MEDINFO23

8 – 12 JULY 2023 | SYDNEY, AUSTRALIA

Measuring Associations between Community-Level Social Determinants of Health and Bariatric Surgery Weight Loss Outcomes

VANDERBILT UNIVERSITY

@ohpenlab

Nicholas Skoufis, Rui Zhang , You Chen

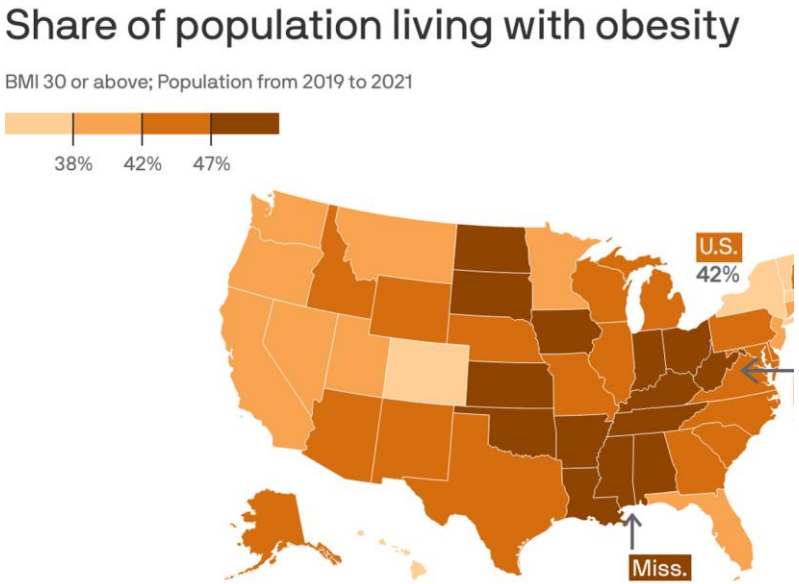
Assistant Professor

Vanderbilt University Medical Center

AIDH IMIA

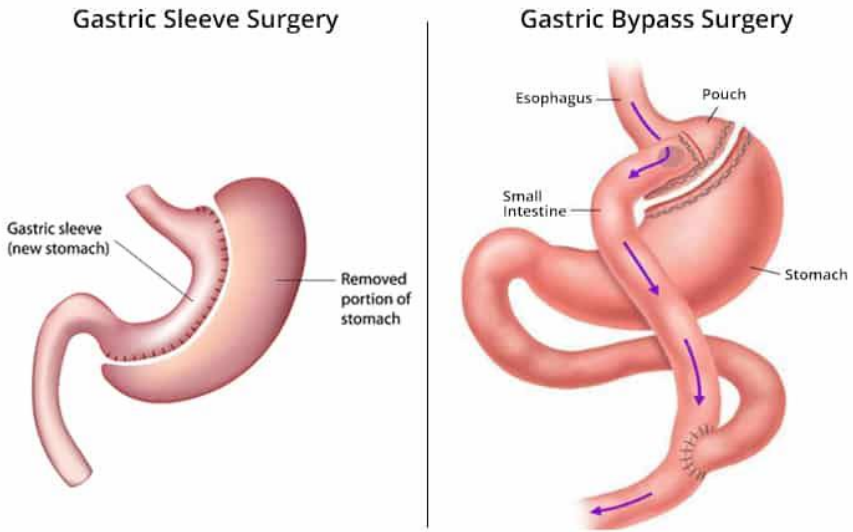
Obesity epidemic

- Obesity affects over 42% of adults in the United States
- WHO: 13% of the world's adult population (11% of men and 15% of women) were obese in 2016



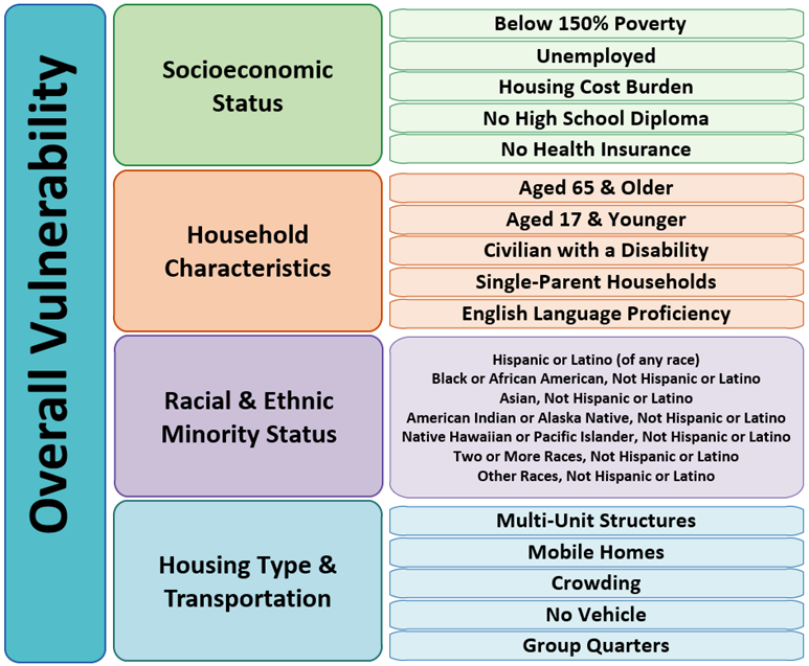
Bariatric surgery as a solution

- In the United States, an average of 200,000 bariatric operations are performed annually
- Patients lose between 60-80% of their excess weight within the first year following surgery



Community-level social determinants of health

- WHO. The conditions in which people are born, grow, live, work, and age. These circumstances are shaped by the distribution of money, power, and resources at global, national, and local levels
- US CDC. Social Vulnerability Index (SVI)



Impact of SDoH on BS outcomes

- Medicaid status and SDoH (ADI, urbanicity, and walkability) at the neighborhood level were not associated with the percent of total body weight loss one year after BS, and Medicaid status was associated with 3-month readmission rates [1] [647 patients investigated]
- SDOH (represented by distressed communities index) could impact length of stay after bariatric surgery, but do not influence percent excess body weight loss or readmission rates [2] [800 patients]

[1] Liu N, et.al. Association between Medicaid status, social determinants of health, and bariatric surgery outcomes. Annals of Surgery Open. 2021 Mar 1;2(1):e028.
[2] https://www.soard.org/article/S1550-7289(22)00421-X/fulltext 2022

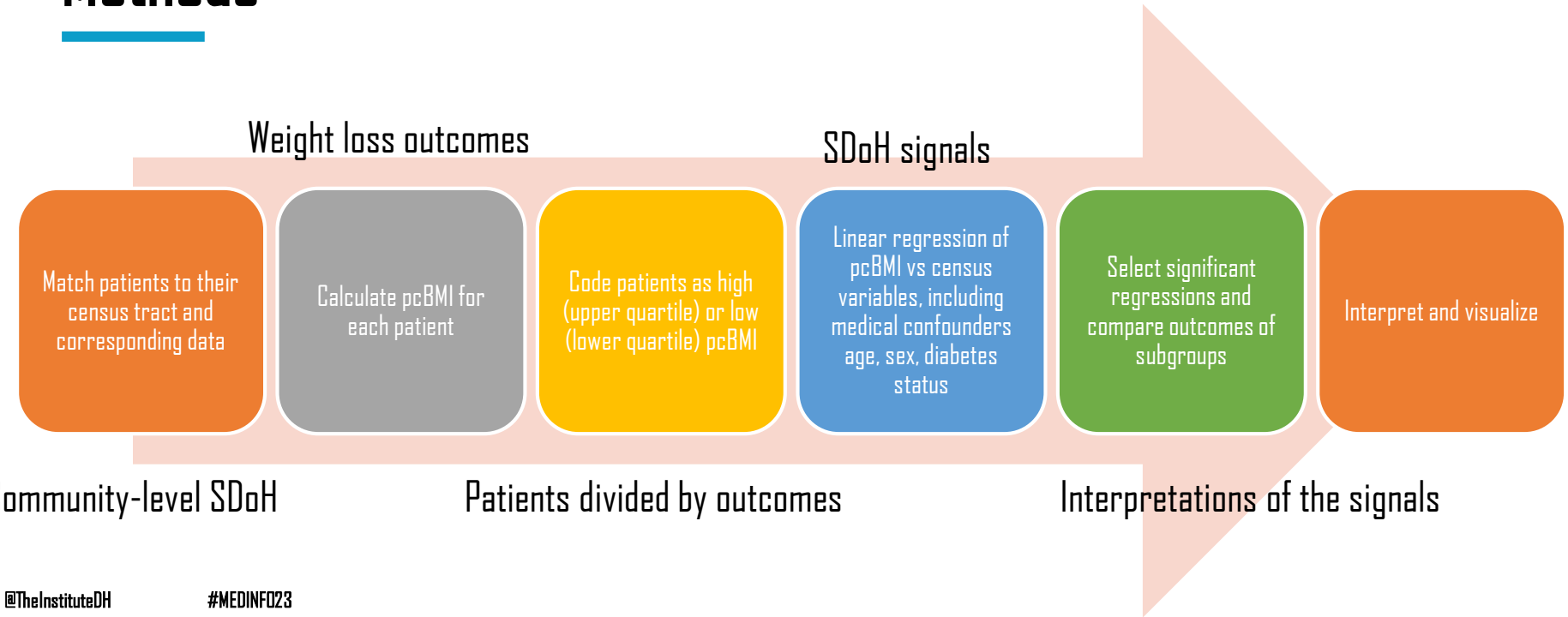
Research gap

- The association between SDoH and weight loss outcomes is still under-explored
- The need for a more comprehensive analysis of how SDoH impact bariatric surgery weight loss outcomes

A study performed at a large medical center

- 3800 patients who received bariatric surgeries at VUMC between Jan 2018 and Jan 2022
- Utilize a social vulnerability index (SVI) to measure the effects of community-level SDoH
- Percent change in body mass index 3 months after receiving bariatric surgery (pcBMI)

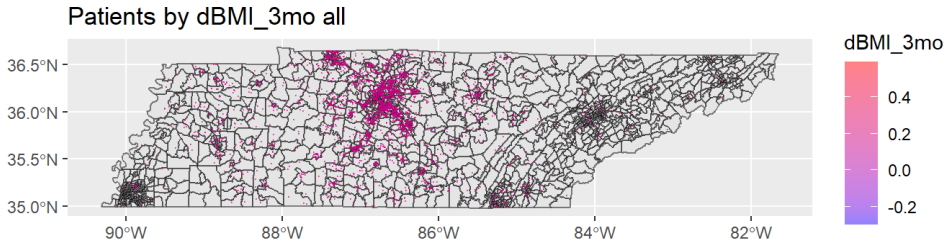
Methods

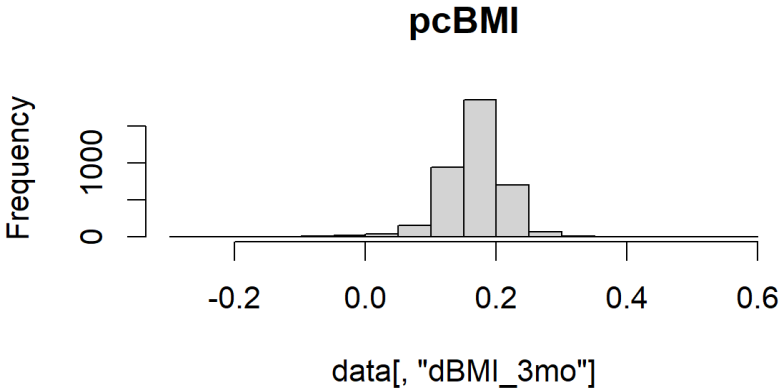

Weight loss outcomes
SDoH signals
Match patients to their census tract and corresponding data
Calculate pcBMI for each patient
Code patients as high (upper quartile) or low (lower quartile) pcBMI
Linear regression of pcBMI vs census variables, including medical confounders age, sex, diabetes status
Select significant regressions and compare outcomes of subgroups
Interpret and visualize
Community-level SDoH
Patients divided by outcomes
Interpretations of the signals

Summary statistics of the data

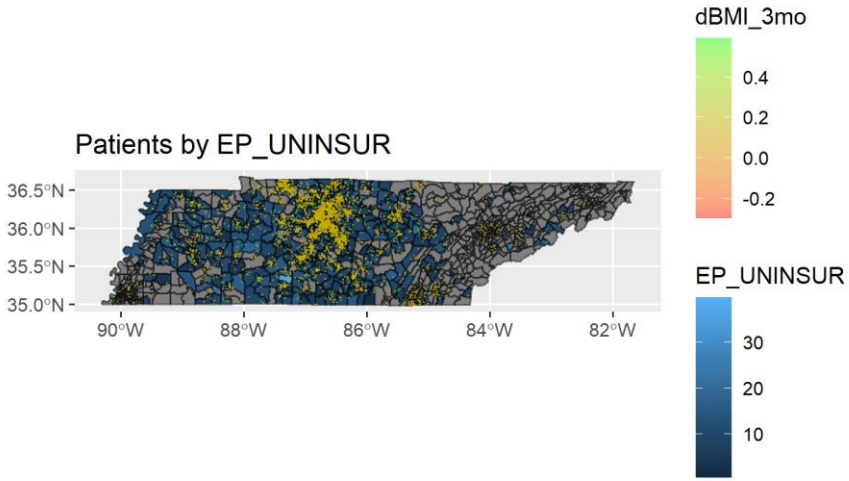
Summary statistics of patients' diagnosis and demographics	
Item	Value
Age (min, median, max)	(15.1, **46.1**,77.7)
Sex (Female, Male)	(**2986**, 814)
Diabetes: N (%)	
No diabetes	**2953** (77.7%)
Insulin dependent	289 (7.6%)
Non-insulin dependent	532 (14.0%)
No data	26 (0.7%)
Operation: N (%)	
Roux-en-Y gastric bypass	**2392** (62.9%)
Sleeve gastrectomy	828 (21.8%)
Adjustable gastric banding	216 (5.7%)
Other	364 (9.7%)

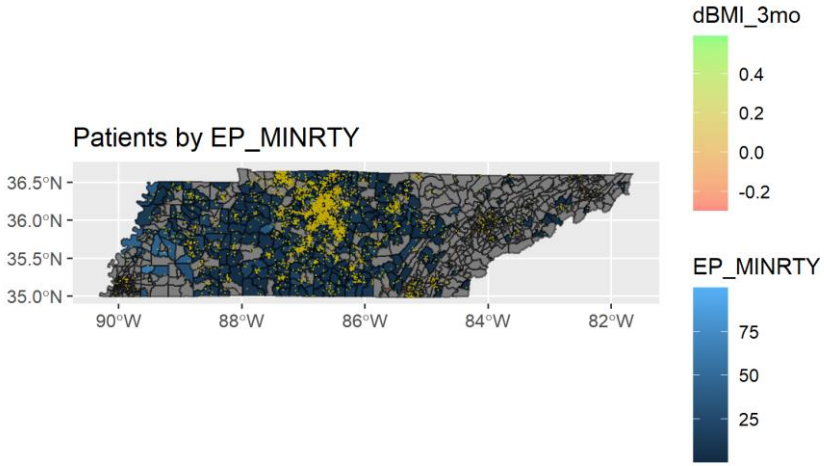
The distribution of percent of the BMI change



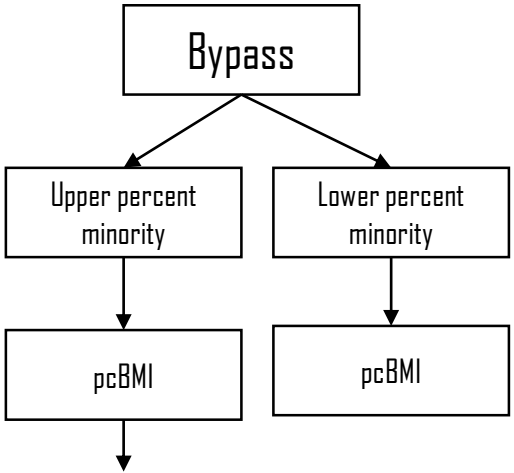


Percent of minority and insured population





The impact of SDoH on subgroups outcomes



less weight loss

		Percent Minority	Percent Uninsured
Age	Upper quartile (>54 years)		
	Not upper quartile		
Diabetes	No diabetes		
	Type 1		
	Type 2		
Operation	Roux-en-Y Gastric Bypass		
	Sleeve Gastrectomy		
Sex	Female		
	Male		

Limitations and future work

- All patients are from Middle Tennessee, USA
- Possible unidentified confounding
- Community-level SDoH

- Causal Inference approach