



# Exploring the Implications of Food Insecurity on Hypertension Outcomes in Hispanic Patient Population in Santa Ana, CA

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# Origin of the Problem

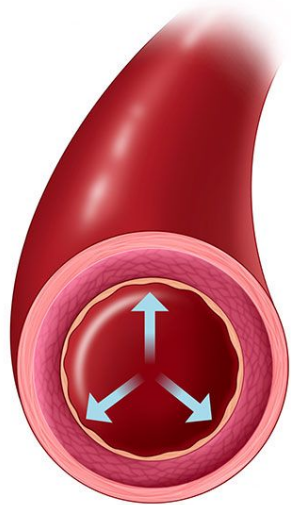
- **Socio-economic** determinants strongly influence a person's diet and perceived beliefs about the importance of nutrition
  - **Structural:** redlining, racism, exclusion
  - **Educational:** Limited health literacy
  - **Environmental:** lack of green space in urban environments
- Zillow study (2016) - "Homes Near Trader Joe's, Whole Foods Stores Appreciate Faster"



Anonymous, 2021

# What is Hypertension?

## High Blood Pressure *Hypertension*



Force of blood on artery wall



$\geq 130$

Systolic number  
is when the  
heart contracts

$\geq 80$

Diastolic number  
is when the  
heart rests



## Blood Pressure Ranges

BLOOD PRESSURE CATEGORY	SYSTOLIC (mm Hg)	DIASTOLIC (mm Hg)
Healthy	less than 120	and less than 80
Elevated	120–129	and less than 80
Stage 1 hypertension	130–139	or 80–89
Stage 2 hypertension	140 or higher	or 90 or higher
Hypertension crisis	over 180	or over 120

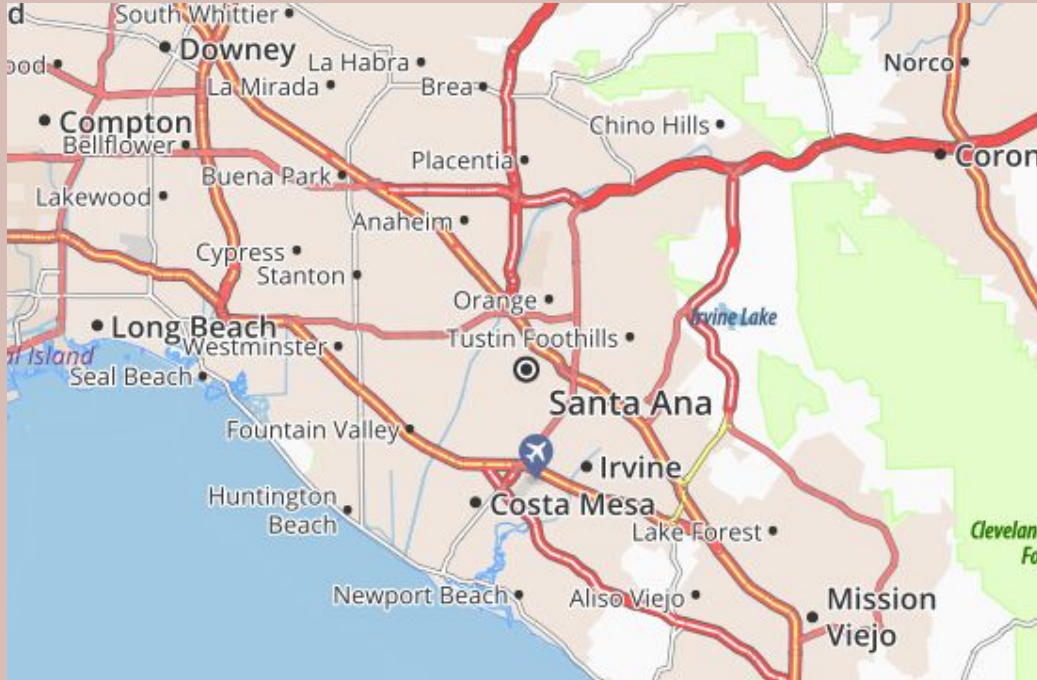


# Food Insecurity

The limited availability and access to adequate food for all individuals, irrespective of class, gender, or region (US Department of Agriculture, n.d.)



# Santa Ana, CA





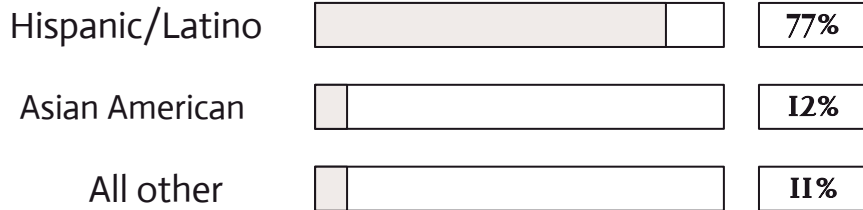
# Statistics about Santa Ana, CA

## Food Insecurity

(Elattar, 2022)



## Race/Ethnicity



## Avg. Household Income

\$26,399/year

## Relevant Statistics

- only **35 grocery stores** for a **305k population** → one grocery store per 9,600 residents (Rhone et al., 2022)
- **11% of the population** has clinically diagnosed hypertension



# In the field...

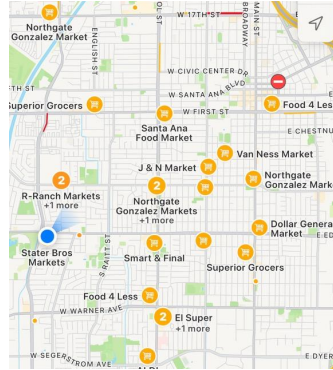
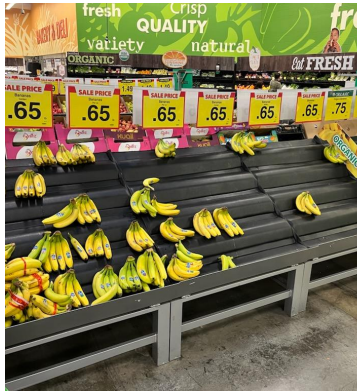


## Liquor stores

More liquor stores are accessible than grocery stores

## Lack of fresh produce

Poorly maintained & understocked produce section



## Lack of grocery stores

Grocery stores (e.g., Albertsons, Ralphs) are often far away

## Limited Greenspace

Unsafe and/or under maintained parks



## Unhealthy food emphasis

Heavy promotion of cheap & unhealthy foods in grocery stores







# Mi Propio Camino

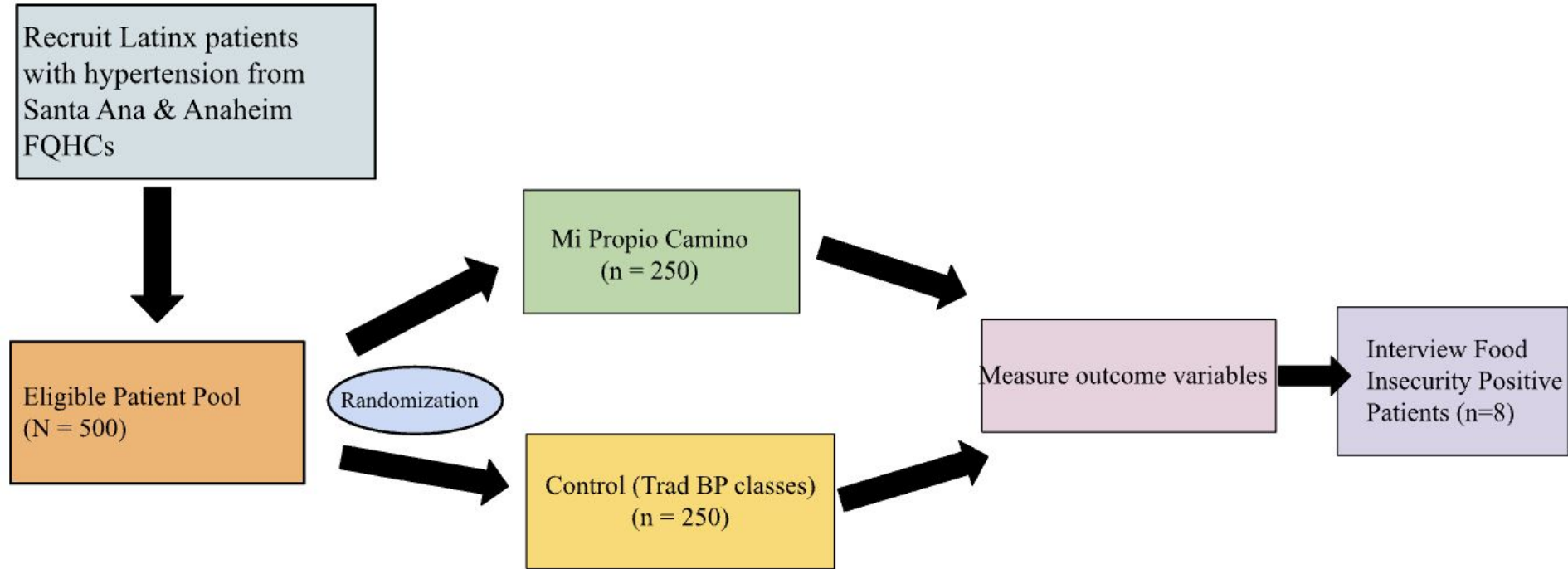
*(My own way)*

Intentar herramientas de estilo de vida + Medicamentos



Mirar como funciona

# Study Outline





# Hypotheses

- Food insecure (FI) patients will have **poorer blood pressure control** in comparison to food secure (FS) patients.
- FS patients will engage in **healthy lifestyle behaviors more frequently** than FI patients
- Compared to FS patients, FI patients will exhibit **lower adherence to blood pressure (BP) medications**

# Results



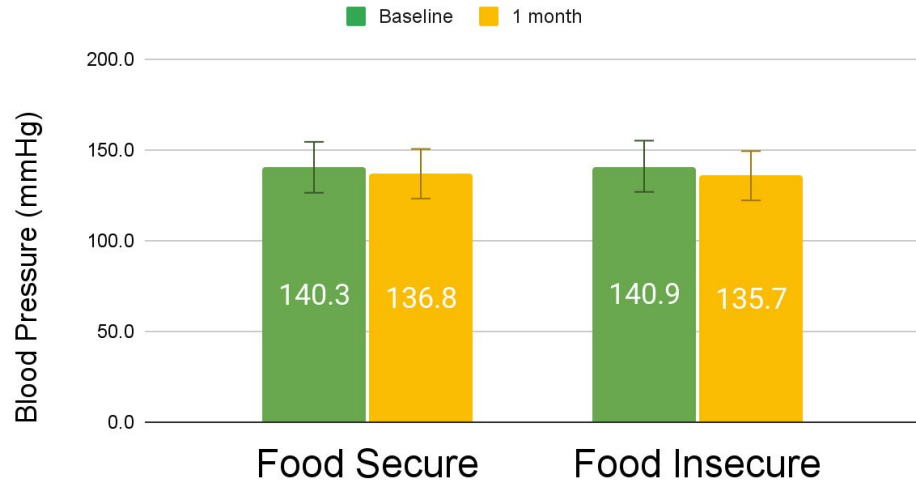


# Patient Demographics

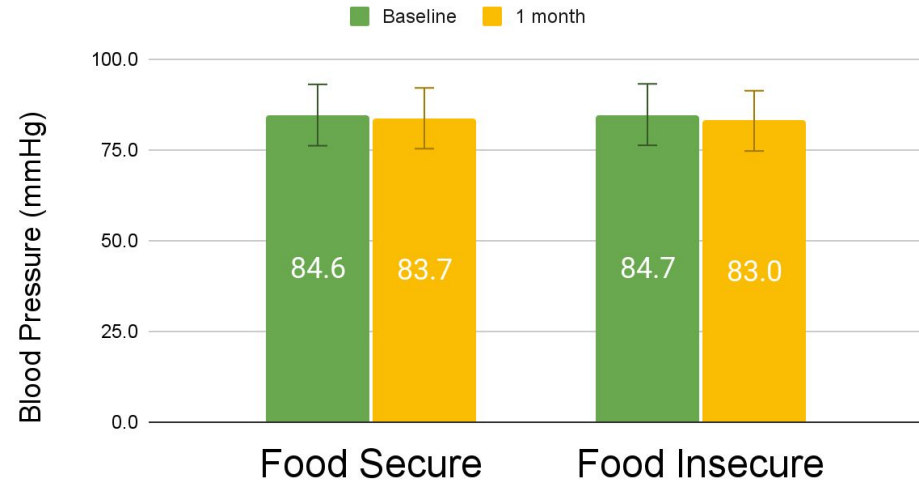
<b>Average Age</b>	57
<b>Gender</b>	66.4% Female, 33.6% Male
<b>HS Education or Higher</b>	57%
<b>Born in the US</b>	9.3%
<b>Income &lt;\$20,000</b>	75.5%

# Food insecure patients exhibit greater systolic BP control 1-month after BP management classes

### Mean Systolic Blood Pressures



### Mean Diastolic Blood Pressures

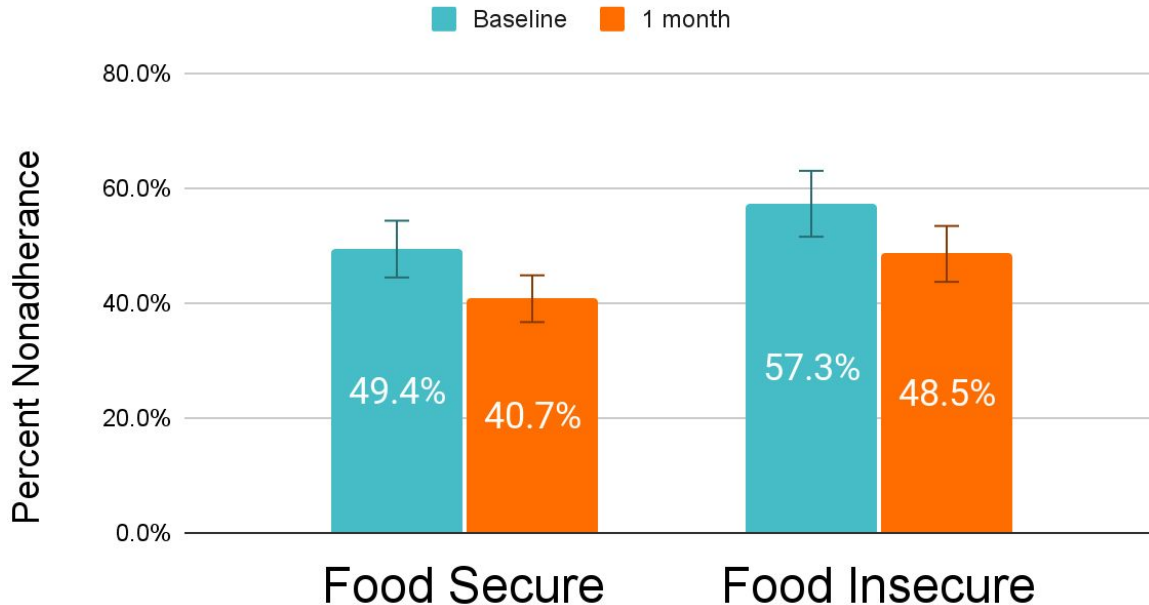


[Systolic] FS:  $t=1.7057$ ,  $p=0.09$ ; FI:  $t=2.9350$ ,  $p=0.004$

[Diastolic] FS:  $t=0.6723$ ,  $p=0.50$ ; FI:  $t=1.5587$ ,  $p=0.12$

# ALL patients **decrease medication nonadherence** 1 month following BP management classes

## Baseline and 1 month Nonadherence



### T-test

Food Secure:

**t = 1.4794**

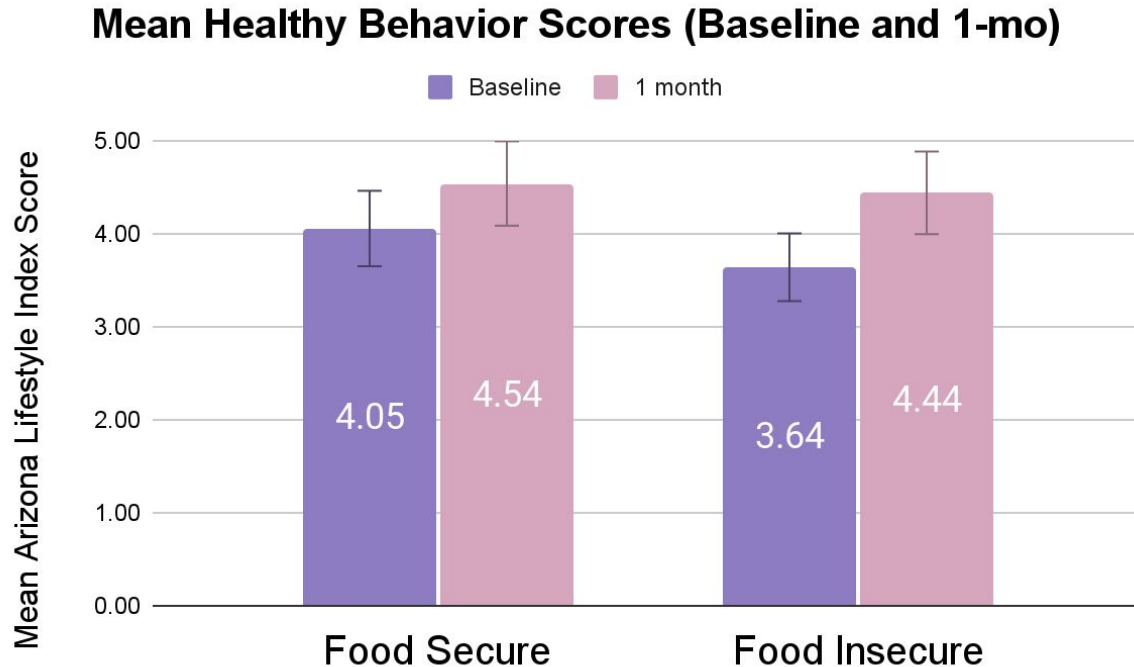
**p = 0.1401**

Food Insecure:

**t = 1.8621**

**p = 0.0632**

**ALL** patients systematically **increase healthy behaviors**  
1-month after BP management classes



**T-test**

**Food Secure:**

**t = 3.5832**

**p = 0.0004**

**Food Insecure:**

**t = 7.5415**

**p = 0.0001**



# Looking forward...

- **Focus groups** and thematic analysis to understand build environment of Santa Ana CA and manifestations of food insecurity
- Looking at **upstream and downstream effects** of food insecurity
- Finding **structured solutions** to support patients with FI in BP control, along with other health disparities



# References

- Becerra, M. B., Mshigeni, S. K., & Becerra, B. J. (2018). The Overlooked Burden of Food Insecurity among Asian Americans: Results from the California Health Interview Survey. *International journal of environmental research and public health*, 15(8), 1684. <https://doi.org/10.3390/ijerph15081684>
- Communities In Action: Santa Ana, CA. (2017, September 12). *Healthy Places by Design*. [https://healthyplacesbydesign.org/communities-in-action-santa-ana-ca/Definitions of Food Security](https://healthyplacesbydesign.org/communities-in-action-santa-ana-ca/Definitions%20of%20Food%20Security). USDA ERS - Definitions of Food Security. (n.d.). <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/#:~:text=Food%20insecurity%E2%80%94the%20condition%20assessed,may%20result%20from%20food%20insecurity>.
- Elattar, B. P., Hosam. (2023, February 6). *Santa Ana to Consider Weekly Food Drives as OC Approaches a Hunger Cliff*. Voice of OC. <http://voiceofoc.org/2023/02/santa-ana-to-consider-weekly-food-drives-as-oc-approaches-a-hunger-cliff/>
- Elattar, H. (2023, November 22). *Many Orange County Residents Still Struggle Putting Food on Table*. Voice of OC. <http://voiceofoc.org/2023/11/many-orange-county-residents-still-struggle-putting-food-on-table/>
- Garcia-Silva, B., Handler, E., & Wolfe, J. (2017). A Public–Private Partnership to Mitigate Food Insecurity and Food Waste in Orange County, California. *American Journal of Public Health*, 107(1), 105–107. <https://doi.org/10.2105/AJPH.2016.303450>
- Gundersen, C., & Ziliak, J. P. (2015). Food Insecurity And Health Outcomes. *Health affairs (Project Hope)*, 34(11), 1830–1839. <https://doi.org/10.1377/hlthaff.2015.0645>
- Haider, A., & Roque, L. (2021, September 29). New Poverty and Food Insecurity Data Illustrate Persistent Racial Inequities. *Center for American Progress*. <https://www.americanprogress.org/article/new-poverty-food-insecurity-data-illustrate-persistent-racial-inequities/>
- Health Promotion and Disease Prevention | OC Health Data*. (n.d.). Retrieved March 10, 2024, from <https://ohealthdata.com/health-priorities/health-promotion-disease-prevention>
- Hines, C. T., Markowitz, A. J., & Johnson, A. D. (2021). Food insecurity: What are its effects, why, and what can policy do about it? *Policy Insights from the Behavioral and Brain Sciences*, 8(2), 127–135. <https://doi.org/10.1177/23727322211032250>
- Kakaei, H., Nourmoradi, H., Bakhtiyari, S., Jalilian, M., & Mirzaei, A. (2022). Effect of COVID-19 on food security, hunger, and food crisis. *COVID-19 and the Sustainable Development Goals*, 3–29. <https://doi.org/10.1016/B978-0-323-91307-2.00005-5>
- Morales, D. X., Morales, S. A., & Beltran, T. F. (2021). Racial/Ethnic Disparities in Household Food Insecurity During the COVID-19 Pandemic: a Nationally Representative Study. *Journal of racial and ethnic health disparities*, 8(5), 1300–1314. <https://doi.org/10.1007/s40615-020-00892-7>
- Rabbitt, M.P., Hales, L.J., Burke, M.P., & Coleman-Jensen, A. (2023). Household food security in the United States in 2022 (Report No. ERR-325). U.S. Department of Agriculture, Economic Research Service. <https://doi.org/10.32747/2023.8134351.ers>
- Rhone, A., Williams, R., & Dicken, C. (June 2022). *Low-Income and Low-Foodstore-Access Census Tracts 2015–19* (EIB-236). U.S. Department of Agriculture, Economic Research Service.
- Rodriguez, C., Crowder, S. L., Rodriguez, M., Redwine, L., & Stern, M. (2021). Food Insecurity and the Hispanic Population during the COVID-19 Pandemic. *Ecology of food and nutrition*, 60(5), 548–563. <https://doi.org/10.1080/03670244.2021.1974014>
- USDA ERS - Food Security and Nutrition Assistance*. (n.d.). Retrieved March 10, 2024, from <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance/>



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