekly, the LSP submitted to us the names and phone numbers of interested participants. Other interested participants who obtained our informational flyers contacted us directly. In this study, there were ten interviewers who were

trained in data collection, interview procedures, and data entry. Interested participants were contacted by phone by one of the trained interviewers who obtained verbal consent from them or their proxy. Interviewers then administered an over-the-phone questionnaire and collected data using Qualtrics, an online survey software available through the University of Maryland. Survey domains included: respondent demographics, food security, dietary information, health-related quality of life, social support, and coping strategies. Participant eligibility included individuals who were aged 60 years and older, who had difficulty leaving home alone due to disabilities or Covid-19, and who were not receiving HDMs or had been receiving HDM for one month or less. Participants were provided with a monetary incentive for participating in the study.

Demographics Characteristics

The demographic characteristics examined were age, sex, race/ethnicity, living arrangements, and income. Age was categorized as 60-75 and 75+ years. Race/ethnicity was categorized as non-Hispanic white, non-Hispanic black, and "other." The other category included Asian and all other racial/ethnic groups. Income was categorized as <$15,000, $15,000-25,000, and >$25,000. Living arrangements were categorized as live alone or live with other/others. The initial sample included 211 individuals; however, those under the age of 60 years, receiving HDM for over one month (*n=3*), with incomplete food security data (*n=4*), and with cognitive difficulties *(n=1)* were also excluded from the analysis. The final analytical sample included 203 individuals. The Institutional Review Board of the University of Maryland, College Park, approved this study.

The Expanded Food Security Screener (FSS-Exp):

For the 6 items of the HFSSM, any affirmative answer (Often, Sometimes, Yes) counted as 1 point. The overall economic food security score is the sum of the points scored for all 6 items to get a score 0-6. Economic food security categories are given based on the scoring range: 0-1 = Food Secure and 2-6 = Food Insecure.[4] To assess the physical access dimension of food security two original questions were added. To measure the ability to get groceries, the following question was used, "Are you able to get groceries into your home when you need them?" To measure the ability to prepare meals, the following question was used: "If you had groceries available, would you be able to use them to prepare a hot meal?" If the individual answered that they were unable to prepare meals, a follow-up question was used: "Do you have reliable help with meal preparation?" Depending on the individual's responses, they were assigned a priority level. Priority levels range from A to E, with A indicating greatest need for a prepared meal, and E indicating lowest need.[15] Criteria used to determine the 5 priority levels of the FSS-Exp HDM prioritization system are listed in Table 1:

Table 1: Priority Level Criteria

Priority Level A	**Can't** prepare a hot meal **and don't** have help (FS score and ability to get groceries don't matter)
Priority Level B	**Can** prepare a hot meal **or have** help & Economically food **insecure** & **can't** get groceries into the home
Priority Level C	**Can** prepare a hot meal **or have** help & Economically food **insecure** & **can** get groceries into the home
Priority Level D	**Can** prepare a hot meal **or have** help & Economically food **secure** & **can't** get groceries into the home
Priority Level E	**Can** prepare a hot meal **or have** help & Economically food **secure** & **can** get groceries into the home

The priority levels were then assigned ordinal scores from 1 to 5 (1 for priority A , 2 for priority B, 3 for priority, 4 for priority D, 5 for priority).

The Dietary Screening Tool (DST):

Dietary intake was measured using the Dietary Screening Tool (DST). The DST consists of 24 items, which assess overall diet quality and categorizes eating patterns into nutrition risk categories. The DST inquires about food-related behaviors. The total score of the DST ranges from 0-100 with 5 'bonus' points for dietary supplement use; the higher the score the healthier the dietary patterns. A higher score is awarded for higher intake of fruits and vegetables, (items associated with healthier foods) whereas a higher score is awarded for lower intake of processed meats and added fats (items associated with less healthy foods). The composite scores of the DST were then classified into one of three nutritional risk categories. Individuals with DST scores <60 were categorized as "at risk," those with DST scores from 60 to 75 were labeled "possible risk," and those with scores >75 were labeled "not at risk."[34] In our study, these DST cut-points were used and the DST score was also examined as a continuous variable.

36-Item Short Form Health Survey (SF-36):

The Health-related quality of life (HRQOL) was measured using the 36-Item Short Form Health Survey (SF-36). This tool consists of 36 items, which ask about health over the past four weeks, measuring eight dimensions of health status: physical functioning, role-physical, role-emotional, social functioning, vitality, bodily pain, mental health, and general health. The following are descriptions of the subscales of the SF-36[26]:

1. The Physical Functioning scale is a 10-item measure of physical ability across a variety of activities such as vigorous exercise to self-care.
2. The Role-Physical scale is a 4-item measure of how physical health limits daily activities at work and around the home.
3. The Bodily Pain scale is a 2-item measure of body pain intensity and the extent to which pain interferes with daily activities.
4. The General Health scale is a 5-items measure of overall general health perceptions.
5. The Vitality scale is a 4-items measure of energy level, fatigue, and subjective well-being.
6. The Social Functioning scale is a 2-item measure of the limitations in social activities because of physical or emotional problems.
7. The Role-Emotional scale is a 3-item measure of role limitations in usual activities (amount of work accomplished, and the care with which work is performed) because of emotional problems.
8. The Mental Health scale is a 5-item measure of anxiety, depression, loss of behavioral/emotional control, and psychological well-being.

The SF-36 Scoring Manual doesn't support a single measure of HRQOL, such as a SF-36 Overall Score. Instead, each sub-scale of the SF-36 obtains an individual score ranging from 0 to 100, with a higher score indicating better health. The eight sub-scales of the SF-36 can then be aggregated into two summary measures; 1) physical component summary (PCS) which includes: Physical Functioning, Role-Physical, Bodily Pain,General Health and 2) the mental component summary (MCS) which includes:Vitality, Social Functioning, Role-Emotional, and Mental

Health. These can be interpretable as the physical and mental dimensions of health. The scoring for PCS and MCS are norm-based methods that use the means, standard deviations and factor score coefficients from the general U.S. population. Z-scores are computed by subtracting the general U.S. population mean score from each SF-36 subscale score and dividing the difference by the U.S. general population standard deviation (Table 2). After z-scores are obtained the PCS and MCS scores are aggregated. PCS scores are constructed by multiplying each SF-36 subscale *z*-score by its respective physical factor scoring coefficient (from the general U.S. population) and summing the eight products (Table 2). Similarly, MCS scores are created by multiplying each SF-36 subscale *z*-score by its respective mental factor score coefficient (from the general U.S. population) and summing the eight products. The component (PCS and MCS) scores were then transformed using norm-based methods so that each had a mean of 50 and a standard deviation of 10 (*T*-score) in the sample. This was accomplished by multiplying each PCS and MCS score by the standard deviation of 10 and adding the resulting product by the mean of 50 (Table 2).[57]

Table 2. Formulas for Physical and Mental Component Scores

Step 1: z-score standardization of SF-36 Scales	
General health (GH) Physical Functioning (PF) Role-Physical (RP) Bodily Pain (BP) Vitality (V) Social Functioning (SF) Mental Health (MH) Role-Emotional (RE)	1. GH z score =(GH score-72.21316)/20.16964 2. PF z score =(PF score-84.52404)/22.89490 3. RP z score =(RP score-81.19907)/33.79729 4. BP z score=(BP score-75.49196)/23.55879 5. V z score=(V score-61.05453)/20.86942 6. SF z score=(SF score-83.59753)/22.37642 7. MH z score =(MH score-74.84212)/18.01189 8. RE z score= (RE score-81.29467)/33.02717
Step 2: The aggregation of PCS and MCS scores	
Physical component summary (PCS)	AGG_PCS= (PF_Z*.42402)+ (RP_Z*.35119)+(BP_Z*.31754)+ (GH_Z*.24954)+ (VT_Z*.02877)+(SF_Z*-.00753) +(RE_Z*-.19206)+(MH_Z*-.22069)
Mental component summary (MCS)	AGG_MCS= (PF_Z*-.22999)+(RP_Z*-.12329)+ (BP_Z*-.09731)+ (GH_Z*-.01571)+(VT_Z*.23534) +(SF_Z*.26876)+(RE_Z*.43407)+(MH_Z*.48581)
Step 3: T-score transformation of component scores	
Transformed PCS Score Transformed MCS Score	PCS=50+(AGG_PCS*10) MCS= 50+ (AGG_MCS*10)

MOS Social Support Survey (MOS-SSS):

Social support was measured using the MOS Social Support Survey. It is a 19-item multidimensional instrument that measures the availability of support, in several domains. In our study, only the tangible support subscale was used. This subscale consists of 4-items assessing the level of social support if a participant were confined to bed and needing assistance with: transportation to the doctor, preparation with meals, and with daily chores. Scoring was assigned based on the following responses: 1="None of the time", 2="A little of the time" , 3="Some of the time", 4="Most of the time", 5="All of the time" . The overall score for tangible support was obtained by calculating the average of the total scores for the 4-items. Average scores range from 1 to 5, and a higher score indicates more support.[46]

Satisfaction with food-related life (SWFL):

This scale consists of five statements and the respondents must indicate their degree of agreement with these statements using a 6-level Likert scale (1 = disagree completely to 6 = agree completely). Total scores range from 5 to 30, and a higher score indicates higher satisfaction with food-related life.[30]

Simplified Nutritional Appetite Questionnaire (SNAQ):

Appetite/malnutrition risk was measured using the Simplified Nutritional Appetite Questionnaire (SNAQ). The SNAQ is composed of four items with five options for answers. These are represented by the letters A to E and each letter has a score (1=A, 2=B, 3=C, 4=D and 5=E). The total score of the questionnaire ranges from 4 to 20. The lower the score, the higher the risk of weight loss. A score of 14 or less indicates the risk of at least 5% weight loss within six months.[40]

Coping Strategies:

A coping strategy score was generated based on the seventeen strategies (Table 3) commonly used by households facing economic food insecurity (inability to afford food) and physical access (inability to prepare meals and get groceries).[53-55] Each affirmative response "Yes" was awarded 1 point. The total score was obtained by calculating the sum of the points, which ranges from 0-17. A higher score indicates that more coping strategies were used.

Table 3. Barriers experienced by older adults with getting groceries, affording food and preparing meals, and common coping strategies.

Ability to get groceries	Barriers	• Getting the groceries home[54] • Limited or inconvenient transportation [53,55,]
	Coping Strategies	1. Using carts to wheel groceries home[54] 2. Using grocery store delivery services[53,54] 3. Limiting the amount of food purchased to reduce the weight of the bags[54] 4. Relocating for easy access to transport or amenities[54] 5. Relying on transport or shopping assistance from social support (family, friends)[53,54] 6. Using public transportation[53,55]
Ability to afford food	Barriers	• Limited budget[53] • Challenges with food prices[55]
	Coping Strategies	1. Social support purchasing food/sharing meals[53,55] 2. Shop where prices are desirable[55] 3. Limit visits to restaurants[55] 4. Use food pantries for groceries[55] 5. Use community centers for meals[53,55] 6. Use Community meal programs (home-delivered meals) [53]
Ability to prepare meals	Barriers	• Lack of motivation to cook[53,54] • Physical difficulties or lack of energy prevent cooking[53,55] • Hard to manage preparing food for one person[53,55]
	Coping Strategies	1. Eating frozen foods that require minimal preparation[54] 2. Eating toast[54] 3. Eating food supplements such as Ensure, Boost, Carnation, Slim Fast[54] 4. Eating fast food [54] 5. Finding less exertive ways to prepare meals by using tools to simplify cooking (such as microwaving)[54]

Statistical Analysis

Descriptive statistics were used to characterize the study sample and those in the five priority levels as determined by the FSS-Exp tool. Descriptive data are presented as frequencies (percentages) for categorical variables

Concurrent Validity:

Concurrent validity is a form of criterion validity and examines the effectiveness of a tool to estimate a participant's performance on another outcome measure administered at approximately the same time.[58] Evidence of concurrent validity of the FSS-Exp tool compared with the validated scales (SF-36, MOS-SSS, DST, SNAQ, SWFL) and number of coping strategies was determined using Spearman's rank correlation. Spearman's correlation (ρ) was used to measure the agreement between the scores of the tools described above and treated as continuous variables, and FSS-Exp ordinal scores. Participants were excluded from the correlation analysis if they did not answer one or more of the questions needed to determine the validated scale scores (SF-36, MOS-SSS, DST, SNAQ, SWFL).

The determination of the sample size for Spearman's rank correlation coefficient was based on a 2-tailed statistical power $\alpha \leq 0.05$, greater than *80%*. Based on these assumptions, the minimum sample size required was $n=200$. Using the 'partial' option in the correlation analysis allowed us to control for various covariates such as: sex, age, gender, race/ethnicity and living arrangements (lived alone vs lived with others).

Known group comparisons:

Known-group comparisons, which is a type of construct validity that examines an instrument's ability to differentiate between distinct groups, were conducted by comparing the

food and health-related scores (SF-36, MOS-SSS, DST, SNAQ, SWFL) by priority level.[56] Analysis of variance (ANOVA) was used to compare mean continuous scores of the validated scales across the five ordinal categories of the FSS-Exp scale while controlling for age, sex, race/ethnicity, living arrangements (living alone versus living with others) and HDM status (on waiting list vs receiving HDM). Participants were excluded from the ANOVA analysis if they did not answer one or more of the questions needed to determine the scores (SF-36, MOS-SSS, DST, SNAQ, SWFL).

All analyses were performed using SAS Studio software 3.8 SAS Institute Inc 2020, which is part of the OnDemand for Academics. The significance level was set at $p<0.05$.

Chapter 3: Results

Characteristics of the study population and by Priority Levels

Over half of the study sample experienced economic food insecurity *(57.1%)*. Most participants were under the age of 75 years *(77.8%)*, non-Hispanic Black *(55.6%)* and lived alone *(61.6%)*. More than two thirds were women *(69.0%)* and almost half had incomes below $15,000 per year *(48.8%)*. Approximately two thirds of the population was assigned a priority level C *(38.9%)* and priority level E *(31.5%)* and the remainder one third of the population was assigned a priority level A *(9.9%)*, priority level B *(14.3%)* and priority level D *(5.4%)*. (Table 4)

Differences in sociodemographic factors by priority level are shown in Table 4. Those categorized as priority level A included the highest proportion of individuals living alone *(70.0%)*. A larger percentage of older adults who live alone experience more difficulty physically performing daily activities. Individuals categorized as priority level B included the highest proportion of men *(44.8%)*, and those under the age of 75 years old *(89.7%)*. Individuals

categorized as priority level C included the highest proportion of those who were non-Hispanic blacks (63.3%). Individuals categorized as priority level D included the highest proportion of individuals over the age of 75 years old (36.4%), and non-Hispanic whites (54.6%). Additionally, Individuals categorized as priority level E included the highest proportion of those who were women (73.4%) and living with others (45.3%). Both priority level A and E had the highest proportion of individuals with incomes $>25,000 (25.0%). The higher incomes in priority level A are the result of categorization being solely dependent on the physical inability to prepare meals and lack of help, without the consideration of economic access unlike the other priority levels B-E. Therefore, priority level A has individuals who are economically food insecure (40.0%) and food secure (60.0%).

Concurrent Validity of the FSS-Exp tool

The results of the correlations from the concurrent validity analysis are displayed in Table 5. Positive correlations were found between the FSS-Exp tool and the SF-36 (HRQL) subscales and summary measures ranging from (r=*0.20 to 0.33)*. Furthermore, positive correlations were found between the FSS-Exp tool and food-related factors such as SWFL (*r=0.29*), and appetite/SNAQ (*r=0.17)*. A positive correlation was also found between the FSS-Exp tool and tangible social support/ MOS-SSS (*r=0.25*). In addition, an inverse correlation was found between FSS-Exp and number of coping strategies used (*r=-0.30*). All correlations were significant at $p<0.05$ except for the correlation between FSS-Exp and of the DST (diet quality) which was not significant.

Known-group comparisons of the FSS-EXP tool

The results of the ANOVA analysis are presented in Table 6. The ANOVA analysis compared each priority level A to D with the referent category priority level E (the economic and physical access food secure group). Individuals categorized as priority level A and B had significantly lower mean scores than priority level E for the SF-36 (HRQL) subscales ($p<0.05$) and summary measures ($p<0.05$), SWFL ($p<0.05$), and the tangible social support ($p<0.01$), with the exception of appetite/SNAQ ($p<0.05$) being significant solely for individuals categorized as priority level A. Individuals categorized as priority level C had significantly lower mean scores than priority level E for SWFL ($p<0.05$), and tangible social support ($p<0.01$). Individuals categorized as priority level D did not have mean scores significantly lower than priority level E. For diet quality (DST), although not significant, the mean DST scores tended to increase as the priority levels increased from A to D.

Table 3 – Demographic Characteristics of Full sample and by Priority Levels (n=203)

	Full Sample	Lev. A[1] (9.85%)	Lev. B[2] (14.3%)	Lev. C[3] (38.9%)	Lev. D[4] (5.4%)	Lev. E[5] (31.5%)
			Frequency (%)			
Demographic Characteristics						
Age Group						
60-75 Years Old	158(77.8)	14 (70.0)	26(89.7)	68(86.1)	7 (63.6)	43 (67.2)
75+ Years Old	45 (22.2)	6 (30.0)	3(10.3)	11(13.9)	4 (36.4)	21 (32.8)
Sex						
Men	63 (31.0)	6 (30.0)	13 (44.8)	23 (29.1)	4 (36.4)	17 (26.6)
Women	140(69.0)	14 (70.0)	16 (55.2)	56(70.9)	7 (63.6)	47 (73.4)
Race/Ethnicity						
Non-Hispanic White	69 (34.0)	8(40.0)	6 (20.7)	23 (29.1)	6(54.6)	26 (40.6)
Non-Hispanic Black	113(55.7)	7(35.0)	18 (62.1)	50 (63.3)	5 (45.5)	33 (51.6)
Other Ethnic/Racial groups	21(10.3)	5(25.0)	5 (17.2)	6 (7.6)	0 (0)	5 (7.8)
Living Arrangements						
Live alone	125(61.6)	14 (70.0)	19(65.5)	50 (63.3)	7 (63.6)	35(54.7)
Live with other/others	78 (38.4)	6 (30.0)	10(34.5)	29 (36.7)	4 (36.4)	29 (45.3)
Income Level						
<$15,000 (n=99)	99 (48.8)	10 (50.0)	18(62.1)	45 (57.0)	7 (63.6)	19 (29.7)
$15,000-25,000 (n=47)	47 (23.2)	5(25.0)	5 (17.2)	17 (21.5)	1 (9.1)	19(29.7)
>$25,000 (n=35)	35 (17.2)	5 (25.0)	3(10.3)	9 (11.4)	2 (18.2)	16 (25.0)
Missing (n=22)	22 (10.8)	0 (0)	3(10.3)	8 (10.1)	1 (9.1)	10 (15.6)
6-Item HFSSM						
Categories	87(42.9)	12(60.0)	0(0)	0(0)	11(100.0)	64(100.0)
Food Secure	116(57.1)	8(40.0)	29(100.0)	79(100.0)	0(0)	0(0)
Food Insecure						

[1]Lev. A-are unable to prepare meals and do not have help (Economic access not considered)
[2]Lev. B-are able to prepare meals (with or without help) but cannot get groceries into their home and are economically food insecure.
[3]Lev. C-are able to obtain groceries and prepare meals (with or without help), but are economically food insecure
[4]Lev. D-are economically food secure, able to prepare meals (with or without help), but have difficulty getting groceries into their home
[5]Lev. E-are economically food secure and have the ability to get groceries into the home and prepare meals, either with or without help

Table 5. Association between the FSS-Exp with health and food-related outcomes Controlling for confounders[*]. (n=203)

	Partial Spearman's rank correlation coefficient	p Value
SNAQ[1] (Scores 4-20)	0.17	0.0164
DST[2] (Scores 0-100)	0.06	0.3749
SF-36 subscales[3] (Scores 0-100)		
General Health	0.26	0.0002
Physical Functioning	0.29	<.0001
Mental Health	0.20	0.0054
Bodily Pain	0.33	<.0001
Vitality	0.24	0.0005
Role-Physical (n=201)	0.26	0.0002
Role-Emotional (n=202)	0.24	0.0014
Social Functioning (n=197)	0.27	0.0001
SF-36 summary scales[4] (n=195)		
Physical component summary	0.30	<.0001
(PCS)	0.22	0.0022
Mental component summary (MCS)		
SWFL[5] (Scores 5-30)	0.29	<.0001
MOS-SSS[6] (Scores 0-4)	0.25	0.0004
Number of Coping Strategies Used (Scores 0-17)	-0.30	<.0001

[*] *Confounders=Age, Sex, Race/Ethnicity, and Living arrangements*

[1] The Simplified Nutritional Appetite Questionnaire (SNAQ) measures Appetite/malnutrition risk

[2] The Dietary Screening Tool (DST) measures diet quality

[3] The 36-Item Short Form Health Survey (SF-36) measures health-related quality of life (HRQOL)

[4] The SF-36 summary scales are measures of the physical and mental dimensions of health.

[5] Satisfaction with food-related life (SWFL)

[6] MOS Social Support Survey measures social support

Table 6: ANOVA Mean comparison SF-36, DST, SFWL, MOS-SSS and SNAQ Scores by Priority Level. Controlling for confounders[+]. Mean(SD)

	MOS[6] (max = 5)	SF-36[7] Subscales							SF-36-Summary[8]		SNAQ[9] (max = 20)	SWFL[10] (max = 30)	DST[11] (max = 100)
		General Health (max = 100)	Physical Functioning (max = 100)	Mental Health (max =100)	Vitality (max = 100)	Bodily Pain (max =100)	Role Physical (max = 100)	Role Emotional (max= 100)	Social Functioning (max= 100)	Physical component summary (PCS)	Mental component summary (MCS)			
n	203	203	203	203	203	203	201	202	197	195	195	203	203	203
Full Sample	3.00 (1.17)	43.4 (23.7)	34.4 (30.0)	60.8 (23.7)	40.7 (22.3)	45.0 (28.0)	22.51 (34.3)	48.8 (42.0)	49.7 (30.6)	30.5 (11.5)	44.3 (13.1)	13.7 (2.64)	21.9 (5.90)	57.2 (13.9)
Lev. A[1] (n=20)	2.49* (0.75)	32.3 ** (16.7)	16.3 ** (19.7)	53.8* (28.2)	31.0 * (21.9)	32.4 ** (28.1)	12.50* (30.8)	33.3* (41.8)	39.4* (30.9)	24.6** (8.06)	40.8* (15.6)	12.2* (2.19)	20.4 * (6.57)	52.2 (10.6)
Lev. B[2] (n=29)	2.72* (1.23)	28.3*** (18.9)	21.7*** (20.8)	50.6** (24.9)	32.8** (19.1)	28.2*** (21.4)	8.03** (18.1)	32.1* (40.4)	31.5*** (26.3)	24.9*** (8.94)	38.6** (12.2)	13.6 (1.94)	19.1** (0.17)	56.7 (15.2)
Lev. C[3] (n=79)	2.88* (1.20)	47.6 (24.8)	39.2 (30.1)	61.8 (23.4)	42.6 (22.1)	46.5 (25.4)	22.8 (34.7)	47.7 (40.8)	51.9 (28.6)	32.0 (11.2)	44.0 (13.3)	13.8 (2.47)	21.4* (5.13)	58.2 (14.8)
Lev. D[4] (n=11)	3.16 (1.38)	47.7 (27.6)	25.5 (26.8)	66.2 (20.7)	40.5 (26.0)	43.0 (35.4)	13.6 (32.3)	63.3 (43.4)	44.3 (30.3)	26.7 (11.0)	48.2 (11.7)	13.9 (3.08)	25.5 (3.17)	60.2 (16.5)
Lev. E[5] (n=64) ***(Ref-Group)***	3.42 (1.07)	47.9 (22.0)	41.3 (32.6)	65.5 (21.1)	44.9 (22.2)	55.1 (28.2)	33.2 (37.5)	59.9 (41.2)	59.2 (31.1)	33.6 (12.6)	47.6 (11.6)	14.0 (3.05)	23.6 (6.27)	57.3 (12.6)

Significantly different from reference group at: ***p≤0.0001 ** p<0.01 *p<0.05

[+]Confounders=Age, Sex, Race/Ethnicity, Living arrangements and HDM status.

[1]Lev. A-are unable to prepare meals and do not have help (Economic access not considered)

[2]Lev. B-are able to prepare meals (with or without help) but cannot get groceries into their home and are economically food insecure.

[3]Lev. C-are able to obtain groceries and prepare meals (with or without help), but are economically food insecure

[4]Lev. D-are economically food secure, able to prepare meals (with or without help), but have difficulty getting groceries into their home

[5]Lev. E-are economically food secure and have the ability to get groceries into the home and prepare meals, either with or without help

[6] MOS Social Support Survey measures social support
[7] The 36-Item Short Form Health Survey (SF-36) measures health-related quality of life (HRQOL)
[8] The SF-36 summary scales are measures of the physical and mental dimensions of health.
[9]The Simplified Nutritional Appetite Questionnaire (SNAQ) measures Appetite/malnutrition risk
[10] Satisfaction with food-related life (SWFL)
[11] The Dietary Screening Tool (DST) measures diet quality, At-risk group, DST score <60 Possible-risk group, DST score 60–75 Not-at-risk group, DST score >75

Chapter 4: Discussion

The intent of this study was to validate the use of the FSS-Exp screening tool in identifying the most vulnerable older adults in need of the HDM program. Over the last few years, the waiting list for the OAANP has expanded due to increased demand for the service.[12,14] The FSS-Exp screening tool was developed to determine priority for the HDM service based on the economic, physical, and social access dimensions of food insecurity. In validating the FSS-Exp tool; we used two approaches: (1) concurrent validity and (2) construct validity. Our results indicate that the FSS-Exp tool provides a useful and valid means to identify HDM applicants who are most vulnerable, particularly as it relates to poor health-related quality of life, lack of tangible social support, lower satisfaction with food, and poor appetite/risk of malnutrition.

In the present study, using the concurrent validity approach, we observed significant but weak to moderate correlations between the FSS-Exp score and the health and food-related constructs: SF-36, MOS-SSS, SWFL, SNAQ, and coping strategies. The SF-36 and FSS-Exp correlation indicates that both share a level of agreement when measuring physical functioning capabilities, including the ability to get groceries home.[15,26] The SF-36 scale is a measure of the physical and mental health status components of health-related quality of life (HRQOL) whereas the FSS-Exp evaluates physical functioning to acquire and prepare food. Consistent with previous studies that have reported an association between physical functioning and HRQOL, the FSS-Exp showed that older adults with poor physical access or in combination with limited economic access to food, experience lower health-related quality of life scores.[59-62] These results also suggest that the FSS-Exp is not only a valid measure of food-related physical functioning but may indirectly assess the mental aspects of HRQOL.

MOS-SSS, a measure of social support, also showed a significant correlation with the FSS-Exp score. Both measures assess the availability of social support in relation to functional limitations, meal preparation and economic food insecurity.[15,46] In agreement with past studies of social support, physical functioning and economic food insecurity, the FSS-Exp tool was able to identify vulnerable individuals with limited social support.[42,43,63-67]

There was also a significant correlation between the SWFL and FSS-Exp tool. This is in support of studies which found that without physical and economic access to food and meals, satisfaction with food-related quality of life may be negatively affected.[68,69] Our results indicate that the FSS-Exp tool identifies individuals with limited physical and/or economic access to food and who have lower satisfaction with food-related quality of life and consequently at risk of poor dietary intake and malnutrition.

Furthermore, the significant correlation between appetite (SNAQ) and FSS-Exp score, although weak, indicates that they share a level of agreement when measuring food access. The physical inability to prepare meals may directly impact the number of meals accessible for individuals to consume per day increasing their risk for anorexia and malnutrition.[70,71] In our results, the FSS-Exp score showed that older adults with more severe physical functional limitations were more at risk for anorexia and malnutrition.

There was an inverse correlation between coping strategies and FSS-Exp score. Coping strategies are direct indicators of the barriers faced by individuals, therefore the higher the number of coping strategies used, the lower the score on the FSS-Exp (priority level A and B).[72-75] Consistent with our results, previous studies have found that households with food insecurity were more likely to engage in coping strategies compared to food secure households.[76-78]

Therefore, these results support that the FSS-Exp tool identifies vulnerable individuals with barriers to acquire, prepare, and afford food.

Lastly, there was no significant correlation between DST and FSS-Exp. These results may be due to the fact that dietary quality of individuals in this study was generally poor as seen from the mean score of individuals in all FSS-Exp categories. Also, the sample size may have been too small to detect a gradient scale.

Overall, the results of the concurrent validity suggest that the FSS-Exp correlated well with other "gold standard" measures of health and food-related indicators, such as SF-36, MOS-SSS and SWFL. This indicates that this tool is useful in identifying the most vulnerable individuals. One important advantage of the FSS-Exp tool is that it not only captures the physical, economic, and social access to food but also reflects underlying mental aspects of health-related quality of life.

The construct validity analysis of the FSS-Exp tool showed that older adults who had difficulty preparing hot meals, did not have reliable help and, who may have been economically FI (priority A) and those who had difficulty with getting groceries into the home and who were economically FI (priority B) were more vulnerable compared to individuals who were economically and physically food secure (priority E). These results support the need to add questions about ability to shop and cook to any food security questionnaire that may be used to collect this information from older adults. Other studies have also shown that older adults with functional impairments may have limited ability to shop for food and to prepare meals.[79-81]

The results of our study demonstrate that older adults categorized as priority level A and B had significantly lower mean scores in all validated measures when compared to economic and physical food secure (priority level E) older adults. The only exception was that there were no

associations between diet quality and the priority levels. These results are similar to those reported earlier in the correlation analysis. Other studies have also found no association between diet quality and economic/physical functioning barriers to food access among older adults.[82,83] In contrast to these results, a few studies did find that among older adults, poor diet quality was associated with economic barriers to food access and functional limitations.[6,20,84,85] Inconsistencies in findings across studies may be attributed to several reasons. Studies use different methods in measuring diet quality, and some may be less sensitive in detecting such differences.[1] Additionally, as stated above, individuals in this study were overall at risk of poor nutrition, with mean DST score in the at-risk category (below 60) for all priority levels. Lastly, the sample size was small indicating that there might not be enough power to detect an effect. Nevertheless, older adults categorized as priority levels A and B and with diminished ability to shop for food and prepare hot meals, although not significant, had lower mean DST scores compared to the other priority levels.

Experiencing difficulties with meal preparation, social support, and potentially economic FI places individuals in priority level A which is at greater nutritional risk than other priority levels.[15] Older adults categorized as priority level A were at greater risk for malnutrition/anorexia (lowest mean SNAQ scores), had less social support (lowest mean MOS-SSS scores), and had poorer overall physical health (lowest mean PCS scores) compared to economic and physical food secure (priority E) individuals. The loss of functional ability for activities related to shopping, transportation, and meal preparation may lead to dependence on others for social support.[79] With inadequate social support with food-related activities, nutritional problems may worsen, due to decreased food intake and increased risk of malnutrition.[79]

Furthermore, our results showed that older adults categorized as priority level B, tended to have higher mean overall physical health scores compared to priority level A, but lower overall mean mental health and SWFL scores compared to the other priority levels. Individuals categorized as priority level B, experience difficulty with both economic access and the ability to get groceries home, but are not as physically limited as those in priority level A.[15] Our findings are consistent with other studies in older adults which found that economic food insecurity and declines in functionality correspond to a decrease in quality of life.[82,86] Added vulnerability of older adults with both physical and economic access barriers to food, were shown to have higher rates of depression and may be more vulnerable to declining health.[87]

Additionally, we found that individuals in priority level C, had higher scores for all health and food-related variables than individuals with combined physical access and economic difficulties (priority A and B), but had significantly lower tangible social support and SWFL compared to individuals who were food secure (priority level E). For priority C, categorization is based on difficulty solely with economic access to food, in which other forms of financial assistance such as the Supplemental Nutrition Assistance Program (SNAP) may provide adequate support.[15] SNAP provides supplemental household income for food, and may therefore improve access to a higher quality diet for food insecure adults.[88] SNAP can reduce financial strain, and the adverse effect of economic food insecurity on dietary quality for older adults living under or near the poverty line.[88-90] However, only 48% of eligible older adults actually participate in the SNAP program.[91]

Lastly, the results in our study showed that there was no significant difference in the validated measures for priority level D compared to food secure older adults (priority level E). For individuals categorized as priority D, they do not have issues with economic access, and may

have enough resources available to pay for groceries to be delivered to the home and are physically able to prepare meals.[15] Since, the sample size in our study for priority level D was small it is difficult to determine whether there is a distinguishable difference between those categorized as priorities D and E.

Overall, the results of this study validate the rationale for the development of the FSS-Exp tool which assigns priority levels based on risk factors that assess the need for the HDM program. Individuals with priority levels A and B were found to be more vulnerable than individuals with priority level C in all health and food-related measures. Thus incorporating the physical access dimension into the food security measurement tool (FSS-Exp), helped identify older adults who were more vulnerable due to the combination of economic and physical access barriers (priority B), but also identified those with physical access barriers and insufficient social support (priority A) who may not have been detected due to their economic food security status.[87] For HDM programs which exist to serve vulnerable older adults with physical functioning barriers, using the validated FSS-Exp tool can help identify those who are most vulnerable and in need of immediate service.

One key notable strength of this study was the recruitment of homebound older adults who are traditionally difficult to recruit. This was done with the assistance of service providers in several states. This study also has several important limitations. The size of the sample may have been too small and with limited power to detect the association between the tool and diet quality. Additional effort should be made to test this tool on a larger sample size. Also, like any self-reported measure, bias is an important consideration. Finally, the number of interviewers was large, which may lead to measurement error. However, all interviewers were trained in a standardized way to minimize bias in collecting and recording data.

Chapter 5: Conclusion

Results of the concurrent and construct validity methods conducted in this study demonstrate evidence supportive of the FSS-Exp tool as a valid measure in identifying and prioritizing older adults with limited physical and/or economic access to food, which is especially important for HDM programs with limited resources and that are experiencing increased demand for services. Current food security tools only measure the economic access dimension of food security and do not assess unique factors affecting older adults such as functional limitation, social isolation and the ability to prepare/ cook meals, which can have a significant impact on health outcomes. For HDM programs that aim to target the most vulnerable older adults, it is necessary to incorporate the physical access dimension into the current food security measurements.

To our knowledge the FSS-Exp is the only tool that assesses both the economic and physical access dimensions of food security. The FSS-Exp tool can help identify individuals in need of faster service and the type of assistance most appropriate for individuals applying for HDM services. This tool can also be used for programs as an indicator of who is being reached and whether additional efforts should be made to target the most vulnerable of the population.[15]

Additionally, this tool can be used to incentivize policymakers to allocate more resources to reduce the prevalence of vulnerable individuals who cannot be served due to limited funding. From our knowledge, this tool has been adopted by HDM programs in several states and our results confirm that this tool is a good way to target the most in need of HDM services. Further exploration is necessary to investigate this tool in a larger sample to identify if there is an association with diet quality and whether there is a distinguishable difference between priority

levels E and D. The inability to prepare a hot meal and no reliable help indicates a crucial need for the HDM program regardless of the economic status. Therefore, individuals categorized as "priority A" may or may not be economically FI. In fact, in our study only 40% were economically FI. Therefore, in using this tool, the results must be interpreted with caution. Also, this tool can be modified to adapt it to the needs of the study or program that is using it.

Appendix 1: Assessment Questions

The following questions are from the Expanded Food Security Screener.[15]

Q1 If you had groceries available, would you be able to use them to prepare a hot meal for yourself?
Yes ……1(NEXT QUESTION IS Q4)
No ……2 (NEXT QUESTION IS Q2)
Refused ……3(NEXT QUESTION IS Q4)
Don't Know/NA……4(NEXT QUESTION IS Q4)

Q2 Do you have reliable help with meal preparation?
Yes ……1 (NEXT QUESTION IS Q4)
No ……2 (STOP HERE)
Refused ……3(NEXT QUESTION IS Q4)
Don't Know/NA……4(NEXT QUESTION IS Q4)

Q4 Are you able to get groceries into your home when you need them?
Yes ……1 (NEXT QUESTION IS Q69)
No ……2 (NEXT QUESTION IS Q69)
Refused ……3 (NEXT QUESTION IS Q69)
Don't Know/NA……4 (NEXT QUESTION IS Q69)

Q69 During the last 30 days, how often was this statement true: The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more.
Often ……1 (NEXT QUESTION IS Q71)
Sometimes……2 (NEXT QUESTION IS Q71)
Never ……3 (NEXT QUESTION IS Q71)
Refused……4 (NEXT QUESTION IS Q71)
Don't Know/NA ……5 (NEXT QUESTION IS Q71)

Q71 During the last 30 days, how often was this statement true: (I/We) couldn't afford to eat balanced meals
Often ……1 (NEXT QUESTION IS Q10)
Sometimes……2 (NEXT QUESTION IS Q10)
Never ……3 (NEXT QUESTION IS Q10)
Refused……4 (NEXT QUESTION IS Q10)
Don't Know/NA ……5 (NEXT QUESTION IS Q10)

Q10 In the past 30 days, did you or other adults in your household ever cut the size of your meals because there wasn't enough money for food?
Yes ……1 (NEXT QUESTION IS Q12)
No ……2 (NEXT QUESTION IS Q12)

Refused …….3 (NEXT QUESTION IS Q12)
Don't Know/NA……4 (NEXT QUESTION IS Q12)

Q12 In the past 30 days, did you or other adults in your household ever skip meals because there wasn't enough money for food?
Yes ……1 (NEXT QUESTION IS Q14)
No …….2 (NEXT QUESTION IS Q14)
Refused …….3 (NEXT QUESTION IS Q14)
Don't Know/NA……4 (NEXT QUESTION IS Q14)

Q14 In the last 30 days, did you ever eat less than you felt you should because there wasn't enough money to buy food?
Yes ……1 (NEXT QUESTION IS Q15)
No …….2 (NEXT QUESTION IS Q15)
Refused …….3 (NEXT QUESTION IS Q15)
Don't Know/NA……4 (NEXT QUESTION IS Q15)

Q15 In the last 30 days, were you ever hungry but didn't eat because you couldn't afford enough food?
Yes ……1 (FINAL QUESTION FOR THIS SECTION)
No …….2 (FINAL QUESTION FOR THIS SECTION)
Refused …….3 (FINAL QUESTION FOR THIS SECTION)
Don't Know/NA……4 (FINAL QUESTION FOR THIS SECTION)

The following questions are from the Dietary screening tool[34]

Q19 How often do you usually drink 100% fruit juices (other than orange juice)?
Never ……1 (NEXT QUESTION IS Q20)
Less than once a week…….2 (NEXT QUESTION IS Q20)
1 or 2 times a week …….3 (NEXT QUESTION IS Q20)
3 or more times a week……4 (NEXT QUESTION IS Q20)
Refused ……5 (NEXT QUESTION IS Q20)
Don't Know/NA……6(NEXT QUESTION IS Q20)

Q20 How often do you usually eat fruit as a snack?
Never or Less than once a week ……1 (NEXT QUESTION IS Q21)
1 or 2 times a week …….2 (NEXT QUESTION IS Q21)
3 or more times a week……3(NEXT QUESTION IS Q21)
Refused ……4 (NEXT QUESTION IS Q21)
Don't Know/NA……5(NEXT QUESTION IS Q21)

Q21 How often do you usually eat vegetables as a snack?

Never or Less than once a week ……1 (NEXT QUESTION IS Q22)
1 or 2 times a week …….2 (NEXT QUESTION IS Q22)
3 or more times a week……3(NEXT QUESTION IS Q22)
Refused ……4 (NEXT QUESTION IS Q22)
Don't Know/NA……5(NEXT QUESTION IS Q22)

Q22 How often do you usually eat whole grain breads?
Never ……1 (NEXT QUESTION IS Q23)
Less than once a week…….2 (NEXT QUESTION IS Q23)
1 or 2 times a week …….3 (NEXT QUESTION IS Q23)
3 or more times a week……4 (NEXT QUESTION IS Q23)
Refused ……5 (NEXT QUESTION IS Q23)
Don't Know/NA……6(NEXT QUESTION IS Q23)

Q23 How often do you usually eat whole grain cereals?
Never ……1 (NEXT QUESTION IS Q24)
Less than once a week…….2 (NEXT QUESTION IS Q24)
1 or 2 times a week …….3 (NEXT QUESTION IS Q24)
3 or more times a week……4 (NEXT QUESTION IS Q24)
Refused ……5 (NEXT QUESTION IS Q24)
Don't Know/NA……6(NEXT QUESTION IS Q24)

Q24 How often do you usually eat candy or chocolate?
Never ……1 (NEXT QUESTION IS Q25)
Less than once a week…….2 (NEXT QUESTION IS Q25)
1 or 2 times a week …….3 (NEXT QUESTION IS Q25)
3 or more times a week……4 (NEXT QUESTION IS Q25)
Refused ……5 (NEXT QUESTION IS Q25)
Don't Know/NA……6(NEXT QUESTION IS Q25)

Q25 How often do you eat crackers, pretzels, chips, or popcorn?
Never ……1 (NEXT QUESTION IS Q26)
Less than once a week…….2 (NEXT QUESTION IS Q26)
1 or 2 times a week …….3 (NEXT QUESTION IS Q26)
3 or more times a week……4 (NEXT QUESTION IS Q26)
Refused ……5 (NEXT QUESTION IS Q26)
Don't Know/NA……6(NEXT QUESTION IS Q26)

Q26 How often do you eat cakes or pies?
Never ……1 (NEXT QUESTION IS Q199)
Less than once a week…….2 (NEXT QUESTION IS Q199)
1 or 2 times a week …….3 (NEXT QUESTION IS Q199)
3 or more times a week……4 (NEXT QUESTION IS Q199)
Refused ……5 (NEXT QUESTION IS Q199)
Don't Know/NA……6(NEXT QUESTION IS Q199)

Q199 How often do you eat cookies?

Never ……1 (NEXT QUESTION IS Q28)
Less than once a week…….2 (NEXT QUESTION IS Q28)
1 or 2 times a week …….3 (NEXT QUESTION IS Q28)
3 or more times a week……4 (NEXT QUESTION IS Q28)
Refused ……5 (NEXT QUESTION IS Q28)
Don't Know/NA……6(NEXT QUESTION IS Q28)

Q28 How often do you eat ice cream?
Never ……1 (NEXT QUESTION IS Q29)
Less than once a week…….2 (NEXT QUESTION IS Q29)
1 or 2 times a week …….3 (NEXT QUESTION IS Q29)
3 or more times a week……4 (NEXT QUESTION IS Q29)
Refused ……5 (NEXT QUESTION IS Q29)
Don't Know/NA……6(NEXT QUESTION IS Q29)

Q29 How often do you eat potatoes?
Never ……1 (NEXT QUESTION IS Q30)
Less than once a week…….2 (NEXT QUESTION IS Q30)
1 or 2 times a week …….3 (NEXT QUESTION IS Q30)
3 or more times a week……4 (NEXT QUESTION IS Q30)
Refused ……5 (NEXT QUESTION IS Q30)
Don't Know/NA……6(NEXT QUESTION IS Q30)

Q30 How often do you eat cold cuts, hot dogs, lunchmeats, or deli meats?
Never ……1 (NEXT QUESTION IS Q31)
Less than once a week…….2 (NEXT QUESTION IS Q31)
1 or 2 times a week …….3 (NEXT QUESTION IS Q31)
3 or more times a week……4 (NEXT QUESTION IS Q31)
Refused ……5 (NEXT QUESTION IS Q31)
Don't Know/NA……6(NEXT QUESTION IS Q31)

Q31 How often do you eat nuts (this includes mixed nuts, peanuts, walnuts, almonds, pistachios, and other nuts)?
Never ……1 (NEXT QUESTION IS Q32)
Less than once a week…….2 (NEXT QUESTION IS Q32)
1 or 2 times a week …….3 (NEXT QUESTION IS Q32)
3 or more times a week……4 (NEXT QUESTION IS Q32)
Refused ……5 (NEXT QUESTION IS Q32)
Don't Know/NA……6(NEXT QUESTION IS Q32)

Q32 How often do you eat eggs?
Never ……1 (NEXT QUESTION IS Q33)
Less than once a week…….2 (NEXT QUESTION IS Q33)
1 or 2 times a week …….3 (NEXT QUESTION IS Q33)
3 or more times a week……4 (NEXT QUESTION IS Q33)
Refused ……5 (NEXT QUESTION IS Q33)

Don't Know/NA……6(NEXT QUESTION IS Q33)

Q33 How often do you eat carrots, sweet potatoes, broccoli, or spinach?
Never or Less than once a week ……1 (NEXT QUESTION IS Q34)
1 or 2 times a week …….2 (NEXT QUESTION IS Q34)
3 or more times a week……3(NEXT QUESTION IS Q34)
Refused ……4 (NEXT QUESTION IS Q34)
Don't Know/NA……5(NEXT QUESTION IS Q34)

Q34 How often do you eat fruit (not including juice)? Please include fresh, canned, or frozen fruit.
Less than 2 times a week……1 (NEXT QUESTION IS Q35)
3 to 5 times a week…….2 (NEXT QUESTION IS Q35)
Every day or almost every day……3(NEXT QUESTION IS Q35)
Refused ……4 (NEXT QUESTION IS Q35)
Don't Know/NA……5(NEXT QUESTION IS Q35)

Q35 How often do you eat hot or cold breakfast cereal?
Never or less than once a week……1 (NEXT QUESTION IS Q36)
1 or 2 times a week …….2 (NEXT QUESTION IS Q36)
3 to 5 times a week…….3 (NEXT QUESTION IS Q36)
Every day or almost every day……4 (NEXT QUESTION IS Q36)
Refused ……5 (NEXT QUESTION IS Q36)
Don't Know/NA……6(NEXT QUESTION IS Q36)

Q36 How often do you drink some kind of juice at breakfast?
Never or Less than once a week ……1 (NEXT QUESTION IS Q37)
2 to 5 times a week…….2 (NEXT QUESTION IS Q37)
Every day or almost every day……3(NEXT QUESTION IS Q37)
Refused ……4 (NEXT QUESTION IS Q37)
Don't Know/NA……5(NEXT QUESTION IS Q37)

Q37 How often do you eat chicken or turkey?
Never or Less than once a week ……1 (NEXT QUESTION IS Q38)
1 or 2 times a week …….2 (NEXT QUESTION IS Q38)
3 or more times a week……3(NEXT QUESTION IS Q38)
Refused ……4 (NEXT QUESTION IS Q38)
Don't Know/NA……5(NEXT QUESTION IS Q38)

Q38 How often do you drink a glass of milk?
[Interviewer note: if the milk they drink is non-dairy, this still counts]
Never or less than once a week……1 (NEXT QUESTION IS Q39)
1 or 2 times a week …….2 (NEXT QUESTION IS Q39)
3 to 5 times a week…….3 (NEXT QUESTION IS Q39)
Every day or almost every day……4 (NEXT QUESTION IS Q39)
Refused ……5 (NEXT QUESTION IS Q39)

Don't Know/NA……6(NEXT QUESTION IS Q39)

Q39 Do you usually add butter or margarine to foods like breads, rolls, or biscuits?
Yes ……1 (NEXT QUESTION IS Q40)
No ……2 (NEXT QUESTION IS Q40)
Refused ……3 (NEXT QUESTION IS Q40)
Don't Know/NA……4 (NEXT QUESTION IS Q40)

Q40 Do you use gravy (when available) at meals?
Yes ……1 (NEXT QUESTION IS Q41)
No ……2 (NEXT QUESTION IS Q41)
Refused ……3 (NEXT QUESTION IS Q41)
Don't Know/NA……4 (NEXT QUESTION IS Q41)

Q41 Do you usually add sugar or honey to sweeten your coffee or tea?
Yes ……1 (NEXT QUESTION IS Q42)
No ……2 (NEXT QUESTION IS Q42)
[Respondent said they add artificial sweetener to coffee or tea]….3 (NEXT QUESTION IS Q42)
Refused ……4 (NEXT QUESTION IS Q42)
Don't Know/NA……5(NEXT QUESTION IS Q42)

Q42 What kind of milk do you drink or serve with cereal?
I don't drink milk or use it on cereal……1 (NEXT QUESTION IS Q43)
Regular/Whole milk……2 (NEXT QUESTION IS Q43)
Reduced Fat (1%, 2%) milk……3 (NEXT QUESTION IS Q43)
Skim, Non-fat milk……4 (NEXT QUESTION IS Q43)
Lactaid/Soy Milk/ or another type of milk not listed……5 (NEXT QUESTION IS Q43)
Refused ……6 (NEXT QUESTION IS Q43)
Don't Know/NA……7(NEXT QUESTION IS Q43)

Q43 How often do you eat fish or seafood that IS NOT fried?
Never ……1 (NEXT QUESTION IS Q44)
Less than once a week……2 (NEXT QUESTION IS Q44)
Once a week ……3 (NEXT QUESTION IS Q44)
More than once a week……4 (NEXT QUESTION IS Q44)
Refused ……5 (NEXT QUESTION IS Q44)
Don't Know/NA……6(NEXT QUESTION IS Q44)

Q44 How many servings of milk, cheese, or yogurt do you usually have each DAY? (One serving is about a cup of milk, a single-serving container of yogurt, or a slice of cheese)
[Interviewer note: non-dairy milk can be included in this count]
None ……1 (NEXT QUESTION IS Q45)
One……2 (NEXT QUESTION IS Q45)
Two or more……3(NEXT QUESTION IS Q45)
Refused ……4 (NEXT QUESTION IS Q45)
Don't Know/NA……5(NEXT QUESTION IS Q45)

Q45 How many different vegetable servings do you usually have at your main meal of the day? Please include salads and potatoes when you answer the question. (One serving is about a half cup of cooked vegetables or a cup of raw vegetables).
[Interviewer note: If they are not sure how to estimate a cup/a half a cup, tell them that a cup is approximately the size of a closed fist, and a half a cup is approximately the amount you could hold in a cupped hand.]
None ……1 (NEXT QUESTION IS Q46)
One…….2 (NEXT QUESTION IS Q46)
Two ……3(NEXT QUESTION IS Q46)
Three or more……4(NEXT QUESTION IS Q46)
Refused ……5 (NEXT QUESTION IS Q46)
Don't Know/NA……6(NEXT QUESTION IS Q46)

Q46 How many times each day do you eat meals?
1 or 2 ……1 (NEXT QUESTION IS Q50)
3 or more …….2 (NEXT QUESTION IS Q50)
Refused …….3 (NEXT QUESTION IS Q50)
Don't Know/NA……4 (NEXT QUESTION IS Q50)

Q50 How many times each DAY do you eat between meals, including an evening snack?
0 ……1 (NEXT QUESTION IS Q47)
1 or more …….2 (NEXT QUESTION IS Q47)
Refused …….3 (NEXT QUESTION IS Q47)
Don't Know/NA……4 (NEXT QUESTION IS Q47)

Q47 Do you take a multivitamin or mineral supplement?
Yes ……1 (FINAL QUESTION FOR THIS SECTION)
No …….2 (FINAL QUESTION FOR THIS SECTION)
Refused …….3 (FINAL QUESTION FOR THIS SECTION)
Don't Know/NA……4 (FINAL QUESTION FOR THIS SECTION)

The following questions are from the Short-form 36 (SF-36)[26]

The following items are about activities you might do during a typical day. I will ask if your health limits you in these activities, and if so, how much.
*[**Interviewer instruction:** For each item, ask if their health limits them in the activity, yes or no. If the response is yes, ask if they are limited a little or limited a lot.]*

Q78 Does your health now limit you in: Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports
Yes, limited a lot ……1 (NEXT QUESTION IS Q80)
Yes, limited a little…….2 (NEXT QUESTION IS Q80)
No …….3 (NEXT QUESTION IS Q80)

Refused……4 (NEXT QUESTION IS Q80)
Don't Know/NA ……5 (NEXT QUESTION IS Q80)

Q80 Does your health now limit you in: Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
Yes, limited a lot ……1 (NEXT QUESTION IS Q81)
Yes, limited a little…….2 (NEXT QUESTION IS Q81)
No …….3 (NEXT QUESTION IS Q81)
Refused……4 (NEXT QUESTION IS Q81)
Don't Know/NA ……5 (NEXT QUESTION IS Q81)

Q81 Does your health now limit you in: Lifting or carrying groceries
Yes, limited a lot ……1 (NEXT QUESTION IS Q82)
Yes, limited a little…….2 (NEXT QUESTION IS Q82)
No …….3 (NEXT QUESTION IS Q82)
Refused……4 (NEXT QUESTION IS Q82)
Don't Know/NA ……5 (NEXT QUESTION IS Q82)

Q82 Does your health now limit you in: Climbing several flights of stairs
Yes, limited a lot ……1 (NEXT QUESTION IS Q83)
Yes, limited a little…….2 (NEXT QUESTION IS Q83)
No …….3 (NEXT QUESTION IS Q83)
Refused……4 (NEXT QUESTION IS Q83)
Don't Know/NA ……5 (NEXT QUESTION IS Q83)

Q83 Does your health now limit you in: Climbing one flight of stairs
Yes, limited a lot ……1 (NEXT QUESTION IS Q84)
Yes, limited a little…….2 (NEXT QUESTION IS Q84)
No …….3 (NEXT QUESTION IS Q84)
Refused……4 (NEXT QUESTION IS Q84)
Don't Know/NA ……5 (NEXT QUESTION IS Q84)

Q84 Does your health now limit you in: Bending, kneeling, or stooping
Yes, limited a lot ……1 (NEXT QUESTION IS Q85)
Yes, limited a little…….2 (NEXT QUESTION IS Q85)
No …….3 (NEXT QUESTION IS Q85)
Refused……4 (NEXT QUESTION IS Q85)
Don't Know/NA ……5 (NEXT QUESTION IS Q85)

Q85 Does your health now limit you in: Walking more than a mile
Yes, limited a lot ……1 (NEXT QUESTION IS Q91)
Yes, limited a little…….2 (NEXT QUESTION IS Q91)
No …….3 (NEXT QUESTION IS Q91)
Refused……4 (NEXT QUESTION IS Q91)
Don't Know/NA ……5 (NEXT QUESTION IS Q91)

Q91 Does your health now limit you in: Walking several blocks
Yes, limited a lot ……1 (NEXT QUESTION IS Q92)
Yes, limited a little…….2 (NEXT QUESTION IS Q92)
No …….3 (NEXT QUESTION IS Q92)
Refused……4 (NEXT QUESTION IS Q92)
Don't Know/NA ……5 (NEXT QUESTION IS Q92)

Q92 Does your health now limit you in: Walking one block
Yes, limited a lot ……1 (NEXT QUESTION IS Q93)
Yes, limited a little…….2 (NEXT QUESTION IS Q93)
No …….3 (NEXT QUESTION IS Q93)
Refused……4 (NEXT QUESTION IS Q93)
Don't Know/NA ……5 (NEXT QUESTION IS Q93)

Q93 Does your health now limit you in: Bathing or dressing yourself
Yes, limited a lot ……1 (NEXT QUESTION IS Q95)
Yes, limited a little…….2 (NEXT QUESTION IS Q95)
No …….3 (NEXT QUESTION IS Q95)
Refused……4 (NEXT QUESTION IS Q95)
Don't Know/NA ……5 (NEXT QUESTION IS Q95)

The next set of questions just require yes or no answers.
During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your **physical** health?

Q95 Have you cut down the amount of time you spent on work or other activities?
Yes ……1 (NEXT QUESTION IS Q96)
No …….2 (NEXT QUESTION IS Q96)
Refused …….3 (NEXT QUESTION IS Q96)
Don't Know/NA……4 (NEXT QUESTION IS Q96)

Q96 Have you accomplished less than you would like?
Yes ……1 (NEXT QUESTION IS Q97)
No …….2 (NEXT QUESTION IS Q97)
Refused …….3 (NEXT QUESTION IS Q97)
Don't Know/NA……4 (NEXT QUESTION IS Q97)
Q97 Were you limited in the kind of work or other activities you did?
Yes ……1 (NEXT QUESTION IS Q198)
No …….2 (NEXT QUESTION IS Q198)
Refused …….3 (NEXT QUESTION IS Q198)
Don't Know/NA……4 (NEXT QUESTION IS Q198)

Q198 Did you have difficulty performing the work or other activities (for example, it took extra effort)?
Yes ……1 (NEXT QUESTION IS Q169)
No …….2 (NEXT QUESTION IS Q169)

Refused …….3 (NEXT QUESTION IS Q169)
Don't Know/NA……4 (NEXT QUESTION IS Q169)

During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of any **emotional** problems (such as feeling depressed or anxious)?

Q169 Have you cut down the amount of time you spent on work or other activities?
Yes ……1 (NEXT QUESTION IS Q170)
No …….2 (NEXT QUESTION IS Q170)
Refused …….3 (NEXT QUESTION IS Q170)
Don't Know/NA……4 (NEXT QUESTION IS Q170)

Q170 Have you accomplished less than you would like?
Yes ……1 (NEXT QUESTION IS Q171)
No …….2 (NEXT QUESTION IS Q171)
Refused …….3 (NEXT QUESTION IS Q171)
Don't Know/NA……4 (NEXT QUESTION IS Q171)

Q171 Did you do work or other activities less carefully than you usually would?
Yes ……1 (NEXT QUESTION IS Q99)
No …….2 (NEXT QUESTION IS Q99)
Refused …….3 (NEXT QUESTION IS Q99)
Don't Know/NA……4 (NEXT QUESTION IS Q99)

The next set of questions has a list of answer choices that I will read for you to pick from.

Q99 During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?
Not at all……1 (NEXT QUESTION IS Q104)
Slightly…….2 (NEXT QUESTION IS Q104)
Moderately ……3 (NEXT QUESTION IS Q104)
Quite a bit……4 (NEXT QUESTION IS Q104)
Extremely……5 (NEXT QUESTION IS Q104)
Refused ……6(NEXT QUESTION IS Q104)
Don't Know/NA……7(NEXT QUESTION IS Q104)

Q104 How much bodily pain have you had during the past 4 weeks?
None……1 (NEXT QUESTION IS Q105)
Very Mild…….2 (NEXT QUESTION IS Q105)
Mild ……3 (NEXT QUESTION IS Q105)
Moderate……4 (NEXT QUESTION IS Q105)
Severe……5 (NEXT QUESTION IS Q105)
Very Severe……6 (NEXT QUESTION IS Q105)

Refused ……7 (NEXT QUESTION IS Q105)
Don't Know/NA……8(NEXT QUESTION IS Q105)

Q105 During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
Not at all……1 (NEXT QUESTION IS Q107)
Slightly…….2 (NEXT QUESTION IS Q107)
Moderately ……3 (NEXT QUESTION IS Q107)
Quite a bit……4 (NEXT QUESTION IS Q107)
Extremely……5 (NEXT QUESTION IS Q107)
Refused ……6(NEXT QUESTION IS Q107)
Don't Know/NA……7(NEXT QUESTION IS Q107)

The next questions are about how you feel and how things have been with you during the past 4 weeks. For each question please give one answer that comes closest to the way you have been feeling. How much of the time during the past four weeks...

Q107 Did you feel full of pep?
All of the time……1 (NEXT QUESTION IS Q108)
Most of the time…….2 (NEXT QUESTION IS Q108)
A good bit of the time……3 (NEXT QUESTION IS Q108)
Some of the time……4 (NEXT QUESTION IS Q108)
A little bit of the time……5 (NEXT QUESTION IS Q108)
None of the time……6 (NEXT QUESTION IS Q108)
Refused ……7 (NEXT QUESTION IS Q108)
Don't Know/NA……8(NEXT QUESTION IS Q108)

Q108 How much of the time during the past four weeks have you been a very nervous person?
All of the time……1 (NEXT QUESTION IS Q109)
Most of the time…….2 (NEXT QUESTION IS Q109)
A good bit of the time……3 (NEXT QUESTION IS Q109)
Some of the time……4 (NEXT QUESTION IS Q109)
A little bit of the time……5 (NEXT QUESTION IS Q109)
None of the time……6 (NEXT QUESTION IS Q109)
Refused ……7 (NEXT QUESTION IS Q109)
Don't Know/NA……8(NEXT QUESTION IS Q109)

Q109 How much of the time during the past four weeks have you felt so down in the dumps that nothing could cheer you up?
All of the time……1 (NEXT QUESTION IS Q110)
Most of the time…….2 (NEXT QUESTION IS Q110)
A good bit of the time……3 (NEXT QUESTION IS Q110)
Some of the time……4 (NEXT QUESTION IS Q110)
A little bit of the time……5 (NEXT QUESTION IS Q110)
None of the time……6 (NEXT QUESTION IS Q110)
Refused ……7 (NEXT QUESTION IS Q110)

Don't Know/NA……8(NEXT QUESTION IS Q110)

Q110 How much of the time during the past four weeks have you felt calm and peaceful?
All of the time……1 (NEXT QUESTION IS Q111)
Most of the time…….2 (NEXT QUESTION IS Q111)
A good bit of the time……3 (NEXT QUESTION IS Q111)
Some of the time……4 (NEXT QUESTION IS Q111)
A little bit of the time……5 (NEXT QUESTION IS Q111)
None of the time……6 (NEXT QUESTION IS Q111)
Refused ……7 (NEXT QUESTION IS Q111)
Don't Know/NA……8(NEXT QUESTION IS Q111)

Q111 How much of the time during the past four weeks did you have a lot of energy?
All of the time……1 (NEXT QUESTION IS Q112)
Most of the time…….2 (NEXT QUESTION IS Q112)
A good bit of the time……3 (NEXT QUESTION IS Q112)
Some of the time……4 (NEXT QUESTION IS Q112)
A little bit of the time……5 (NEXT QUESTION IS Q112)
None of the time……6 (NEXT QUESTION IS Q112)
Refused ……7 (NEXT QUESTION IS Q112)
Don't Know/NA……8(NEXT QUESTION IS Q112)

Q112 How much of the time during the past four weeks have you felt downhearted and blue?
All of the time……1 (NEXT QUESTION IS Q113)
Most of the time…….2 (NEXT QUESTION IS Q113)
A good bit of the time……3 (NEXT QUESTION IS Q113)
Some of the time……4 (NEXT QUESTION IS Q113)
A little bit of the time……5 (NEXT QUESTION IS Q113)
None of the time……6 (NEXT QUESTION IS Q113)
Refused ……7 (NEXT QUESTION IS Q113)
Don't Know/NA……8(NEXT QUESTION IS Q113)

Q113 How much of the time during the past four weeks did you feel worn out?
All of the time……1 (NEXT QUESTION IS Q114)
Most of the time…….2 (NEXT QUESTION IS Q114)
A good bit of the time……3 (NEXT QUESTION IS Q114)
Some of the time……4 (NEXT QUESTION IS Q114)
A little bit of the time……5 (NEXT QUESTION IS Q114)
None of the time……6 (NEXT QUESTION IS Q114)
Refused ……7 (NEXT QUESTION IS Q114)
Don't Know/NA……8(NEXT QUESTION IS Q114)

Q114 How much of the time during the past four weeks have you been a happy person?
All of the time……1 (NEXT QUESTION IS Q115)
Most of the time…….2 (NEXT QUESTION IS Q115)
A good bit of the time……3 (NEXT QUESTION IS Q115)

Some of the time……4 (NEXT QUESTION IS Q115)
A little bit of the time……5 (NEXT QUESTION IS Q115)
None of the time……6 (NEXT QUESTION IS Q115)
Refused ……7 (NEXT QUESTION IS Q115)
Don't Know/NA……8(NEXT QUESTION IS Q115)

Q115 How much of the time during the past four weeks did you feel tired?
All of the time……1 (NEXT QUESTION IS Q116)
Most of the time…….2 (NEXT QUESTION IS Q116)
A good bit of the time……3 (NEXT QUESTION IS Q116)
Some of the time……4 (NEXT QUESTION IS Q116)
A little bit of the time……5 (NEXT QUESTION IS Q116)
None of the time……6 (NEXT QUESTION IS Q116)
Refused ……7 (NEXT QUESTION IS Q116)
Don't Know/NA……8(NEXT QUESTION IS Q116)

Q116 During the past 4 weeks how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?
All of the time……1 (NEXT QUESTION IS Q118)
Most of the time…….2 (NEXT QUESTION IS Q118)
A good bit of the time……3 (NEXT QUESTION IS Q118)
Some of the time……4 (NEXT QUESTION IS Q118)
A little bit of the time……5 (NEXT QUESTION IS Q118)
None of the time……6 (NEXT QUESTION IS Q118)
Refused ……7 (NEXT QUESTION IS Q118)
Don't Know/NA……8(NEXT QUESTION IS Q118)

For the next set of questions, please tell me how true or false each of the statements is for you. *[**Interviewer Instructions:** First ask if the statement is true or false. Then ask if it is definitely true/false or mostly true/false.]*

Q118 I seem to get sick a little easier than other people
Definitely true ……1 (NEXT QUESTION IS Q119)
Mostly true…….2 (NEXT QUESTION IS Q119)
Mostly false ……3 (NEXT QUESTION IS Q119)
Definitely false……4 (NEXT QUESTION IS Q119)
Refused ……5 (NEXT QUESTION IS Q119)
Don't Know/NA……6(NEXT QUESTION IS Q119)

Q119 I am as healthy as anybody I know
Definitely true ……1 (NEXT QUESTION IS Q120)
Mostly true…….2 (NEXT QUESTION IS Q120)
Mostly false ……3 (NEXT QUESTION IS Q120)
Definitely false……4 (NEXT QUESTION IS Q120)
Refused ……5 (NEXT QUESTION IS Q120)
Don't Know/NA……6(NEXT QUESTION IS Q120)

Q120 I expect my health to get worse
Definitely true ……1 (NEXT QUESTION IS Q121)
Mostly true…….2 (NEXT QUESTION IS Q121)
Mostly false ……3 (NEXT QUESTION IS Q121)
Definitely false……4 (NEXT QUESTION IS Q121)
Refused ……5 (NEXT QUESTION IS Q121)
Don't Know/NA……6(NEXT QUESTION IS Q121)

Q121 My health is excellent
Definitely true ……1 (FINAL QUESTION FOR THIS SECTION)
Mostly true…….2 (FINAL QUESTION FOR THIS SECTION)
Mostly false ……3 (FINAL QUESTION FOR THIS SECTION)
Definitely false……4 (FINAL QUESTION FOR THIS SECTION)
Refused ……5 (FINAL QUESTION FOR THIS SECTION)
Don't Know/NA……6(FINAL QUESTION FOR THIS SECTION)

The following questions are from the SWFL[30]

Q125 Food and meals are positive elements in my life
Disagree completely……1 (NEXT QUESTION IS Q126)
Disagree…….2 (NEXT QUESTION IS Q126)
Disagree slightly ……3 (NEXT QUESTION IS Q126)
Agree slightly……4 (NEXT QUESTION IS Q126)
Agree……5 (NEXT QUESTION IS Q126)
Strongly agree……6 (NEXT QUESTION IS Q126)
Refused ……7 (NEXT QUESTION IS Q126)
Don't Know/NA……8(NEXT QUESTION IS Q126)

Q126 I am generally pleased with my food
Disagree completely……1 (NEXT QUESTION IS Q127)
Disagree…….2 (NEXT QUESTION IS Q127)
Disagree slightly ……3 (NEXT QUESTION IS Q127)
Agree slightly……4 (NEXT QUESTION IS Q127)
Agree……5 (NEXT QUESTION IS Q127)
Strongly agree……6 (NEXT QUESTION IS Q127)
Refused ……7 (NEXT QUESTION IS Q127)
Don't Know/NA……8(NEXT QUESTION IS Q127)

Q127 My life in relation to food and meals is close to my ideal
Disagree completely……1 (NEXT QUESTION IS Q128)
Disagree…….2 (NEXT QUESTION IS Q128)
Disagree slightly ……3 (NEXT QUESTION IS Q128)

Agree slightly……4 (NEXT QUESTION IS Q128)
Agree……5 (NEXT QUESTION IS Q128)
Strongly agree……6 (NEXT QUESTION IS Q128)
Refused ……7 (NEXT QUESTION IS Q128)
Don't Know/NA……8(NEXT QUESTION IS Q128)

Q128 With regard to food, the conditions of my life are excellent
Disagree completely……1 (NEXT QUESTION IS Q129)
Disagree…….2 (NEXT QUESTION IS Q129)
Disagree slightly ……3 (NEXT QUESTION IS Q129)
Agree slightly……4 (NEXT QUESTION IS Q129)
Agree……5 (NEXT QUESTION IS Q129)
Strongly agree……6 (NEXT QUESTION IS Q129)
Refused ……7 (NEXT QUESTION IS Q129)
Don't Know/NA……8(NEXT QUESTION IS Q129)

Q129 Food and meals give me satisfaction in daily life
Disagree completely……1 (FINAL QUESTION FOR THIS SECTION)
Disagree…….2 (FINAL QUESTION FOR THIS SECTION)
Disagree slightly ……3 (FINAL QUESTION FOR THIS SECTION)
Agree slightly……4 (FINAL QUESTION FOR THIS SECTION)
Agree……5 (FINAL QUESTION FOR THIS SECTION)
Strongly agree……6 (FINAL QUESTION FOR THIS SECTION)
Refused ……7 (FINAL QUESTION FOR THIS SECTION)
Don't Know/NA……8 (FINAL QUESTION FOR THIS SECTION)

The following questions are from the SNAQ[40]

Q182 My appetite is
Very Poor ……1 (NEXT QUESTION IS Q183)
Poor…….2 (NEXT QUESTION IS Q183)
Average ……3(NEXT QUESTION IS Q183)
Good……4(NEXT QUESTION IS Q183)
Very Good……5(NEXT QUESTION IS Q183)
Refused ……6 (NEXT QUESTION IS Q183)
Don't Know/NA……7 (NEXT QUESTION IS Q183)

Q183 When I eat
I feel full after eating only a few mouthfuls……1 (NEXT QUESTION IS Q184)
I feel full after eating about a third of a meal…….2 (NEXT QUESTION IS Q184)
I feel full after eating over half a meal ……3(NEXT QUESTION IS Q184)
I feel full after eating most of the meal ……4(NEXT QUESTION IS Q184)
I hardly ever feel full ……5(NEXT QUESTION IS Q184)

Refused ……6 (NEXT QUESTION IS Q184)
Don't Know/NA……7 (NEXT QUESTION IS Q184)

Q184 Food tastes
Very Bad ……1 (NEXT QUESTION IS Q185)
Bad…….2 (NEXT QUESTION IS Q185)
Average ……3(NEXT QUESTION IS Q185)
Good……4(NEXT QUESTION IS Q185)
Very Good……5(NEXT QUESTION IS Q185)
Refused ……6 (NEXT QUESTION IS Q185)
Don't Know/NA……7 (NEXT QUESTION IS Q185)

Q185 Normally I eat
Less than one meal a day ……1 (FINAL QUESTION FOR THIS SECTION)
One meal a day…….2 (FINAL QUESTION FOR THIS SECTION)
Two meals a day ……3(FINAL QUESTION FOR THIS SECTION)
Three meals a day ……4(FINAL QUESTION FOR THIS SECTION)
More than three meals a day……5(FINAL QUESTION FOR THIS SECTION)
Refused ……6 (FINAL QUESTION FOR THIS SECTION)
Don't Know/NA……7 (FINAL QUESTION FOR THIS SECTION)

The following questions are from the MOS-SSS[46]

Q191 Someone to help you if you were confined to bed.
Is this type of support available...
None of the time……1 (NEXT QUESTION IS Q192)
A little of the time…….2 (NEXT QUESTION IS Q192)
Some of the time……3(NEXT QUESTION IS Q192)
Most of the time……4(NEXT QUESTION IS Q192)
All of the time……5(NEXT QUESTION IS Q192)
Refused ……6 (NEXT QUESTION IS Q192)
Don't Know/NA……7 (NEXT QUESTION IS Q192)

Q192 Someone to take you to the doctor if you needed it.
Is this type of support available...
None of the time……1 (NEXT QUESTION IS Q193)
A little of the time…….2 (NEXT QUESTION IS Q193)
Some of the time……3(NEXT QUESTION IS Q193)
Most of the time……4(NEXT QUESTION IS Q193)
All of the time……5(NEXT QUESTION IS Q193)
Refused ……6 (NEXT QUESTION IS Q193)
Don't Know/NA……7 (NEXT QUESTION IS Q193)

Q193 Someone to prepare your meals if you were unable to do it yourself.
Is this type of support available...
None of the time……1 (NEXT QUESTION IS Q194)
A little of the time…….2 (NEXT QUESTION IS Q194)
Some of the time……3(NEXT QUESTION IS Q194)
Most of the time……4(NEXT QUESTION IS Q194)
All of the time……5(NEXT QUESTION IS Q194)
Refused ……6 (NEXT QUESTION IS Q194)
Don't Know/NA……7 (NEXT QUESTION IS Q194)

Q194 Someone to help with daily chores if you were sick.
Is this type of support available...
None of the time……1 (FINAL QUESTION FOR THIS SECTION)
A little of the time…….2 (FINAL QUESTION FOR THIS SECTION)
Some of the time……3(FINAL QUESTION FOR THIS SECTION)
Most of the time……4(FINAL QUESTION FOR THIS SECTION)
All of the time……5(FINAL QUESTION FOR THIS SECTION)
Refused ……6 (FINAL QUESTION FOR THIS SECTION)
Don't Know/NA……7 (FINAL QUESTION FOR THIS SECTION)

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