# Relationships Between Food Insecurity and Consumption of Fruits and Vegetables Among Kansas Adults

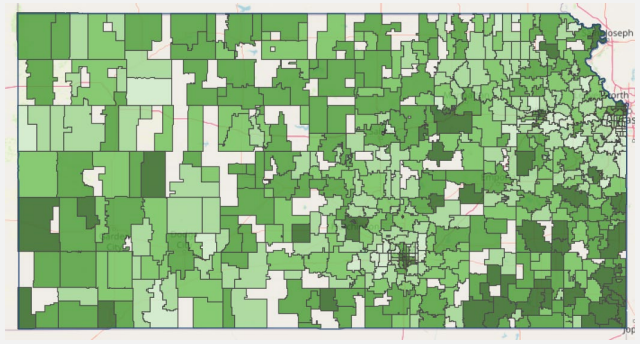
**Jeremy Goering, MPH[1,2], Shannon Metz, MPH[1], Steven Corbett, PhD[1], Babalola Faseru, MD, MPH[1,2]**

1. Kansas Department of Health and Environment
2. Department of Population Health, University of Kansas Medical Center

## Background

In Kansas, chronic diseases associated with poor diet place a large burden on the health of residents. Improving fruit and vegetable (FV) intake requires an understanding of the factors that contribute to their underconsumption. Food insecurity, which was estimated to affect over 280,000 Kansans in 2020[1], has previously been shown to be associated with decreased FV consumption[2,3]. This study combines FV consumption data from the 2021 Kansas Behavioral Risk Factor Surveillance System (Kansas BRFSS)[4] with ZIP code-level food insecurity data from the 2021 Food Insecurity Index (FII)[5] to determine if there is an association between food insecurity and FV consumption among Kansas adults.

## Food Insecurity In Kansas




The Food Insecurity Index (FII) assigns each Kansas ZIP code into one of five categories. Category One indicates lowest need and Category Five indicates highest need.

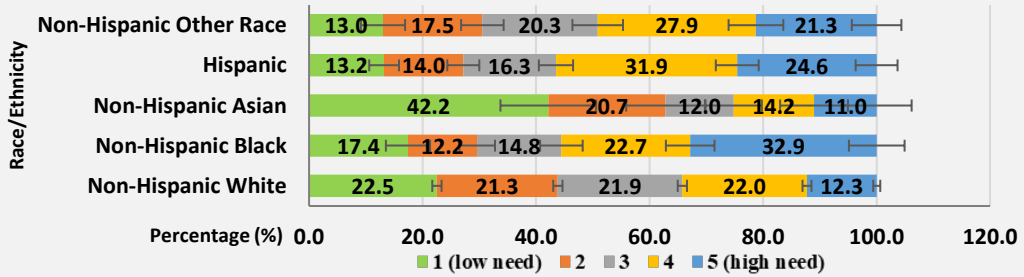
Images: kansashealthmatters.org/indexsuite/index/foodinsecurity

## Selected Descriptive Statistics Of The Study Population

| Individual Characteristics | Unweighted Frequency | Weighted Frequency | Weighted Percent | 95% CI |
|---|---|---|---|---|
| **Fruit Consumption** | | | | |
| Consume fruit one or more times per day | 9,106 | 1,131,279 | 56.3 | (55.4, 57.3) |
| Consume fruit less than one time per day | 6,768 | 877,110 | 43.7 | (42.7, 44.6) |
| **Vegetable Consumption** | | | | |
| Consume vegetables one or times per day | 12,670 | 1,576,012 | 80.3 | (79.5, 81.2) |
| Consume vegetables less than one time per day | 2,870 | 385,858 | 19.7 | (18.8, 20.5) |
| **Food Insecurity Index Categories of Residential ZIP Code** | | | | |
| 1 (Low need) | 3,067 | 442,129 | 21.4 | (20.6, 22.1) |
| 2 | 3,238 | 411,490 | 19.9 | (19.1, 20.7) |
| 3 | 3,426 | 427,509 | 20.7 | (19.9, 21.4) |
| 4 | 4,060 | 477,156 | 23.1 | (22.3, 23.9) |
| 5 (High need) | 2,397 | 309,531 | 15.0 | (14.2, 15.7) |

Kansas BRFSS data show that four out of five respondents (80.3%) consume vegetables one or more times per day but just over half (56.3%) consume fruit one or more times per day. the percentage of Kansas BRFSS respondents who live in a ZIP code with a FII category of one (lowest need) through five (highest need) are 21.4%, 19.9%, 20.7%, 23.1% and 15.0%, respectively.

## Distribution Of Food Insecurity By Race/Ethnicity




A high proportion of Non-Hispanic Black and Hispanic Kansans lived in food insecure ZIP codes compared with Non-Hispanic White, Asian and other races. Rao-Scott Chi Square analysis indicates a strong association ($p<0.0001$) between race/ethnicity and FII category.

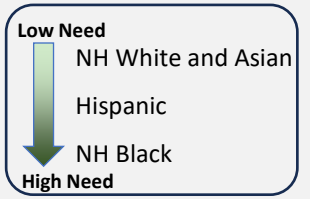
## Selected Odds Ratios

| BRFSS Dietary Behaviors | OR | 95% CI |
|---|---|---|
| **Consume Vegetables <1 Time/Day** | | |
| 1 (lowest need) | Reference | |
| 2 | 1.12 | (0.94, 1.33) |
| 3 | 1.14 | (0.96, 1.36) |
| 4 | 1.19 | (1.00, 1.41) |
| 5 (highest need) | 1.35 | (1.11, 1.64) |
| **Consume Fruit <1 Time/Day** | | |
| 1 (lowest need) | Reference | |
| 2 | 1.13 | (1.00, 1.29) |
| 3 | 1.15 | (1.01, 1.31) |
| 4 | 1.36 | (1.20, 1.54) |
| 5 (highest need) | 1.26 | (1.08, 1.46) |
| **Consume Green Vegetables <1 Time/Day** | | |
| 1 (lowest need) | Reference | |
| 2 | 1.23 | (1.05, 1.44) |
| 3 | 1.25 | (1.07, 1.45) |
| 4 | 1.35 | (1.16, 1.58) |
| 5 (highest need) | 1.49 | (1.23, 1.81) |
| **Consume Fried Potatoes (French Fries, Home Fries, Hash Browns) <1 Time/Day** | | |
| 1 (lowest need) | Reference | |
| 2 | 0.62 | (0.44, 0.88) |
| 3 | 0.58 | (0.41, 0.81) |
| 4 | 0.45 | (0.32, 0.62) |
| 5 (highest need) | 0.40 | (0.28, 0.58) |

After controlling for the baseline characteristics of race/ethnicity and age, the Odds Ratio of consuming fruits, vegetables and green vegetables less than one time per day **increased** with each FII category. The Odds Ratio of consuming fried potatoes less than one time per day **decreased**.

## Conclusions

1) Non-Hispanic Black, Hispanic and non-Hispanic groups other than White or Asian are disproportionately likely to live in a food insecure ZIP code.




2) Individuals living in food insecure ZIP codes consume healthy fruits and vegetables less frequently but consume unhealthy fried potatoes more frequently.

**References** **1.** Feeding America. Food Insecurity among Overall (all ages) Population in Kansas, map.feedingamerica.org/county/2020/overall/kansas (2020). **2.** Turnbull, O., Homer, M. & Ensaff, H. Food insecurity: Its prevalence and relationship to fruit and vegetable consumption. J Hum Nutr Diet 34, 849-857, doi:10.1111/jhn.12866 (2021). **3.** Hanson, K. L. & Connor, L. M. Food insecurity and dietary quality in US adults and children: a systematic review. Am J Clin Nutr 100, 684-692, doi:10.3945/ajcn.114.084525 (2014). **4.** Kansas 2021 BRFSS Questionnaire. (Kansas Department of Health and Environment, 2022). **5.** Conduent Healthy Communities Institute. 2021 Food Insecurity Index, kansashealthmatters.org/indexsuite/index/foodinsecurity (2021).