

Development, Implementation and Validation of 2-item Nutrition Security Screener for Use in Clinical & Public Health Settings in the U.S.



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Background

- Nutrition security is a major public health problem in the U.S., referring to access, availability, and affordability of foods that support well-being and prevent and manage nutrition-related diseases.
- Healthcare and government entities are increasingly focused on nutrition insecurity given the distinction between access to calories vs. nourishing foods.
- Validated screening measures of nutrition security are not yet established.
- Tufts, Kaiser Permanente, and L.A. County Department of Public Health developed a new 2-item Nutrition Security Screener (NSS).
- This study assessed the relationship between food and nutrition insecurity among national, state, and county-level surveys in the U.S.

Research Questions

- What is the prevalence of nutrition insecurity in diverse U.S. populations?
- How does prevalence of nutrition insecurity compare to prevalence of food insecurity, as measured by the 2-item HVS and 6-item USDA food security module?
- How does nutrition insecurity compare to food insecurity as a predictor of diet-related disease and self-reported health?

2-item Nutrition Security Screener

[Preamble: The next questions are about healthy foods - foods that support your health and well-being. These foods include, for example, fruits, vegetables, whole grains, beans, nuts, yogurt, and fish. These foods can be fresh, frozen, or canned; and don't have to be organic. Less healthy foods can include foods that are highly processed, packaged, and high in salt, starch, sugar, and unhealthy fats.]

- Thinking about the last 12 months, how hard was it for you or your household to regularly get and eat healthy foods?** Response options include very hard, hard, somewhat hard, not very hard, or not hard at all. [Don't know, refused].
- People have different reasons for eating or not eating healthy foods. Please tell me which, if any, of the following reasons were true for you or your household in the last 12 months.** Response options: often true, sometimes true, or never true [Don't know, refused]

a. Healthy foods are too expensive	h. I don't know how to cook healthy foods
b. There aren't a lot of healthy food choices at stores where I usually shop	i. I don't know which foods are considered healthy foods
c. Stores or food pantries with healthy foods are too far away / hard to reach	j. I or my family don't like the taste of healthy foods
d. I don't have a car or other transportation to reach stores or food pantries that have healthy foods	k. Some of the foods from my culture are hard to make healthy
e. I don't have enough time to shop for healthy foods	l. I'm not sure I qualify for food assistance programs like food stamps (aka SNAP, CalFresh, or EBT) or WIC that help me buy healthy foods
f. I don't have enough time to cook healthy foods	m. I have mobility challenges / physical limitations that make it difficult for me to prepare and eat healthy foods.
g. My cooking equipment or storage space is not enough to prepare healthy foods	n. Other - please specify: _____

Methods

- NSS was refined in pilot studies and validated against measures of food insecurity, socio-demographics, and health in 5 diverse populations.
- Multivariate logistic modelling examined food and nutrition insecurity as predictors of health, adjusting for age, sex, income, race/ethnicity, education.

Results

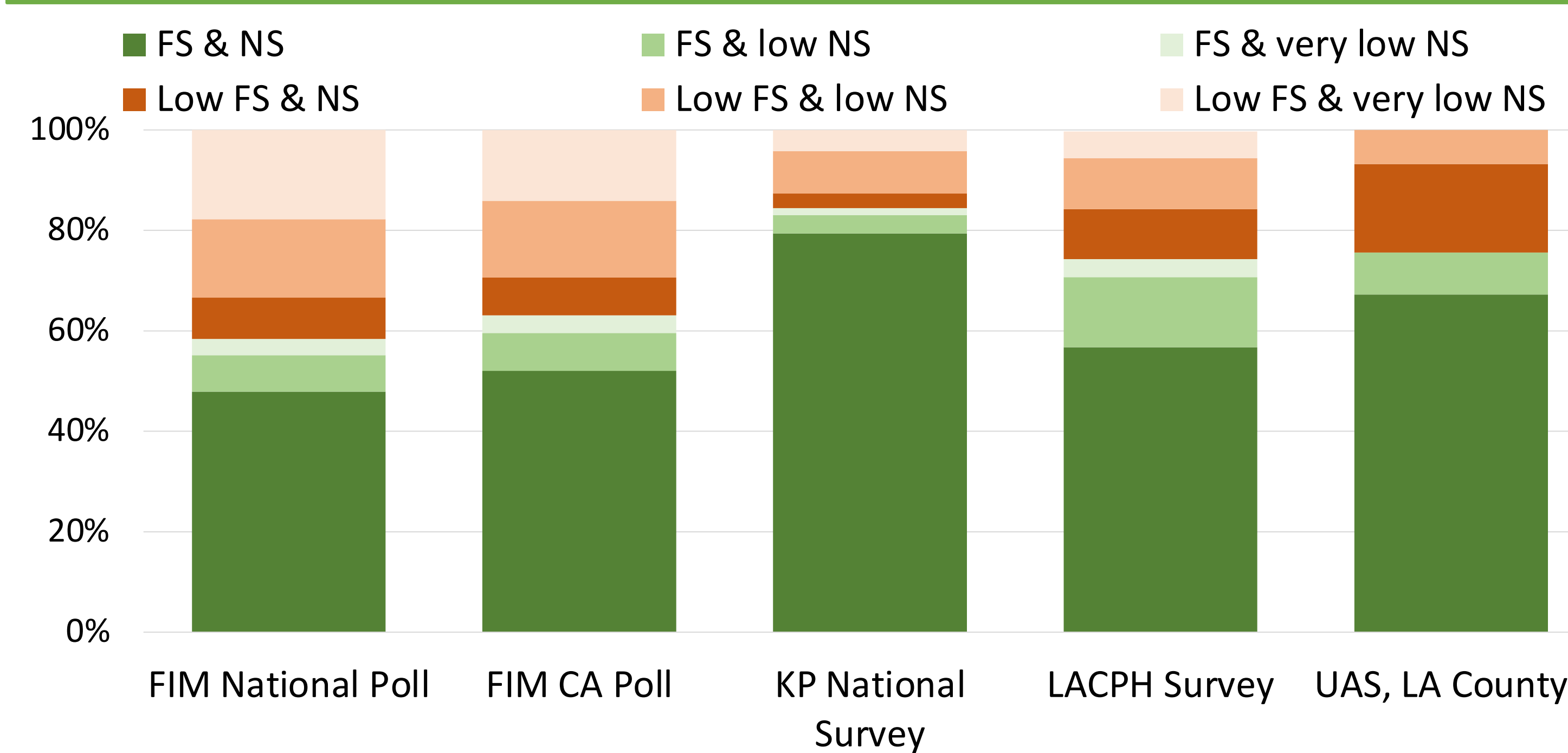
- 19,348 respondents total, from five diverse populations (Table 1).
- Only moderate positive correlation exists between the presence of food insecurity and nutrition insecurity (Table 1).
- Prevalence of food insecurity in the five surveys ranged from 13-42% while prevalence of nutrition insecurity ranged from 18-44% (Table 1).
- Food insecurity and nutrition insecurity only partly overlapped, with discordance in about 20% of all respondents (Figure 1).

Table 1. Correlation between measures of food and nutrition insecurity by dataset

Survey name	n	Food security measure	Food insecurity	Nutrition insecurity	Spearman correlation	P-value
FIM National Poll	3009	2-item HVS	42%	44%	0.618	<0.001
FIM California Poll	650	2-item HVS	37%	41%	0.610	<0.001
KP National Social Needs Survey	6317	2-item HVS	13%	18%	0.551	<0.001
Los Angeles County Public Health Survey (LACPH)	9372	6-item USDA module	25%	33%	0.400	<0.001
UAS Study, Los Angeles County	1152	6-item USDA module	24%	25%	0.458	<0.001

FIM = Food is Medicine. HVS = Hunger Vital Signs. KP = Kaiser Permanente. UAS = University of Southern California's Understanding America Study.

Figure 1. Overlap of food security (FS) and nutrition security (NS)



*UAS survey did not assess low vs. very low NS.

Figure 2. Barriers to nutrition security (often/sometimes)

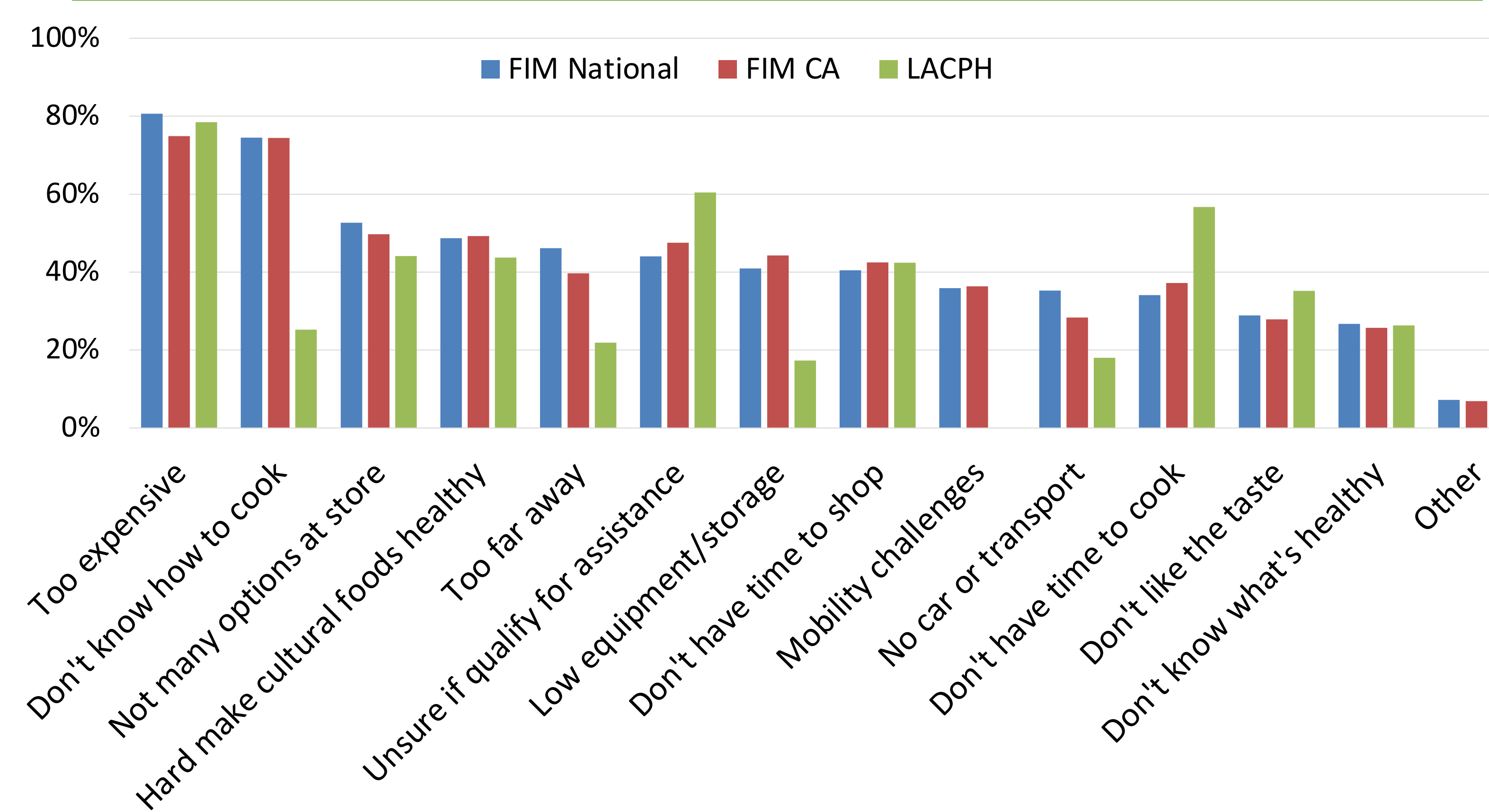
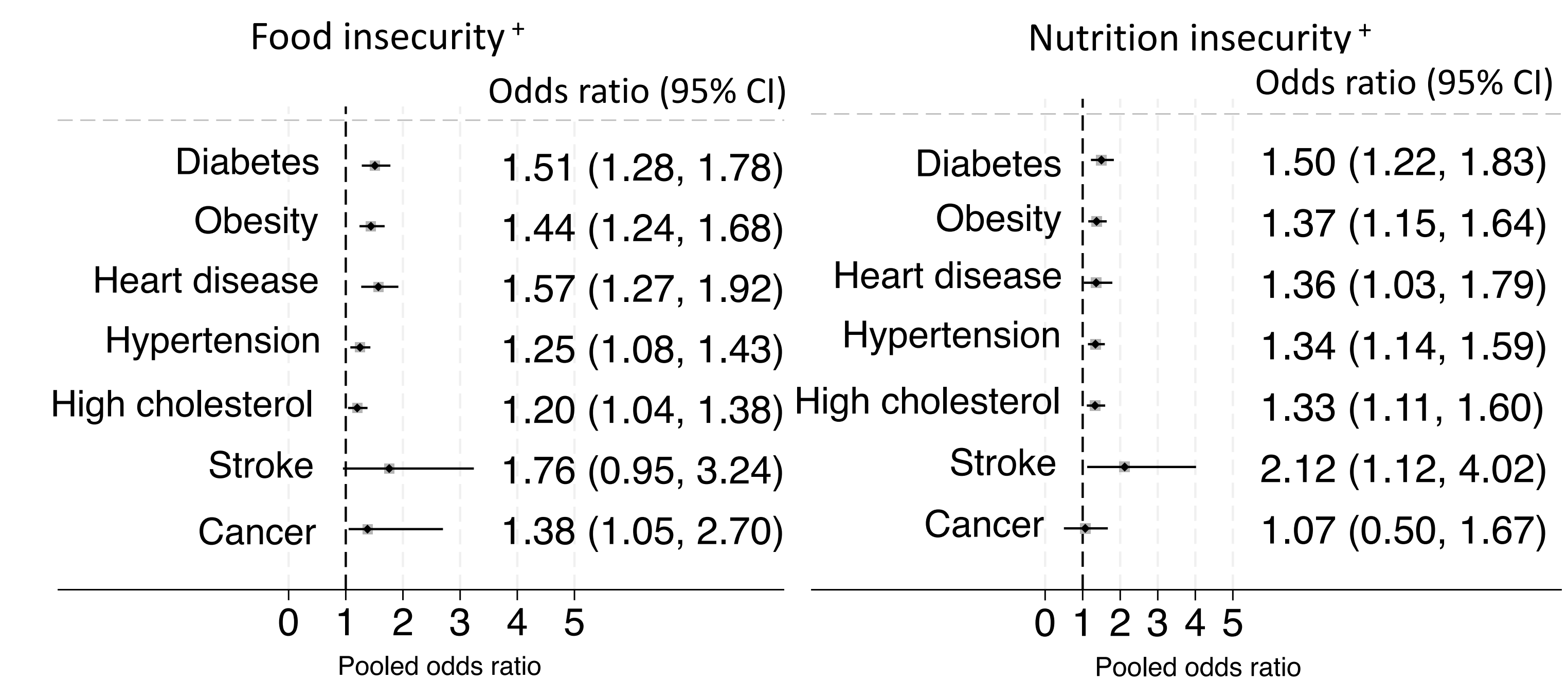


Figure 3. Multivariable adjusted associations of food and nutrition insecurity with prevalent health conditions



* Multivariable model adjusted for age, sex, income, race/ethnicity, education and jointly adjusted for food and nutrition insecurity. Pooled results from FIM National, FIM CA, and LACPH Surveys.

Table 2. Association of food and nutrition insecurity and self-reported physical and mental health

Survey	Food insecurity*		Nutrition insecurity*	
Self-reported physical health	OR	95% CI	OR	95% CI
Very Good/Excellent (n=2877)	1.00 (Ref)	---	1.00 (Ref)	---
Good (n=2358)	1.37	(0.92, 2.04)	1.75*	(1.25, 2.45)
Poor / Fair (n=1017)	1.67*	(1.03, 2.72)	3.14**	(2.07, 4.75)
Self-reported mental health				
Very Good/Excellent (n=3524)	1.00 (Ref)	---	1.00 (Ref)	---
Good (n=1796)	1.23	(0.83, 1.81)	2.04**	(1.47, 2.85)
Poor/Fair (n=943)	2.54**	(1.66, 3.91)	2.30**	(1.58, 3.33)

* Multivariable model adjusted for age, sex, race/ethnicity, income, and education with both food insecurity and nutrition insecurity (adjusted for each other). *p-value<0.05. **p-value<0.001.

Results (cont.)

- Common barriers to nutrition security were cost, cooking knowledge, and uncertainty around food assistance qualifications (Figure 2).
- Across all the studies, presence of nutrition insecurity and food insecurity each independently predicted significantly higher risk of diabetes, obesity, heart disease, hypertension, and high cholesterol (Figure 3).
- Compared to nutrition secure, those with nutrition insecurity had over 3x greater odds of reporting poor or fair physical health and 2.3x greater odds of reporting poor or fair mental health (Table 2).

Conclusions

- Our results show a 2-item Nutrition Security Screener provides new information independent of food insecurity, associates with key disease outcomes, and provides insight on barriers to inform interventions in clinical and public health settings.

Funding & Further Information

The Bia-Echo Foundation, the HAND Foundation, Kaiser Permanente, Seeding the Future Foundation, and NIH. For more information, please visit our website tuftsfoodmedicine.org.

