Extrapolation of Counties by Zip Code to Illustrate Rurality and Social Vulnerability

Ujjawal Manocha[1], Mary O'Dwyer[1]
[1]UNC Lineberger Comprehensive Cancer Center,
University of North Carolina at Chapel Hill

Background

Public data are available for researchers aiming to enhance clinical outcomes and address the needs of specific catchment areas.

Geographic health and social vulnerability public data is often reported through census tracts and county / state specific Federal Information Processing System (FIPS) codes. Researchers are often limited to a subject's ZIP code, proving a challenge for contextual data analysis.

Utilizing public data in conjunction with clinical trial accrual data can highlight novel trends and needs across a catchment area.

Open-source function libraries in Python, including Pandas v2.2, was utilized for data transformation and merging.

Opportunities

Hybrid Decentralized Trials pose a unique opportunity to attain and maintain accrual in areas where social vulnerabilities play a role. The ability of a local care provider to provide part of the interventional care can remove barriers to diverse patient populations' participation in clinical research.

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Discussion

To meet the needs of North Carolina's growing population, UNC Lineberger Comprehensive Cancer Center is leveraging a visual map-based approach with public health context to optimize trial design.

The Accrual Demographics map dashboard allows for decision makers to tailor accrual strategies to increase clinical effect. An interactive tool allows clinicians to further understand unmet need.
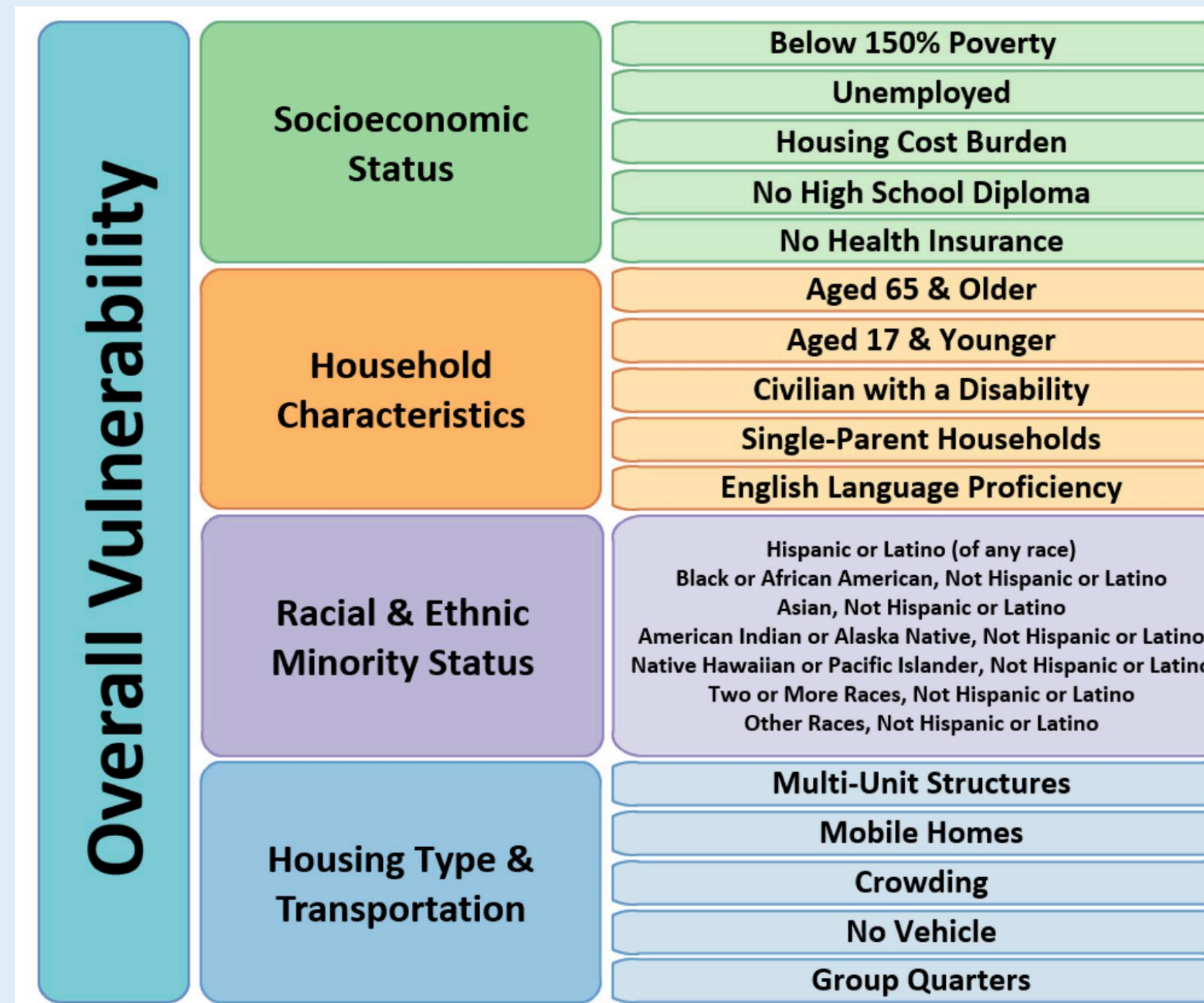

Fig 1. Overall Vulnerability Themes. CDC

Conclusions

Our goal is to equip University of North Carolina (UNC) Lineberger Comprehensive Cancer Center (LCCC) researchers with geographical context to improve clinical and public health outcomes. This is accomplished by a dashboard that can plot accrual demographic data on a map.

Using publicly available data and open-source data transformation tools can be a way to ascertain novel insights while deterring the cost and risk of private data. The ability to connect postal ZIP code to a county FIPS code allow for a plethora of data analyses that can guide researchers.
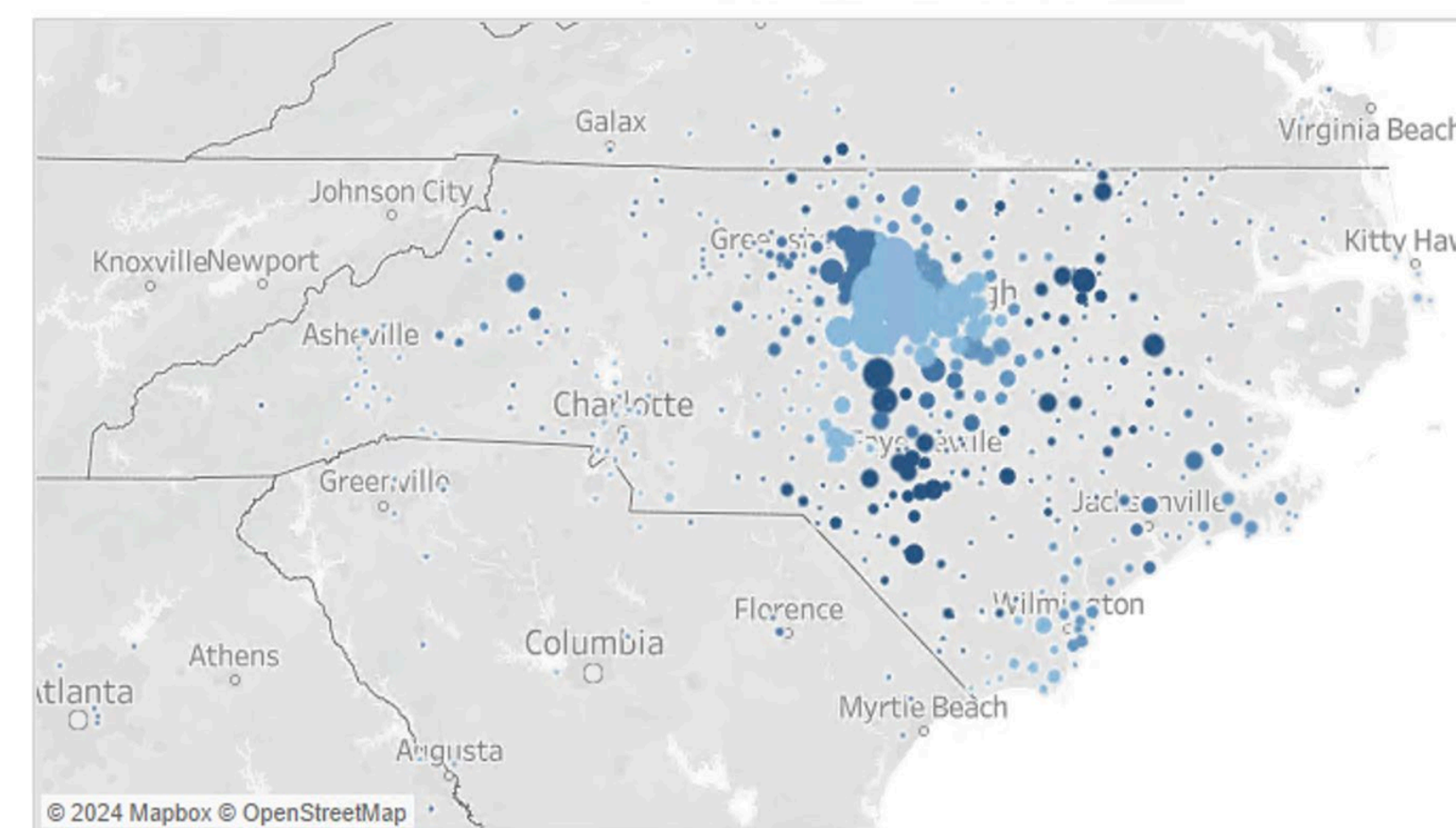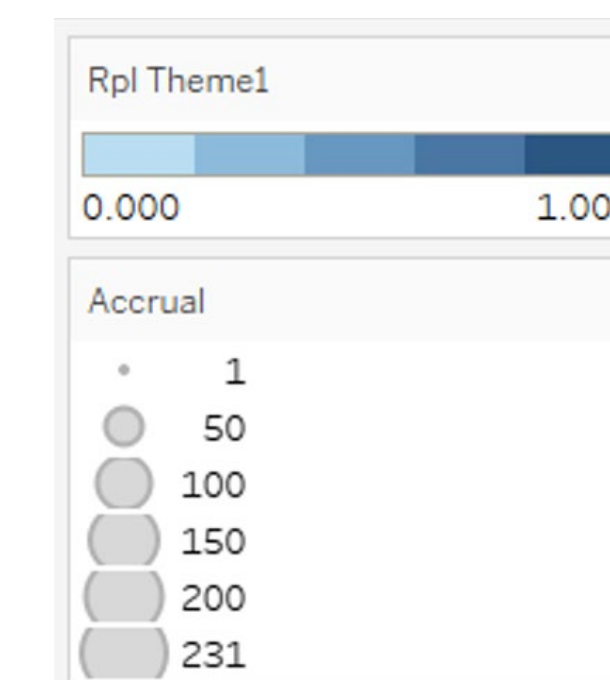

Fig 3. A subset of accrual at UNC with percentile ranking of Socioeconomic status summary (higher # = increased vulnerability index).

Methodology

HUD ZIP-County FIPS data was aggregated to 1 FIPS record per ZIP with the highest resident ratio.

ZIP	TRACT	RES_RATIO	BUS_RATIO	OTH_RATIO	TOT_RATIO
03870	33015066000	0.0042	0.0000	0.0000	0.0039
03870	33015071000	0.9958	1.0000	1.0000	0.9961

Fig 2. A subset of HUD ZIP-Tract Crosswalk file. Resident Ratio can be used to isolate the most likely county of residence from a postal ZIP code.

Data from CDC's Social Vulnerability Index and United States Housing and Urban Development's Rural-Urban Continuum Codes was combined for a ZIP – geographical context dictionary.

Tableau data visualization platform was utilized to create a dashboard that views our NC catchment area accrual.

Fig 4. UNC's Expanding Network – Partner Institutions Across NC

Contact

ujjawal@med.unc.edu
mary_odwyer@med.unc.edu