

# DIETARY RISKS AMONG LOW- INCOME AND FOOD INSECURE SENIORS

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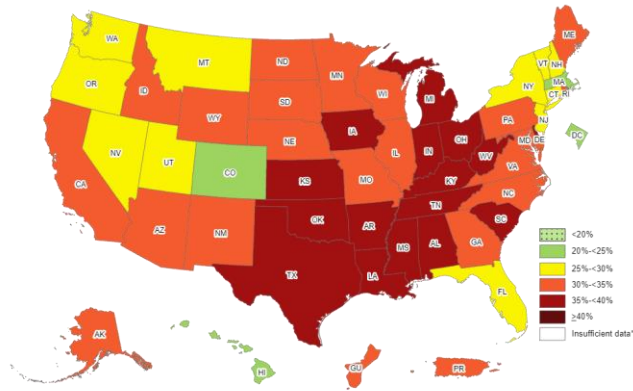
A community thanksgiving meal in West Lafayette, Indiana provided to seniors living in households where resources and incomes are low and many face food insecurity



# CHRONIC DISEASES INCLUDING OBESITY, HEART DISEASE, DIABETES, AND CANCER ARE MAJOR KILLERS OF US ADULTS

## Obesity

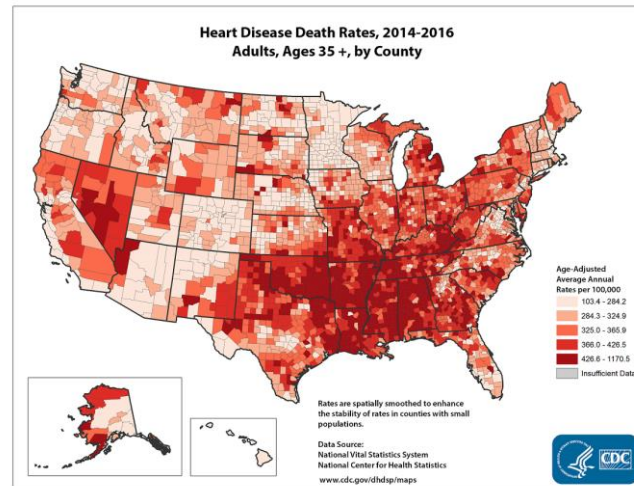
Prevalence<sup>†</sup> of Self-Reported Obesity Among U.S. Adults, 2020



42.4% adult obesity,  
9.2% severe obesity

<https://www.cdc.gov/heartdisease/facts.htm>  
<https://www.cdc.gov/diabetes/data/index.html>

## Heart Disease

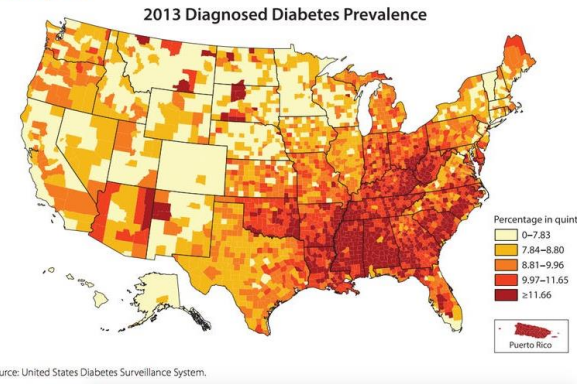


7% adult heart disease,  
1 in every 4 deaths

<https://www.cdc.gov/obesity/data/prevalence-maps.html#overall>  
<https://www.cdc.gov/cancer/dcpc/data/index.htm>

## Diabetes

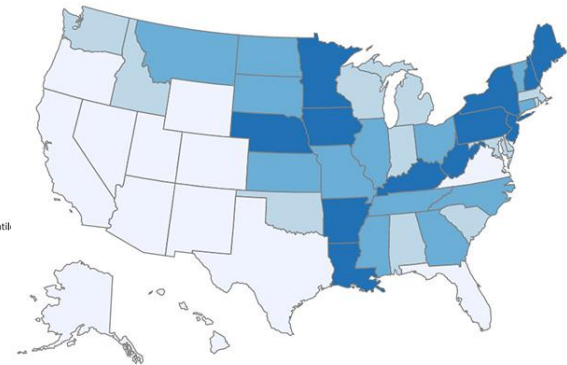
Figure 2. Age-adjusted, county-level prevalence of diagnosed diabetes among adults aged ≥20 years, United States, 2013



13% adult diabetes

## Cancer

Prevalence<sup>†</sup> of Cancer Among US Adults, 2018



1.9 million adults have  
cancer

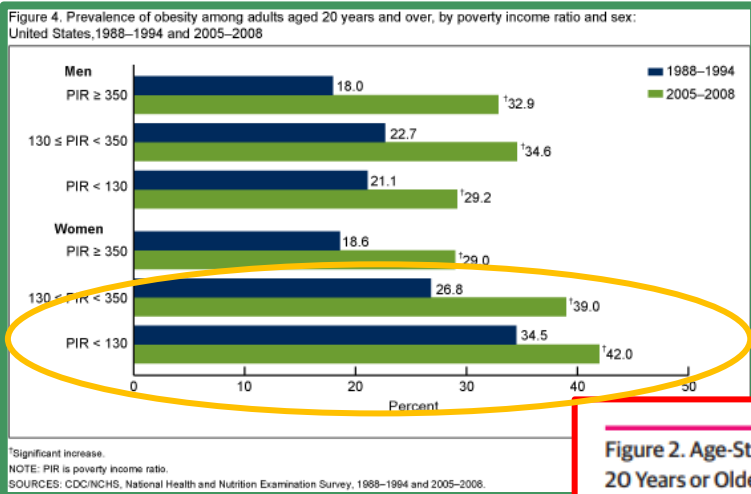
# THESE CHRONIC DISEASES DISPROPORTIONATELY IMPACT THOSE WITH LOW INCOMES

## Obesity

## Heart Disease

## Diabetes

## Cancer



### By Income Level

Adults with a family income below the federal poverty level (FPL) have the highest prevalence of diabetes.

### US Adults 18 or Older With Diagnosed Diabetes, by Family Income Level, 2018–2019

Family Income Level	Percentage
Less than 100% FPL	14.1
100%–299% FPL	10.8
300%–499% FPL	7.8
500% FPL or more	5.6

Data source: 2018–2019 National Health Interview Survey.

Figure 2. Age-Standardized Trends in Prevalence of Cardiovascular Disease Outcomes Among Participants 20 Years or Older Stratified by Income Group, 1999–2016

### A Trends in CHF prevalence

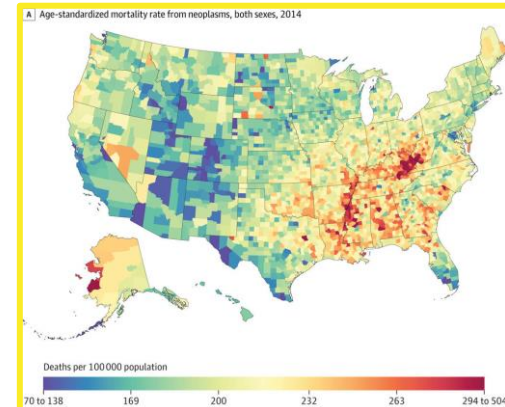
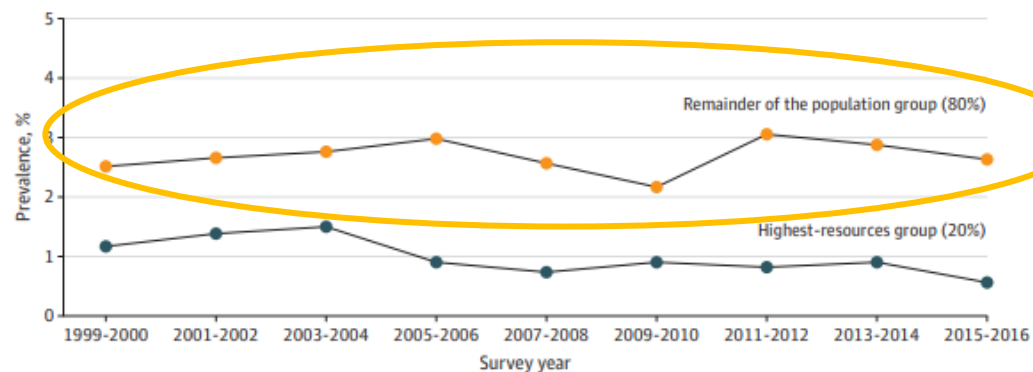
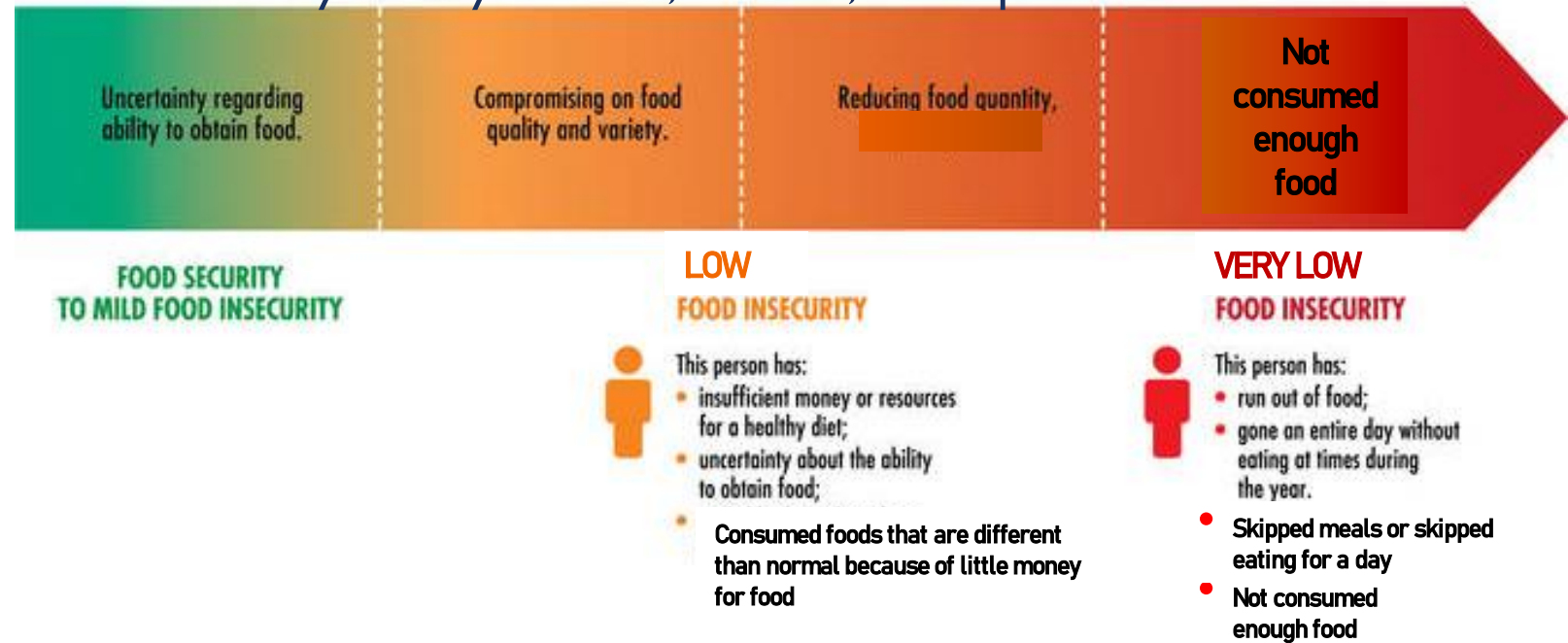


Image courtesy of The JAMA Network®  
© 2017 American Medical Association

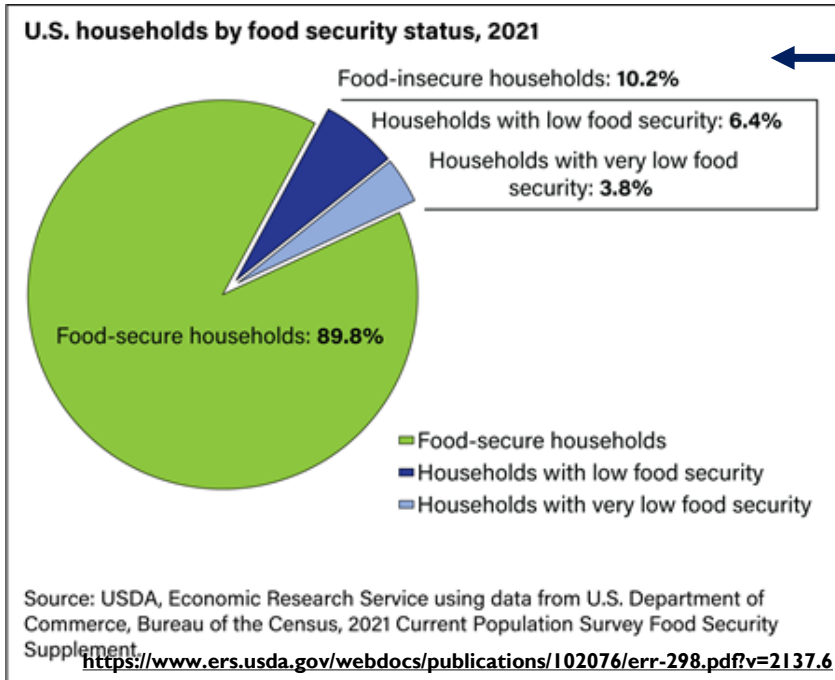
# ...AND THOSE WITH FOOD INSECURITY, INDICATING DIFFICULTY ACCESSING FOOD FOR AN ACTIVE HEALTHY LIFE

- Food Insecurity: “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable food in socially acceptable ways” Anderson et al, 1990
- Measured by US Household Food Security Survey Module, 18 item, self-reported

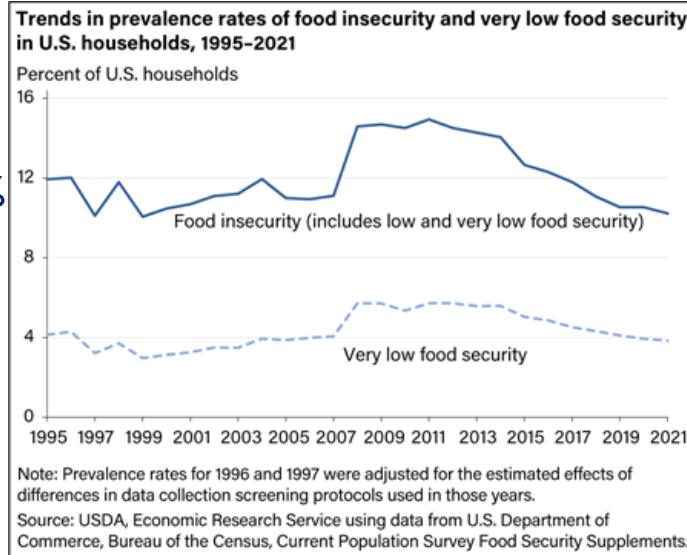


- Linked with greater prevalence of chronic health outcomes and risk factors for chronic health outcomes

# FOOD INSECURITY & LOW-INCOME ARE PREVALENT IN THE U.S. DESPITE A PLENTIFUL FOOD SUPPLY

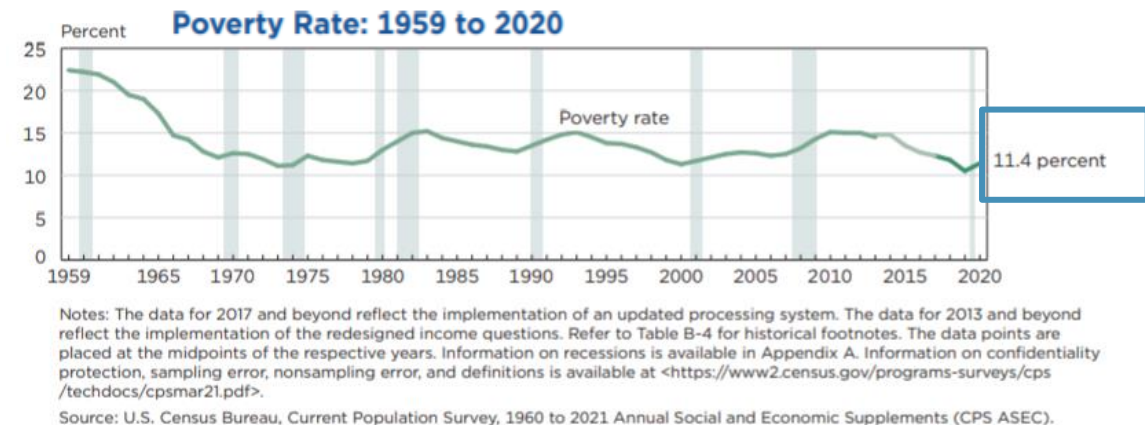


Healthy People 2030 Goal = 6%



FI has not gone below about 10%

Relatively less change 3.9%



- **Low-income is defined by the Federal Poverty Guideline, & based on Official Poverty Threshold**
- Poverty Threshold or Poverty Line is based on cost of the USDA economy food plan as 1/3 the cost of household expenses after taxes for a certain family size and composition
- A household's cash income (wages, social security, pension, etc) is compared with Poverty Line to determine eligibility for federal programs (e.g. \$14,580 for one person in 2023)

# U.S. DIETARY QUALITY IS ALREADY POOR, LOW-INCOME AND FOOD INSECURITY PRESENT AN ADDITIONAL NUTRITIONAL RISK

## How Healthy Is the American Diet?



**59**

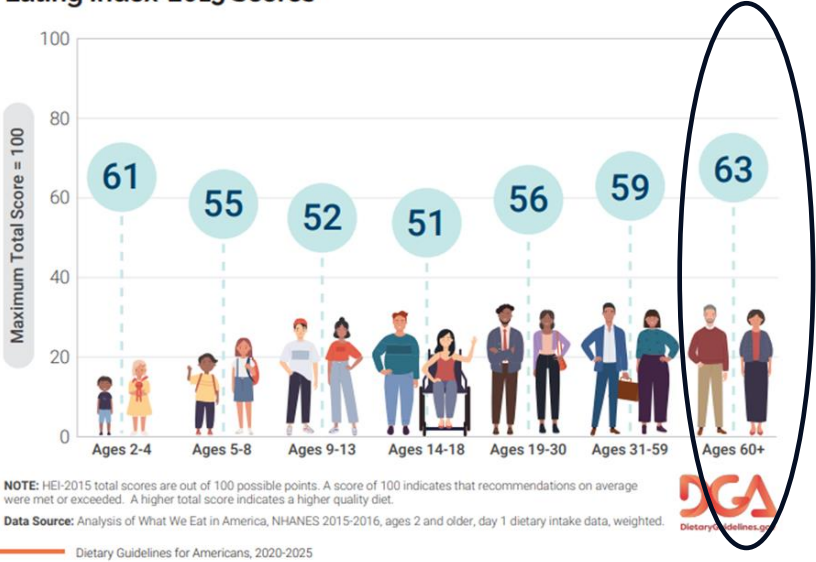
**The Healthy Eating Index Score**

shows that Americans do not align their eating choices with the Dietary Guidelines.  
(on a scale from 0-100)

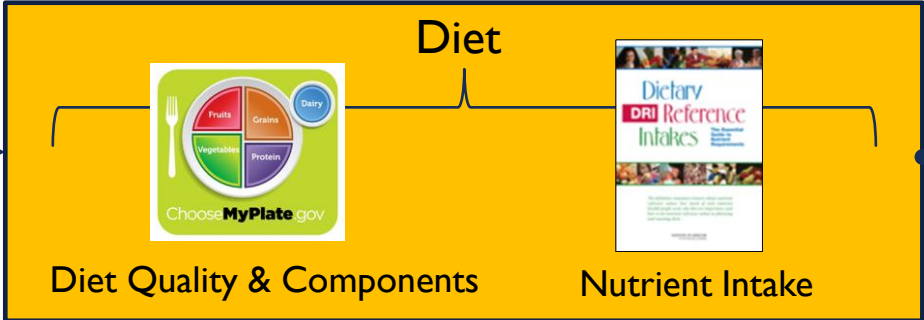
Data source for Healthy Eating Index scores: What We Eat in America, National Health and Nutrition Examination Survey (undated data are from 2013-2014)

<https://www.fns.usda.gov/hei-scores-americans>

## Adherence of the U.S. Population to the Dietary Guidelines Across Life Stages, as Measured by Average Total Healthy Eating Index-2015 Scores



Low-Income & Food insecurity



**Health**

*WHAT ARE THE DIETARY  
QUALITY AND NUTRIENT  
RISKS OF LOW-INCOME AND  
FOOD INSECURE  
U.S. SENIORS?*



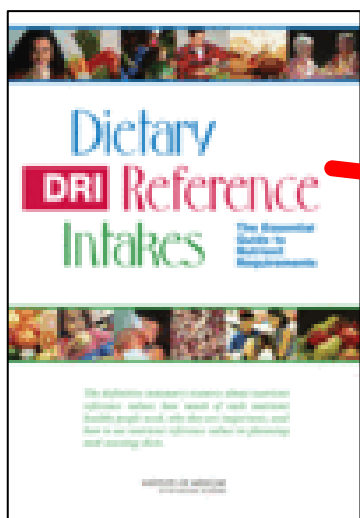
A “Reaching Rural Veterans” Intervention at a rural, Midwestern food pantry to improve food security and access to resources to low-income veterans, including many older adults, through the Military Family Research Institute at Purdue University.

# METHODS FOR EVALUATING THE RELATIONSHIP OF INCOME AND FOOD INSECURITY WITH DIET

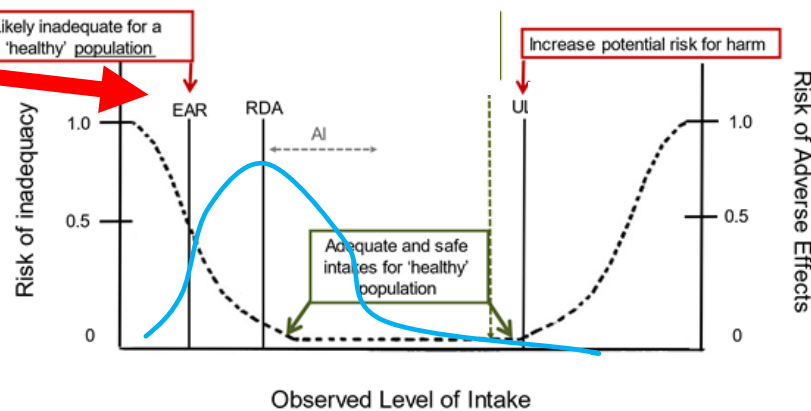
- One or more 24-hour dietary recalls
- Compare how low-income/food insecure groups are meeting the dietary quality in the DGA using the Healthy Eating Index
- Simple Algorithm or Population Ratio Method



Healthy Eating Index	Maximum
HEI 2015 Total	100
Total Vegetable	5
Greens and Beans	5
Total Fruits	5
Whole Fruits	5
Whole Grains	10
Dairy	10
Total Protein Foods	5
Fatty Acids	10
Sodium	10
Refined Grains	10
Added Sugars	10
Saturated Fats	10
Seafood & Plant Proteins	5



## Dietary Reference Intakes

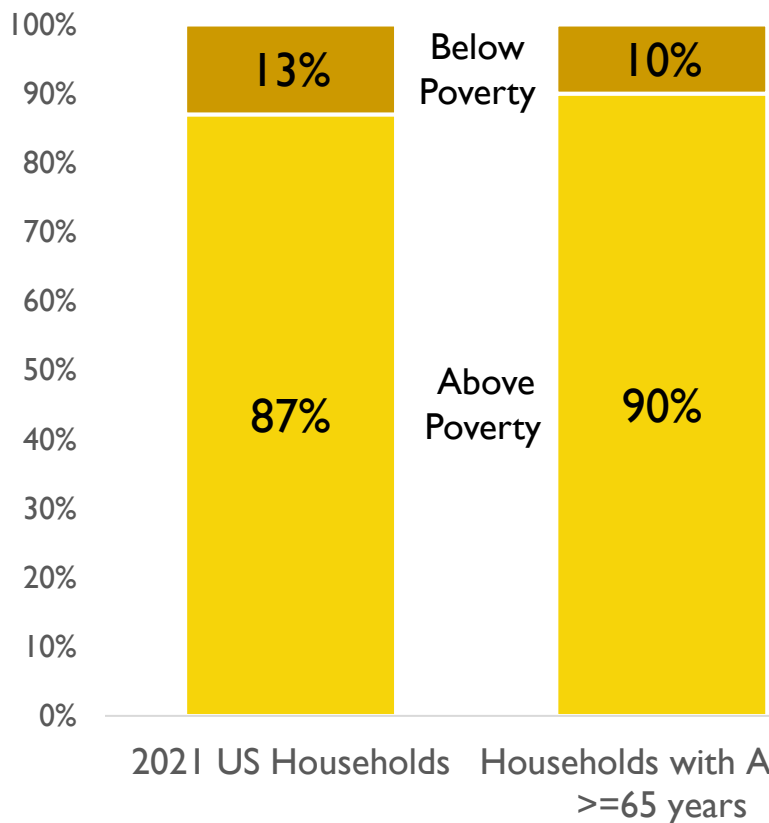


Adapted from the IOM/FNB: Dietary Reference Intakes Applications in Dietary Assessment, 2000.

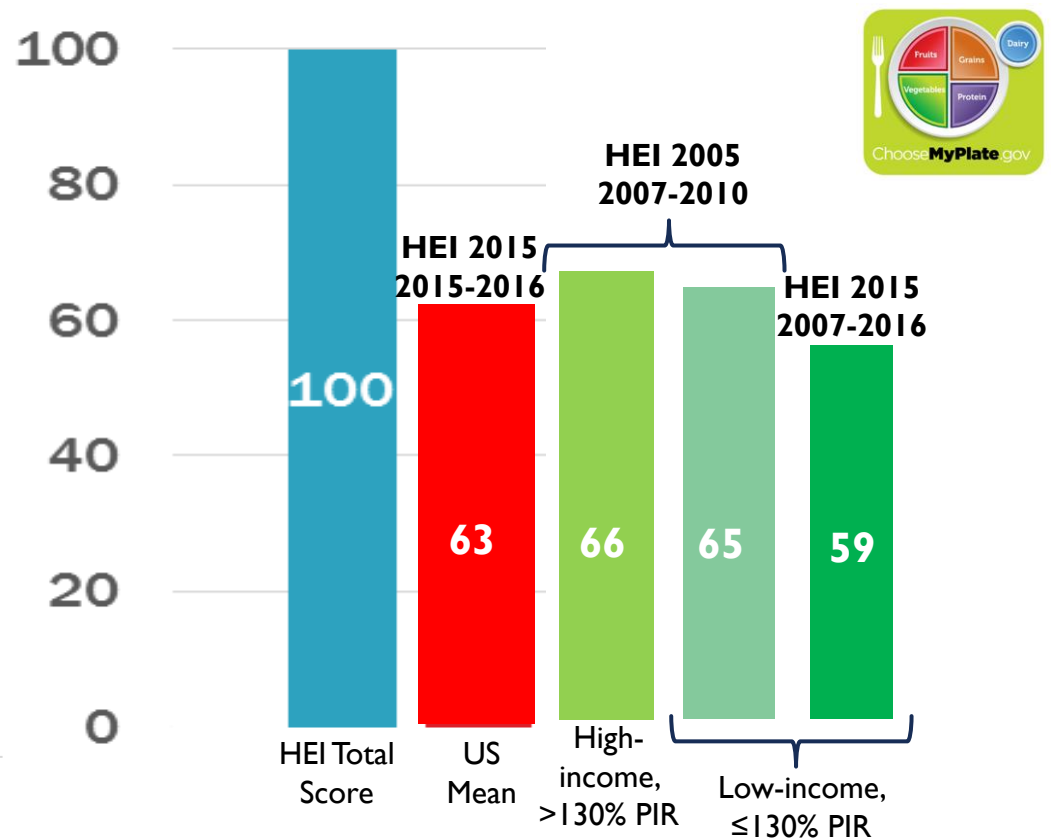
- One or multiple 24-hour dietary recalls
- Compare how low-income/food insecure groups are meeting average requirements for micronutrients using the Estimated Average Requirement or Adequate Intake
- NCI Method to Estimate Usual Intake

# DIET QUALITY WAS LOWER IN U.S. ADULTS ≥60 YEARS IN HOUSEHOLDS BELOW 130% OF THE POVERTY LINE

2021 US Poverty Rates for All US households and Households with Adults ≥65 Years



Healthy Eating Index Total Scores among Older Adults (60+)



# ONE COMPONENT WAS LOWER IN U.S. ADULTS ≥60 YEARS WITH LOW INCOMES; ALL HAD LOW DIET QUALITY, ESPECIALLY FOR 3 COMPONENTS

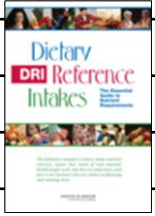


Scores are at least half of maximum score



	NHANES 2007-2010, ≥60 years, (n=2,668)	>130% PIR,	≤130% PIR,	Maximum	NHANES 2007-2016, ≥60 years (n=2,347)	≤130% PIR	Maximum
HEI 2005 Total		66	65	100	HEI 2015 Total	58.7(0.6)	100
Total Vegetables		4.3	4.0	5	Total Vegetable	3.7(0.1)	5
Dark Green & Orange		2.2	2.2	5	Greens and Beans	3.1(0.2)	5
<b>Total Fruit * p&lt;0.05</b>		4.3	3.6	5	Total Fruits	2.9(0.1)	5
Whole Fruit		5.0	4.6	5	Whole Fruits	3.3(0.1)	5
Whole Grain		1.6	1.5	5	Whole Grains	3.3(0.2)	10
Milk		5.7	5.4	10	Dairy	5.4(0.2)	10
Meat & Beans		10.0	10.0	10	Total Protein Foods	4.8(0.0)	5
Oils		7.8	7.3	10	Fatty Acids	5.0(0.2)	10
Sodium		2.8	3.0	10	Sodium	3.7(0.2)	10
Total Grains		5.0	5.0	5	Refined Grains	6.0(0.2)	10
Empty Calories		11.1	11.3	20	Added Sugars	7.0(0.2)	10
Saturated Fat		5.9	6.5	10	Saturated Fats	6.4(0.2)	10
					Seafood & Plant Proteins	4.2(0.2)	5

# THE PROPORTION MEETING NUTRIENT ADEQUACY WAS SIGNIFICANTLY LOWER FOR 9 NUTRIENTS AMONG U.S. ADULTS ≥60 WITH LOW INCOMES AND NUTRIENT ADEQUACY FOR ALL WAS POOR FOR 7 NUTRIENTS

		NHANES 2007-2010, (n=2,668)				EAR/AI		NHANES 2007-2016, (n=2,347)
		Male, % <EAR, >AI		Female, % <EAR, >AI				% <EAR, >AI
		>130% PIR	≤130% PIR	>130% PIR	≤130% PIR			≤130% PIR
<b>Vitamins</b>								
→ A (EAR)		42	70	33	46	500-625 RAE/d	→ 53.0(2.1)	
→ C (EAR)		48	65	38	46	60-70 mg/d	→ 54.9(1.9)	
→ D (EAR)		93	94	98	98	10 mcg/d	→ 96.9(0.6)	
→ E (EAR)		87	97	95	98	12 mg/d	→ 95.4(0.9)	
Folate (EAR)		6	19	21	20	320 ug/d	→ 21.5(2.7)	
B6 (EAR)		12	33	26	33	1.3-1.4 ,g/d	→ 32.9(1.8)	
<b>Minerals</b>								
→ Calcium (EAR)		46	78	75	86	800-1000 mg/d	→ 70.0(1.7)	
Iron (EAR)		0	1	0	1	5.0-6.0 mg/d	→ -----	
→ Magnesium (EAR)		66	84	56	71	265-350 mg/d	→ 71.6(1.2)	
→ Potassium (%AI)*		64	53	52	47	4700 mg/d	→ -----	
Zinc (EAR)		19	41	16	24	6.8-9.4 mg/d	→ 36.6(1.6)	
Choline (%AI)*		67	58	62	60	425-550 mg/d	→ -----	

Condon, Elizabeth, Susan Drilea, Keri Jowers, Carolyn Lichtenstein, James Mabli, Emily Madden, and Katherine Niland. 2015. "Diet Quality of Americans by SNAP Participation Status: Data from the National Health and Nutrition Examination Survey, 2007–2010." <http://www.fns.usda.gov>; Qin Y, Cowan AE, Bailey RL, Jun S, Eicher-Miller HA. Usual nutrient intake and dietary quality of low-income U.S. older adults. Applied Economic Perspectives and Policy. 2022; 1-19. [doi.org/10.1002/aapp.13328](https://doi.org/10.1002/aapp.13328)

## **SUMMARY:**

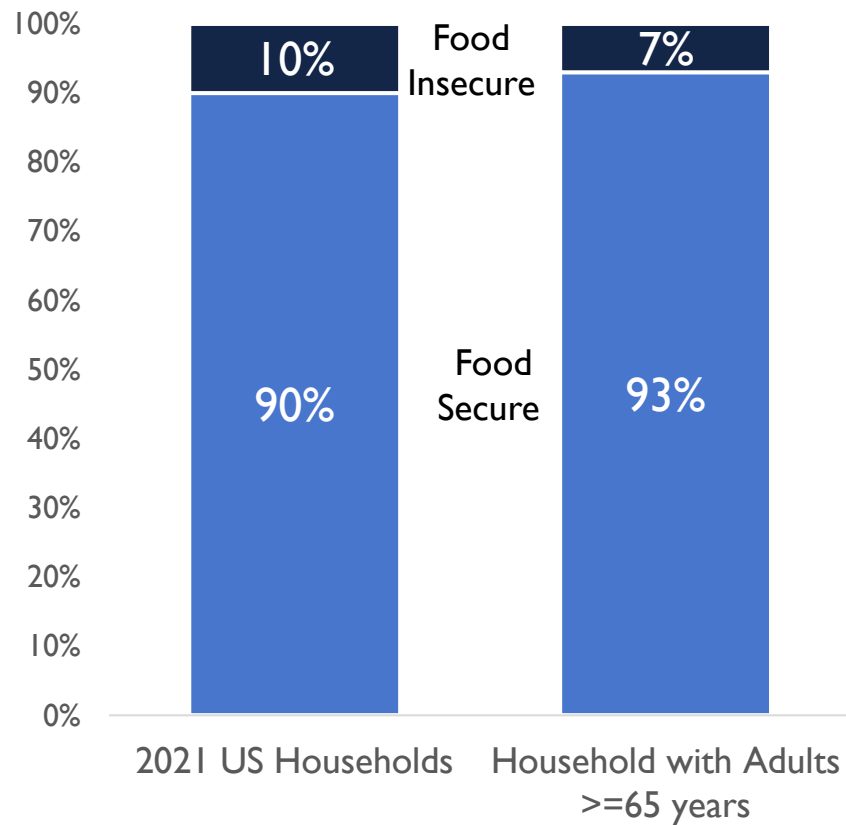
*Low-income was linked to lower component total fruit dietary quality and higher percentage of inadequacy for 9 micronutrients. All older adults had poor dietary intake of dark green and orange vegetable, whole grain, fatty acid, and Na components, and 50% or more inadequate vitamin A, C, D, E, Ca, Mg and choline.*



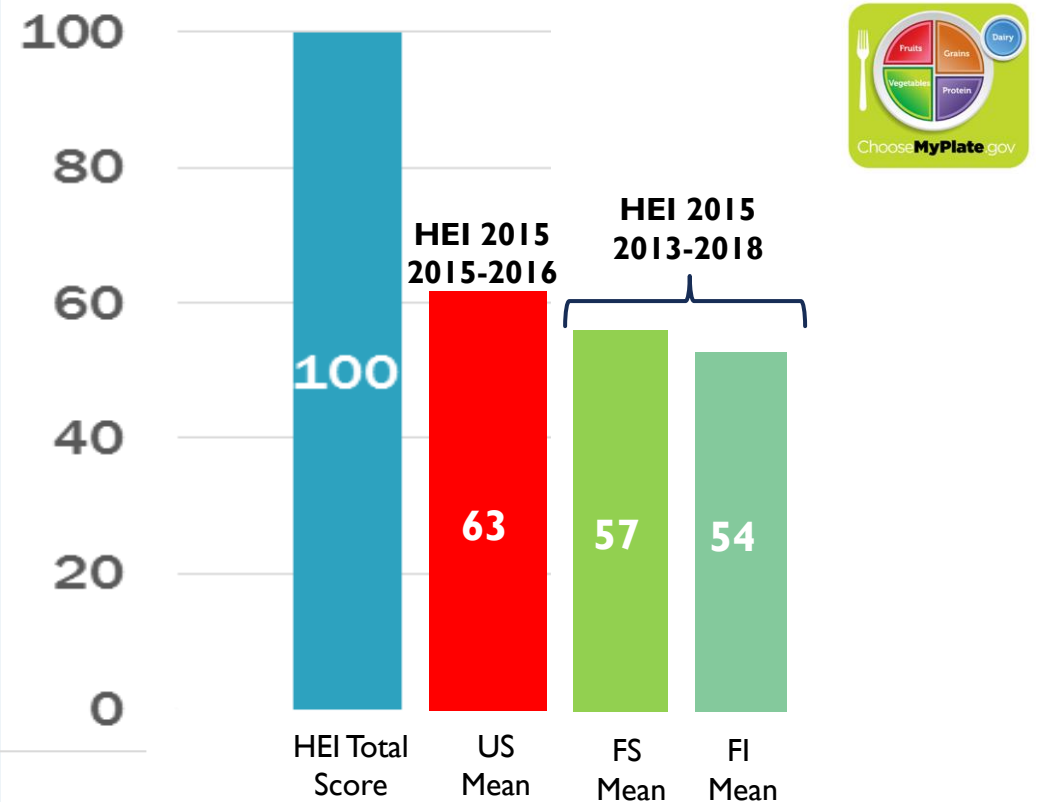
Seniors using a food pantry to support access to food, a proportion of which come from USDA's The Emergency Food Resource Program (TEFAP) and the Commodity Supplemental Food Program (CSFP)

# DIET QUALITY IS LOWER IN U.S. ADULTS ≥60 YEARS IN FOOD INSECURE HOUSEHOLDS

2021 US Food Security Rates for All US households and Households with Adults ≥65 Years



Healthy Eating Index Total Scores among Older Adults (60+)



Vaudin AM, Moshfegh AJ, Sahyoun NR. Measuring Food Insecurity in Older Adults Using Both Physical and Economic Food Access, NHANES 2013-18. J Nutr. 2022 Aug 9;152(8):1953-1962. doi: 10.1093/jn/nxac058. PMID: 35285903.

# THREE COMPONENTS WERE LOWER IN U.S. ADULTS ≥60 YEARS LIVING IN FOOD INSECURE SITUATIONS; ALL HAD LOW DIET QUALITY, ESPECIALLY FOR 4 COMPONENTS



NHANES 2013-2018	FS, n=2,730	FI, n=380	Maximum
HEI 2015 Total	57.3(0.45)	53.1(1.1)	100
Total Vegetables	3.5(0.04)	3.3(0.2)	5
Green and Beans	2.2(0.06)	1.9(0.2)	5
Total Fruit	2.6(0.06)	2.5(0.2)	5
Whole Fruit	3.0(0.06)	2.7(0.2)	5
Whole Grain	3.6(0.11)	3.3(0.3)	10
Total Dairy	5.2(0.09)	4.5(0.3)	10
Total Protein	4.6(0.02)	4.4(0.1)	5
Sea/Plant Protein	3.3(0.07)	2.5(0.2)	5
Fatty Acids	5.1(0.12)	4.7(0.3)	10
Sodium	4.3(0.11)	4.5(0.3)	10
Refined Grains	7.0(0.10)	6.0(0.3)	10
Added Sugars	7.6(0.09)	7.4(0.3)	10
Saturated Fat	5.4(0.10)	5.5(0.3)	10



## *SUMMARY:*

*Food insecurity was linked to lower total dairy, seafood & plant proteins, and higher refined grain components. All older adults had poor dietary intake of greens and beans, whole grains, fatty acids, and sodium components.*



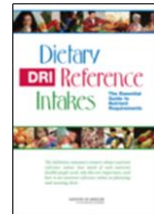
A retired schoolteacher eats a lunch of ramen noodles and buttered rice in her room at a Ramada in Houston. Amy Toensing, photographer for National Geographic <https://www.nationalgeographic.com/foodfeatures/hunger/>

# DIETARY RISKS FOR ALL SENIORS ARE HEIGHTENED AMONG THOSE WITH LOW INCOMES OR FOOD INSECURITY, ESPECIALLY FOR NUTRIENT ADEQUACY

- numerous nutrients were risks for a high percentage of inadequacy among seniors by income and food insecurity, most of these were the nutrients where everyone had 50% or more inadequacy
- Less apparent risks by income and food security for dietary quality



- Dietary quality was poor
- 4 Components for all U.S. seniors were especially low
- Low incomes and food insecurity were linked with 4 poorer component scores



- Nutrient adequacy was poor overall (up to 97%)
- All had low adherence (>50% not meeting) to adequacy markers for 7 nutrients
- Low incomes linked to lower % (up to 32%) adequacy for 9 nutrients

*Poor diet and nutrient intake are prevalent among U.S. seniors.  
Food insecurity and low-incomes present an additional nutritional  
CONCLUSIONS: risk (more for nutrients compared with dietary quality).*

