Assessing the Primary Care Workforce in St. Louis

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Introduction

St. Louisans who are underinsured, uninsured, and insured through Medicaid typically seek the primary healthcare services from specific safety net primary care providers in the city and surrounding counties. Of the total patient populations of six major primary care organizations (Affinia Healthcare, St. Louis County Department of Public Health, CareSTL Health, Casa de Salud, The SPOT and Mercy JFK Clinic), at least 30% are uninsured.[1] The primary care safety net providers served roughly 77% of the total uninsured population in St. Louis City and County in 2017.[1] According to the American Community Survey 2017, Missouri has more than 621,500 uninsured residents, 114,179 of whom live in St. Louis City.[2] The magnitude of these numbers is due in part to the fact that Missouri is one of fourteen states that have chosen not to expand Medicaid for the non-mandatory low-income groups.[3] About 37,800 St. Louis residents would be eligible for Medicaid upon expansion.[4] Nonetheless, the total number of uninsured individuals in St. Louis City and County fell by 10% from 2016 to 2017, and by 26% since 2013, due to other provisions in the Affordable Care Act.[1]

This report will use the data from the primary care organizations that provide their services for the uninsured and safety net patients, combined with other available data on the demographics of the St. Louis population, healthcare utilization trends, and the locations of primary care providers in the area to identify the gaps in the primary care workforce in St. Louis. The report will also shed light on the underserved geographic areas where people struggle to access needed services.

Methodology

To understand the distribution of services, we have analyzed the data reported by seven primary healthcare organizations in St. Louis for 2017, all of whom care for safety net patients. The seven organizations were Affinia, Department of Public Health, BJK People's Health, Family Care Health Centers, CareSTL, Barnes Jewish Hospital, and St. Louis University. The data included the number of patients and the locations at which the organizations provided services to the patients. ArcGis was used as a mapping tool for all our models' outputs to demonstrate the geographic distribution of the data throughout St. Louis's ZIP codes. We used CDXGeoData template and an Excel sheet model to calculate the average driving time and the distance between each ZIP code to the corresponding service locations according to the available data[5]. The CDXGeoData template used Bing maps to calculate the driving time and the distances. We then used additional Bing map

output to estimate a constant factor for each site to adjust driving times to include the possibility that patients may travel by public transportation. This resulted in an estimate of total travel time. For BJH, DPH and FCHC, we had sufficient information about patients at the site level. Due to lack of data detailing the specific location the patients visited for the other organizations (i.e. data were at the organization rather than site level), we allocated patients to sites by mathematically modeling the tendency of patients to visit the surrounding sites based on the distance to each site. We assumed that a given patient is more likely to visit a closer location than a more distant one.

We used SAS statistical software to analyze the data from the 2017 Medical Expenditure Panel Survey (MEPS) using a Zero-Inflated Binomial Model (ZINB) to predict the number of the office-based visits to access primary care health services.[6] We restricted the sample to include only people with incomes below 200% of the Federal Poverty Level (FPL), and separate models were estimated for adults and for children under 18. We used the resulting models to estimate the likely or typical number of visits for low-income people in the St. Louis area, based upon information from the American Community Survey(ACS). In particular, ACS data from respondents living in Public Use Microdata Areas (PUMAs) in the St. Louis area were used.[7] A crosswalk from the Geographic Correspondence Engine allowed us to apportion the PUMA data into more familiar ZIP codes.[8] This allowed us to generate estimates of the total number of visits which people with incomes under 200% FPL are likely to make in each ZIP code in St. Louis.

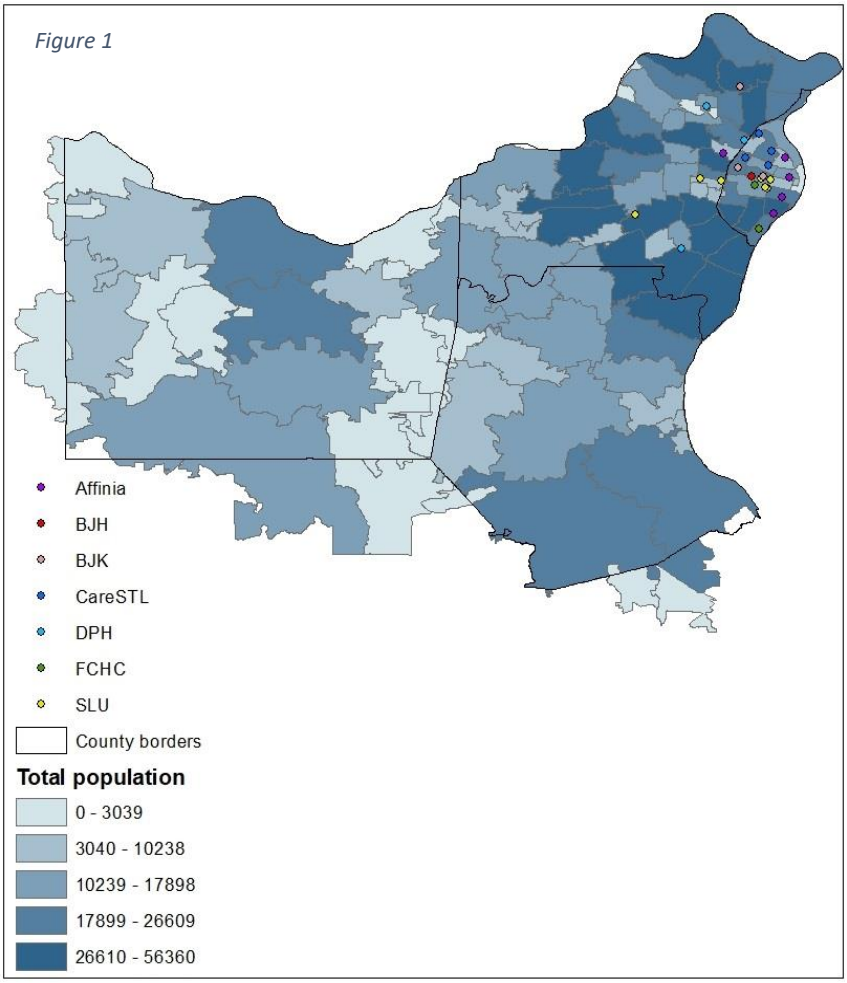
Finally, we subset the National Providers Identifier database to create a list of primary care providers in St. Louis, using SAS to run an algorithm to exclude non-primary care providers.[9] Primary care providers were geocoded using ArcGis to illustrate their distribution throughout the St. Louis area in map form.

St. Louis Area Demographics

The socioeconomic indicators from the Census help us understand the healthcare demand of individuals based on their socioeconomic status. Additionally, these indicators were found to be significant predictors of the number of visits people make. The maps below show St. Louis City, St. Louis County, Jefferson County, and Franklin County, because the safety net patients seen by the seven organizations in our data are drawn largely from these places.

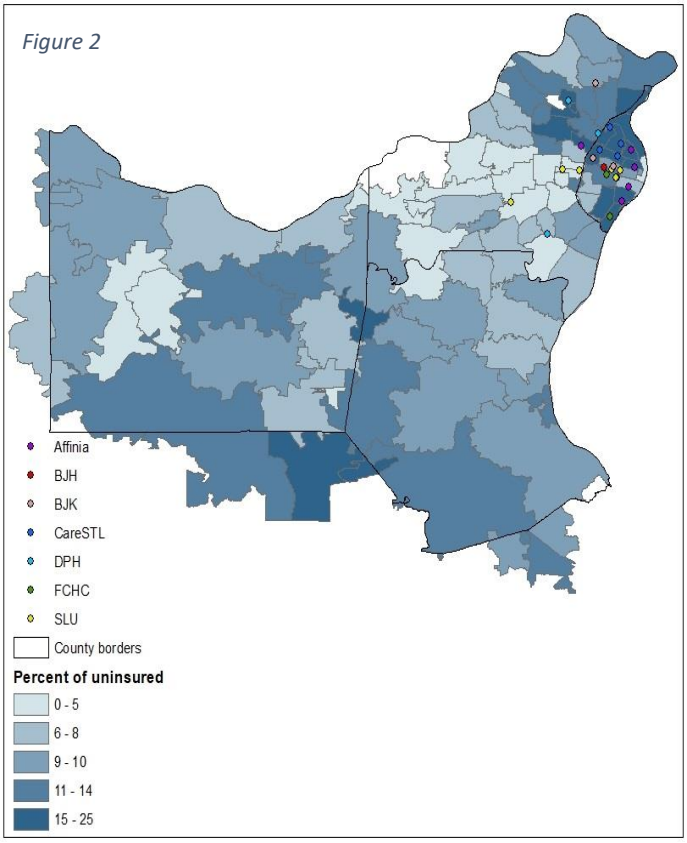
Census data (American Community Survey, 2017) show that the overall population is distributed unevenly, with higher concentrations of people living in the central parts of St. Louis, especially in St. Louis city and St. Louis county (Figure 1). Yet, some other ZIP codes in the south and west are also highly populated. To assess the demand for safety net primary care services, we look at various socio-economic indicators in Figures 2-4.

Figure 1



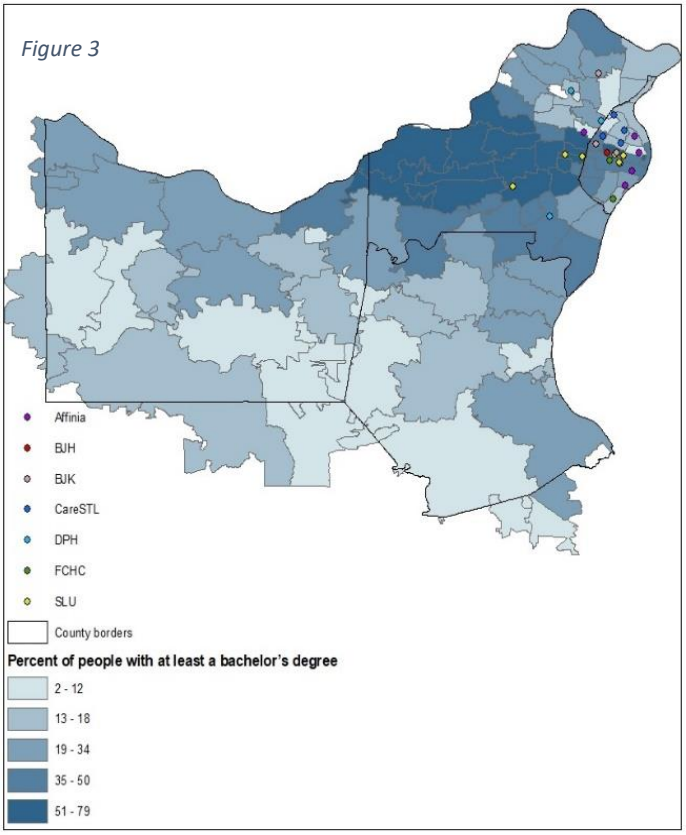
The ZIP codes that have a high percentage of uninsured people (Figure 2) are concentrated in the central areas and the very peripheral areas as well. We found that adult patients (with incomes less than 200% FPL) with no health insurance are less likely to visit primary care providers. Lack of health insurance as one of the most significant obstacles for people to access to primary care.

Figure 2



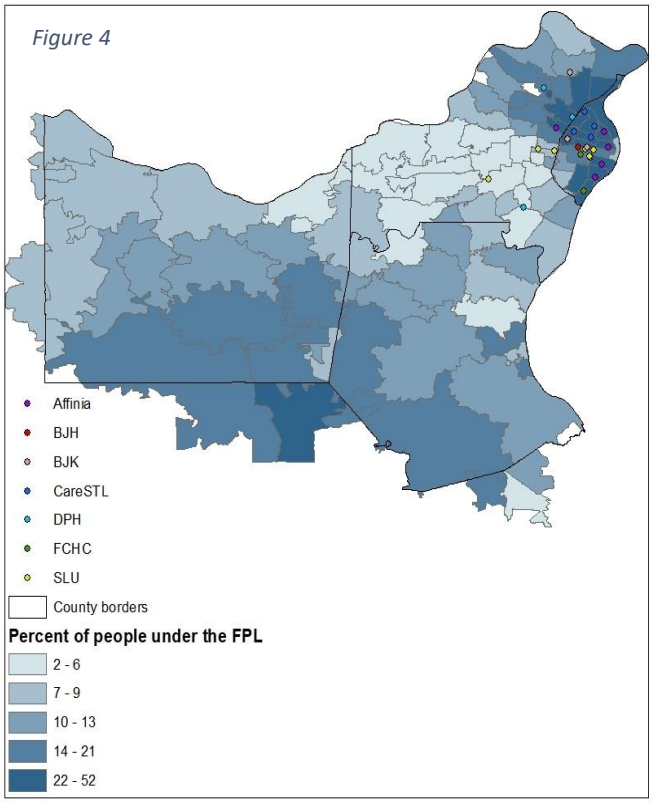
We use completion of at least a bachelor's degree as an indicator of educational level, and by this measure St. Louis County has significantly higher educational levels than other parts of the region (Figure 3). Our model showed that as the level of education increases, the it is more likely that adults (with incomes less than 200% FPL) will make primary care visits.

Figure 3



Similarly, poverty was found to be significantly related to the demand of primary care services too. We found that the greater the degree of poverty, even among the subset of adults whose incomes are below 200% FPL, the less likely that visits to primary care providers occur, and again poverty is concentrated in the same places where people tend to be uninsured and less educated (Figure 4).

Figure 4



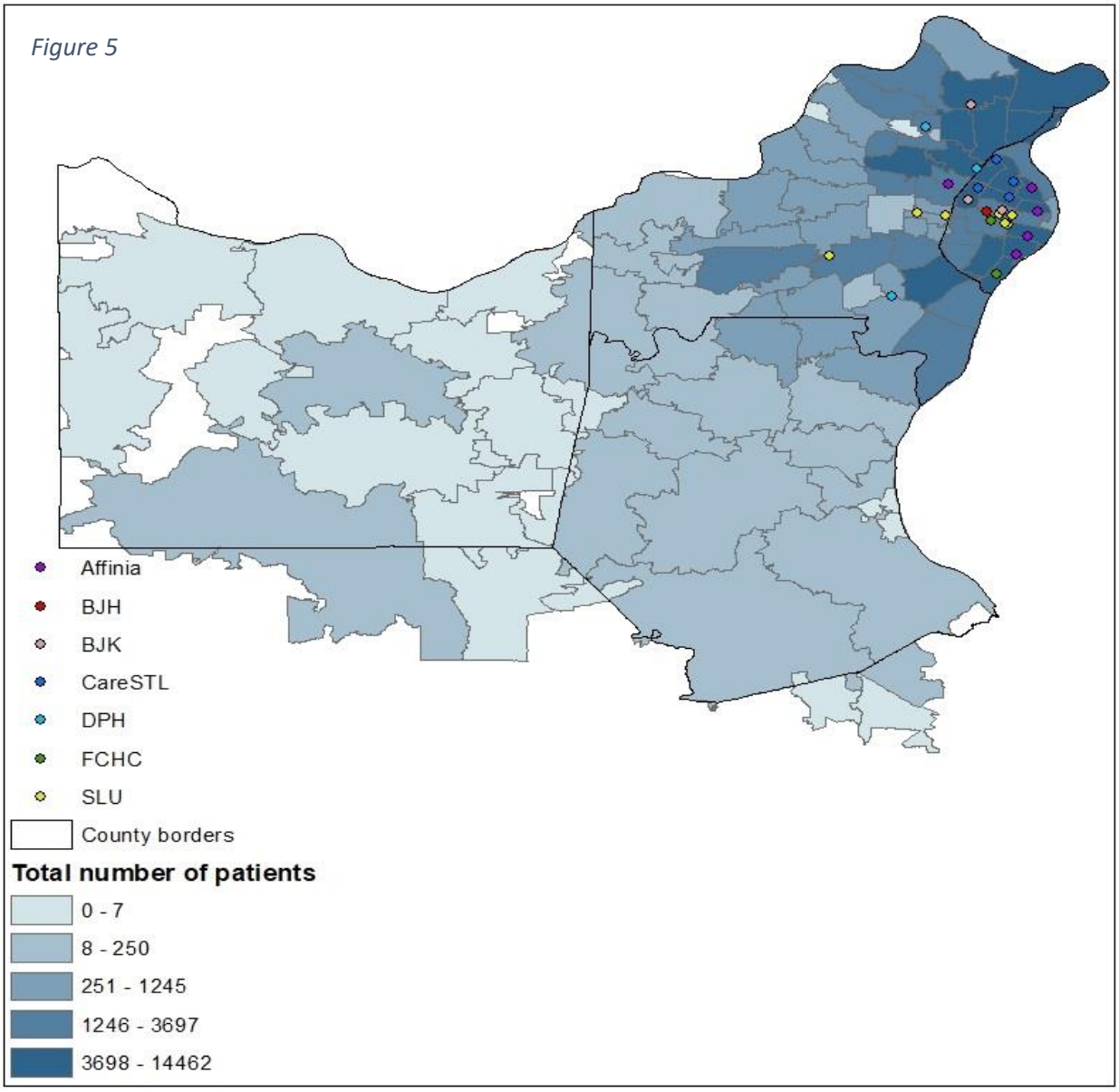
One implication of the maps and the model results is that there are areas peripheral to the central metropolitan area, where our organizations' locations are concentrated, where many potential safety net patients may be. Those peripheral areas are relatively poorer, less educated and have higher uninsured percentages than the inner-ring suburbs. While these factors were found to be associated with a lower total number of office visits among low-income adults (those with incomes less than 200% FPL), distance to available safety net care is not an explicit part of the model. It is estimated on data for the overall low-income adult population, including those with convenient, close access to safety net care and those without.

This is an important point, because there are two components to predicting healthcare demand by an underserved population. One is to use available demographics that correspond to actual healthcare needs, e.g. older people may be sicker, and project demand accordingly. Another is to associate demographic variables with what people actually do, i.e. use actual data on care that was sought in the past. The latter option is easier with available data, but it is limiting in that it may not capture current unmet need. In the next section, we will compare the actual safety net patient population to these general demographics to approximate unmet need across the region.

Current Safety Net Demand

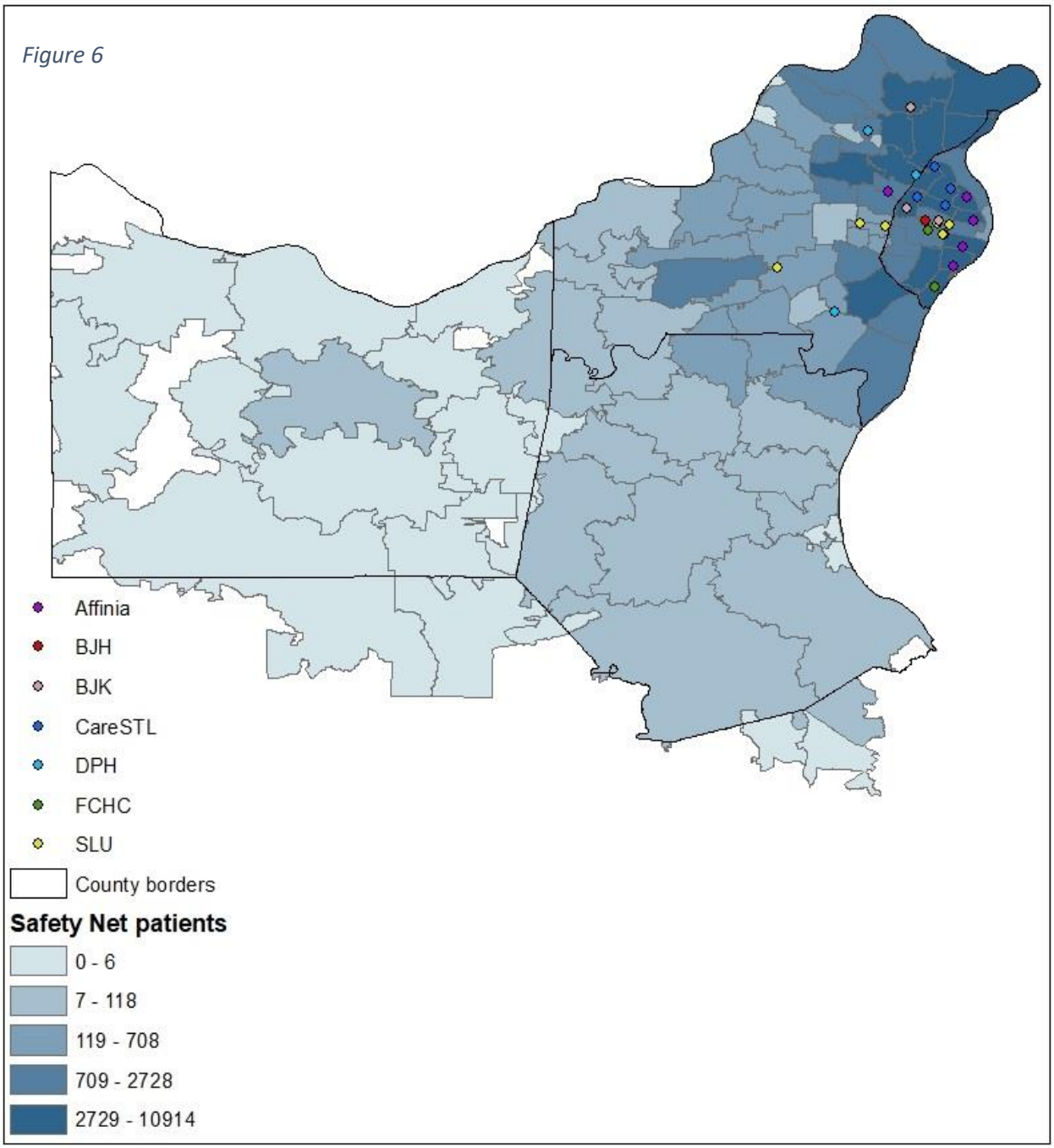
Figure 5 shows total number of patients served by all the organizations, by patient ZIP code. Most of the patients' and providers' locations are concentrated in the central areas of the city with low numbers of patients and no organizations located in the peripheral southern and western parts of the region. Despite the high population density of potential safety net patients in the southern and western areas (shown in the previous maps), there are few patients from those areas served by our primary care safety net organizations. The lack of clinic sites in the peripheral parts of the region causes patients to spend more time driving or using public transportation to access to the closest provider (see Travel Time section below for more details). The result is a low number of registered patients coming from the peripheral parts of St. Louis relative to their projected need.

Figure 5



The distribution of safety net patients (those who are uninsured or on Medicaid) is very close to the total patient distribution (Figure 6). Safety net patients have few other options to access primary care services beyond those organizations. Yet, the locations are not accessible in many parts of the county. This might help explain the higher rate of emergency visits on the part of St. Louis County residents compared to St. Louis City residents[10].

Figure 6



Travel Time

As we have seen, travel time is an important element in determining whether low-income people will be able to access safety net care. The maps below (Figures 7 and 8) show the average number of minutes of travel (based upon driving and on using public transportation, respectively) spent on average by patients in each ZIP code to access to the surrounding primary healthcare locations. A study in 2013 showed that patients are willing only to travel up to 28.4 minutes on average to access routine medical care.[11] According to our model, the average driving time to access to primary care was 19.5 minutes. (For the sake of simplicity, we will focus in the following maps on St. Louis City and St. Louis County only.)

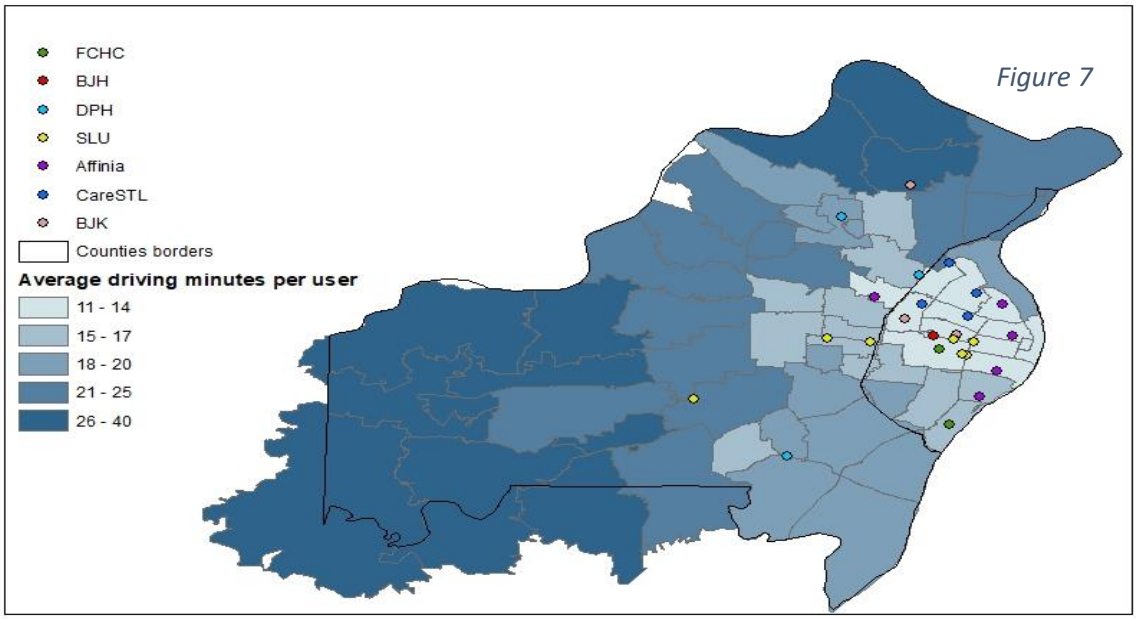


Figure 7

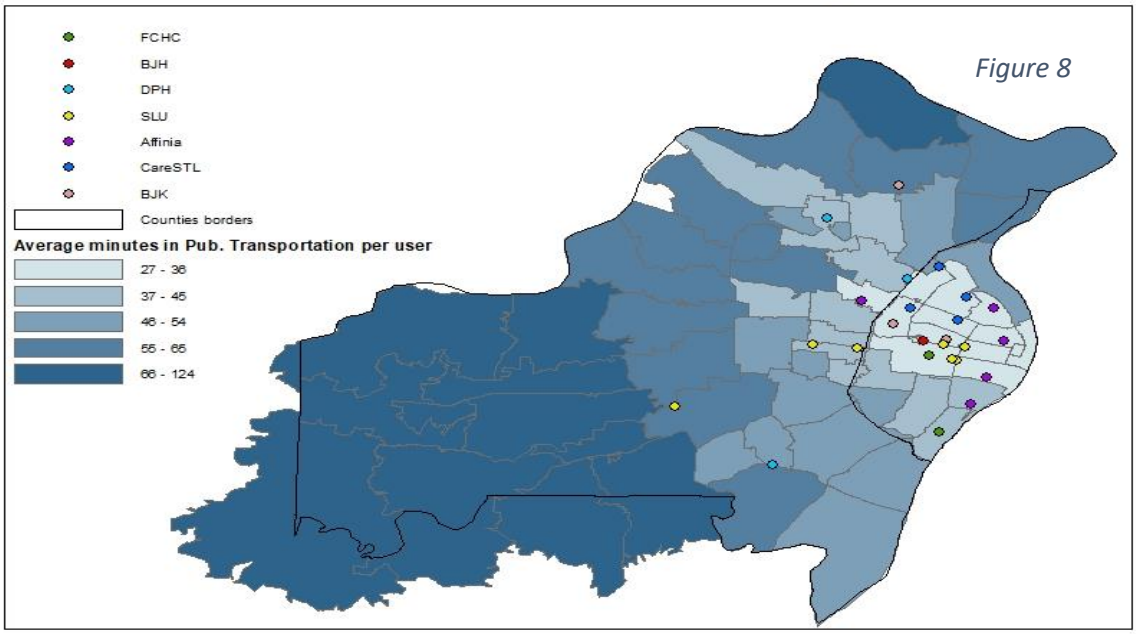


Figure 8

Additionally, we found that the average number of minutes needed to access care via public transportation was 53. Given that 18.5% of the households in St. Louis do not own vehicles – and without adjusting for the fact that this lack is concentrated among low-income households – this implies an overall average travel time of 25.7 minutes ((0.185×53) + (0.815×19.5)). However, 20 zip-codes (31% of the zip-codes) were above the acceptable traveling time (28.4 minutes).

Residents of southern and western ZIP codes need significantly more time to access primary healthcare services compared to residents of more central ZIP codes. This is clearly a reflection of the distribution of provider sites; most of the sites are located in the central areas with lack of locations in the peripheral ZIP codes.

Estimating Primary Care Demand

The expected number of visits was computed from a model based upon socioeconomic indicators such as age, gender, race, insurance status, and educational level. As discussed earlier, the model predicts the actual expected number of office-based visits people might make to all sources of care (not only safety net providers), based upon the behavior of other similar people in the MEPS dataset; it is not necessarily the needed number of the visits that should ideally occur. Although predominately comprised of primary care visits, the number of "office-based visits" is a MEPS variable and is not specific to primary care. For that reason, it works best as a way to capture the relative needs of different places in the STL area, not as an absolute estimate of primary care need. Annual estimates are created for each low-income (less than 200% FPL) respondent in the St. Louis area PUMAs (who are more likely to be safety net patients), scaled to represent the population demographically, apportioned to ZIP codes using GIS, and finally summed at the ZIP level and depicted on the map below. Note that there are similarities and differences between this map and the map of safety net patients (Figures 9,10).

The model predicts that people with lower incomes, lower educational levels, and less health insurance coverage are less likely to visit a provider's office or clinic. Therefore, the specific values predicted are almost certainly an undercount of services needed in terms of health. However, proximity to a safety net clinic may make a person's low income or lack of insurance less relevant, and vice versa. Broadly, this map conveys a sense of where there are areas of unmet demand for safety net services.

Figure 9

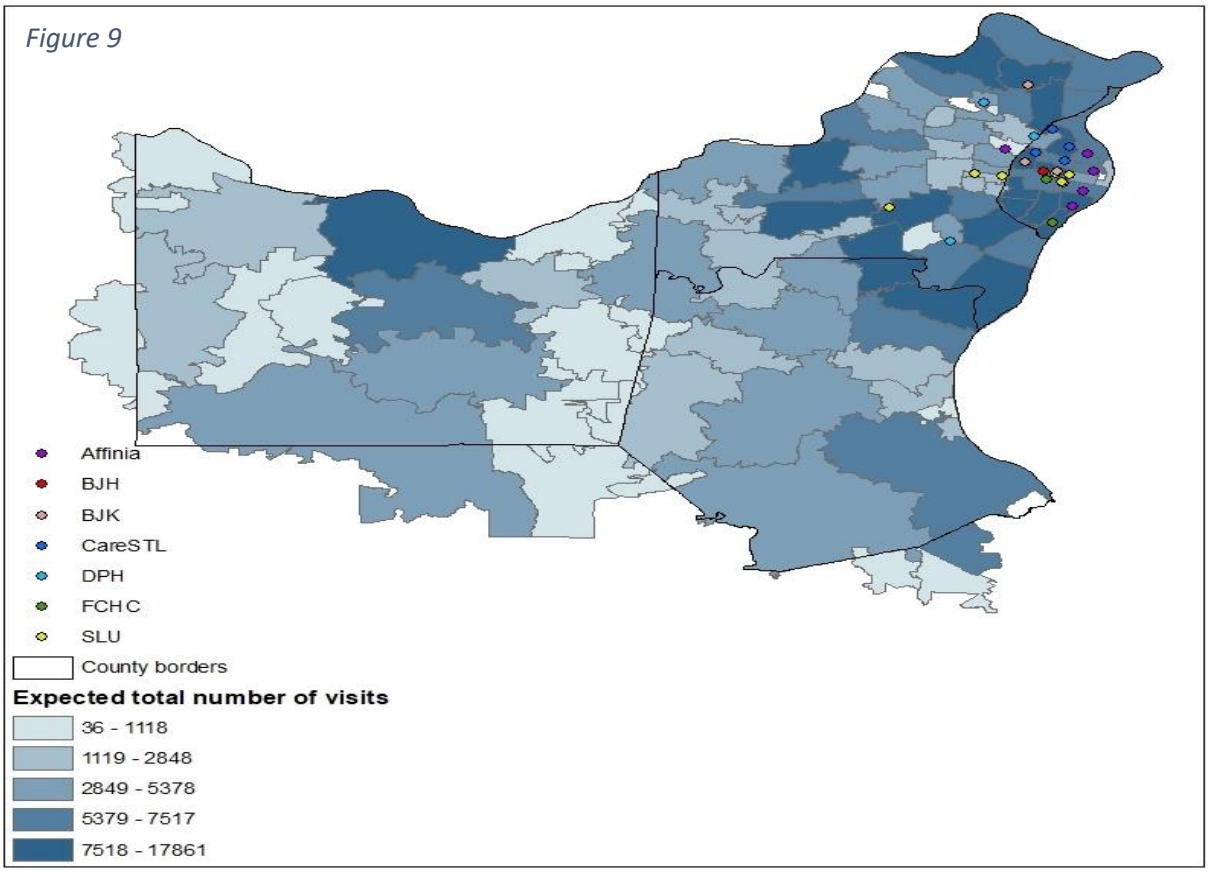
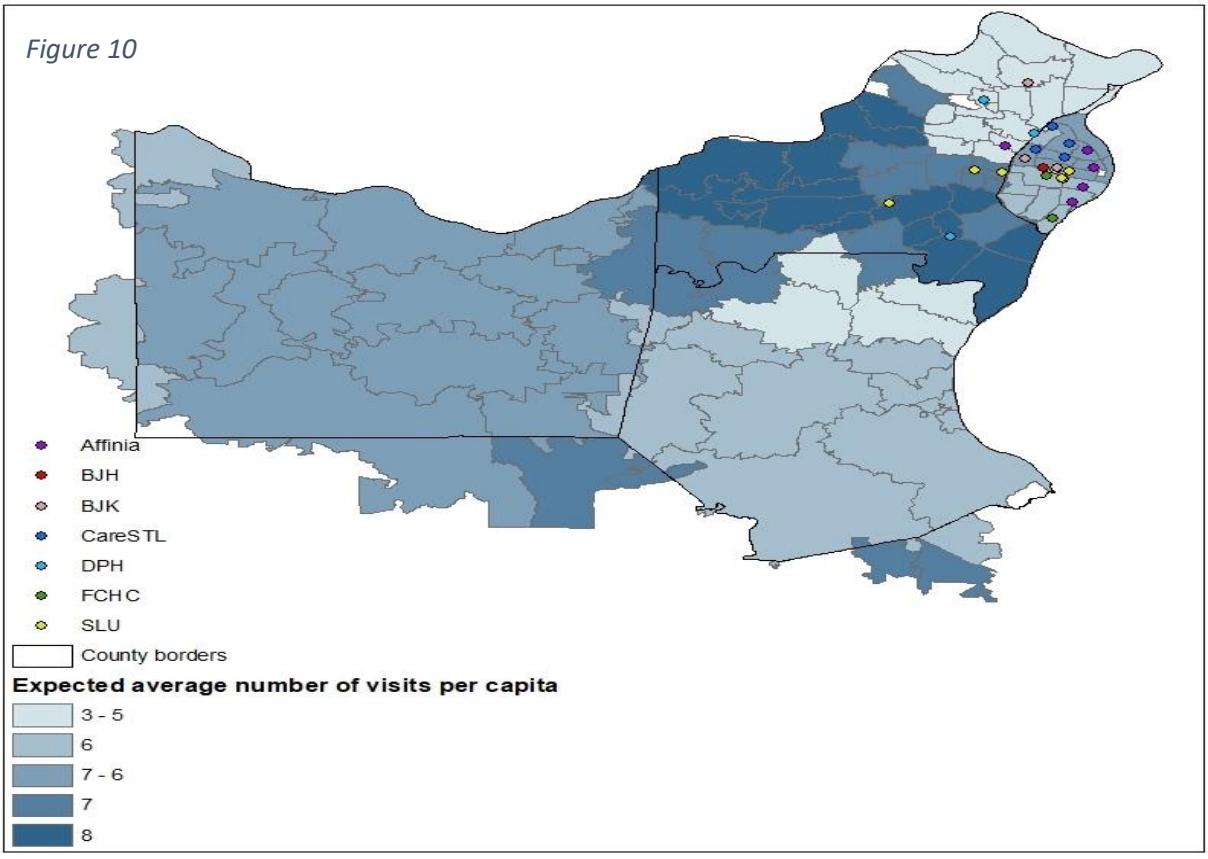
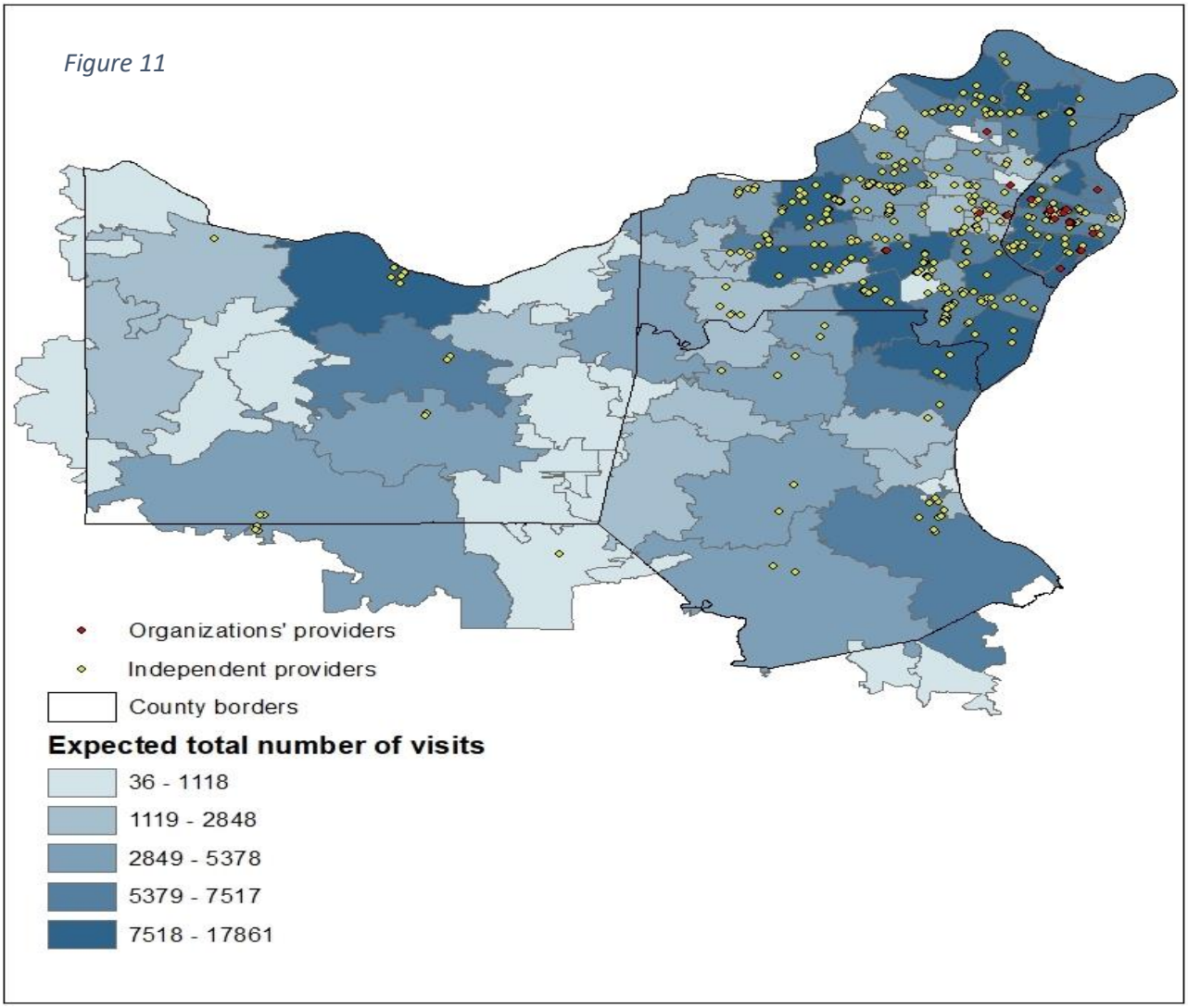


Figure 10



For the last part of our analysis, we display the geographic distribution of all primary care providers in the area based upon National Providers Identifier data, superimposed on the previous map (Figure 11). The red dots represent locations that are part of the existing safety net (sites for which we have data), while the yellow dots are other primary care providers not affiliated with the organizations for which we have data. There are many unaffiliated providers in the region, some of whom may already perform safety net care, and many of whom are geographically positioned in areas where we estimate demand by low-income individuals may be high. A greater degree of cohesion across the region, coordinating safety net care to align with medical need and geographic access, would be useful in better meeting the region's health equity goals. Moreover, as insurance is a significant predictor of visits by low-income individuals, strengthening the regional safety net in these ways will better prepare our region for an increase in demand if Medicaid expansion eventually occurs in Missouri.

Figure 11



Main Findings

- The northern parts of the region are likely the most underserved areas, given that they have more patients with high density of population in general, no locations of services, higher percentages of poverty, lower insurance coverage rates and higher number of safety net patients.
- Patients must travel an average of 25.7 minutes to access the safety net care locations. However, in 31% of the zip-codes, travel time exceeds the 28 minute average that previous research has found that people are generally willing to travel to access routine care.
- The southern and western parts of the region have low numbers of patients served by the current organizations despite their high population densities. Also, the main safety net organizations have no sites in those areas, so patients spend more time to get access to the nearest surrounding locations.
- Adding the currently unaffiliated primary care providers into the safety net network could help in covering the underserved areas in the northern, southern and western parts of the region. It is likely that the lack of services (access points) in some specific areas in St. Louis leads to some people not seeking as many visits as they should ideally to meet health needs. The demand model can help identify underserved areas that might need support with more access points. Policies encouraging and incentivizing the primary care providers (Figure 10) who are practicing in these areas could be effective in providing an access to low-income people there. However, increasing the supply will likely increase the demand to some extent.

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