

# Exploring Urban Healthcare Access with Open Data in Detroit

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## Introduction

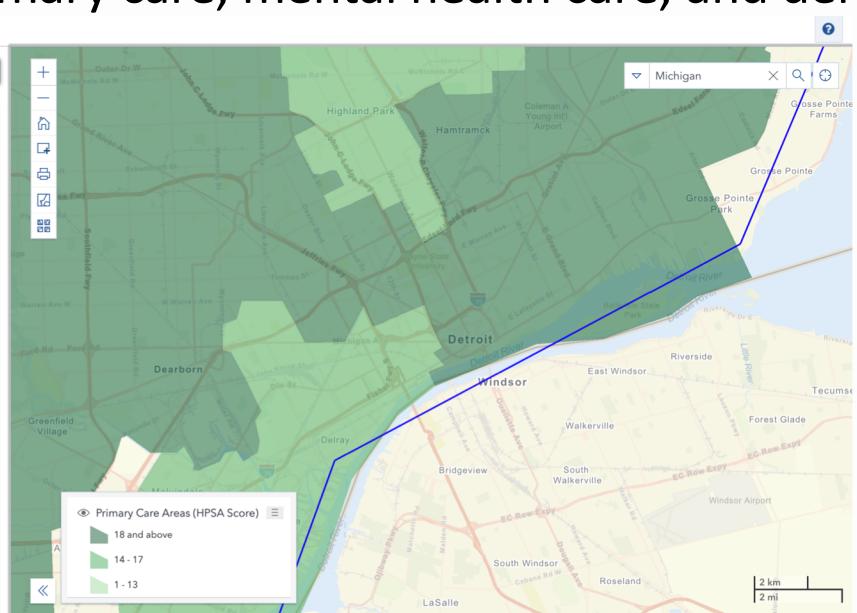
Access continues to be a barrier to health care. Current research and resource allocation methods rely on proximity to evaluate access. However, accessibility involves not only reasonable travel time between places, but the availability of services when demanded within that reasonable travel time. This demand can be recurring or urgent and lack of access puts patients at risk and without reliable and inclusive transit coverage, disproportionately affects already vulnerable populations that are more likely to be transit dependent, like low income and elderly patients.

### OPINION

**Hospital chiefs: Lack of transit in metro Detroit is a public health issue**

Detroit Free Press Published 10:52 a.m. ET May 2, 2019

States can apply for Healthcare Shortage Area designations for support in addressing poor access from DHHS. However, these designations typically rely on ratios of population to healthcare providers over some arbitrary geographic area without regard to travel time between them or travel mode and are currently only segmented by primary care, mental health care, and dental care.



Lack of geographic granularity ignores distinctions between urban and rural populations and fails to promote intelligent allocation of resources specific to what needs are required where.

## Objectives

Using openly available data and tools, this project demonstrates variability in access beyond a simple ratio of providers to population with consideration different types of healthcare provision, population demographics, and travel mode.

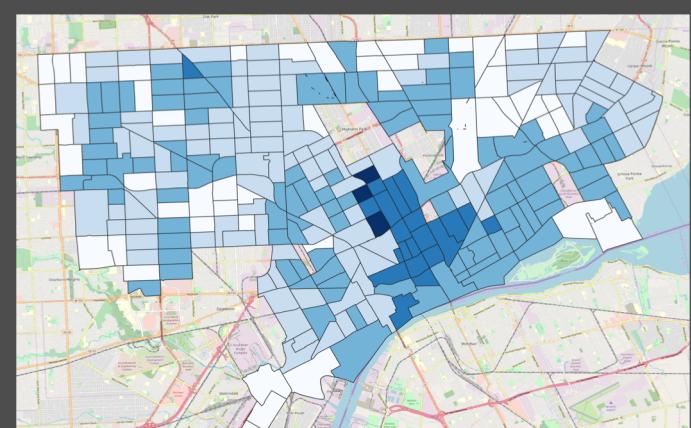
## Data & Methods

Step	Data/Tool
Identify Michigan medical provider taxonomy codes (type) and addresses	National Plan and Provider Enumeration System (NPI)
Geocode NPI addresses	Texas A&M Geocoder
Join Detroit census tracts and socioeconomic data	Data Driven Detroit
Extract Detroit MSA road network	Open Street Map (OSM)
Extract Detroit DOT transit general transit feed specifications	OpenMobilityData (OMD)
Route from census tracts to provider locations using OSM and OMD networks	Open Trip Planner
Map results using Detroit census tracts	QGIS

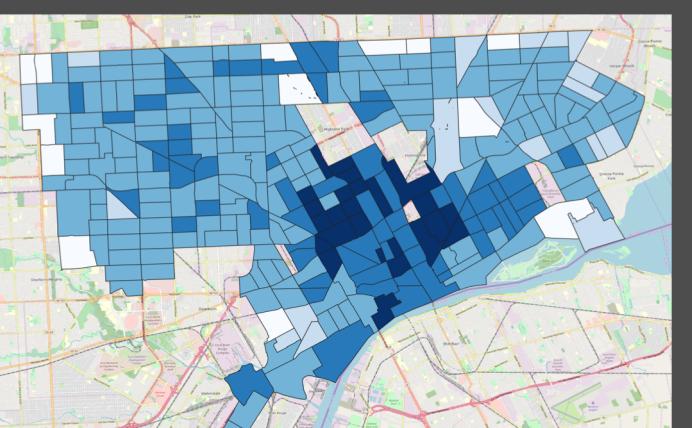
# Key takeaway: Travel mode and provider availability should be considered for addressing urban Health Professional Shortage Areas

## Providers within 30 minutes:

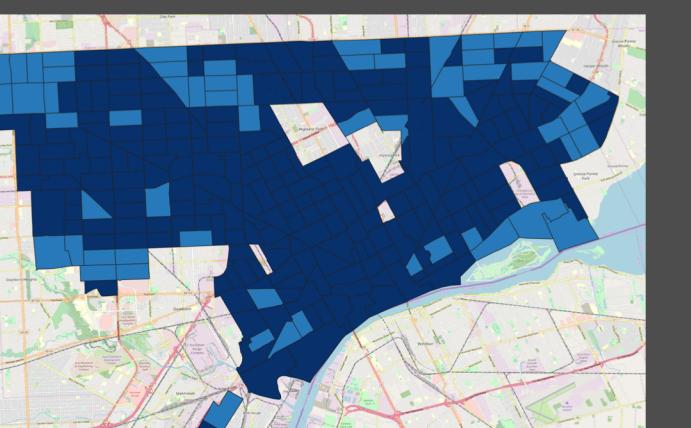
### Walking



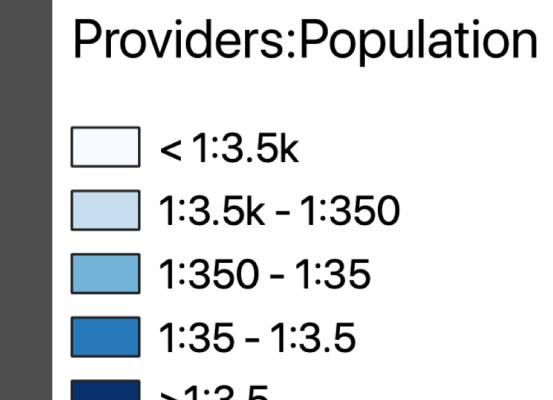
### Transit



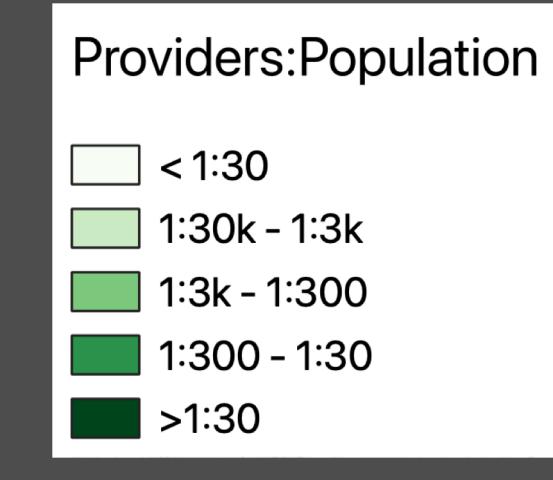
### Driving



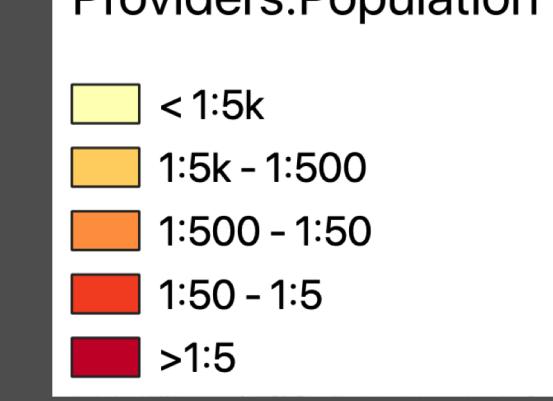
### Primary Care



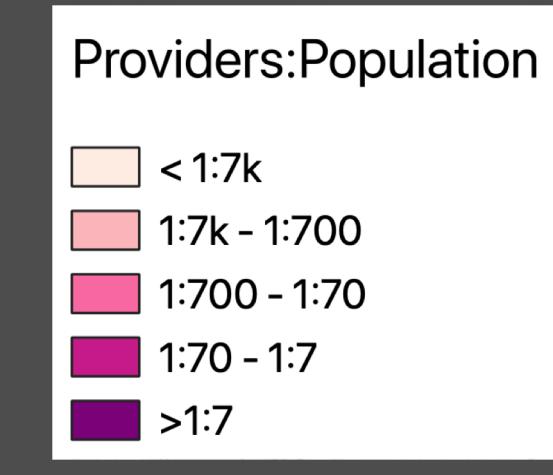
### Mental Health



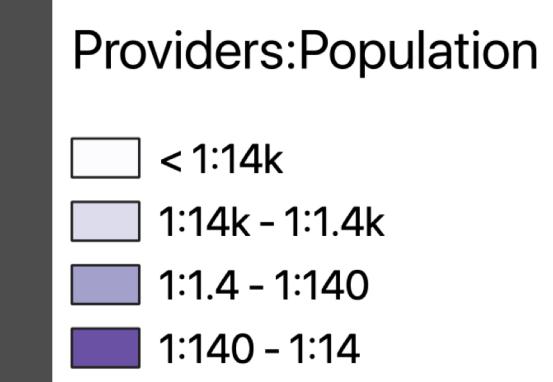
### Dental



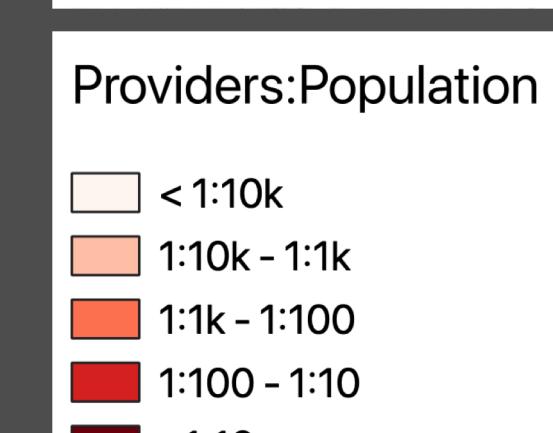
### Women's Care



### Pediatrics



### Pharmacy

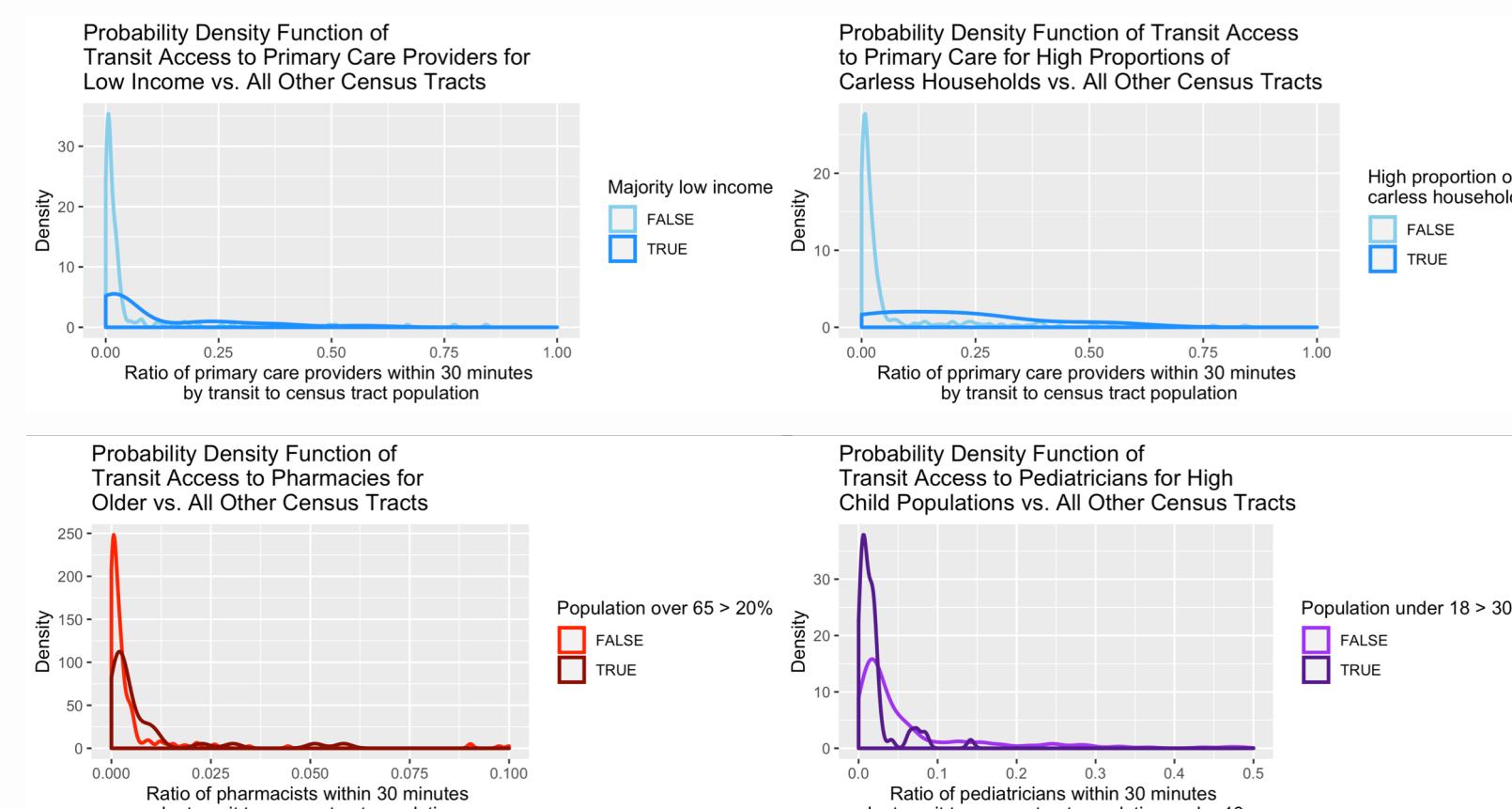


## Results

The maps to the left show the ratio of providers for each service type within 30 minutes of each census tract by walking, taking transit, or driving a car. The symbology levels were determined based on DHHS ratios for determining healthcare access, with the lightest color corresponding to ratios currently used for shortage area designations. As these designations are delineated only for primary care, mental health care, and dental care service types, the minimum ratio for women's care providers, pediatricians, and pharmacists were extrapolated based on the proportion of the affected subpopulation to total population.

These resulting maps show reasonable coverage by car. This supports the idea that in Detroit, in contrast to research consensus about rural populations, health care is generally accessible for those who can drive to it. The maps showing transit access show coverage for those who reside close to downtown, which makes sense as bus routes are concentrated downtown. These residents have more options when it comes to their healthcare providers, whereas residents living outside of the downtown face lower access and higher limitations. Access in non-downtown tracts varies across provider types, revealing the need to evaluate access across different medical needs for evaluating access more inclusively.

The below graphs show that evaluating access along multiple attributes beyond a ratio of providers to total population enables further insight into access constraints for more vulnerable and transit-dependent populations.



## Discussion

Urban health care access varies by travel mode and service need, so any interventions for providing better access should include consideration of those variables. This analysis shows that in Detroit, health care is generally accessible within 30 minutes by car, but not for populations without cars. In addition to perpetuating inequities in health outcomes between driving versus transit-dependent populations determining health care access based on driving times perpetuates car dependence and consequent zoning policies, such as parking minimums. Future analysis should incorporate transit reliability metrics and transit access at different times of day, as dependability is important for making appointments and collecting prescriptions. Additionally, insurance and Medicare/ Medicaid acceptance should be incorporated into evaluating healthcare demand versus supply. Finally, locations other than centroids should be used to evaluate access, as the distribution of subpopulations may vary within census tracts.