

Cleveland Ohio Flu Vaccine Uptake Across Social Determinants of Health:

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Background:

I was welcomed into the UH CORVETS team to learn about their role in the CDC's Flu Vaccine Effectiveness Network. I was fortunate enough to participate in active recruitment in a clinical setting at UH emergency room and access electronic health records database to better understand the role this VE network plays in driving annual vaccination efforts.

Population:

Ohio residents seeking care for mild to moderate Acute Respiratory Illness (ARI) at UH sites as well as the Louis Stokes Cleveland VA Medical Center.

Learning Objectives:

- Apply epidemiological methods to CORVETS flu data
- Analyze electronic health data using biostatistics and computer-based programming; interpret results of data analysis for public health practice and research
- Identify methods for decision making using evidence-based and data driven approaches to health policy

Deliverables:

- Cleaned ARI data for Nov. 2023 – February 2024 from UH EHR database
- Map with ARI incidence and SVI across census tract

Flu Vaccine Effectiveness (VE) Network:

The US VE network is comprised of seven institutions reporting to the coordinating institution, Duke University. The aim of this network is to assess the real-time effectiveness of flu vaccination efforts.

Social Vulnerability Index (SVI):

SVI was obtained from the CDC and comprises 15 factors aimed at capturing the various prongs of social vulnerability. These factors surround socioeconomic status, household composition, disability, minority status, language fluency, housing, and transportation. Census tracts receive an SVI score with a higher score indicating higher degree of social vulnerability. For analysis, these scores were grouped into quartiles with Q1 being the least social disadvantaged subgroup.

Table 1: Data Overview & Demographics

Variable Name	SVI Quartile**					p-value:	
	N	Overall N = 8,540	Q1 N = 1,643	Q2 N = 2,058	Q3 N = 2,103		Q4 N = 2,736
Age in Years	8,540	39 (17, 62)	49 (23, 69)	45 (21, 67)	39 (18, 62)	30 (9, 53)	<0.001
Sex	8,540						0.082
female		5,075 (59%)	933 (57%)	1,245 (60%)	1,246 (59%)	1,651 (60%)	
male		3,465 (41%)	710 (43%)	813 (40%)	857 (41%)	1,085 (40%)	
Race	8,540						<0.001
white		5,667 (66%)	1,458 (89%)	1,670 (81%)	1,352 (64%)	1,187 (43%)	
black		2,363 (28%)	103 (6.3%)	278 (14%)	641 (30%)	1,341 (49%)	
other		510 (6.0%)	82 (5.0%)	110 (5.3%)	110 (5.2%)	208 (7.6%)	
Flu Result	8,540						0.002
positive		802 (9.4%)	119 (7.2%)	190 (9.2%)	200 (9.5%)	293 (11%)	
negative		7,738 (91%)	1,524 (93%)	1,868 (91%)	1,903 (90%)	2,443 (89%)	
Ethnicity	8,540						<0.001
hispanic		487 (5.7%)	53 (3.2%)	86 (4.2%)	84 (4.0%)	264 (9.6%)	
non-hispanic		8,053 (94%)	1,590 (97%)	1,972 (96%)	2,019 (96%)	2,472 (90%)	
Facility Type	8,540						<0.001
EM		6,368 (75%)	1,055 (64%)	1,401 (68%)	1,625 (77%)	2,287 (84%)	
Primary Care		1,728 (20%)	512 (31%)	539 (26%)	346 (16%)	331 (12%)	
Urgent Care		444 (5.2%)	76 (4.6%)	118 (5.7%)	132 (6.3%)	118 (4.3%)	
Recent Flu Vax	8,540						<0.001
No		6,482 (76%)	1,132 (69%)	1,463 (71%)	1,626 (77%)	2,261 (83%)	
Yes		2,058 (24%)	511 (31%)	595 (29%)	477 (23%)	475 (17%)	

* Median (IQR) or Frequency (%)

** Kruskal-Wallis rank sum test; Pearson's Chi-squared test

Figure 1: ARI Frequency at UH Sites between Nov. 27 2023 – Jan. 21 2024

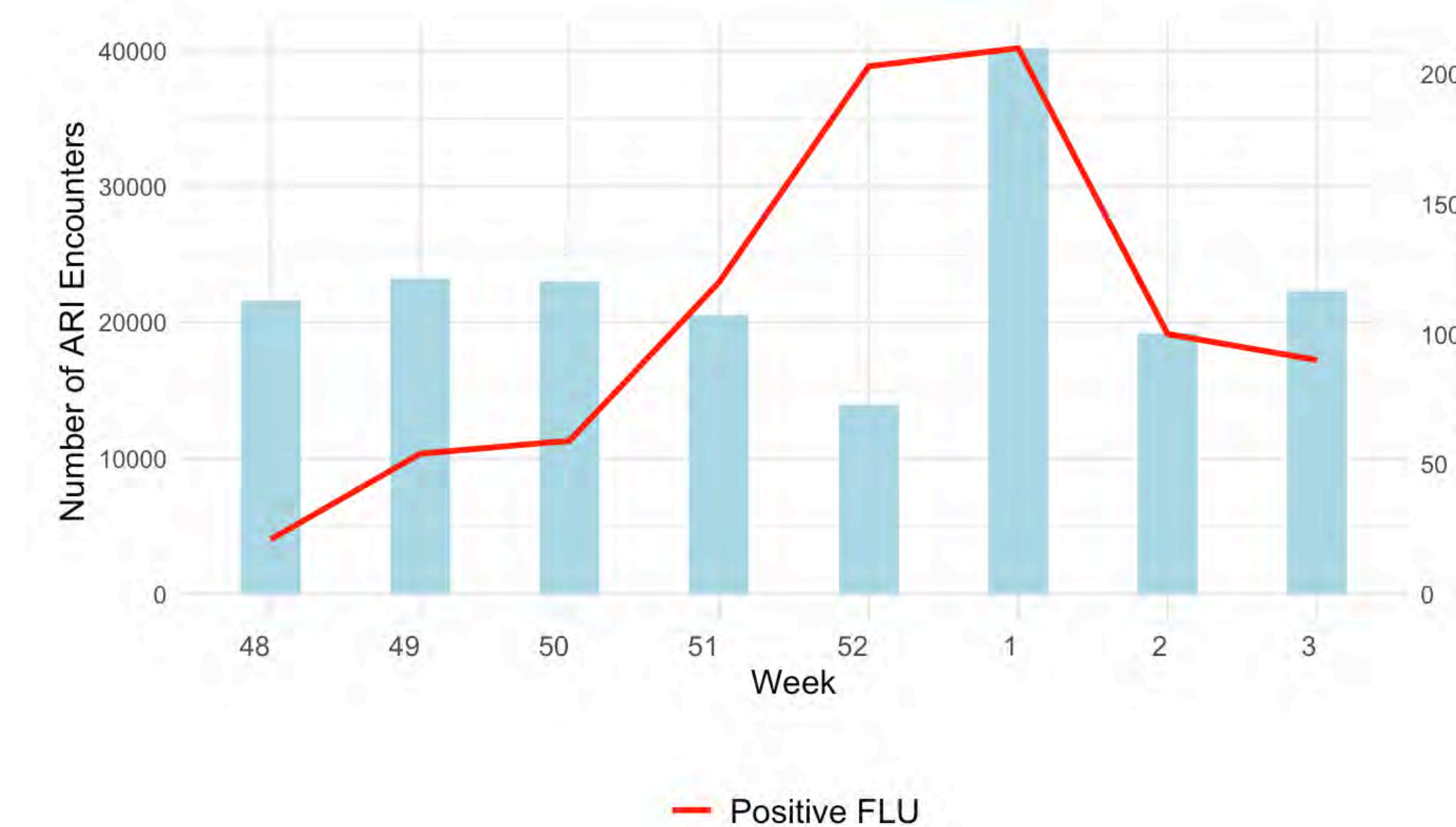
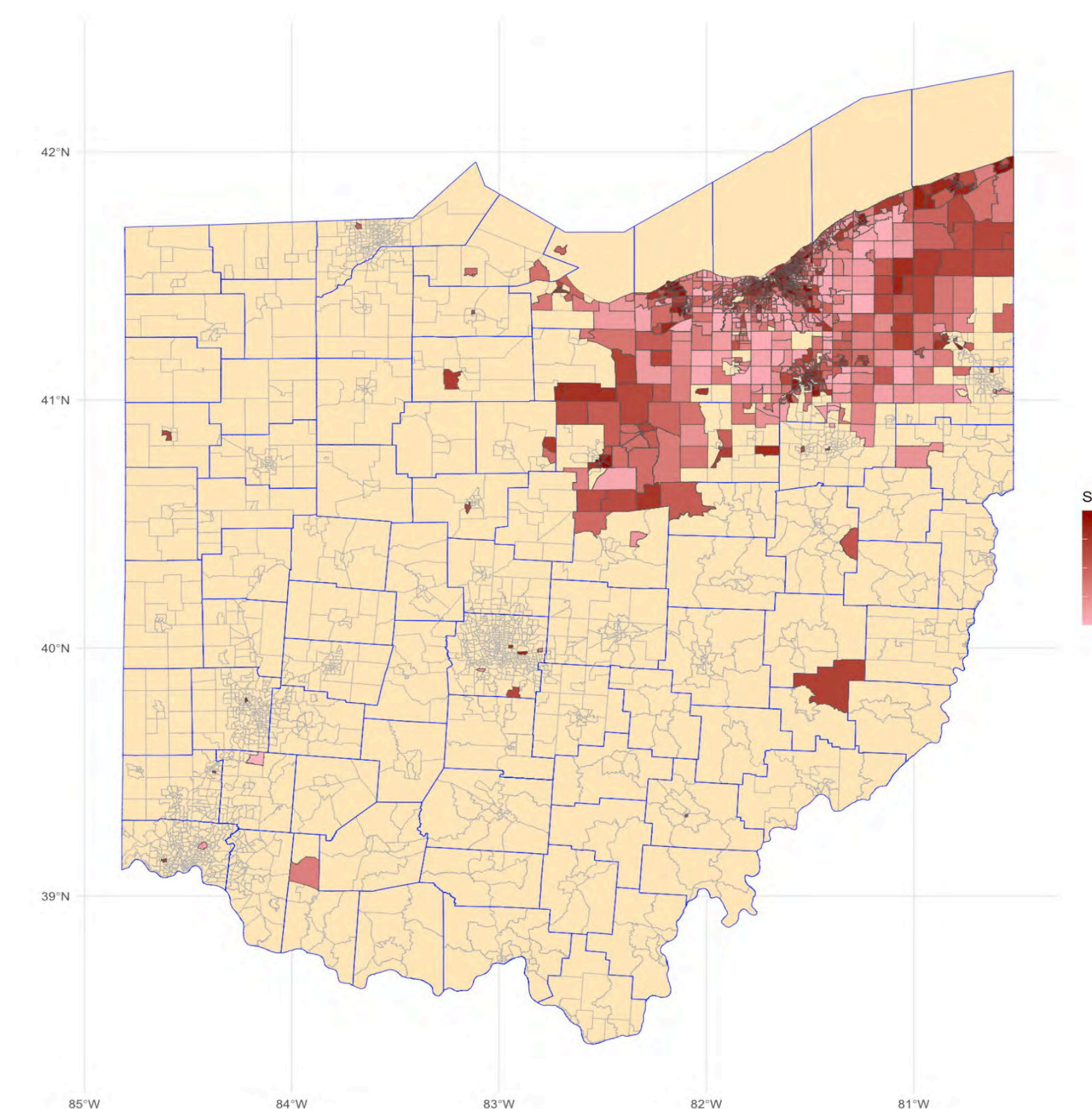


Figure 1 graphs the peak of flu incidence at UH centers in the first week of 2024.

Figure 2: SVI Among 8,540 Ohioans with Flu Diagnosis During 2023-2024 Flu Season



Used patients addresses from EHR then geocoded address with 11 digits FIPS code using Docker and 2020 census tract. Merged with Ohio SVI census tracts 2020 and county boundaries.

Activities:

- Data management for Ohio source data for ARI incidence using SQL
- Geocoding ARI incidence across Ohio using Docker and R
- Shadowing research assistants at UH emergency room conducting recruitment

Lessons Learned:

- Recruitment underscored the value of thorough institutional collaboration when sharing data
- Observed research ethics in practice through researcher assistants' efforts to facilitate the study while ensuring patient autonomy.
- Learned to use R and SQL to translate large volumes of data into actionable health insights through shadowing and conducting data management practices on flu VE data

Public Health Implications:

The US VE network provides real-time health data to most equitably distribute resources and concentrate efforts in high-populations. The participating UH sites provide further insights for the national network by capturing the real-time impact of flu vaccine campaigns on diverse, often disadvantaged populations.

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