

Travel Times to the Hub: Mapping Access to Medication-Assisted Treatment in Chittenden County, Vermont

Background

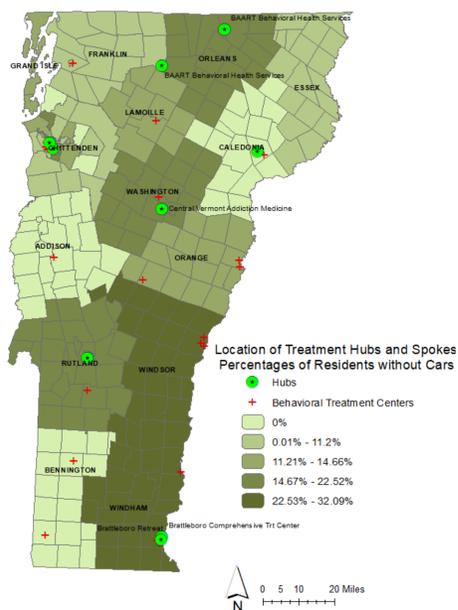
The United States opioid epidemic is a public health issue that has touched all corners of American society. Once defined by many as an urban problem, opioid use disorder (OUD) and overdose prevalence has grown as a concern in rural communities, in part due to over-prescription of opioid pain killers.

Twenty years ago, Vermont was one of eight states without opioid agonist treatment (OAT). Vermonters living with OUD needed to travel outside of the state to access medication-assisted treatment (MAT), one of the most effective treatment options (Brooklyn & Sigmon 2017). Lack of physical access to methadone and buprenorphine a significant barrier to successfully completing treatment, which typically requires daily visits to the clinic. A 2011 study found that 60 percent of patients nationwide traveled less than ten miles for treatment, while 6 percent made a trip between 50 and 200 miles, and 8 percent had to visit a neighboring state (Rosenblum et al 2011).

Vermont's solution to this access issue, the Care Alliance for Opioid Addiction, also known as the "hub-and-spoke" system, was launched in January 2013. The state was divided into five geographic regions served by at least one "hub" that offers specialty outpatient treatment programs and has the authority to dispense both methadone and buprenorphine. A larger number of "spokes" provide buprenorphine treatment (Rawson 2017).

Although the hub-and-spoke system has vastly improved the treatment access for Vermonters living with OUD, travel-related challenges remain. The Howard County Chittenden Clinic, the hub that serves the greater Burlington area, one of the state's most densely populated regions and home to the University of Vermont, recently moved to a location on the outskirts of the city. The staff at the Chittenden County Opioid Alliance is hoping to utilize GIS to better understand the transportation barriers faced by the clinic's patients.

This project depicts travel distances to the Howard Center Chittenden Clinic and the spatial relationship between the clinic, the percentage of residents without cars, and the locations of overdose-related service calls and interactions with the Burlington Police between January 2012 and March 2018.

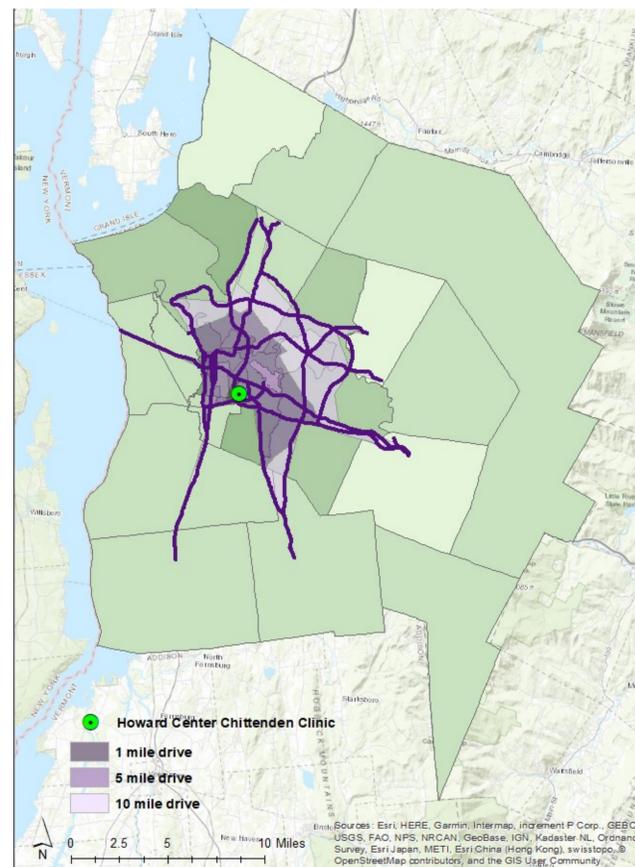


Methods

Kayla Donohue, Data Analyst, of the Chittenden County Opioid Alliance, provided Burlington Police Department data documenting incidents called in or encountered between January 2012 and March 2018. This dataset is the most recent collection of publicly-available crime data, which include 336 incidents associated with drug overdose in addition to the latitude and longitude of each. Due to the large quantity of incidents, only overdose cases were used. The spreadsheet was imported into ArcGIS, located in the map using the latitude and longitude coordinates, and exported as a shapefile. The compelling nature of the plotted points suggested allowing the individual calls to stand on their own.

The locations of Vermont's Care Alliance for Opioid Addiction facilities were obtained from the Substance Abuse and Mental Health Services Administration (SAMHSA) data portal. Data for behavioral health treatment facilities were downloaded (findtreatment.samhsa.gov) and only Vermont locations were selected. Results were cross-checked for address accuracy against online materials posted by the Care Alliance. Two hubs were identified that were not included in the SAMHSA data; latitude and longitude coordinates were obtained using the Vermont Department of Health Address Locator (ahs-vt.maps.arcgis.com). These data were imported and visualized in ArcGIS using the same methods as the overdose case data.

Data from the Vermont Social Vulnerability Index provided context for understanding transit barriers that may exist for Vermonters living with OUD. The Vermont Department of Public Health Environmental Public Health Tracking Program compiled these data from the U.S. Census Bureau American Community Survey, 5-year estimates, 2011-2015 (<http://healthvermont.gov/tracking>). Social determinants of health, including poverty, unemployment, per capita income, education, and



health insurance status, are part of this dataset. These data were available as a shapefile, which was accessible through ArcGIS.

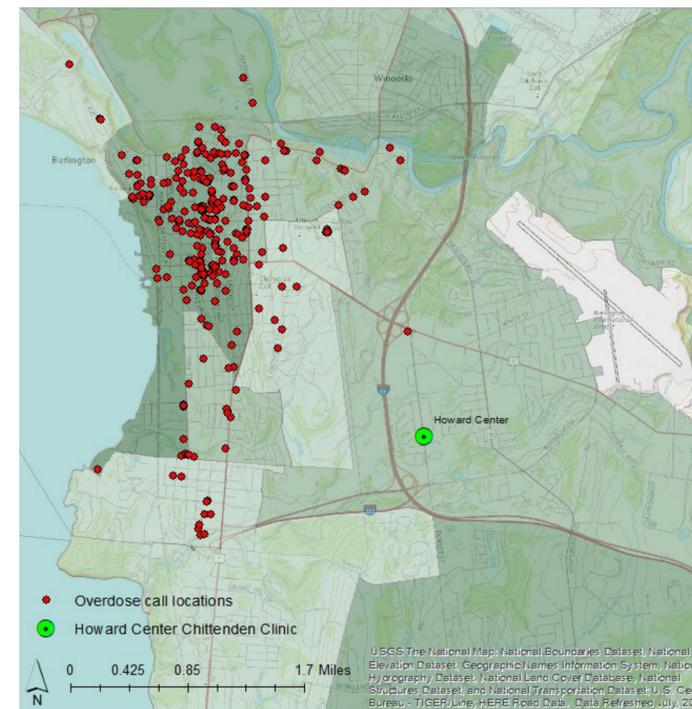
Three maps resulted from these data combined with basemaps, shapefiles representing Vermont's census tracts and county boundaries. Each is shaded to depict the percentage of residents with access to a car. The first provides context for the statewide hub-and-spoke system. The second map focuses on Chittenden County and a network analysis depicting driving distances from the clinic in 1, 5, and 10 mile buffers. Finally, a third map depicts the location of overdose-related incidents in relationship to the Howard Center. Client-level address data were not available due to privacy regulations; therefore, the overdose incidents serve as a proxy for this population.

Results

These set of maps suggest that travel-related disparities likely exist that make access to methadone treatment challenging for patients without a car. Although the Howard Clinic is accessible via public transit, taking the local bus adds time to a daily commute. The clinic is also less proximate to the areas of Burlington where the need may be most critical, as suggested by the location of overdose incidents.

Discussion

Based on this initial visual investigation of travel distance, overdose incidents, and vehicle access, additional transportation services to the Howard Center Chittenden Clinic would likely improve access to methadone treatment. Further network analysis of travel times by bus would be the next valuable step. A strength of this project was including the social vulnerability data to provide information about access to a car, which were not only revealing of disparities in the greater Burlington area, but may also be relevant in other parts of the state. The hub-and-spoke system has improved MAT options for many Vermonters over the past five years. By providing additional transit options from low-resource areas, even more might access life-saving treatment.



References

- Brooklyn JR, & Sigmon SC. (2017). Vermont hub-and-spoke model of care for opioid use disorder: Development, implementation, and impact. *Journal of Addiction Medicine*, 11(4), 286-292.
- Rosenblum A., Cleland CM, Fong C, Kayman DJ, Tempalski B, & Parrino M. (2011). Distance traveled and cross-state commuting to opioid treatment programs in the United States. *Journal of Environmental and Public Health*. doi:10.1155/2011/948789.
- Rawson R. Vermont Hub-and-Spoke Model of Care of Opioid Use Disorders: An Evaluation. Vermont Center on Behavior & Health, University of Vermont. December 2017.

Data Sources: Burlington Police Department, SAMHSA, Bureau of Transportation Services, Vermont Department of Health, Vermont Department of Public Health, ESRI.

Geographic Projection Systems: NAD_1983_StatePlane_Vermont_FIPS_4400_Feet; UTM_WGS_1984_Zone19N (Network Analysis Map)

Cartographer: Jennifer Pustz, PH 262: GIS for Public Health, May 4, 2018

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