

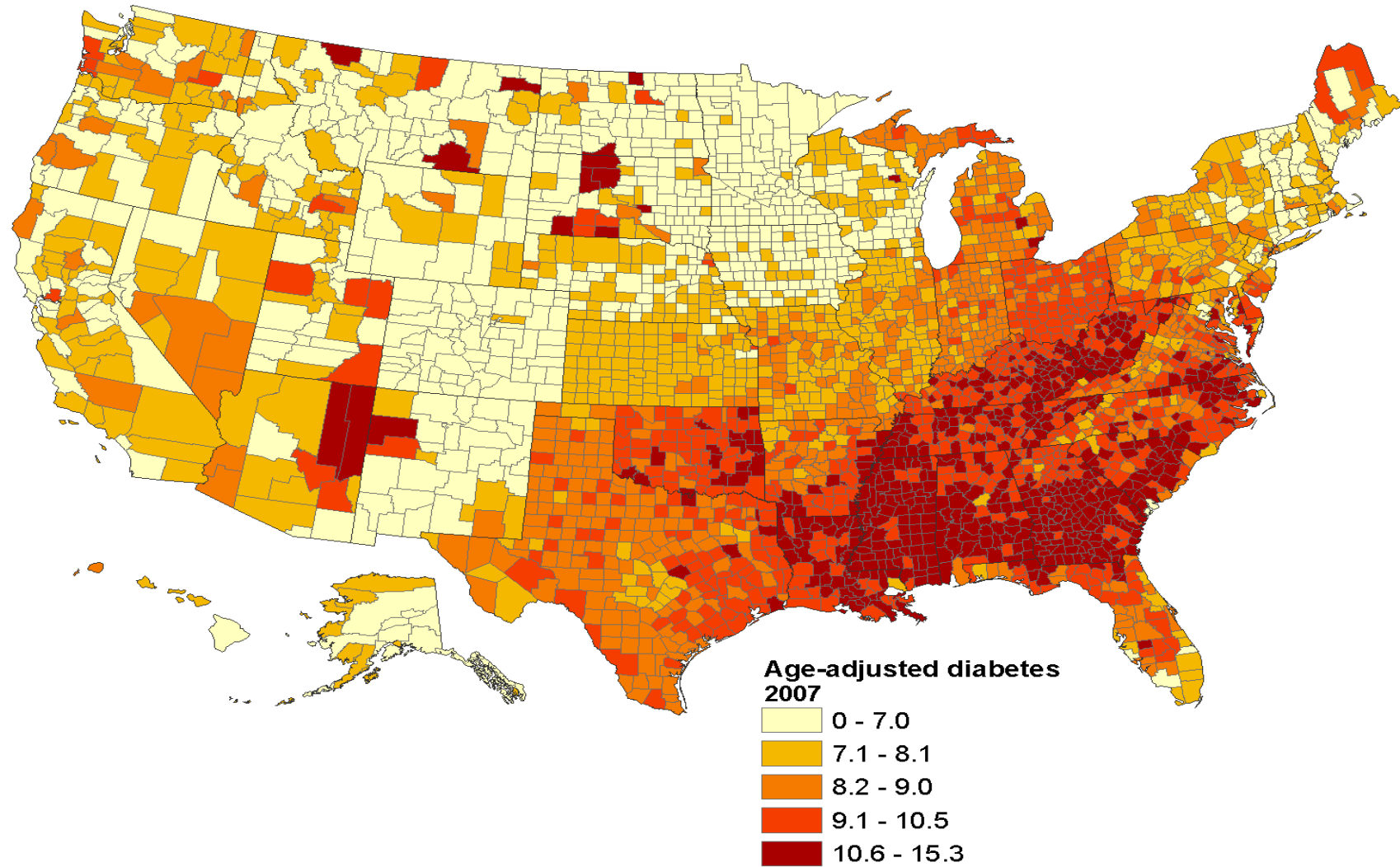
Risk of Living in a Food Desert

Javed Butler, MD, MPH, MBA
Patrick H. Lehan Chair in Cardiovascular Research
Professor and Chairman, Department of Medicine
Professor of Physiology
University of Mississippi

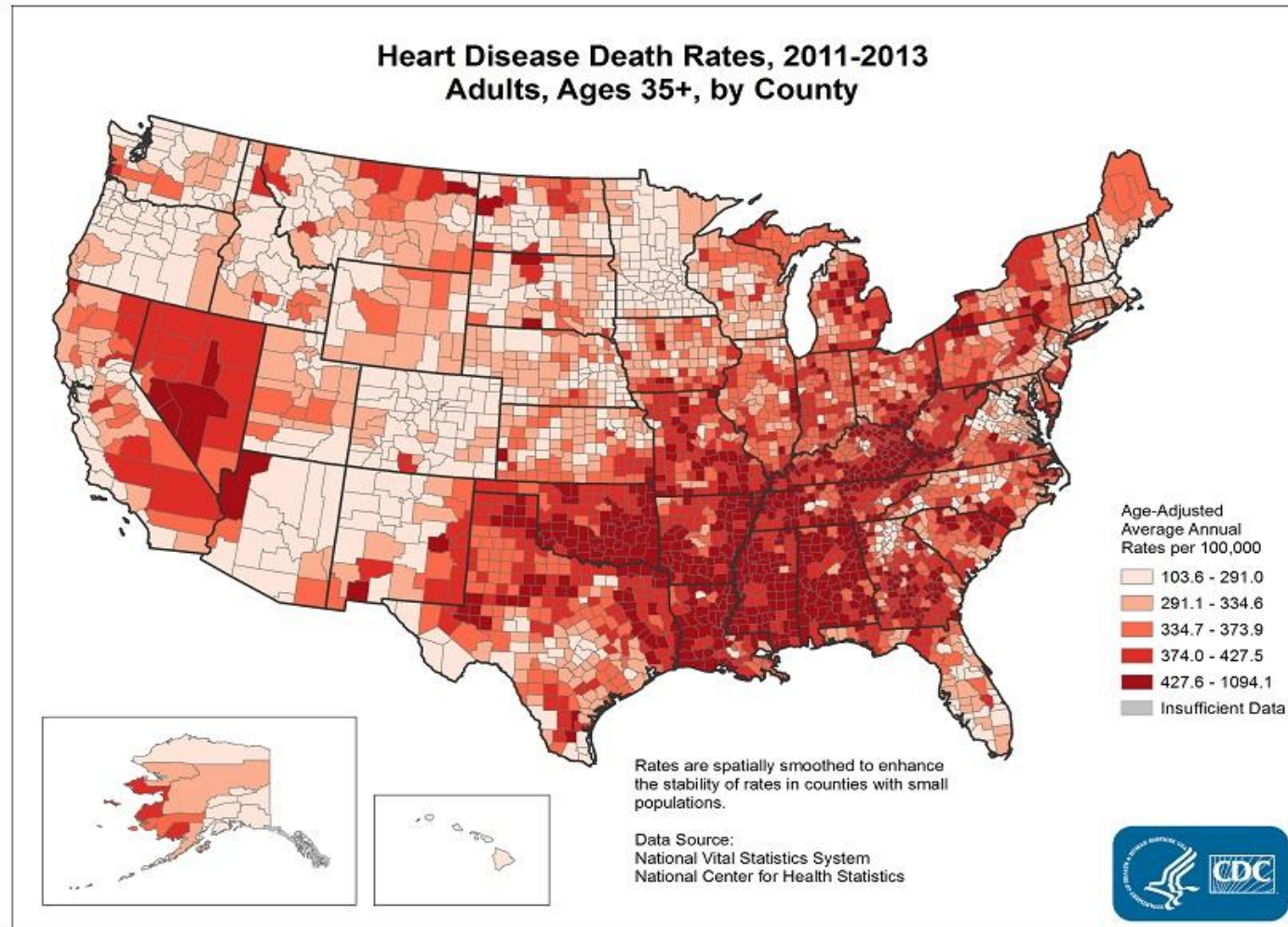
Disclosures

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 - NIH, European Union, PCORI
- Consultant
 - Adrenomed, Amgen, Array, Astra Zeneca, Bayer, Boehringer Ingelheim, Bristol Myers Squibb, CVRx, G3 Pharmaceutical, Innolife, Janssen, LinaNova, Luitpold, Medtronic, Merck, Novartis, Relypsa, Roche, Sanofi, and Vifor

Diabetes Prevalence

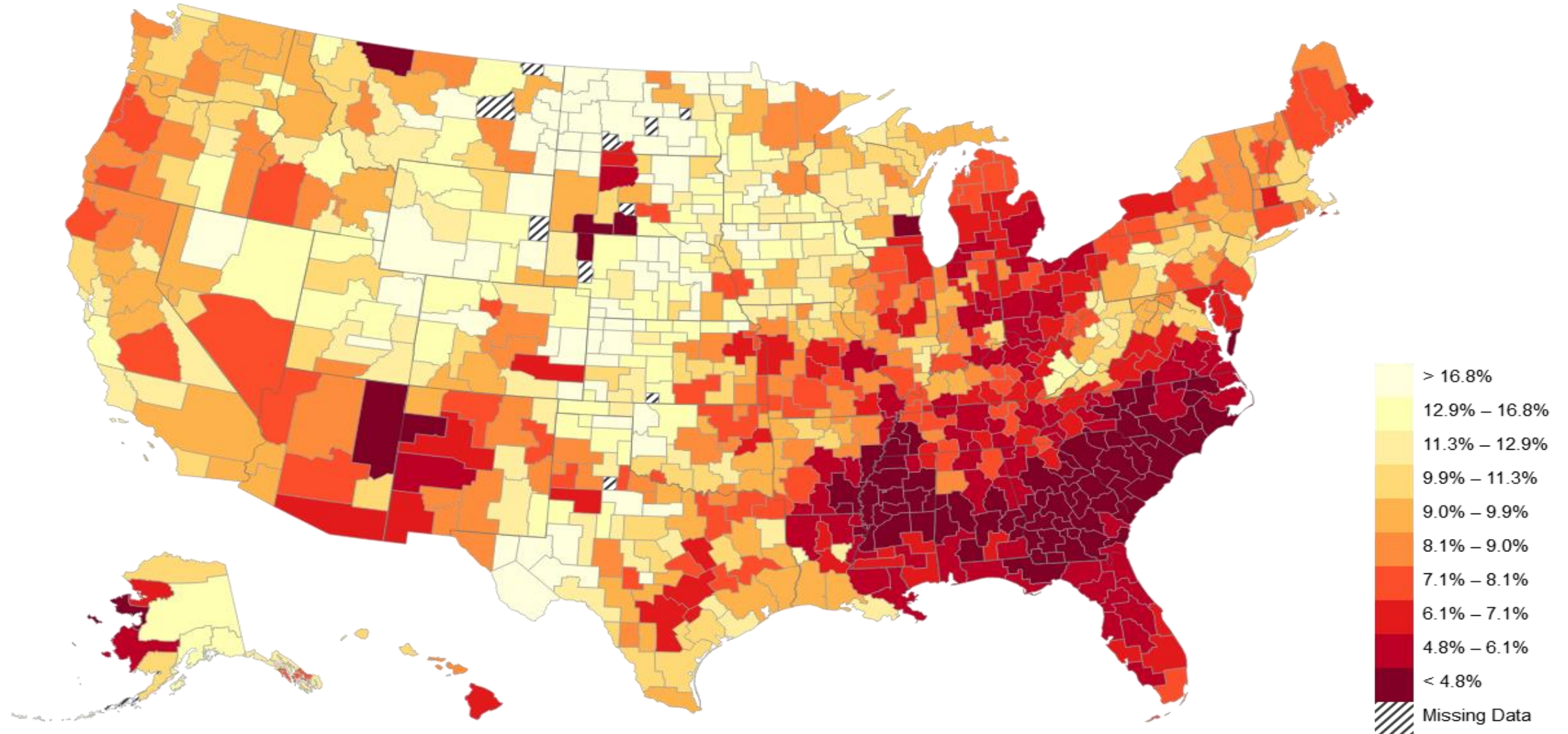


Heart Disease Prevalence

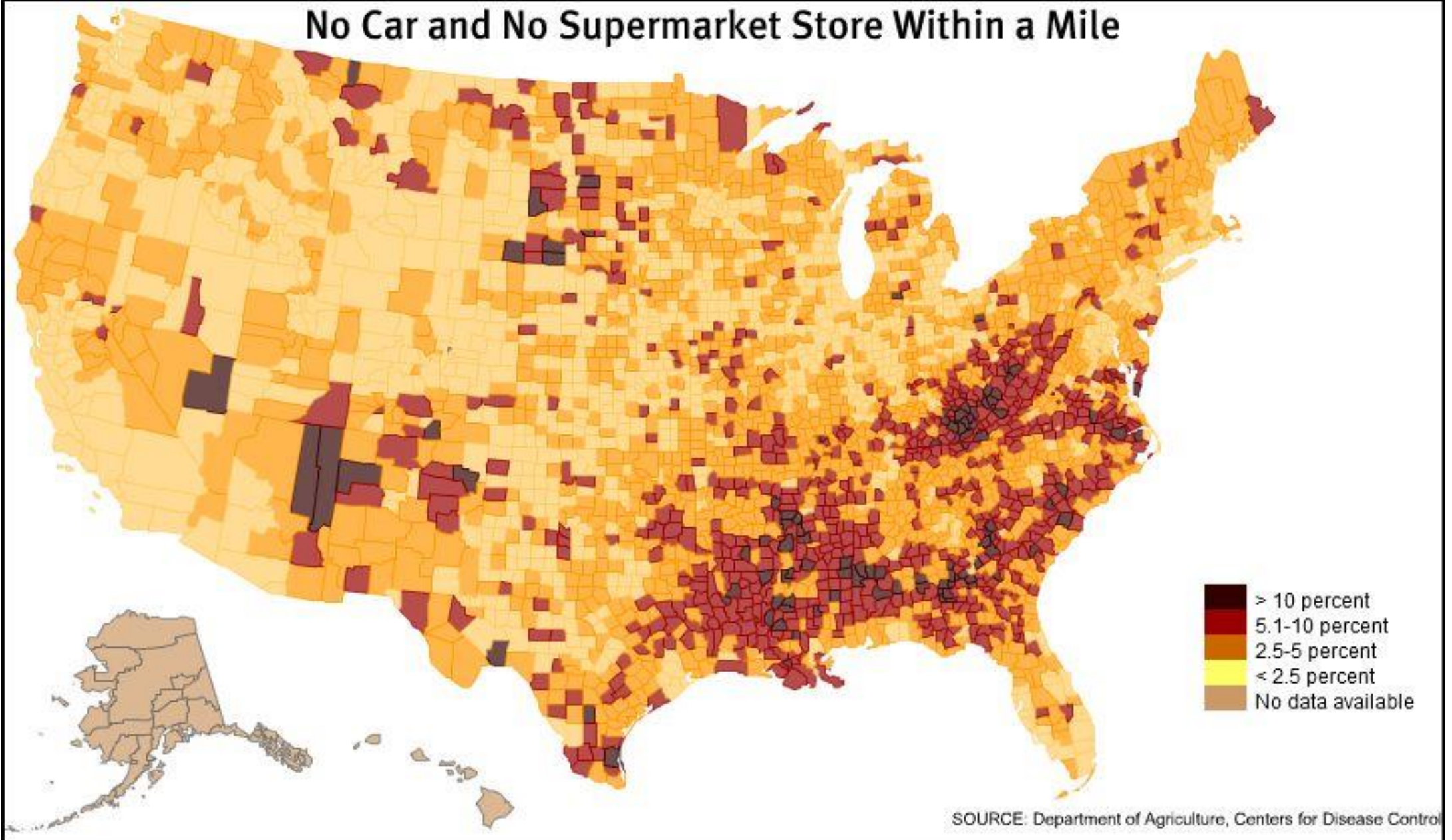


The Geography of Upward Mobility in America

Children's Chances of Reaching Top 20% of Income Distribution if Parents in Bottom 20%



No Car and No Supermarket Store Within a Mile



SOURCE: Department of Agriculture, Centers for Disease Control

Social determinants of health

- The circumstances in which people are born, grow, live, work, and age, and the systems put in place to deal with illness. WHO
 - Health and illness are not distributed randomly throughout human society
 - Resources to prevent illness and its effects are not distributed randomly throughout human society either
- “There is a need to understand the role of social determinants of health in order to develop innovative approaches that address social barriers to CV health”

Social determinants of health

- Socioeconomic status (wealth and income, education, employment, occupational status, etc).
- Race/ethnicity
- Social support
- Culture and language
- Access to care
- Residential environment

Rural and Urban Issue

- **Food Desert:** a district with little or no access to foods needed to maintain a **Healthy Diet.**



What is a Food Desert?

- A food desert is a low income area or neighborhood that lacks a proper source of healthy food.
- These areas usually have many fast food chains and smaller convenience stores.
- Access
 - Physical
 - Financial
 - Food Desert





Kids & Family

Create McDonald's moments
with the family.

Lack of Access to Real Food: Stats

- Santa Clara Health Profile of 2010
- Population 1.8M
- **35** produce stores compared to **918** fast food, pizza, and sandwich stores.
- 1940 population per fast food store
- 51000 population per produce store

Who Is Affected?

- People who live in food deserts that have low income and no transportation are affected.
- The children who grow up eating unhealthy food may influence their preference later on in their lives.

Pathways by which neighborhood impacts CVD risk

- Aspects of the built environment affect health-related behaviors
 - Proximity of grocery stores
 - Spaces where residents can exercise.
- Proximity to health care providers might influence the detection or management of health problems.
- Neighborhood safety might influence exercise level, diet, or level of stress.
- Social norms for health-related behaviors may vary across neighborhoods.

Health Issues

- People who live in food deserts may eventually develop some health issues such as:
 1. Obesity
 2. Cardiovascular Disease
 3. Cancer
 4. Diabetes
 5. Premature Death

Urban Food Deserts are More Likely to have a high proportion of AA

Bivariate correlation coefficients (*p*-values) between healthy food index components and neighborhood demographics.

	Average number of supermarkets	Percent of bodegas that are healthy of all bodegas	Percent of restaurants that are fast food	Food desert index
Proportion of Black/African-American residents	-0.2656 (0.0000)	-0.4895 (0.0000)	0.0376 (0.4275)	-0.3935 (0.0000)
Proportion of Latino residents	0.0253 (0.5936)	0.2979 (0.0000)	0.0492 (0.2992)	0.1632 (0.0001)
Proportion of white residents	0.3312 (0.0000)	0.4053 (0.0000)	-0.0889 (0.0575)	0.3940 (0.0000)
Median household income	0.2014 (0.0000)	0.2136 (0.0000)	-0.1118 (0.0180)	0.2666 (0.0000)

Living in a Food Desert is associated with Preclinical Indices of CVD

Table 2. Estimated Adjusted Differences in Markers of Inflammation, Oxidative Stress, and Vascular Function According to the Status of Food Deserts, Food Access, Area Income, and Individual Income

	Estimated Difference (96% Confidence Interval)			
	Food Desert vs Non-food Desert	Low Food Access vs Good Food Access	Low-Income Area vs High-Income Area	Low Individual Income vs High Individual Income
Inflammatory markers				
Hs-CRP, %	5 (−11.8 to 25.2)	−6.6 (−16.9 to 5.1)	13.8 (1 to 29.3)*	20.7 (5.1 to 38.7)*
Oxidative stress markers, μmol/L				
Glutathione	−0.12 (−0.22 to −0.02)*	0.003 (−0.07 to 0.07)	−0.10 (−0.18 to −0.03)*	−0.10 (−0.18 to −0.02)*
Cystine	0.377 (−2.49 to 3.25)	−0.57 (−2.53 to 1.40)	−0.49 (−2.60 to 1.63)	−0.74 (−1.54 to 3.03)
Vascular function				
Pulse wave velocity, m/s	−0.02 (−0.29 to 0.25)	0.09 (−0.08 to 0.25)	0.06 (−0.12 to 0.25)	0.19 (−0.02 to 0.40)
Augmentation index at 75 bpm	1.47 (0.12 to 2.83)*	−0.47 (−1.39 to 0.46)	0.43 (−0.59 to 1.45)	1.89 (0.80 to 2.99)*
Cardiovascular risk estimation				
ASCVD, %	14 (6.4 to 22.1)*	0.5 (−4.2 to 5.3)	10.2 (4.5 to 16.2)*	15.1 (8.7 to 22.1)*

Living in Food Deserts and Adverse Cardiovascular Outcomes in Patients With Cardiovascular Disease

Heval M. Kelli, MD;* Jeong Hwan Kim, MD;* Ayman Samman Tahhan, MD; Chang Liu, MPH; Yi-An Ko, PhD; Muhammad Hammadah, MD; Samaah Sullivan, PhD; Pratik Sandesara, MD; Ayman A. Alkhoder, MD; Fahad K. Choudhary, MD; M. Mazen Gafeer, MD; Keyur Patel, MD; Saqib Qadir, BS; Tené T. Lewis, PhD; Viola Vaccarino, MD, PhD; Laurence S. Sperling, MD; Arshed A. Quyyumi, MD

Table 2. Rate of Adverse Events Stratified by Living in FD, Access to Food, and Area Income

	Overall	FD			Access to Food			Area Income		
		FD	Non-FD	<i>P</i> Value	Adequate	Poor	<i>P</i> Value	High	Low	<i>P</i> Value
MI	230 (4.7)	171 (4.3)	59 (6)	0.028*	114 (4.9)	116 (4.5)	0.54	105 (3.8)	125 (5.7)	0.002*
Death	812 (16.4)	636 (16)	176 (17.9)	0.16	401 (17.1)	411 (15.8)	0.25	424 (15.4)	388 (17.7)	0.03*
Death or MI	941 (19)	734 (18.5)	207 (21.1)	0.07	471 (20.1)	470 (18.1)	0.09	480 (17.4)	461 (21.1)	0.001*

Number of events (%) are shown. FD indicates food desert; MI, myocardial infarction.

*Denotes a statistically significant *P*-value.

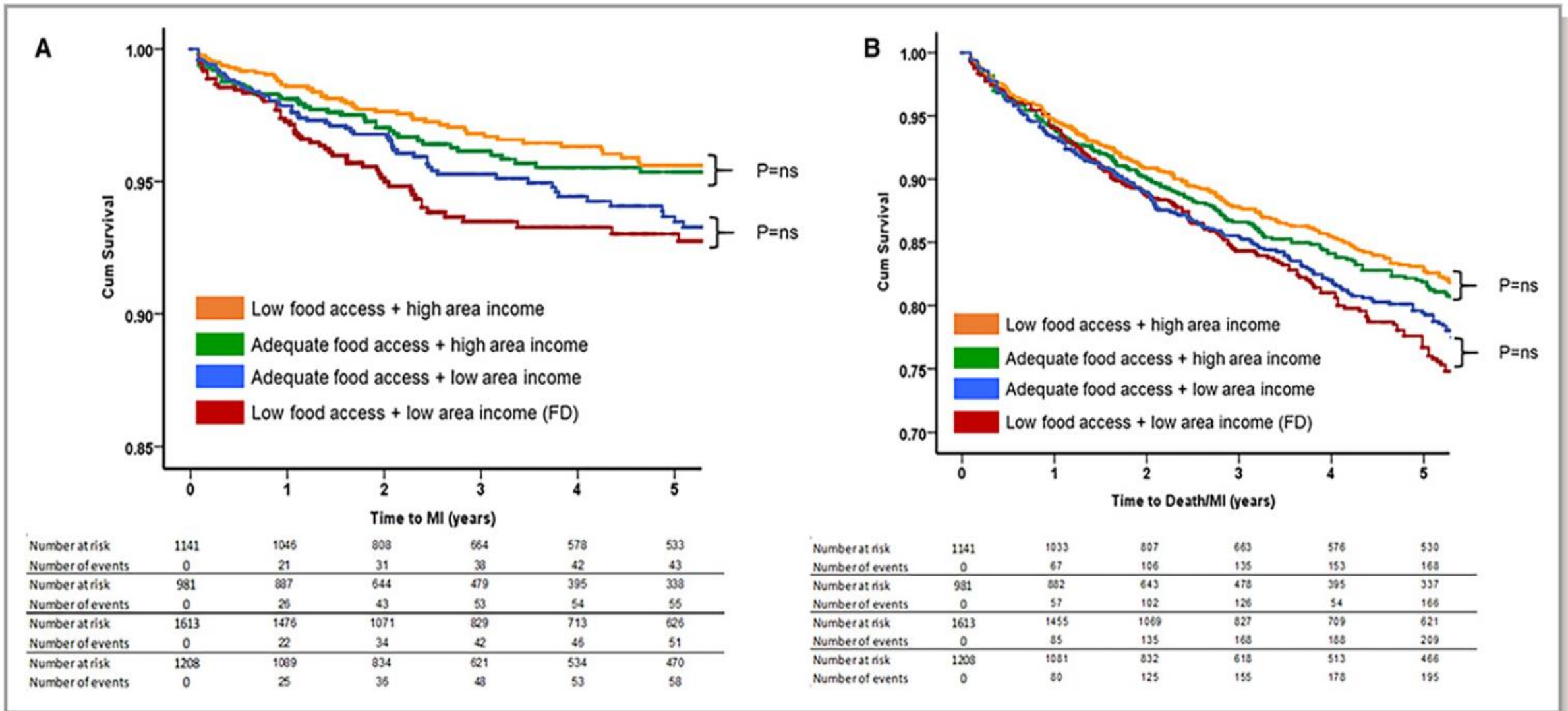


Figure 3. Kaplan–Meier curves for association between food access and area income with (A) incident myocardial infarction (MI) and (B) incident composite event rate of all-cause death/MI. *P* values were derived from log-rank tests. A, Incident MI. B, Incident death/MI. FD indicates food desert; ns, not significant.

Relation of Living in a “Food Desert” to Recurrent Hospitalizations in Patients With Heart Failure



Alanna A. Morris, MD, MSc^{a,*}, Paris McAllister, BS^b, Aubrey Grant, MD^a, Siyi Geng, BS^c, Heval M. Kelli, MD^a, Andreas Kalogeropoulos, MD, MPH, PhD^a, Arshed Quyyumi, MD^a, and Javed Butler, MD, MPH, MBA^d

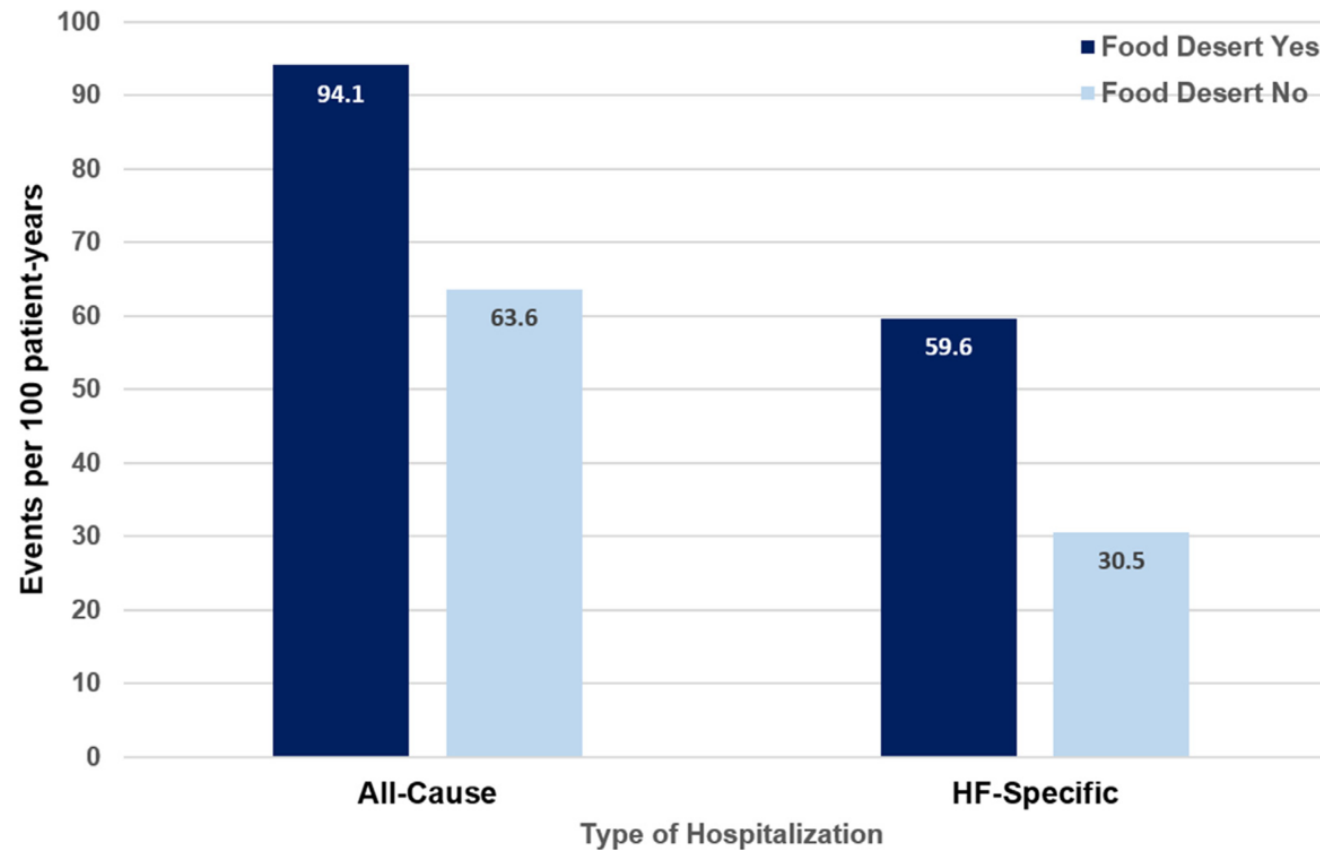


Figure 1. Rates of all-cause and heart failure (HF)-specific hospitalizations in subjects according to food desert status.

Conclusion

- Many studies have correlated food deserts with health related
 - Risk factors and habits
 - Pre-clinical disease
 - Clinical disease
 - Clinical outcomes
- Food desert also correlate with non-medical social determinants of health
- Important considerations for health disparity/equity
- Provision of healthy food is a necessary first step but represents one of the determinants of health for people living in food deserts