Socio-economic factors exhibit mixed effects on diagnosis and treatment of **food allergy** events.

Impact of Area Deprivation Index on rate of hospitalization and quality of treatment for food allergy and food anaphylaxis events

Ayushman Choudhury; Linying Zhang, PhD, Assistant Professor of Biostatistics, Washington Univ. School of Medicine

INTRODUCTION

- Food allergy (FA) prevalence has increased over recent decades, implying **non-genetic causes of FA**
- Recent research suggests social, environmental, economic factors may increase rate of FA diagnosis/events
- Non-FA research suggests social determinants of health (SDOH) have wide-ranging impacts on access to (and quality of) patient care in general

METHODS

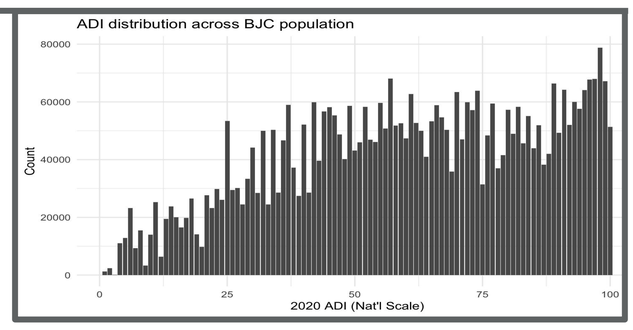
1. Created **two patient cohorts** of MO patients who visited BJC Hospital with these conditions in 2018 or later:
   a. Food Allergies (n = 53,676)
   b. Food Anaphylaxis (n = 1,754)
2. Combined EHR with external sources:
   a. Geocoded addresses to coordinates with ArcGIS
   b. Mapped coordinates to US Census Block Groups
   c. Matched Block Groups with 2020 Area Deprivation Index (higher = more deprived)
3. Estimated causal effects of ADI

"Causal Inference" - techniques to apply to observational data to emulate randomized trials, to determine a causal relationship

Question 1: "Access"

Limitation: data does not include people not in "BJC population"

- Ex. people who have FA event, but do not seek care at BJC
- If this group is skewed by deprivation, analysis is skewed
- See left: BJC population includes patients across ADI levels



Individual: among BJC patient population, is ADI associated with FA occurrence?

By Propensity Score Stratification, controlling for age/race/sex, $\tau = -3.4 \cdot 10^{-3}$, Std. Error = $1.3 \cdot 10^{-8}$.
Conclusion: **very small negative effect**

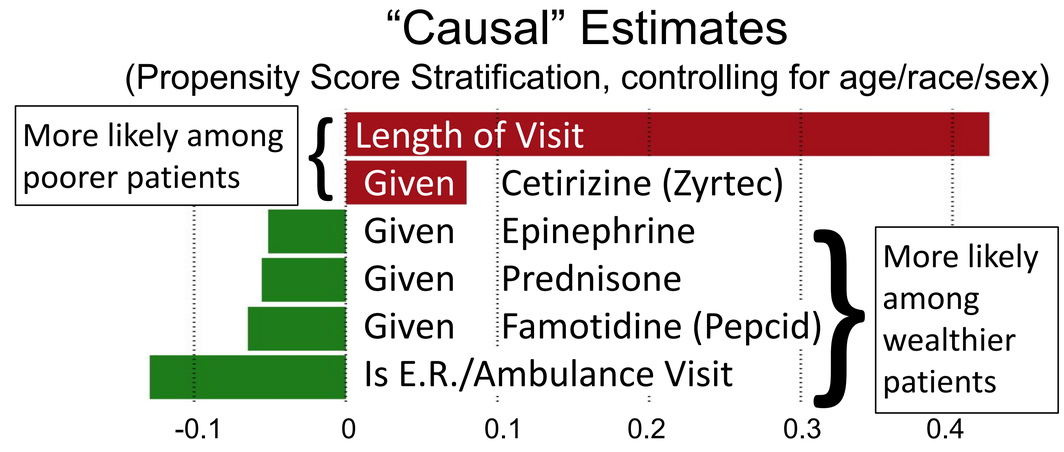
Blockwise: among US Census Blocks, is ADI associated with FA occurrence?

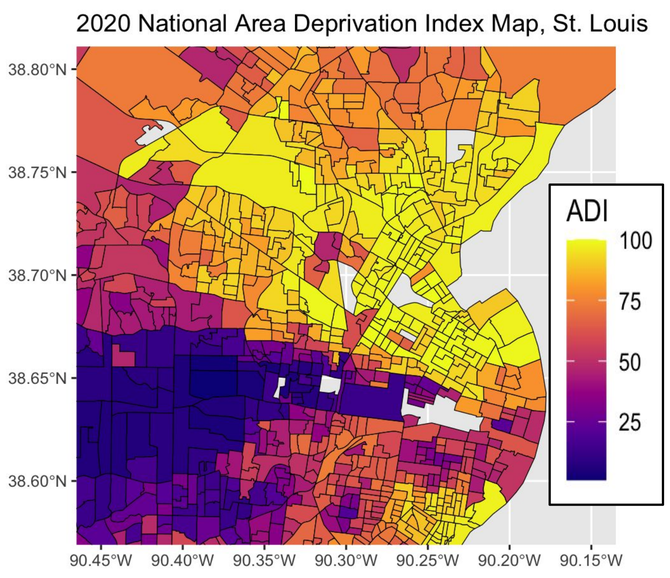
By PSS with the same controls,
$\tau = -1.9 \cdot 10^{-4}$, Std. Error = $3 \cdot 10^{-9}$.
Conclusion: **very small negative effect**

Question 2: "Quality"

For a particular Food Anaphylaxis hospitalization, is the patient's ADI associated with:

- length of stay?
- medications received?
- admit/discharge category?





DISCUSSION

- Access to patient's **family history of FA** would improve the models, as genetics are considered a main driver of FA.
- Census Block Groups are designed to be homogenous by the US Census, yet **individual socioeconomic variations** are possible. Individual data would improve the models.
- OHDSI OMOP Common Data Model's **standard vocabulary does not fully support standardized FA research;** developing FA cohort required manually selecting deprecated "non-standard" concept codes.

Washington University in St. Louis
School of Medicine

Institute for Informatics,
Data Science and Biostatistics (I²DB)