Planning for Urban Health Access: Supporting Community Development & Healthcare Partnerships

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Executive Summary

Today, very few primary health care practices choose to establish themselves in low income urban communities, and planners have a critical role to play in altering this trend. This report provides an overview of the factors that lead to the creation of medically underserved urban communities and details six case study communities that have successfully planned and implemented a local strategy to address low health care access. Lastly, the report outlines recommendations for both community development and government planners to better address health care shortages.

Research conducted for this report adheres to two different but complementary approaches. Interviews have been conducted with six representatives of case study community organizations that have a history of working on health care access issues. The communities profiled here are low income urban communities with substantial minority populations. Interviews revealed how these community organizations successfully identified hurdles to health care access and used available resources to address those challenges. A geographically weighted regression analysis was also performed to complement the interview and background research. The regression analysis analyzed publically available data to identify the demographic, economic, health and environmental factors that most contribute to the low health care access in each case study community.

There are several key recommendations arising from the research of this report. These recommendations are targeted for both public sector planners and planners working in nonprofit community development settings.

Public sector planners should adhere to the recommendations to address low health care access:

1. Make land use and transportation decisions that do not restrict access to medical services.
2. Make gap financing available for health care projects.
3. Consider providing unused municipal property at little or no cost to community development organizations looking to administer medical services.
4. Use the comprehensive planning process to jumpstart discussions on health care access between community stakeholders.

Nonprofit community development planners should use the following guidelines to establish partnerships with health care providers:

1. Include health care providers in the early stages of the developing a program to address issues of health care access.
2. Provide potential health care partners with a demonstration or pilot project to realize potential value from collaboration.
3. Establish clear rules of collaboration with other local nonprofit organizations.

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Role of Planning Professionals in Health Care

Community planners have given only limited attention to the provision of medical services in recent years. The Urban Land Institute released a 2011 report titled *The Outlook for Health Care,* which provides ample reason for planners to focus more on health care access. The report points out that demand for medical services will increase steadily as America's elderly population grows and more individuals are insured under provisions of the Patient Protection and Affordable Care Act (PPACA). The health care industry is projected for continued growth, and is seen as resilient in the face of recession due to patients' inelastic demand for health care services and goods. The industry also receives enormous government support. Future demand for health care will be high and the industry has tremendous potential to offer economic stability for a city or region, but it is critical to realize that attracting increased investment from medical providers is not as straightforward as other industries. The number of new physicians is largely controlled by available Medicare and Medicaid funding for hospital residency programs and the number of open medical school seats allowed by the American Medical Association (AMA). The number of new doctors, however, is not keeping pace with the country's growth in population. America is seeing a growing shortage of doctors to meet demand, and new medical practices are establishing themselves in locations where they can achieve the greatest time and cost savings.[1] There are a number of factors that medical practitioners examine in making these decisions.

Health Insurance Barriers

It is often argued that those with low incomes have low access to health care because many of these individuals do not have health insurance or are underinsured. Historically, those with the lowest incomes have not received opportunities for employer-provided health insurance and cannot afford to purchase health insurance independently. A 2009 report by the McKinsey Global Institute found that 78% of American households making less than $27,500 annually were not covered under an employer-provided health plan. Furthermore, even those

[1] Shilling, Gary. 2011. *The Outlook for Health Care*. Washington D.C.: The Urban Land Institute. http://uli.org/report/land-use-impacts-of-rising-demand-for-medical-facilities/

employers that offer insurance coverage to low earning employees are likely to contribute substantially less to cover the overall cost of a premium. The McKinsey report cites data from 2005 which indicates that employees earning less than $27,300 were typically asked to provide 20% of their income towards insurance coverage while those making greater than $27,300 contributed less than 10% of their income.[2] Thus, urban communities with high concentration of poverty have been more likely to contain uninsured households, and primary care practices have been reluctant to locate in these places for fear or not being able to attract enough patients to cover practice costs.

The PPACA sought to address the spatial mismatch of low-income households and access to primary care practices through expansion of Medicaid coverage. The Medicaid insurance program has existed since the mid-1960s but has historically only offered limited coverage to those with low incomes.[3] The Henry J. Kaiser Family Foundation provides a helpful summary of Medicaid eligibility requirements prior to passage of the PPACA:

> Before the ACA, federal law provided federal funding for Medicaid only for specified categories of low-income individuals: children, pregnant women, parents of dependent children, individuals with disabilities, and people age 65 and older. States were required to cover individuals in these groups up to federal minimum income thresholds, but also had the option to expand coverage to people at higher income levels. Importantly, prior to the ACA low-income adults were largely excluded from Medicaid.[4]

Medicaid was originally conceived as a program that would benefit low-income families in addition to the elderly and those living with disabilities. It was not intended to cover those who were low-income and without dependent children. Unless a state provided otherwise, the program also did not cover those who were above the federal minimum income thresholds but below the poverty line. These limited eligibility requirements formed what is often referred to

[2] Auguste, Byron, Martha Laboissiere, and Lenny Mendonca. 2009. *How Health Care Costs Contribute to Income Disparity in the United States*. The McKinsey Quarterly. Washington D.C.: McKinsey Global Institute.
[3] Sloan, Frank, Janet Mitchell, and Jerry Cromwell. 1978. 'Physician Participation in State Medicaid Programs'. *The Journal of Human Resources* 13: 211.
[4] Paradise, Julia. 2015. 'Medicaid Moving Forward'. *Henry J. Kaiser Family Foundation*. http://kff.org/health-reform/issue-brief/medicaid-moving-forward/.

as the “Medicaid Coverage Gap,” where many poor individuals have not been eligible for Medicaid.[5]

The PPACA was passed with several provisions that would increase the number of individuals eligible for Medicaid insurance. The PPACA extends Medicaid insurance coverage to all individuals making below 138% of the federal poverty line and providing private insurance subsidies to those individuals falling between 138% and 400% of the federal poverty line.[6] While the PPACA initially mandated that all states expand Medicaid coverage, the U.S. Supreme Court ruled in *National Federation of Independent Business v Sebelius (2012)* that states had the right to choose whether or not to participate in the Medicaid expansion.[7] As of December 2015, only 30 states and the District of Columbia have opted-in to expand Medicaid coverage.[8] Most of the states rejecting Medicaid expansion are located in the Midwestern and Southern regions of the country.

The limits on eligibility for Medicaid are not the only barrier the program has created to limit low-income individuals’ access to primary care. Numerous studies have consistently cited Medicaid’s low reimbursement rates compared to those of other insurance providers as a motivating factor in practices not accepting Medicaid patients.[9, 10, 11, 12, 13] Most states’ Medicaid reimbursement rates for primary care are well below that of private insurance and Medicare, which provides insurance to Americans over the age of 65. The average reimbursement rate for

[5] Garfield, Rachel, and Anthony Damico. 2015. 'The Coverage Gap: Uninsured Poor Adults in States That Do Not Expand Medicaid – An Update'. *Henry J. Kaiser Family Foundation*. http://kff.org/health-reform/issue-brief/the-coverage-gap-uninsured-poor-adults-in-states-that-do-not-expand-medicaid-an-update/.
[6] Ibid.
[7] National Federation of Independent Business v Sebelius. 2012, 11 393. U.S. Supreme Court.
[8] Cardwell, Anita. 2015. 'Map: Where States Stand On Medicaid Expansion Decisions'. *State Refor(U)m*. https://www.statereforum.org/Medicaid-Expansion-Decisions-Map.
[9] Cunningham, Peter, and Jessica May. 2006. *Medicaid Patients Increasingly Concentrated Among Physicians*. Results from the Community Tracking Report. Washington D.C.: Center for Studying Health System Change.
[10] Decker, S. L. 2012. 'In 2011 Nearly One-Third of Physicians Said They Would Not Accept New Medicaid Patients, But Rising Fees May Help'. *Health Affairs* 31 (8): 1673-1679.
[11] Sloan, Frank, Janet Mitchell, and Jerry Cromwell. 1978. 'Physician Participation in State Medicaid Programs'. *The Journal of Human Resources* 13: 211.
[12] Sommers, Anna, Julia Paradise, and Carolyn Miller. 2012. 'Physician Willingness and Resources to Serve More Medicaid Patients: Perspectives from Primary Care Physicians'. *Medicare & Medicaid Research Review* 1 (2).
[13] United States Government Accountability Office. 2012. *States Made Multiple Program Changes, And Beneficiaries Generally Reported Access Comparable to Private Insurance*. Washington D.C.

Medicaid in 2012 was only 59% of what Medicare reimbursed.[14] Because of this, primary care practices that have chosen to accept Medicaid patients have had to adapt to reimbursement rates that do not cover typical practice costs.

Adapting to Medicaid's Low Reimbursement Rates in Urban Communities

There has been limited research to investigate how primary care practices have adapted to provide care to low-income urban communities. In 1989, two researchers from the University of Illinois conducted a study of how primary care physicians coped with low Medicaid reimbursement rates in urban areas. Their findings suggested that primary care practices operating in competitive urban areas have adapted by either accepting a very low share or a very high share of Medicaid patients, and that anything between the two extremes was too costly for the practice. A low share of Medicaid patients would have very little impact on a practice's revenue because practice losses create by those with Medicaid would be offset by those with private insurance. Practices with a high share of Medicaid patients would face reduced reimbursements, but these revenue shortfalls could be compensated for by seeing a larger number of patients. This would require shorter patient visits. The research suggested that a practice could only maintain a moderate share of Medicaid patients if it could achieve a local monopoly on demand from privately insured individuals.[15] If competition was present, the medical practice would not be able to reliably anticipate having patients with higher reimbursement rates. A similar study was conducted in 2011 for the Centers for Medicare and Medicaid Services' (CMS) Center for Strategic Planning which found that the number of practices accepting a moderate share of Medicaid patients had increased since 1989. This increase in moderate-share practices accepting Medicaid patients was attributed to improved technology to handle claims, as well as that those practices were often backed by a hospital ownership interest. Similarly, most practices accepting a high share of Medicaid patients were hospitals or health centers. Based on survey results, most high-share and moderate-share practices reported accepting all or most Medicaid patients. Low-share practices tended to

[14] Henry J. Kaiser Family Foundation. 2012. 'Medicaid-To-Medicare Fee Index'. http://kff.org/medicaid/state-indicator/medicaid-to-medicare-fee-index/.
[15] Fossett, James W., and John A. Peterson. 1989. 'Physician Supply and Medicaid Participation'. *Medical Care* 27 (4): 386-396.

operate only in high income areas.[16] Taken together, these studies suggest that larger practices or practices that are part of a larger provider network will be the most likely to accept an increased share of Medicaid patients.

Larger practices can afford to be reimbursed at a low rate for Medicaid patients as long as they can devote enough medical professionals to see other patients that will reimburse treatment at a higher rate. Larger practices achieve cost savings not only from having a diversity of patients but also from having a greater diversity of medical professionals. Larger practices achieve modest economies of scale when they include specialist physicians, laboratory personnel and equipment and a range of common scanning technology such as ultrasound and radiology equipment.[17] In contrast, smaller practices often have to contract these services out to other facilities and this greatly increases cost to the practice.

Physicians completing their residencies can be utilized by larger scale medical school providers to administering primary care at low cost in urban communities. Because the medical profession has long placed an emphasis on learning through practice, all doctors must complete multi-year residencies as part of their education before becoming licensed. Medical schools have the opportunity to operate primary care clinics in low-income communities and assign physicians completing their residencies to work in these locations. Residents are financed mostly with Medicare and Medicaid dollars and, because of this, are typically focused on serving those with low incomes, the disabled and those over the age of 65.[18] Most medical school hospitals are also non-profits which means they fall within the provision of the PPACA mandate that they justify their tax exemption through evidence of providing community health benefits at little or no cost.[19] Any cost that residents might incur beyond the rate of Medicaid and Medicare reimbursements are typically used to justify a medical school's tax exempt status. In following this mandate, a number of non-profit hospitals operate clinics in low-income communities that serve both those on Medicaid and also those without insurance. Losses

[16] Sommers, Anna, Julia Paradise, and Carolyn Miller. 2012. 'Physician Willingness and Resources to Serve More Medicaid Patients: Perspectives from Primary Care Physicians'. *Medicare & Medicaid Research Review* 1 (2).
[17] Escarce, José J., and Mark V. Pauly. 1998. 'Physician Opportunity Costs in Physician Practice Cost Functions'. *Journal of Health Economics* 17 (2): 129-151.
[18] Fishman, L. E., and J. D. Bentley. 1997. 'The Evolution of Support for Safety-Net Hospitals'. *Health Affairs* 16 (4): 30-47.
[19] Internal Revenue Service. *2014 Instructions for Schedule H (Form 990)*. (Washington D.C.: Department of the Treasury, 2014).

incurred by treating those without insurance can also be used to justify a hospital's tax exempt status.

A recently published study details a pilot program that combined utilizing health professionals in residency to create a modest economy of scale. Using Medicare funding, an interdisciplinary group of physician and pharmacy students established a clinic to serve a group of patients with a history of not following through on preventative care measures recommended by their physicians. The group conducted initial screenings and collected detailed patient histories on the patients and then met as a group to develop a care plan for each patient. The students presented the plans to the patients and conducted follow-ups to ensure that patients were taking prescriptions and following home-based care recommendations. For those patients enrolled in the program, 91% of the identified preventative care variables improved over the course of the pilot period. Patient satisfaction was also seen as high from surveys administered to patients after completion of the program. Because the physicians and pharmacists operated in a group and were able to act as checks to one another's work very little work was required by the attending physician or pharmacist.[20] This pilot program holds great promise for the spread of a team-based care model in the future, but limitations to exporting this model to everyday practice exist. The model ultimately relies upon the ability of the team leader to delegate tasks effectively, and clear billing procedures for Medicaid and Medicare are not currently available for this method of practice.[21]

The PPACA has recently offered states incentives to increase Medicaid reimbursement rates to the same levels as Medicare rates. The act mandated the federal government to cover 100% of the cost to increase Medicaid primary care rates to Medicare levels for both 2013 and 2014. When the increased rates expired states had to decide whether or not they would continue the increased rates on their own. Ultimately, 16 states and the District of Columbia

[20] Sicat, Brigitte Luong, Christine Huynh, Rita Willett, Susan Polich, and Sallie Mayer. 2014. 'Interprofessional Education in A Primary Care Teaching Clinic: Findings from A Study Involving Pharmacy and Medical Students'. *J Interprofessional Care* 28 (1): 71-73.

[21] Carrier, Emily, Tracy Yee, and Lucy Stark. 2011. *Matching Supply to Demand: Addressing the U.S. Primary Care Workforce Shortage*. Policy Analysis. Washington D.C.: National Institute for Health Care Reform.

decided to at least partially keep the increased rates.[22] Research regarding the long-term effect of Medicaid increases within these states has yet to be completed.

Many communities have adapted to the problems of low Medicaid reimbursement rates by establishing Federally Qualified Health Centers (FQHCs). FQHCs provide numerous medical servicers in communities with low health care access and, through a system of federal payments, provide an increased reimbursement rate for those with Medicaid. Grants are also provided to cover costs for treating those without insurance, but an FQHC must accept all patients in return for this financial assistance.[23] FQHCs do often operate with a challenging administrative burden. An FQHC must provide detailed quarterly reports that it is treating patients that would otherwise not receive care from a provider.[24] Because of this, FQHCs must spend a great deal of resources to recruit and document underserved patients.

It is important to point out that accepting Medicaid patients often results a higher administrative burden on *all* office-based physician practices. Many different insurance providers have their own unique forms and coding systems that physicians must utilize when requesting reimbursement for services. Medicaid is no exception. While many practices have chosen to maintain a diversity of patient insurers in order to cover the Medicaid reimbursement gap for patients, having this diversity of patient insurers comes with its own cost. Physician practices have to hire additional administrative staff or incur cost from additional hours in order to process a large number of different patient insurance forms. Medicaid patients often place an additional burden on administrative staff in the form of researching specialists that will both accept Medicaid and fit the schedules and travel demands of those with low-incomes. Because those with low incomes in urban areas often rely upon public transit, administrative staff must factor this into consideration when choosing a specialist for referral or pharmacy for prescription. Other factors that can create difficulty for administrative staff in locating a specialist or pharmacy can include the need to find specialists

[22] Tollen, Laura. 2015. *Medicaid Primary Care Parity*. Health Policy Brief. Health Affairs. http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=137.
[23] Chamberlain, Ann Clayton. 2016. South Broad Community Health Interview. Stefen Samarripas. Interview by Phone.
[24] Kim, Keun. 2016. Codman Square Health Center Interview. Stefen Samarripas. Interview by Phone.

with unconventional hours to reflect a Medicaid patient's low wage job schedule or difficulty in finding child care. [25, 26, 27, 28]

Adapting to High Patient Demand from Low Income Patients

Primary care practices can operate efficiently and control costs if there is less patient demand for costly or unnecessary services. Increasingly, primary care physicians are turning to e-health interventions to supplement traditional treatment services and reduce patient demand for unnecessary treatment. The World Health Organization (WHO) defines e-health as "the cost-effective and secure use of information and communication technologies in support of health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research."[29] The use of technology in medicine can take many forms. It can include simple text or email reminders to confirm or cancel a scheduled doctor's appointment. This ensures that a new appointment can take the place of a cancelled one and not result in lost revenue. It can also involve mobile phone apps that allow a patient to research symptoms and determine whether a visit to the doctor is necessary. Apps can also be used to keep track of and encourage regular exercise or medication routines. These e-health interventions can be used to reduce the number of unnecessary appointments at a primary care practice. Reducing unnecessary appointments or rescheduling appointments in advance to avoid "no-shows" can both result in tremendous cost savings for a practice.[30] The one significant barrier that exists in many low income communities to e-health is limited internet access. While the use of smartphones is common among individuals in these communities, data usage can be extremely limited and thus restricts consistent access to e-health software. Many

[25] Cunningham, Peter, and Jessica May. 2006. *Medicaid Patients Increasingly Concentrated Among Physicians*. Results from the Community Tracking Report. Washington D.C.: Center for Studying Health System Change.
[26] Sloan, Frank, Janet Mitchell, and Jerry Cromwell. 1978. 'Physician Participation in State Medicaid Programs'. *The Journal of Human Resources* 13: 211.
[27] Sommers, Anna, Julia Paradise, and Carolyn Miller. 2012. 'Physician Willingness and Resources to Serve More Medicaid Patients: Perspectives from Primary Care Physicians'. *Medicare & Medicaid Research Review* 1 (2).
[28] United States Government Accountability Office. 2012. *States Made Multiple Program Changes, And Beneficiaries Generally Reported Access Comparable to Private Insurance*. Washington D.C.
[29] Han, Jung H., Naomi Sunderland, Elizabeth Kendall, and Garth Henniker. 2010. 'Chronic Disease, Geographic Location and Socioeconomic Disadvantage as Obstacles to Equitable Access to E-Health'. *Health Information Management Journal* 39 (2): 30-36.
[30] Johnson, B. J., J. W. Mold, and J. M. Pontious. 2007. 'Reduction and Management of No-Shows by Family Medicine Residency Practice Exemplars'. *The Annals of Family Medicine* 5 (6): 534-539.

low income communities also have a substantial number of residents that have limited computer literacy or do not speak fluent English.[31]

Use of e-health interventions in low income communities can only be truly effective if a patient has an adequate degree of health literacy. It does not matter that a patient has access to electronic health information if they cannot fully read or comprehend the information. A 2008 study showed that most low-income urban patients who regularly visit a health professional have at least an adequate level of health literacy, and those who show up at the emergency room or infrequently to a health clinic have the lowest level of health literacy. However, a low level of formal education was the most significant predictor of low health literacy in the study's urban poor patients.[32] This finding has since been reinforced by other studies. A study to assess the effectiveness of health literacy screening instruments in Detroit found that an overwhelming majority of those surveyed reported needing help reading medical brochures or prescription pamphlets.[33] Those with higher education attainment levels are more likely to be more health literate and exhibit self-managed health activities such as eating well, exercising and adhering to prescribed at-home treatments. Medical practices require the assistance of health educators either within or in close proximity to the practice in order to increase health literacy for those with low education attainment.[34] Attending to health literacy needs can result in tremendous savings for primary care practices. A 2004 study estimated that the average treatment costs for a patient with low levels of health literacy are three times that of a patient with higher health literacy.[35]

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[31] NORC at the University of Chicago. 2010. *Understanding the Impact of Health IT in Underserved Communities and Those with Health Disparities*. Briefing Paper. Washington D.C.: U.S. Department of Health and Human Services.

[32] Zun, L., and L. Downey. 2008. '268: Assessing Adult Health Literacy in Urban Health Care Settings'. *Annals of Emergency Medicine* 51 (4): 552.

[33] Schwartz, K. L., M. Bartoces, K. Campbell-Voytal, P. West, J. Monsur, A. Sartor, and A. V. Neale. 2013. 'Estimating Health Literacy in Family Medicine Clinics in Metropolitan Detroit: A Metronet Study'. *The Journal of the American Board of Family Medicine* 26 (5): 566-570.

[34] Erica I. Lubetkin, Wei-Hsin Lu, and Marthe R. Gold. 2010. 'Levels and Correlates of Patient Activation in Health Center Settings: Building Strategies for Improving Health Outcomes'. *Journal of Health Care for the Poor and Underserved* 21 (3): 796-808.

[35] Weiss, B. D., and R. Palmer. 2004. 'Relationship between Health Care Costs and Very Low Literacy Skills in a Medically Needy and Indigent Medicaid Population'. *The Journal of the American Board of Family Medicine* 17 (1): 44-47.

Promising Planning Tools to Address Low Health Care Access

Planners have a long history of conducting community engagement, and it is apparent from past health care access research that community engagement can be very useful in determining a community's specific barriers to health care. There has been no known research to document the most effective community engagement practices used in attracting health care providers to a medically underserved low income urban community. However, there has been past research to document the most effective community engagement practices utilized in Health Impact Assessments (HIAs) and Community Health Needs Assessments (CHNAs). HIAs examine the potential health outcomes of a policy or program, and CHNAs examine a population's health status to develop interventions that can produce positive health outcomes. While not exclusively focused on attracting medical care, the community engagement practices of HIAs and CHNAs are helpful considerations. In a report evaluating the most effective HIA community outreach practices for vulnerable populations, Anna Rose Harkness emphasizes that the best outreach practices occur at a small geographic scale and utilize community organizations that have strong ties to the community as key stakeholders in developing an initial outreach framework. Past HIA community engagement practices should be considered, and databases of HIAs are available through the Health Impact Project as well as the University of California Los Angeles HIA Clearinghouse, Learning and Information Center. Community engagement processes in HIAs can vary depending upon the policy being assessed and the community being impacted. Having a diverse group of community stakeholders is thus important in determining which methods and approaches should be utilized.[36] Hospitals' Community Health Needs Assessments (CHNAs) can also potentially be helpful templates for a community engagement process. In addition to the best practices outlined for HIA community engagement, a similar overview of CHNAs identifies several other needs including:

> Providing a forum for community members to interact with one another throughout the process [and]… Conducting successful community engagement processes by: holding

[36] Harkness, Anna Rose. 2013. 'Engaging Vulnerable Populations in Health Impact Assessment'. Masters, Georgia Institute of Technology.

> key informant interviews, building the trust of the leaders, providing incentives for attending, equipping people with health knowledge, having convenient meeting times, [and] understanding motives for attending.[37]

Planners have a long history of overseeing community engagement processes, but fostering community discussions around health care access and outcomes will likely require building trust with new community leaders and engaging in a shared learning experience about community health with local residents. Before any engagement process can begin around the issue of health care access it is important to first understand the economic and policy context which has created these concerns for residents of low income urban communities.

Planners equipped with knowledge of Geographic Information Systems (GIS) have the tools necessary to analyze the needs of both the health care industry and medically underserved urban communities. Most peer-reviewed GIS research of patient access to primary health care has focused on how to increase medical care delivery efficiency given disease prevalence in a location. [38, 39, 40, 41] There have been two common deficiencies in this research. One shortcoming is that this research has not incorporated a full consideration of the economic, political, geographic and sociocultural variables which determine the provision of primary care in communities. Only one known past GIS study has incorporated a consideration of racial segregation in Detroit and its' relationship to health care access.[42] It is for this reason that the research presented here includes an examination of potential geographically weighted regression models that utilize multiple social determinants to predict health care access.

Another deficiency with past GIS research on health care access is that the primary geographic level of analysis has been the U.S. Department of Health and Human Services'

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[37] Madden, Mackenzie. 2013. 'Community Improvement through Enhanced Community Health Needs Assessments (CHNAs)'. Masters, Georgia Institute of Technology.
[38] Luo, Wei, and Fahui Wang. 2003. 'Measures of Spatial Accessibility to Health Care in A GIS Environment: Synthesis and a Case Study in the Chicago Region'. *Environment and Planning B: Planning and Design* 30 (6): 865-884.
[39] McLafferty, Sara L. 2003. 'GIS and Health Care'. *Annual Rev. Public Health* 24 (1): 25-42.
[40] Sui, Daniel Z. 2007. 'Geographic Information Systems and Medical Geography: Toward A New Synergy'. *Geography Compass* 1 (3): 556-582.
[41] Wang, Fahui. 2012. 'Measurement, Optimization, and Impact of Health Care Accessibility: A Methodological Review'. *Annals of the Association of American Geographers* 102 (5): 1104-1112.
[42] Grady, Sue, and Joe Darden. 2012. 'Spatial Methods to Study Local Racial Residential Segregation and Infant Health in Detroit, Michigan'. *Annals of the Association of American Geographers* 102 (5): 922-931.

(DHHS) Health Professional Shortage and Medically Underserved Areas. These geographic areas are typically much larger than a single community and prevent the possibility of fine-grained analysis that might benefit a neighborhood. Recently, the exact addresses of physicians registered with the CMS National Plan & Provider Enumeration System have been made publicly available. Health care providers create a record of themselves in this database when they register for a National Provider Identifier Standard (NPI). When physicians register for an NPI they provide a great deal of information regarding their practice including location and whether they accept Medicaid or Medicare coverage. Researchers have recently started to use this data to map out the specific locations of providers and their proximity to one another, but the large amount of available NPI data has made it difficult to analyze.[43] Today, planners can also use crowdsourced data from mobile phone health apps to ascertain information regarding illness and health behavior and use the information to assess the relative health of a community's population. However, there are concerns that the public's expectations of privacy and confidentiality may limit the use of this data.[44] In response to these issues, the regression analysis included here utilizes values from the DHHS Index of Medical Underservice (IMU) as the independent variable.[45] IMU values were selected because they are available for individual census tracts.

Linear & Geographically Weighted Regression Research Methodology

A geographically weighted regression analysis was performed to analyze publically available data and identify the demographic, economic, health and environmental factors that most contribute to the low health care access in each case study community selected for this report. Statistical regression results were generated using IBM's Statistical Package for the Social Sciences (SPSS) software and ESRI's ArcGIS software. All data used to create final regression models were collected for the U.S. Census defined urban census tracts surrounding

[43] Davis, M. A., O. Yakusheva, D. J. Gottlieb, and J. P. W. Bynum. 2015. 'Regional Supply of Chiropractic Care and Visits to Primary Care Physicians for Back and Neck Pain'. *The Journal of the American Board of Family Medicine* 28 (4): 481-490.
[44] Williams, Patricia A.H. 2013. 'Creating Context: Making Sense of Geo-Location and Social Media Data for Health'. *Studies in Health Technologies and Informatics* 188: 149-154.
[45] U.S. Health Resources and Services Administration. 2016. "MUA/Ps: Index of Medical Underservice Data Tables". http://www.hrsa.gov/shortage/mua/imutables.html.

the five case study cities highlighted in this report.[46] Ultimately, only those census tracts with a population density greater than 1,000 people per square mile were selected for analysis. Past research has tended to show that regression models are most accurate in predicting actual medical underservice in areas of very high population density or very low population density. Physicians in areas of moderate population density are more able to adapt to patient needs because there exists neither an undersupply or oversupply of patients.[47] High population density for a census tract was defined as anything greater than 1,000 people per square mile because the U.S. Census will only define urban areas as those containing a cluster of census blocks or tracts with at least that level of population density.[48]

The dependent variable selected for the analysis is the U.S. Health Resources and Services Administration's (HRSA) Index of Medical Underservice (IMU) for census tracts. IMU scores are used to identify populations which are medically underserved given their health status. IMU scores range from 0 to 100 with a score of 0 being the most underserved population and 100 being a perfectly served population. A score off less than 62 qualifies a census tract as being medically underserved. Scores are generated based upon four variables: percentage of population below the poverty level, percentage of population age 65 and older, the infant mortality rate and ratio of primary care physicians per 1,000 people.[49] The statistical regression used for this analysis seeks to understand which demographic, economic, health and environmental determinants are related to a particular case study area's IMU score in lieu of the four variables used by HRSA. Another way to understand this approach is to think of the independent variables in this analysis as the underlying factors which determine the four variables used in the creation of the IMU score. While it might be somewhat helpful to see how a factor like poverty is contributing to an IMU score, it is more helpful to know the specific reasons for why a population is poor so that specific interventions can be created. In order to

[46] Urban area census tracts used in the analysis were selected using ESRI's ArcGIS software and are those tracts that have centroids within the census-defined urban areas that matched the locations of those interviewed.
[47] Ricketts, Thomas C., Laurie J. Goldsmith, George Mark. Holmes, Randy, M.R.P. Randolph, Richard. Lee, Donald H. Taylor, and Jan. Ostermann. 2007. "Designating Places and Populations as Medically Underserved: A Proposal for a New Approach". *Journal of Health Care for The Poor and Underserved* 18 (3): 567-589.
[48] U.S. Census Bureau. 1994. *Geographic Areas Reference Manual*. Washington D.C.: U.S. Department of Commerce.
[49] U.S. Health Resources and Services Administration. 2016. "MUA/Ps: Index of Medical Underservice Data Tables". http://www.hrsa.gov/shortage/mua/imutables.html.

control for non-normality in the models, the natural log of the natural log of the dependent variable was used in the analysis. These values were converted back to IMU scores in presenting the final predicted values for the geographically weighted regression model.

Independent variable data was collected from the U.S. Census Bureau, the U.S. Department of Housing and Urban Development (HUD), the National Cancer Institute (NCI) and the National Oceanic and Atmospheric Administration (NOAA) National Geophysical Data Center. Table 1 provides an overview of the variables used and which location they proved to be statistically significant to the model using a 90% confidence interval. Demographic variables are drawn from the U.S. Census Bureau's American Community Survey 2014 5-Year Estimates.[50] Selected demographic variables were chosen because they were identified by previous research detailed in this report as relevant factors in determining health care access. Expenditures of Community Development Block Grant (CDBG) dollars per square mile for census tracts was included from the U.S. Department of Housing and Urban Development. Expenditure data covers the years 1996 to 2015.[51] This variable was included with the rationale that those areas most in need of economic development would receive the most CDBG dollars per square mile and would be among the least likely for private medical practices to establish themselves. CDBG data was not available for neither Atlanta nor Milwaukee.

Table 1. Summary of Regression Variables

Variable	Locations Used					Source
	Birmingham	Atlanta	New Orleans	Boston	Milwaukee	
Percentage of Households without Access to a Vehicle	X	X	X	X	X	U.S. Census Bureau
Percentage of Population Age 25 & Older with Associate Degrees	X		X	X	X	U.S. Census Bureau
Percentage High School Graduates		X			X	U.S. Census Bureau
CDBG Dollars Spent Per Square Mile	X	N/A	X	X	N/A	U.S. Dept of Housing & Urban Development
Sprawl Index Rating	N/A	X	X	N/A	X	National Cancer Institute
Percentage with a Disability		X		X	X	U.S. Census Bureau
Percentage That Don't Speak English Well		X				U.S. Census Bureau
Percentage Non-Hispanic White			X			U.S. Census Bureau
Percentage with Medicaid Insurance Only				X		U.S. Census Bureau
Percentage of Population Age 25 & Older with Some College			X			U.S. Census Bureau
Standard Deviation of Elevation			X			NOAA National Geophysical Data Center

[50] U.S. Census Bureau. 2015. "American Factfinder". http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
[51] Department of Housing and Urban Development. 2016. CDBG Activity by Tract". http://egis.hud.opendata.arcgis.com/datasets/9208b86eaf044407a0a0584017cbc4c1_0.

Two environmental variables were also included. The main environmental variable used for these analyses is the composite sprawl index created by the NCI and the National Institutes of Health (NIH). The index measures urban sprawl along four dimensions – development density, land use mix, population and employment centering and street accessibility.[52] Previous research has pointed to the fact that medical practices are often in need of large spaces to operate efficiently in urban areas. Thus, it was expected that those census tracts with less sprawl (and a higher sprawl index value) would be more likely to have lower health care access. It is important to articulate that because of the data selected for this project, it is not assumed that more sprawl can be always equated with higher access to health care. All of the tracts selected for analysis have a population density of at least 1,000 people per square mile. Thus, an area with more sprawl in this context is not necessarily what would be considered a high sprawl area in a wider context. Elevation data was obtained for census tracts in New Orleans by using the "Zonal Statistics as Table" tool available in ArcGIS to analyze a 2015 NOAA digital elevation map (DEM) raster file.[53] The standard deviation in elevation was used in the New Orleans Model because interviewees from this city identified elevation as a significant determinant of what areas are medically underserved. Those communities below sea level were more likely to experience flooding during Hurricane Katrina, and consequently these areas have been the slowest to rebuild their medical infrastructure. Areas with a high elevation can also be less attractive for a new medical practice because the land values for these locations have risen dramatically post-Katrina. [54, 55]

Linear regression analyses were conducted for each case study city in SPSS to determine which variables were statistically significant in predicting each city's IMU scores. The results of these linear regressions and the results of several model diagnostics are included in the appendix to this report. After completing a linear regression analysis, the data was analyzed using the ESRI ArcMap software's "Geographically Weighted Regression" tool. In order to

[52] Ewing, Reid, and Shima Hamidi. 2014. *Measuring Urban Sprawl and Validating Sprawl Measures*. Salt Lake City, UT: Metropolitan Research Center.
[53] National Oceanic and Atmospheric Administration. 2009. "National Geophysical Data Center". *National Centers for Environmental Information*. https://www.ngdc.noaa.gov/.
[54] Chamberlain, Ann Clayton. 2016. South Broad Community Health Interview. Stefen Samarripas. Interview by Phone.
[55] Hannan, J.T. 2016. Bayou District Foundation Interview. Stefen Samarripas. Interview by Phone.

control for local multicollinearity in the independent variables, each variable was transformed into its respective mean deviation values. The results of the geographically weighted regressions are provided in the following sections alongside descriptions of each case study community. It should be noted that the regression results should be approached with some caution. Exact IMU scores are not available for every census tract, and because of this spatial autocorrelation (observations are not independent from one another) cannot be discounted entirely from the models. While the regression results provided here are a good starting place to narrow the list of possible determinants that underlie a community's health care access, it is recommended that future research be conducted to determine the exact IMU score for each census tract and then rerun the regression models.

Interview Methodology

Interviews with representatives of community based development organizations were performed over the months of January, February and March 2016. Interviewed organizations were selected because each organization's mission reflects a belief that social and health determinants cannot be addressed separately. While community based development organizations have long worked to address social inequities, the additional focus on addressing interrelated health determinants has led these organizations to also address health care access. These six case study organizations have been able to successfully establish permanent local space for medical staff to operate. Because there are relatively few community organizations that fit this description, interviewees were selected from locations across the United States based on convenience sampling. Interview subjects included:

- Keun Kim, Development Director
  The Center for Pan Asian Community Services, Inc. (Atlanta, GA)
- Mashonda Taylor, Program Director
  Woodlawn Foundation (Birmingham, AL)
- Ann Clayton Chamberlain, Treasurer
  South Broad Community Health (New Orleans, LA)
- J.T. Hannan, Director of Public and Governmental Affairs

Bayou District Foundation (New Orleans, LA)

- Kirsten Gaskin, Health Clinic Manager
  City on a Hill (Milwaukee, WI)
- Anthony Stankiewicz, Chief of Staff
  Codman Square Health Center (Boston, MA)

When possible, supplemental information about the history and work of these organizations was gathered from numerous secondary sources including peer-reviewed journal articles, organization reports, public records and online media.

Overview of Case Study Organizations & Regression Results

City on a Hill

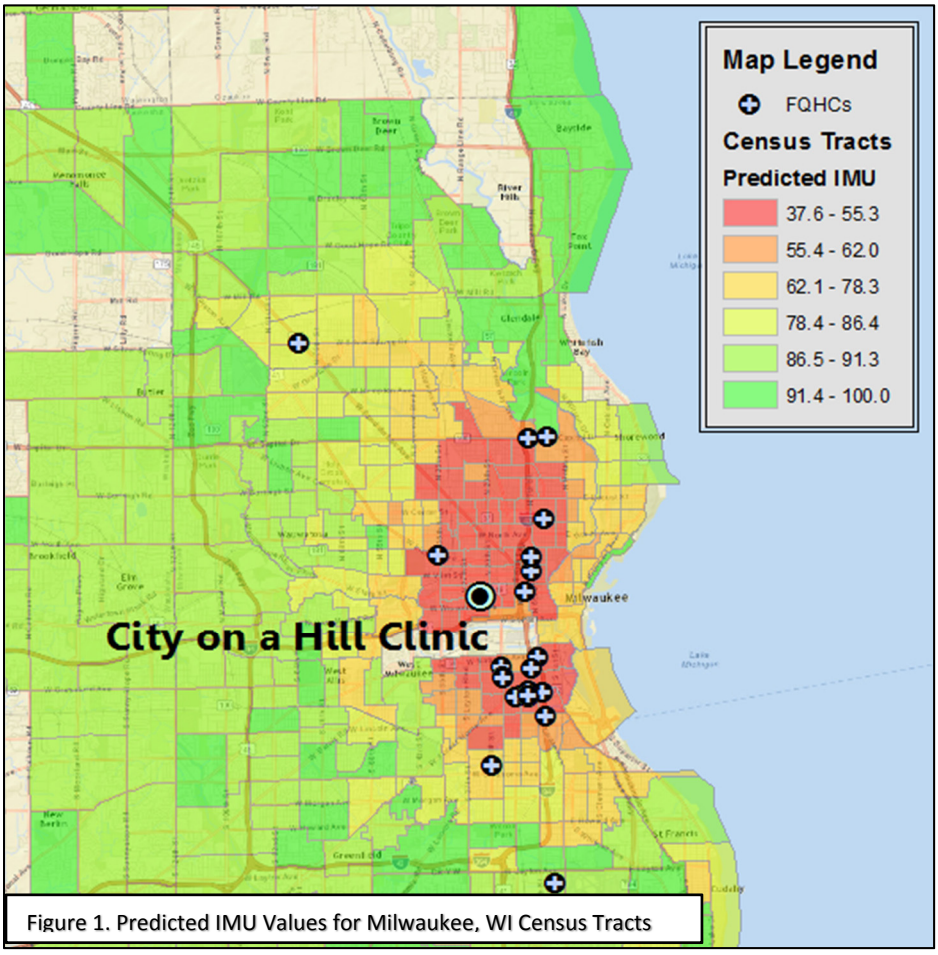


Figure 1. Predicted IMU Values for Milwaukee, WI Census Tracts

City on a Hill is a faith-based organization in Milwaukee, Wisconsin which provides a free health clinic in addition to a number of other community development services. The organization was started in 2000 when the Urban Ministry Center of the Assemblies of God along with a number of inner-city churches collaborated to provide a large social service and health fair. The fair required a large space and leaders of the event reached out to Milwaukee's Aurora Health Care to ask for the use of a recently shuttered hospital's

parking lot. Aurora Health Care agreed to the request and was impressed with the size and impact of the event. Diane De La Santos, an Aurora executive, worked with community members to establish City on a Hill in 2001. Aurora agreed to donate the hospital and the surrounding two acres of land to the newly-formed organization to provide continued health, social and religious services to the community. Today, Diane De La Santos is the executive director of City on a Hill and the organization uses the old hospital to offer community residents free health clinics, youth and family programs, low-cost rental space for local businesses and 150 affordable housing units. The combination of services offered to the community has been extremely helpful in attracting large numbers of patients to the free health clinic. The health clinic is solely funded by philanthropy and grants; therefore, most medical professional at the clinic are volunteers with very few permanent medical staff. When the clinic is open it can attract as many as 85 patients per hour. While the clinic offers only basic screening and primary care, referrals can be made to a number of Aurora Health Care's providers.[56]

Table 2. Linear Model Predicting IMU Scores in Milwaukee, WI

Independent Vairables	Unstandardized Coefficients		Standardized Coefficients	T-Statistic	P-Value
	B	Std. Error	Beta		
(Constant)	1.382	.037		37.821	.000
Sprawl Index Rating	-.001	.000	-.163	-3.658	.000
Percentage High School Graduates	.002	.000	.347	6.975	.000
Percentage of Population Age 25 & Older with Associate Degrees	.002	.001	.086	2.102	.036
Percentage of Households without Access to a Vehicle	-.003	.000	-.393	-8.284	.000
Percentage with a Disability	.001	.001	.090	2.049	.041

Results from both the linear and geographically weighted regression analyses for Milwaukee are shown in Figure 1 and Table 2. Figure 1 depicts the lowest IMU scores in the heart of Milwaukee with City on a Hill occupying a central location within that cluster. The R^2 value for the geographically weighted regression was .78 and indicates that the model was able to explain 78% of the variance in the independent variable. Five variables were found to be statistically significant within the model and are presented in Table 2. Based upon standardized coefficients, the variables that had the greatest influence on the model were the percentage of households without a vehicle and the percentage of high school graduates. The IMU score for a

[56] Gaskin, Kirsten. 2016. City on a Hill Interview. Stefen Samarripas. Interview by Phone.

census tract increased as the percentage of high school graduates increased. The IMU scores in census tracts dropped as the percentage of those households without a vehicle climbed.

Woodlawn Foundation

The Woodlawn Foundation works in the area surrounding the Woodlawn neighborhood of Birmingham, Alabama and is a "community quarterback" organization. The concept of a community quarterback is based upon a community development model created by Purpose Built Communities. Purpose Built Communities is a national foundation established to help guide urban community revitalization efforts across the country. The foundation's community development model was first implemented in the Atlanta, Georgia neighborhood of East Lake and has since been utilized in numerous other communities. This model works by having a lead organization integrate the work of already-existing community development organizations in a collaborative and complementary fashion. The community quarterback can be an organization which already exists in a community or it can be a newly created organization.[57]

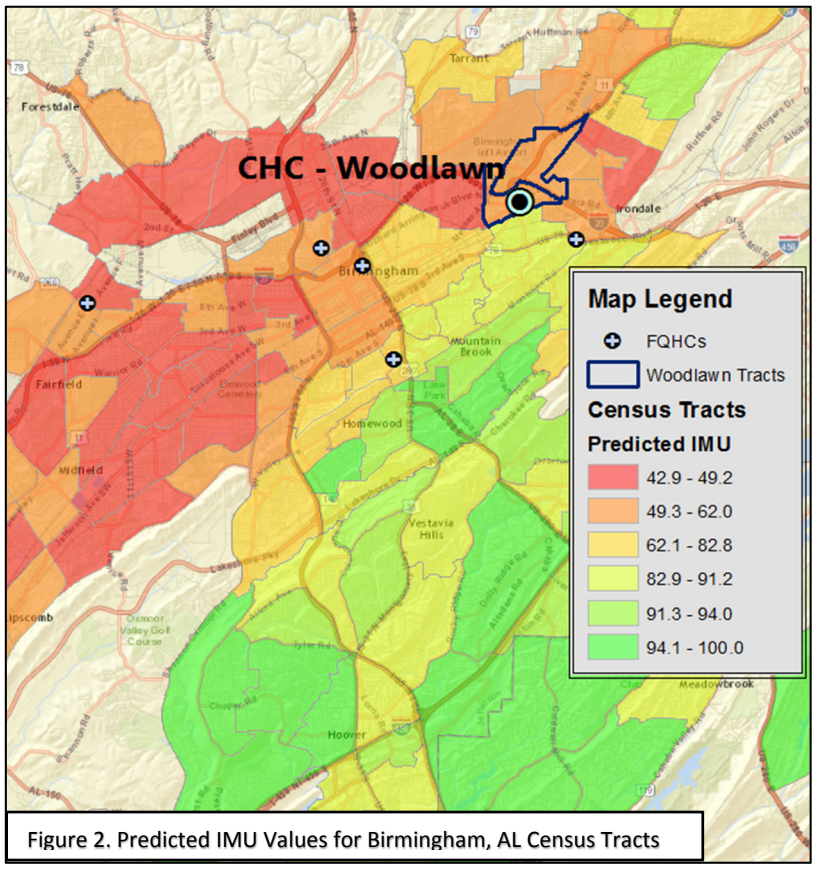


Figure 2. Predicted IMU Values for Birmingham, AL Census Tracts

In the case of the Woodlawn Foundation, discussions among Woodlawn's organizations and community residents led to the creation of a new organization to act as the community

[57] "Who We Are - Purpose Built Communities". 2016. *Purpose Built Communities*. http://purposebuiltcommunities.org/who-we-are/.

quarterback. Today, the Woodlawn Foundation provides affordable housing development, numerous K-12 education programs in local schools and school-based health clinics to K-12 students. The organization's school-based health clinics are the newest organization program and provide a number of primary care health services to students with referrals being made to both for-profit health care partners and a local FQHC – Christ Health Center Woodlawn (shown in Figure 2). The school-based health clinics started with a small pilot program in one local school, and the foundation has since expanded the program by hiring several full time health care staff to run clinics and administer care in three different schools. Additionally, a local private eye care practices has offered to provide eye care screening services for free in exchange for promotion of their more comprehensive services. [58]

Table 3. Linear Model Predicting IMU Scores in Birmingham, AL

Independent Vairables	Unstandardized Coefficients		Standardized Coefficients	T-Statistic	P-Value
	B	Std. Error	Beta		
(Constant)	1.398	.015		91.077	.000
CDBG Dollars Spent Per Square Mile	-2.727E-06	.000	-.117	-2.236	.027
Percentage of Households without Access to a Vehicle	-.003	.001	-.226	-3.723	.000
Percentage Non-Hispanic White	.001	.000	.671	10.285	.000
Percentage of Population Age 25 & Older with Associate Degrees	.003	.001	.112	2.009	.047

Results from both the linear and geographically weighted regression analyses for Birmingham are shown in Figure 2 and Table 3. Figure 2 depicts the lowest IMU scores spreading out from southeast to northwest and the census tracts containing the Woodlawn neighborhood occupy the northwestern corner of this stretch. The R^2 value for the geographically weighted regression was .85 and indicates that the model was able to explain 85% of the variance in the independent variable. Four variables were found to be statistically significant within the model and are presented in Table 3. Based upon standardized coefficients, the variables that had the greatest influence on the model were the percentage of individuals that were Non-Hispanic White and the percentage of households without a vehicle. The IMU score for a census tract increased as the percentage of the population that was non-white dropped. The IMU scores in census tracts dropped as the percentage of those households

[58] Taylor, Mashonda. 2016. Woodlawn Foundation Interview. Stefen Samarripas. Interview by Phone.

without a vehicle climbed. Here too, education was a significant contributing factor. IMU scores increased as the percentage of the population with an associate degree climbed.

Bayou District Foundation

The Bayou District Foundation is also a Purpose Built Community operating in the Gentilly neighborhood of New Orleans, Louisiana. Gentilly is a neighborhood which sits below sea level and because of this experienced extensive damage from flooding during Hurricane Katrina in 2005. The city council voted to raze Gentilly's heavily-damaged St. Bernard Public Housing Development two years after Katrina. In the intervening years, the Bayou District Foundation has worked to rebuild those lost low-income housing units as part of a master plan community called Columbia Parc. The master plan created by the Bayou District Foundation has also included plans for an on-site charter school, grocery store, pharmacy, and health center to primarily benefit Columbia Parc's low income families. While the charter school and grocery store are currently under construction, a FQHC has already been established on the site. The FQHC was originally designed to be run by Louisiana State University's (LSU) medical school health care network, but the demand for services quickly outpaced what the medical school could provide. Consequently, the day-to-day administering of the health center has been transferred to St. Thomas Health Care, a non-profit health care provider which runs other FQHCs in New Orleans. In addition to offering a number of medical services,

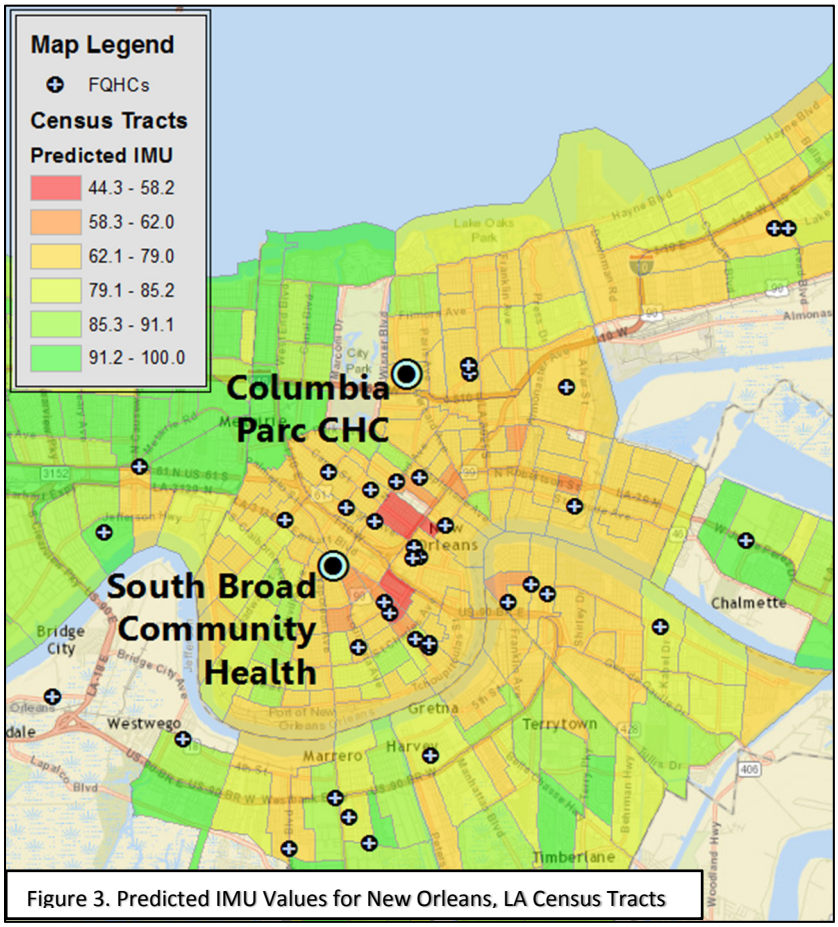


Figure 3. Predicted IMU Values for New Orleans, LA Census Tracts

there are also plans for the FQHC staff to partner with the surrounding businesses in providing referrals and discounts for healthy food and fitness classes.[59]

South Broad Community Health

South Broad Community Health has also developed a FQHC in New Orleans, but in a different community hit hard by Hurricane Katrina. The Broadmoor neighborhood sits at one of the lowest points in elevation in the city and was inundated with water when a nearby pump failed during Katrina. This flooding destroyed a number of medical practices in the nearby area and created a shortage of available health care providers. A community advisory committee was set up under the Broadmoor Improvement Association to address this issue. The Broadmoor Improvement Association operates a number of community development programs in the neighborhood. The advisory committee decided to pursue the creation of an FQHC beginning in 2006. They successfully applied for a HRSA grant to conduct a health needs assessment and examine the health needs of the nearby population. After completion of the assessment the advisory committee formed a new organization, South Broad Community Health, to formally develop the health center. The newly formed organization worked with real estate developers Green Coast Enterprises to plan, finance and construct the property. South Broad Community Health chose the location for the project based on the fact that five public transit bus lines intersect at a nearby bus stop. Tulane's medical school was initially contracted to run the health center but, as with the Bayou District Foundation, the university eventually declined to pursue the project citing cost concerns. The medical school partner was replaced with a non-profit health care provider called Access Health Louisiana. The project was slow to develop due to the change in provider and the lengthy process for acquiring needed financing for the project. During the course of the long development period the Tulane University School of Public Health conducted a free follow-up community needs assessment to understand if any changes had occurred in the community's health status and needs. The health center opened in

[59] Hannan, J.T. 2016. Bayou District Foundation Interview. Stefen Samarripas. Interview by Phone.

2014, and current efforts are focused on increasing the number of patients visiting the clinic on a weekly basis.[60]

Table 4. Linear Model Predicting IMU Scores in New Orleans, LA

Independent Vairables	Unstandardized Coefficients		Standardized Coefficients	T-Statistic	P-Value
	B	Std. Error	Beta		
(Constant)	1.521	.030		50.424	.000
Percentage of Households without Access to a Vehicle	-.001	.000	-.156	-2.589	.010
CDBG Dollars Spent Per Square Mile	-1.634E-06	.000	-.112	-2.305	.022
Sprawl Index Rating	-.001	.000	-.184	-3.193	.002
Standard Deviation of Elevation	-.003	.001	-.190	-3.950	.000
Percentage of Population Age 25 & Older with Associate Degrees	.003	.001	.110	2.156	.032
Percentage Non-Hispanic White	.001	.000	.361	6.387	.000
Percentage of Population Age 25 & Older with Some College	.001	.001	.097	1.849	.066

Results from both the linear and geographically weighted regression analyses for New Orleans are shown in Figure 3 and Table 4. The New Orleans model was the least predictive of IMU scores in comparison to other cities. The R^2 value for the geographically weighted regression was .39 and indicates that the model was able to explain 39% of the variance in the independent variable. This may be due to the uneven recovery that has occurred in the years following Hurricane Katrina. Seven variables were found to be statistically significant within the model and are presented in Table 4. Based upon standardized coefficients, the variables that had the greatest influence on the model were the percentage of individuals that were Non-Hispanic White and the standard deviation of a census tract's elevation. The IMU score for a census tract increased as the percentage of the population that was non-white dropped. The IMU scores in census tracts also dropped as elevations became more extreme. As with other models, the percentage of households without access to a vehicle and educational attainment remained statistically significant variables. They were, however, not as influential on the model's results compared to other cities.

[60] Chamberlain, Ann Clayton. 2016. South Broad Community Health Interview. Stefen Samarripas. Interview by Phone.

Codman Square Health Center

The Codman Square Health Center was established in 1979 in the Dorchester neighborhood in Boston. While the neighborhood had been a thriving working class neighborhood until the middle of the 20th century, the neighborhood witnessed a period of disinvestment in the 1960s and 1970s as residents moved to the Boston suburbs. The community lost much of its health care infrastructure during this period, and the health center was established to fill the gap. A shuttered public library in the neighborhood square was acquired at low cost from the City of Boston for the center.[61] The health center initially had only 2 staff but is today a FQHC with nearly 300 staff. Medical services are provided in multiple languages, and a full range of comprehensive health and social services are available through the center including primary care, urgent care, dental care, eye care, behavioral health, public health, fiscal health, fitness/wellness and youth programming. The health center has also created a collaborative work-study program with a charter school that operates within the same building, a multi-provider collaborative diabetes care model and a system of providing complementary and alternative medicine.[62]

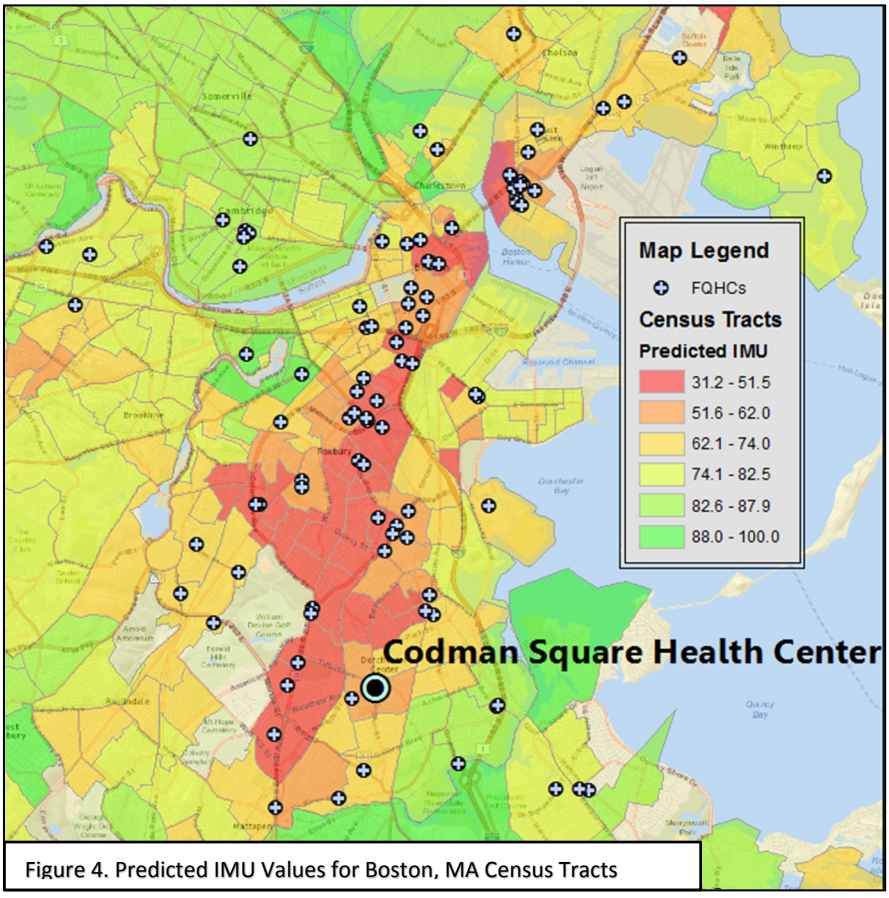


Figure 4. Predicted IMU Values for Boston, MA Census Tracts

[61] *TedxBoston - Bill Walczak - Codman Square*. 2010. Video. Boston, MA: TEDx Talks.
[62] "About Us". 2016. *Codman Square Health Center*. http://www.codman.org/about/.

These numerous services and programs offered to patients have allowed the health center to be recently classified as a Level 3 Patient-Centered Medical Home (PCMH). The PCMH model is a health care delivery system whereby a primary care physician leads a team of health care providers, nurses, teachers, counselors and community organizers to address a patient's health issues in a systematic and integrated fashion. In return for successfully implementing a PCMH program, the Codman Square Health Center receives federal assistance in the form of a monthly care coordination payment to pay for coordination expenses, a visit-based fee-for-service component to encourage regular visits to doctors and a performance-based component for realizing positive health outcomes for patients.[63] The high intensity and collaborative work of the Codman Square Health Center has been successful in addressing many of the community's social and health needs, but it has also an anchor for economic revitalization of Codman Square.[64]

Table 5. Linear Model Predicting IMU Scores in Boston, MA

Independent Vairables	Unstandardized Coefficients		Standardized Coefficients	T-Statistic	P-Value
	B	Std. Error	Beta		
(Constant)	1.550	.006		246.135	0.000
Percentage with a Disability	-.002	.001	-.157	-4.355	.000
Percentage of Households without Access to a Vehicle	-.001	.000	-.232	-6.813	.000
Percentage with Medicaid Insurance Only	-.002	.000	-.398	-10.958	.000
Percentage of Population Age 25 & Older with Associate Degrees	.002	.001	.096	2.899	.004
CDBG Dollars Spent Per Square Mile	-2.569E-07	.000	-.081	-2.802	.005

Results from both the linear and geographically weighted regression analyses for Boston are shown in Figure 4 and Table 5. Figure 4 depicts the lowest IMU scores spreading out from the center of Boston with the Codman Square Health Center on the edge of census tracts with low IMU scores. The R^2 value for the geographically weighted regression was .67 and indicates that the model was able to explain 67% of the variance in the independent variable. Five variables were found to be statistically significant within the model and are presented in Table 5. Based upon standardized coefficients, the variables that had the greatest influence on the model were the percentage of individuals with Medicaid as their only insurance and the percentage of households without a vehicle. The IMU score for a census tract decreased as the

[63] Agency for Healthcare Research and Quality. 2016. "Defining The PCMH". *PCMH Resource Center*. https://pcmh.ahrq.gov/page/defining-pcmh.
[64] *TedxBoston - Bill Walczak - Codman Square*. 2010. Video. Boston, MA: TEDx Talks.

percentage of the population with only Medicaid insurance increased. The IMU scores in census tracts dropped as the percentage of those households without a vehicle climbed.

Center for Pan Asian Community Services (CPACS) COSMO Health Center

The CPACS Cosmo Health Center is a FQHC located in the Atlanta, Georgia metro area that caters to predominantly low-income immigrants with limited English proficiency. CPACS was originally established by the leaders of several Korean churches in 1997 as a formal community based development organization. However, these churches had been working collaboratively to provide health services to those with limited English proficiency since 1980 when church leaders began organizing a health fair 3 to 4 times annually. This health fair eventually evolved into a free clinic in the 1990s. The clinic continued to expand its services and physicians until 2013 when CPACS was able to establish the clinic as a FQHC. The health center has three physicians along with a number of nurses and translators. The on-site translators also act as health insurance navigators to encourage individuals to purchase health insurance through the national health insurance marketplace established by the PPACA. Along with the health center, CPACS assists local immigrant families and individuals with access to healthy food, employment opportunities and transportation. Classes are offered in financial literacy, English literacy, after-school education and driver safety.[65]

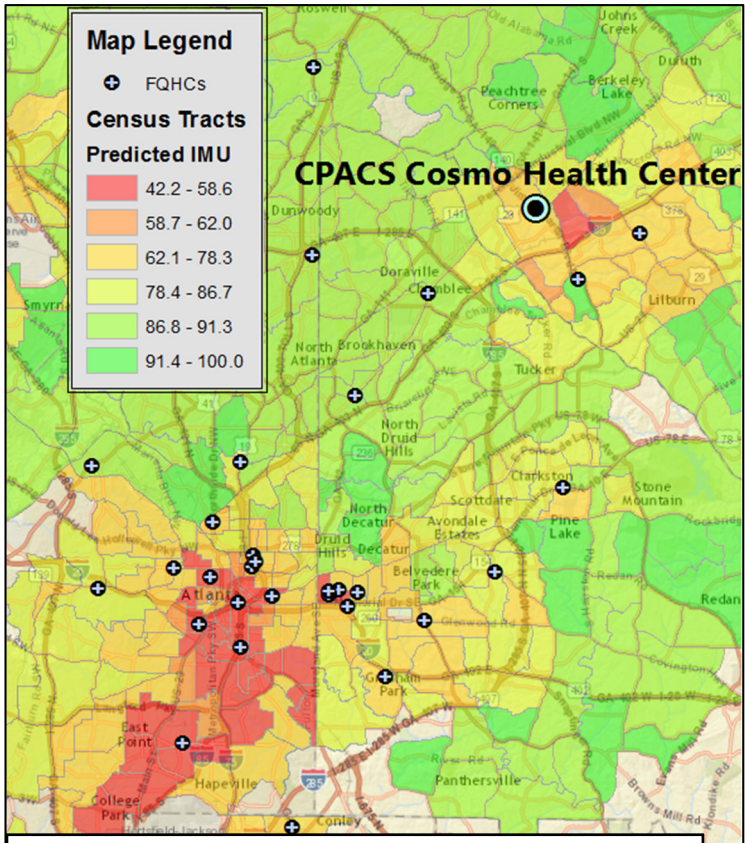


Figure 5. Predicted IMU Values for Atlanta, GA Census Tracts

[65] Kim, Keun. 2016. Codman Square Health Center Interview. Stefen Samarripas. Interview by Email.

Table 6. Linear Model Predicting IMU Scores in Atlanta, GA					
Independent Vairables	Unstandardized Coefficients		Standardized Coefficients	T-Statistic	P-Value
	B	Std. Error	Beta		
(Constant)	1.494	.023		63.978	.000
Percentage of Households without Access to a Vehicle	-.002	.000	-.261	-6.865	.000
Sprawl Index Rating	-.001	.000	-.296	-9.016	.000
Percentage with a Disability	-.001	.000	-.114	-2.886	.004
Percentage High School Graduates	.001	.000	.246	5.109	.000
Percentage That Don't Speak English Well	.002	.000	.331	7.412	.000

Results from both the linear and geographically weighted regression analyses for Boston are shown in Figure 5 and Table 6. Figure 5 depicts several clusters of low IMU scores spread across the metro region with the CPACS Cosmo Health Center located in a cluster located at the northeast corner of the region. The R^2 value for the geographically weighted regression was .63 and indicates that the model was able to explain 63% of the variance in the independent variable. Five variables were found to be statistically significant within the model and are presented in Table 6. Based upon standardized coefficients, the variables that had the greatest influence on the model were the percentage of individuals that do not speak English well, the sprawl index rating and the percentage of households without a vehicle. The IMU score for a census tract decreased as the percentage of the population that did not speak English well increased. Those census tracts which had a higher sprawl rating and thus less sprawl were less likely to have a high IMU score. The IMU scores in census tracts also dropped as the percentage of those households without a vehicle climbed.

Roles for Public Sector Planners

1. Make land use and transportation decisions that don't restrict access to medical services.

Issues of land use and transportation access came up in discussions with interviewees from New Orleans. J.T. Hamman of the Bayou District Foundation identified a zoning requirement as a significant obstacle to establishing the Columbia Parc FQHC. The New Orleans zoning code does not allow a medical facility within close distance of a multifamily property, and thus the Bayou District Foundation had to appeal for a zoning change. As has been made clear in previous research, it is critical that medical facilities be close to where people live. If medical facilities are not easily accessible this can create an increased burden for

administrative staff in dealing with appointment no-shows or sudden cancellations.[66] Both the regression analyses in this report and previous research tends to indicate that medical practices prefer to establish themselves in areas of medium density. Planners should be aware that encouraging areas of high population density means that there must be space reserved for a larger medical practice to serve the many people who reside nearby.

It is also important that medical facilities be close to public transportation for those who do not own a car. Ann Clayton Chamberlain identified proximity to public transportation as a key reason for why the South Broad Community Health Center is located where it is. It currently lies at the connecting point of five different bus lines.[67] Transportation was also a statistically significant variable in every city's regression analysis. Proximity to public transit is important not only so that patients can easily reach their primary care provider but also so that patients can easily travel to see specialist providers when necessary. It is critical that public sector planners engage those who depend upon public transit for daily travel in discussions that will shape a community's future land use and public transit decisions.

2. *Make gap financing available for health care projects*

All of the organizations interviewed with established FQHCs stressed the importance of gap financing to purchase and construct a permanent health center. Gap financing varied from project to project but included forgivable loans, Community Development Block Grants, New Market Tax Credits and tax-exempt bonds. Economic planners often work within state housing and finance authorities as well as local economic development authorities. It is important that planners in these government agencies understand the strains on the current medical system and why constructing FQHCs are so valuable to low income communities. Planners in these public agencies should work to identify medically underserved populations and promote the use of gap financing to fund the construction of FQHCs.

[66] Hannan, J.T. 2016. Bayou District Foundation Interview. Stefen Samarripas. Interview by Phone.
[67] Chamberlain, Ann Clayton. 2016. South Broad Community Health Interview. Stefen Samarripas. Interview by Phone.

3. *Consider providing unused municipal property at little or no cost to community development organizations looking to administer medical services.*

   Three of the six organizations interviewed for this report relied upon the use of properties acquired at reduced or no cost to operate health clinics and centers. City on a Hill uses a hospital donated by Aurora Health. The Codman Square Health Center began in an unused city library building acquired at reduced cost. Finally, the Woodlawn Foundation has been able to acquire free space within public schools to provide students with primary care services. Local municipal properties are often situated in strategic community locations to maximize the provision of government services. Thus, these properties could well be positioned to maximize the number of patient visits for a health clinic or health center.

4. *Use the comprehensive planning process to jumpstart discussions on health care access between community stakeholders.*

   There are numerous private actors that can play a role in addressing issues of urban health care access. These include community development nonprofits, community health workers, university medical schools, hospitals and other health care related businesses. These various actors have a number of shared interests, but they do not regularly communicate with one another. Planners should make a point to include representatives of these various groups on a comprehensive plan's steering committee and include a plan element which focuses on community health. Having these actors work together in this capacity can lead to further collaboration on addressing issues of health care access.

Keys to Community Development & Health Care Provider Partnership Building

1. *Include health care providers in the early stages of the developing a program to address issues of health care access.*

   All of the organizations interviewed for this report indicated that health care providers were included on either an advisory committee or a community development organization's board of directors. It is important to select individuals who are familiar with the many key actors of a community's medical system. An organization should approach someone with a

long history of administering health care in the area or someone who has management experience within a large local health care provider such as a university medical school. If a community organization is approaching someone who works for an anchor institution such as a hospital or university, the individual must be someone who has a strong commitment to the institution. The leadership of anchor institutions can change over time, and it is important to select an individual who will remain with the institution through such a transition.[68]

2. *Provide potential health care partners with a demonstration or pilot project to realize potential value from collaboration.*

Three of the six organizations interviewed for this report began their effort to reach out to health care providers by organizing a demonstration or pilot project. City on a Hill organized a health and social services fair in 2000 which impressed members of Aurora Health. The Woodlawn Foundation used a pilot health screening program in elementary schools to justify the need for permanent school-based health clinics.[69] CPACS's predecessors started with a simple health fair which grew into a free clinic and eventually a FQHC. In the case of CPACS, the gradual development of a health project allowed the group to collect increased financial and volunteer support with each passing year.

It is critical to acknowledge that it is not simply enough to organize a pilot project. Both Kirsten Gaskins of City on a Hill and Mashonda Taylor of the Woodlawn Foundation stressed the importance of collecting data on the pilot in a rigorous, ethical and organized fashion. It is important for those considering a demonstration project to understand that the administrators of the project must be familiar with the research approaches and standards of the medical community. [70, 71] Four of the six communities in this report also conducted research into the overall health needs of the local population. An example of one of these

[68] Taylor, Mashonda. 2016. Woodlawn Foundation Interview. Stefen Samarripas. Interview by Phone.
[69] Ibid.
[70] Ibid.
[71] Gaskin, Kirsten. 2016. City on a Hill Interview. Stefen Samarripas. Interview by Phone.

assessments conducted by South Broad Community Health has been attached to this report (See Appendix F). Showing a potential partner quantifiable benefits of a partnership that are both valid and reliable can be an important first step to begin working with one another.

3. Establish clear rules of collaboration with other local nonprofit organizations.

Both the Woodlawn Foundation and the Bayou District Foundation act as community quarterbacks that both work to coordinate the programs and services of their fellow community development organizations. Mashonda Taylor of the Woodlawn Foundation indicated that the principal advantage of this approach is that multiple organizations will not be competing against one another for funding and participation from community residents. Instead the programs and services of the local organizations are coordinated to complement one another.[72] Health care providers are often very enthusiastic about coordinating health care with community development because there are numerous social determinants of health. For example, improving health literacy often requires increasing overall educational attainment levels for a community. As has been mentioned, the PPACA has recognized this relationship between social factors and health outcomes and includes provisions that incentivize partnerships to address the social determinants of health. Examples include requiring hospitals to invest in community projects that achieve positive health outcomes and the creation of PCMHs. However, health care providers may be less likely to engage in these partnerships if there is a lack of integration among the various local organizations. Achieving this integration requires up-front negotiations among community stakeholders to define how organizations will coordinate efforts.

Establishing procedures for integrated community and health services can also address a number of problems that might arise as a program or practice begins. Keun Kim of CPACS identified that the integration of medical and community services has allowed the COSMO health center to save money on translators. This is accomplished by having those who act as

[72] Ibid.

health insurance navigators also act as translators during health center appointments.[73] Anthony Stankiewicz of the Codman Square Health Center pointed to the many years of collaborative work with other organizations as a key reason why the health center has been able to acquire certification as a PCMH.[74]

Conclusion

Previous research, case study interviews and statistical analysis all point toward the promise that partnerships between planners, community development organizations and health care workers can address medical underservice in low income urban communities. Public sector planners have a role to play in establishing the framework from which community planners can effectively operate to address underservice. Planner are in a strong position to address issues of transportation to health care providers, available gap financing for health care developments and problematic zoning regulations. Planners also have the capacity in comprehensive planning to bring together diverse stakeholders across a community. This process could be used to help jump-start negotiations that will lead to a coordinated effort to address both health care access and the social determinants of health simultaneously. Community planners would be wise to think of this process as a continuum which starts with a small first step like a pilot project to show potential health care partners the benefits of coordinated action. This can evolve into a health clinic which could then evolve into a FQHC and potentially a PCMH in much the same way as the Codman Square Health Center in Boston has evolved. However, addressing overlap and gaps in services between existing community development organizations is critical to this progression. Demonstrated coordination between community development organizations is paramount to attracting the work and collaboration of those in the health care community.

[73] Kim, Keun. 2016. Codman Square Health Center Interview. Stefen Samarripas. Interview by Email.
[74] Stankiewicz, Anthony. 2016. Codman Square Health Center Interview. Stefen Samarripas. Interview by Email.

Appendix A

Linear Regression Diagnostics for Milwaukee, WI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			90.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.382	.037		37.821	.000	1.322	1.443					
	compositeindex2010	-.001	.000	-.163	-3.658	.000	-.001	.000	-.538	-.195	-.130	.636	1.571
	hs_grad	.002	.000	.347	6.975	.000	.001	.002	.627	.354	.249	.514	1.944
	25_Associa	.002	.001	.086	2.102	.036	.000	.003	.407	.113	.075	.764	1.309
	No_Vehicle	-.003	.000	-.393	-8.284	.000	-.004	-.003	-.647	-.410	-.295	.564	1.774
	Pct_disabi	.001	.001	.090	2.049	.041	.000	.002	-.299	.110	.073	.654	1.530

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.753[a]	.568	.561	.04293	1.975

Correlations

		Ln2IMU	compositeindex2010	hs_grad	25_Associa	No_Vehicle	Pct_disabi
Pearson Correlation	Ln2IMU	1.000	-.538	.627	.407	-.647	-.299
	compositeindex2010	-.538	1.000	-.461	-.391	.490	.124
	hs_grad	.627	-.461	1.000	.432	-.543	-.502
	25_Associa	.407	-.391	.432	1.000	-.309	-.157
	No_Vehicle	-.647	.490	-.543	-.309	1.000	.462
	Pct_disabi	-.299	.124	-.502	-.157	.462	1.000
Sig. (1-tailed)	Ln2IMU		.000	.000	.000	.000	.000
	compositeindex2010	.000		.000	.000	.000	.010
	hs_grad	.000	.000		.000	.000	.000
	25_Associa	.000	.000	.000		.000	.002
	No_Vehicle	.000	.000	.000	.000		.000
	Pct_disabi	.000	.010	.000	.002	.000	
N	Ln2IMU	346	346	346	346	346	346
	compositeindex2010	346	346	346	346	346	346
	hs_grad	346	346	346	346	346	346
	25_Associa	346	346	346	346	346	346
	No_Vehicle	346	346	346	346	346	346
	Pct_disabi	346	346	346	346	346	346

Model		Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	compositeindex2010	hs_grad	25_Associa	No_Vehicle	Pct_disabi
1	1	5.191	1.000	.00	.00	.00	.00	.01	.00
	2	.587	2.974	.00	.00	.00	.03	.42	.00
	3	.115	6.716	.00	.01	.00	.56	.33	.22
	4	.088	7.682	.00	.03	.01	.19	.02	.51
	5	.016	17.874	.00	.48	.26	.22	.22	.00
	6	.003	43.144	.99	.48	.73	.00	.00	.26

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.823	5	.165	89.312	.000[b]
	Residual	.627	340	.002		
	Total	1.450	345			

Appendix B

Linear Regression Diagnostics for Birmingham, AL

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			90.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.398	.015		91.077	.000	1.372	1.423					
	CDBG_SqMi	-2.727E-06	.000	-.117	-2.236	.027	.000	.000	-.245	-.192	-.114	.955	1.047
	No_Vehicle	-.003	.001	-.226	-3.723	.000	-.005	-.002	-.586	-.309	-.190	.706	1.417
	White_100	.001	.000	.671	10.285	.000	.001	.002	.765	.668	.524	.611	1.638
	25_Associa	.003	.001	.112	2.009	.047	.000	.005	-.130	.173	.102	.836	1.197

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.812[a]	.660	.649	.04465	1.985

Correlations

		Ln2IMU	CDBG_SqMi	No_Vehicle	White_100	25_Associa
Pearson Correlation	Ln2IMU	1.000	-.245	-.586	.765	-.130
	CDBG_SqMi	-.245	1.000	.126	-.132	-.102
	No_Vehicle	-.586	.126	1.000	-.527	.070
	White_100	.765	-.132	-.527	1.000	-.354
	25_Associa	-.130	-.102	.070	-.354	1.000
Sig. (1-tailed)	Ln2IMU		.002	.000	.000	.066
	CDBG_SqMi	.002		.073	.062	.119
	No_Vehicle	.000	.073		.000	.209
	White_100	.000	.062	.000		.000
	25_Associa	.066	.119	.209	.000	
N	Ln2IMU	136	136	136	136	136
	CDBG_SqMi	136	136	136	136	136
	No_Vehicle	136	136	136	136	136
	White_100	136	136	136	136	136
	25_Associa	136	136	136	136	136

Collinearity Diagnostics[a]

Model		Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	CDBG_SqMi	No_Vehicle	White_100	25_Associa
1	1	2.999	1.000	.01	.01	.02	.02	.01
	2	.985	1.745	.00	.69	.04	.03	.00
	3	.725	2.034	.00	.26	.30	.09	.00
	4	.250	3.463	.00	.00	.39	.27	.26
	5	.041	8.513	.99	.04	.25	.58	.72

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.507	4	.127	63.515	.000[b]
	Residual	.261	131	.002		
	Total	.768	135			

Appendix C

Linear Regression Diagnostics for New Orleans, LA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			90.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.521	.030		50.424	.000	1.471	1.571					
	No_Vehicle	-.001	.000	-.156	-2.589	.010	-.002	.000	-.461	-.150	-.121	.595	1.681
	CDBG_SqMi	-1.634E-06	.000	-.112	-2.305	.022	.000	.000	-.216	-.134	-.107	.914	1.094
	compositeindex2010	-.001	.000	-.184	-3.193	.002	-.001	.000	-.335	-.184	-.149	.653	1.530
	std	-.003	.001	-.190	-3.950	.000	-.004	-.002	-.110	-.226	-.184	.939	1.065
	25_Associa	.003	.001	.110	2.156	.032	.001	.005	.301	.126	.100	.831	1.203
	White_100	.001	.000	.361	6.387	.000	.000	.001	.410	.351	.298	.678	1.476
	25_Sm_Univ	.001	.001	.097	1.849	.066	.000	.002	.111	.108	.086	.794	1.260

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.609[a]	.371	.356	.04718	2.130

Correlations

		Ln2IMU	No_Vehicle	CDBG_SqMi	compositeindex2010	std	25_Associa	White_100	25_Sm_Univ
Pearson Correlation	Ln2IMU	1.000	-.461	-.216	-.335	-.110	.301	.410	.111
	No_Vehicle	-.461	1.000	.244	.412	-.004	-.308	-.453	-.045
	CDBG_SqMi	-.216	.244	1.000	.223	-.056	-.045	-.079	-.013
	compositeindex2010	-.335	.412	.223	1.000	-.099	-.331	-.027	-.348
	std	-.110	-.004	-.056	-.099	1.000	.021	.165	-.071
	25_Associa	.301	-.308	-.045	-.331	.021	1.000	.177	.176
	White_100	.410	-.453	-.079	-.027	.165	.177	1.000	-.251
	25_Sm_Univ	.111	-.045	-.013	-.348	-.071	.176	-.251	1.000
Sig. (1-tailed)	Ln2IMU		.000	.000	.000	.029	.000	.000	.027
	No_Vehicle	.000		.000	.000	.474	.000	.000	.217
	CDBG_SqMi	.000	.000		.000	.168	.222	.088	.410
	compositeindex2010	.000	.000	.000		.044	.000	.322	.000
	std	.029	.474	.168	.044		.360	.002	.112
	25_Associa	.000	.000	.222	.000	.360		.001	.001
	White_100	.000	.000	.088	.322	.002	.001		.000
	25_Sm_Univ	.027	.217	.410	.000	.112	.001	.000	
N	Ln2IMU	298	298	298	298	298	298	298	298
	No_Vehicle	298	298	298	298	298	298	298	298
	CDBG_SqMi	298	298	298	298	298	298	298	298
	compositeindex2010	298	298	298	298	298	298	298	298
	std	298	298	298	298	298	298	298	298
	25_Associa	298	298	298	298	298	298	298	298
	White_100	298	298	298	298	298	298	298	298
	25_Sm_Univ	298	298	298	298	298	298	298	298

Collinearity Diagnostics[a]

Model		Eigenvalue	Condition Index	Variance Proportions							
				(Constant)	No_Vehicle	CDBG_SqMi	compositeindex2010	std	25_Associa	White_100	25_Sm_Univ
1	1	5.201	1.000	.00	.01	.00	.00	.01	.01	.01	.00
	2	1.047	2.229	.00	.06	.51	.00	.07	.00	.02	.00
	3	.722	2.684	.00	.00	.06	.00	.86	.01	.00	.00
	4	.626	2.882	.00	.29	.39	.00	.00	.01	.06	.00
	5	.230	4.751	.00	.12	.01	.00	.04	.20	.55	.02
	6	.123	6.502	.01	.29	.00	.01	.00	.69	.07	.09
	7	.044	10.840	.02	.18	.00	.11	.00	.01	.29	.58
	8	.005	31.559	.98	.04	.02	.88	.03	.07	.00	.31

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.380	7	.054	24.411	.000[b]
	Residual	.646	290	.002		
	Total	1.026	297			

Appendix D

Linear Regression Diagnostics for Boston, MA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.550	.006		246.135	0.000	1.539	1.560					
	Pct_disabi	-.002	.001	-.157	-4.355	.000	-.003	-.001	-.393	-.158	-.122	.605	1.653
	No_Vehicle	-.001	.000	-.232	-6.813	.000	-.001	-.001	-.410	-.243	-.191	.679	1.472
	Medicaid_O	-.002	.000	-.398	-10.958	.000	-.002	-.001	-.562	-.373	-.308	.597	1.676
	25_Associa	.002	.001	.096	2.899	.004	.001	.003	.209	.106	.081	.713	1.403
	CDBG_SqMi	-2.569E-07	.000	-.081	-2.802	.005	.000	.000	-.179	-.102	-.079	.946	1.057

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.645[a]	.415	.412	.04890	2.011

Correlations

		Ln2IMU	Pct_disabi	No_Vehicle	Medicaid_O	25_Associa	CDBG_SqMi
Pearson Correlation	Ln2IMU	1.000	-.393	-.410	-.562	.209	-.179
	Pct_disabi	-.393	1.000	.049	.585	.180	.115
	No_Vehicle	-.410	.049	1.000	.268	-.493	.192
	Medicaid_O	-.562	.585	.268	1.000	-.044	.063
	25_Associa	.209	.180	-.493	-.044	1.000	-.106
	CDBG_SqMi	-.179	.115	.192	.063	-.106	1.000
Sig. (1-tailed)	Ln2IMU		.000	.000	.000	.000	.000
	Pct_disabi	.000		.092	.000	.000	.001
	No_Vehicle	.000	.092		.000	.000	.000
	Medicaid_O	.000	.000	.000		.116	.042
	25_Associa	.000	.000	.000	.116		.002
	CDBG_SqMi	.000	.001	.000	.042	.002	
N	Ln2IMU	747	747	747	747	747	747
	Pct_disabi	747	747	747	747	747	747
	No_Vehicle	747	747	747	747	747	747
	Medicaid_O	747	747	747	747	747	747
	25_Associa	747	747	747	747	747	747
	CDBG_SqMi	747	747	747	747	747	747

Collinearity Diagnostics[a]

Model		Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	Pct_disabi	No_Vehicle	Medicaid_O	25_Associa	CDBG_SqMi
1	1	3.928	1.000	.00	.01	.01	.01	.01	.00
	2	1.006	1.975	.00	.00	.03	.00	.01	.78
	3	.618	2.520	.00	.00	.41	.01	.05	.19
	4	.313	3.540	.03	.00	.18	.56	.04	.00
	5	.083	6.872	.09	.45	.15	.23	.69	.01
	6	.051	8.778	.88	.54	.22	.18	.20	.01

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.259	5	.252	105.343	.000[b]
	Residual	1.772	741	.002		
	Total	3.031	746			

Appendix E

Linear Regression Diagnostics for Atlanta, GA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			90.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.494	.023		63.978	.000	1.456	1.533					
	no_vehicle	-.002	.000	-.261	-6.865	.000	-.002	-.001	-.468	-.259	-.207	.631	1.584
	compositei	-.001	.000	-.296	-9.016	.000	-.001	-.001	-.413	-.332	-.272	.842	1.188
	pct_disabi	-.001	.000	-.114	-2.886	.004	-.002	.000	-.393	-.112	-.087	.584	1.714
	hs_grad	.001	.000	.246	5.109	.000	.001	.001	.284	.195	.154	.392	2.554
	no_engl_we	.002	.000	.331	7.412	.000	.002	.003	.128	.278	.224	.457	2.190

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.634[a]	.402	.397	.03372	1.002

Correlations

		Ln2IMU	no_vehicle	compositei	pct_disabi	hs_grad	no_engl_we
Pearson Correlation	Ln2IMU	1.000	-.468	-.413	-.393	.284	.128
	no_vehicle	-.468	1.000	.393	.324	-.502	.210
	compositei	-.413	.393	1.000	.096	-.188	.129
	pct_disabi	-.393	.324	.096	1.000	-.330	-.258
	hs_grad	.284	-.502	-.188	-.330	1.000	-.565
	no_engl_we	.128	.210	.129	-.258	-.565	1.000
Sig. (1-tailed)	Ln2IMU		.000	.000	.000	.000	.000
	no_vehicle	.000		.000	.000	.000	.000
	compositei	.000	.000		.007	.000	.000
	pct_disabi	.000	.000	.007		.000	.000
	hs_grad	.000	.000	.000	.000		.000
	no_engl_we	.000	.000	.000	.000	.000	
N	Ln2IMU	664	664	664	664	664	664
	no_vehicle	664	664	664	664	664	664
	compositei	664	664	664	664	664	664
	pct_disabi	664	664	664	664	664	664
	hs_grad	664	664	664	664	664	664
	no_engl_we	664	664	664	664	664	664

Collinearity Diagnostics[a]

Model		Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	no_vehicle	compositei	pct_disabi	hs_grad	no_engl_we
1	1	4.612	1.000	.00	.01	.00	.00	.00	.01
	2	.688	2.590	.00	.12	.00	.01	.00	.27
	3	.555	2.882	.00	.50	.00	.01	.00	.13
	4	.125	6.070	.00	.15	.01	.65	.00	.10
	5	.018	15.994	.02	.18	.95	.00	.05	.02
	6	.002	49.026	.98	.05	.03	.32	.94	.47

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.502	5	.100	88.303	.000[b]
	Residual	.748	658	.001		
	Total	1.250	663			

Appendix F

Example Health Needs Assessment

Broadmoor Improvement Association Citizens Working Group Needs Assessment

New Orleans, LA

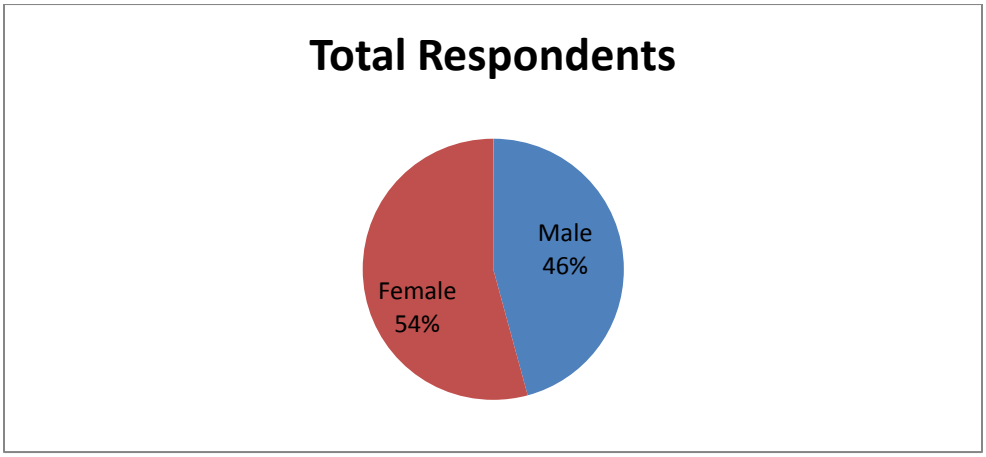
BROADMOOR IMPROVEMENT AGENCY
CITIZENS WORKING GROUP
NEEDS ASSESSMENT

BROADMOOR – FRERET -- HOFFMAN TRIANGLE -- GERT TOWN – ZION CITY

Introduction

This needs assessment is based on a community health census conducted during the fall of 2008 as well as a survey of existing health data published locally and nationally. Although the relevancy of data generated prior to Hurricane Katrina is widely questioned in the New Orleans area, in some instances these sources are the only statistically reliable source of information. In addition, some funders, such as the federal government, only allow "gold standard" sources (i.e. Census data). Therefore, this paper seeks to combine both the pre-Katrina data sources with post-Katrina information and a primary source health needs survey. This type of analysis must suffice until updated demographic and socio-economic is published from the 2010 Census.

The health needs survey was a door-to-door census conducted by the Broadmoor Improvement Agency. The areas included in the health census include Broadmoor, Freret, Hoffman Triangle, Gert Town, and Zion City, which included census tracts 70, 72, 94, 103, 111, 112, and 123. This door-to-door health census was conducted with the assistance of volunteer surveyors. 446 surveys were collected with 46% of respondents being male and 54% female.

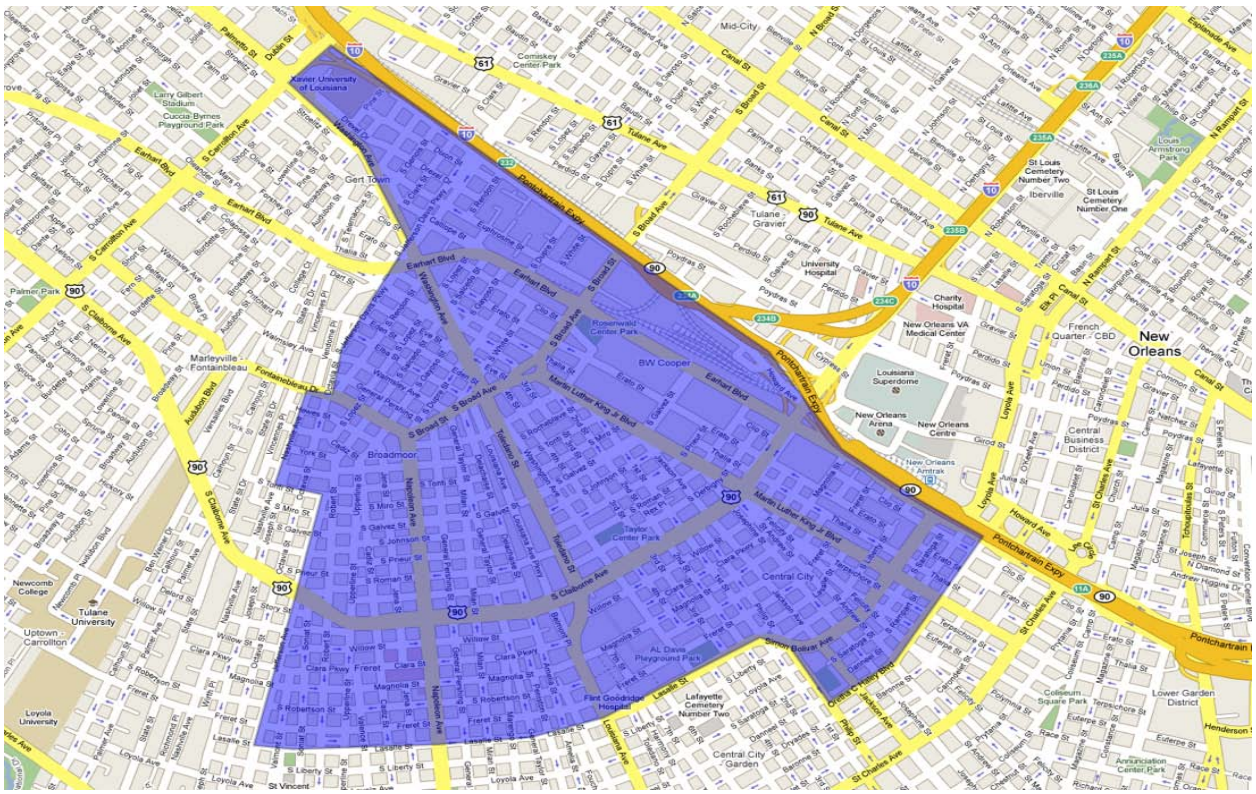


This survey is meant to serve as proxy data for the larger proposed service area, which is comprised of census tracts: 68, 69, 70, 72, 80, 85, 86, 93.01, 93.02, 94, 102, 103, 111, 112, 119, 123, 124, and 128. This larger service area is similar in terms of poverty, racial, and ethnic composition to the area surveyed in the health needs census.

The analysis of existing health and demographic data used national, state, and local resources. The purpose of this paper is to present a health status profile for the target population. Therefore, projections were made based on race and ethnicity in order to generate a

demographic and health status profile for the entire proposed service area. If only state level data could be located, then the health issue was not included in this paper. Finally, this analysis incorporated the slightly larger geographic area defined as the proposed service area because this is the area that was identified by the advisory board to this study, the Citizens Working Group, as an appropriate area for health care development.

Proposed Service Area



Service Area Demographics

The proposed service area lies within the boundaries of the City of New Orleans. This area experienced significant flooding during Hurricane Katrina, which has resulted in a demographic shift in certain portions of the proposed service area. According to data provided by the United States Post Office, before Hurricane Katrina, in June 2005 there were 15,051 households receiving mail in the service area. As of December 2008, 74% of those households, or 11,072, had returned. This results in an estimated service area population of 28,905. This total population is expected to increase since the Road Home Program reports that as of December 2008, 97% of the population in the proposed service area has chosen to return to their home.

Although the Latino population in New Orleans has significantly increased post-Katrina, the racial and ethnic composition of the service area remains relatively unchanged. The racial and ethnic breakdown pre-Katrina was 17 % White, 78% Black, 2% Latino, and 3% Other (Census 2004). According to the Health Needs Survey, the composition is now 21% White, 77% Black, 1% Hispanic/Latino, and 1% Other. In addition, 6% of the population speaks a language other than English at home (Census 2004).

Poverty status was not included in the Health Needs Survey, but according to the 2004 Census data, 44% of the service area is below 100% of the Federal Poverty Level (FPL), and an astonishing 68% are below 200% FPL. Another indicator of socio-economic status is education. In the service area, 27% have no high school education, 29% graduated high school, 38% have some college or associate degree, and 6% have a Bachelor's degree or higher (Census 2004).

The average age of the residents is 40.0 years old, and there are 3.1 people per household. However, this average varies dramatically among racial and ethnic groups. Black individuals reported an average household size of 6.1, while Hispanic/Latino respondents reported an average size of 4.7, and white respondents reported an average size of 2.7. In terms of transportation, 54% use a personal care, 25% use public transportation, 8% use taxis, 10% rely on friends and family, and 3% walk (Health Needs Survey 2008).

In terms of age, 58% of the population is 18-64 years old; 12% is over 65 years; and 30% is under 18 years old (Census 2004).

Health Status

Chronic diseases are having a significant impact on the United States as a whole, but target population is bearing a disproportionate share of that burden.

Nationally, the prevalence of diabetes is 8% and in Louisiana, the prevalence is 12.7%. However, for the target population the rate is 12.7% (Behavioral Risk Factor Surveillance System 2007). In addition, to having higher prevalence, the age-adjusted diabetes mortality rate is also significantly higher. Nationally, the age-adjusted diabetes mortality rate is 25.3 per 100,000 deaths (Center for Disease Control 2006). In Orleans Parish, the rate is 64.6 per 100,000 deaths, and the target population rate is 65.4 (Department of Health and Hospitals 2004).

Diabetes Mortality (age-adjusted per 100,000 deaths)			Diabetes Prevalence		
Orleans Parish	Target Area	National	Louisiana	Target Area	National
64.6	65.4	25.3	9.80%	12.72%	8.00%

Nationally, 4.2% of the population has ever had a heart attack. In Louisiana, the rate is 4.9%, and the target population rate is 4.2% (Behavioral Risk Factor Surveillance System 2007). However, according to a post-Katrina survey conducted by the Kaiser Family Foundation, 36% of Orleans Parish residents report having hypertension, which is a major risk factor for heart attacks, and this rate has steadily increased since Katrina (2010). Therefore, it seems logical to expect the incidence of heart attacks to increase if the prevalence of hypertension within the population is not decreased.

Another cardiovascular disease prevention indicator is the frequency of cholesterol checks. Nationally, 74.8% of the population has had their cholesterol checked in the last five years. In Louisiana, the rate is 75.3%, but in the target population, the rate is 69% (Behavioral Risk Factor Surveillance System 2007). However, the age-adjusted mortality rate for diseases of the heart is 211 per 100,000 deaths (Center for Disease Control 2006). Although data is not available for the same year, in 2003, the age-adjusted mortality rate for diseases of the heart was 271.8 per 100,000, but the rate in the target population was 300.8 per 100,000 deaths (Department of Health and Hospitals 2003).

Have ever been told you had a heart attack? (Yes)			Had cholesterol checked in the last five years			Diseases of the Heart (age-adjusted mortality rate)		
Louisiana	Target Area	National	Louisiana	Target Area	National	Louisiana	Target Area	National
4.90%	75.30%	75.30%	75.30%	4.10%	2.60%	271.8	300.8	211

However, if the Louisiana statistics are broken down based on race and sex, the results are a bit startling. The age-adjusted mortality rate for diseases of the heart for white males is 321.3; white females is 207.0; black males is 382.2; and black females is 271.2. All rates are per 100,000 deaths (Department of Health and Hospitals 2003).

The cerebrovascular age-adjusted mortality rate shows one of the most dramatic disparities compared to the national rate. Nationally, the rate is 45.8 deaths per 100,000 while the Louisiana rates are higher at 59.9. Locally, however, the mortality rate for the target area is

73.1 per 100,000 deaths (Center for Disease Control 2006 and Department of Health and Hospitals 2003).

Has ever had a stroke			Cerebrovascular Mortality (age-adjusted per 100,000 deaths)		
Louisiana	Target Area	National	Louisiana	Target Area	National
3.20%	4.10%	2.60%	59.9	73.1	45.8

Cancer is also disproportionately affecting the target population. The age-adjusted mortality rate for cancer nationally is 188.7 per 100,000 deaths. In the target population, the rate is 244.0 per 100,000 deaths (National Institute of Cancer 2005). This disparity is not seen in preventative screenings for women's health issues as only small differences are noted. Nationally, 76.5% of women age 40+ have had a mammogram in the past two years. For the target population, the rate is 72.3%. For cervical cancer, nationally 84.0% of women have been screened within the past three years, and 82.9% have been screened in the target population (Behavioral Risk Factor Surveillance System 2006).

However, adequate prenatal care is a women's health issue that shows a significant disparity. Nationally, 96.3% of women receive adequate prenatal care (Peristats 2002). However, in the target population only 74.5% of women receive adequate prenatal care, which is defined as receiving the first prenatal visit in the first three months of the pregnancy and that the number of prenatal visits was appropriate to the gestational age of the baby at birth (Department of Health and Hospitals 2002).

Adequate Prenatal Care		
Orleans Parish	Target Area	National
74.70%	74.46%	96.30%

In regards to children, there is one salient disparity for the target population. Nationally, the rate of pediatric asthma is 9.0% whereas the rate for the target population is 13.9% and 10.5% for Orleans Parish (Youth Risk Factor Surveillance System 2002 and Department of Health and Hospitals 2002).

Pediatric Asthma		
Orleans Parish	Target Area	National
10.50%	13.92%	9.00%

Among adults, the Kaiser Family Foundation study has shown that the prevalence of asthma has increased by 89% since Hurricane Katrina. In 2006, 9% of adults reported being diagnosed with asthma and in 2010 that number has risen to 17% (Kaiser Family Foundation 2007 and 2010).

Dental care is also severely lacking in the target population. Of adults 65 and older, 19.3% have had all of their natural teeth extracted nationally. However, in Orleans Parish, that rate is 28.9% and for the target population the rate is 41.8%. One reason for this could be the lack of dental visits each year. Nationally, 29.7% of adults have at least one dental visit per year. In Orleans Parish, the rate is 36.5%, but in the target population, the rate is 43.7% (Behavioral Risk Factor Surveillance System 2006).

Adults 65+ who have had all their natural teeth extracted			Visited the dentist in the past year? (No)		
Orleans Parish	Target Area	National	Orleans Parish	Target Area	National
28.90%	41.76%	19.30%	36.50%	43.73%	29.70%

In terms of mental health, several studies document the dire mental health needs in the New Orleans area as well as the paucity of mental health resources post-Katrina. A study by the University of New Orleans (2006) indicated that the number of people suffering from anxiety disorders, major depression, and post-traumatic stress disorder doubled after Hurricane Katrina. In New Orleans, 8% of individuals ranked their mental health as fair or poor in 2006 (Kaiser Family Foundation 2007). However, a follow-up study by the Kaiser Family Foundation shows that the percentage of people who rank their mental health as fair or poor is actually increasing instead of decreasing (Kaiser Family Foundation 2008). Among those individuals who ranked their overall health as fair or poor, more than one-third (36%) ranked their mental health as fair or poor (Kaiser Family Foundation 2008).

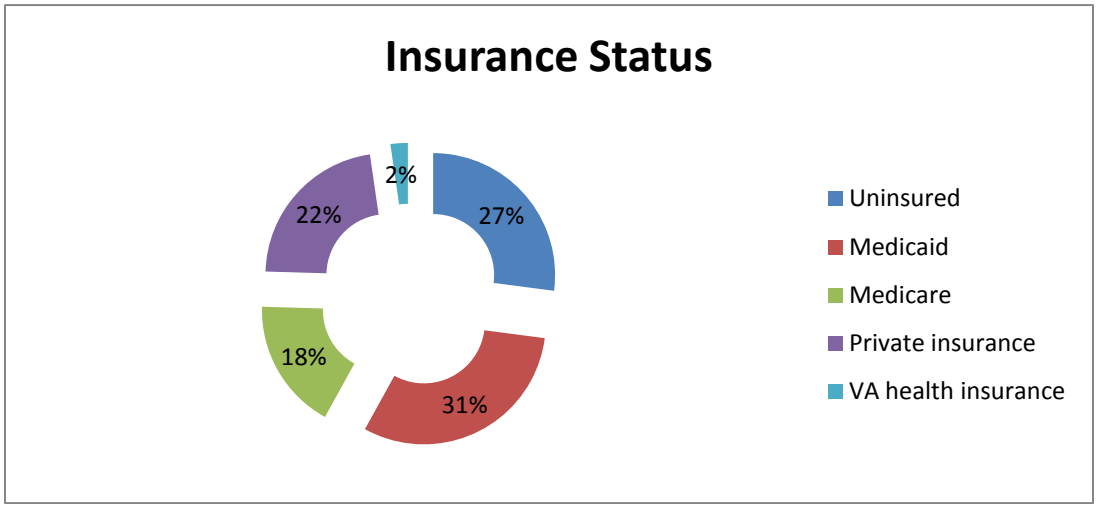
Post-traumatic stress disorder and depression are the two most common disorders affecting the population, and these disorders are affecting the low-income and disadvantaged at a

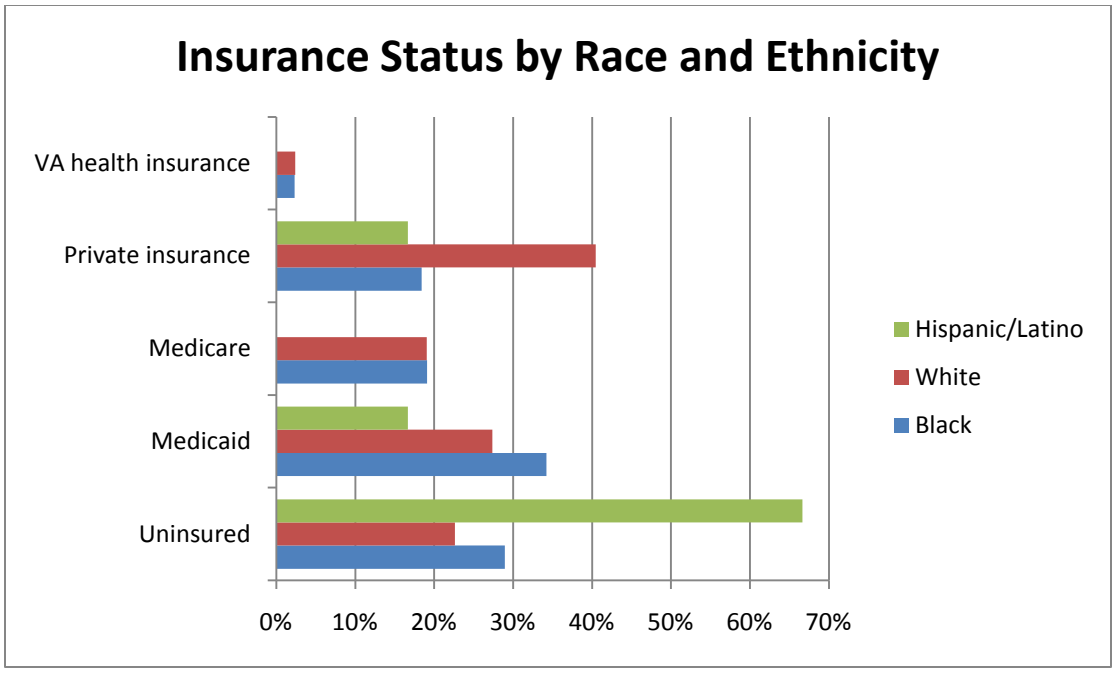
greater rate in New Orleans. The Kaiser Family Foundation study found that on average, 6% of New Orleans residents reported symptoms of depression. However, the uninsured reported symptoms of depression at a rate of 12% and the economically disadvantage reported symptoms of depression at a rate of 9% (2007).

Access to Care

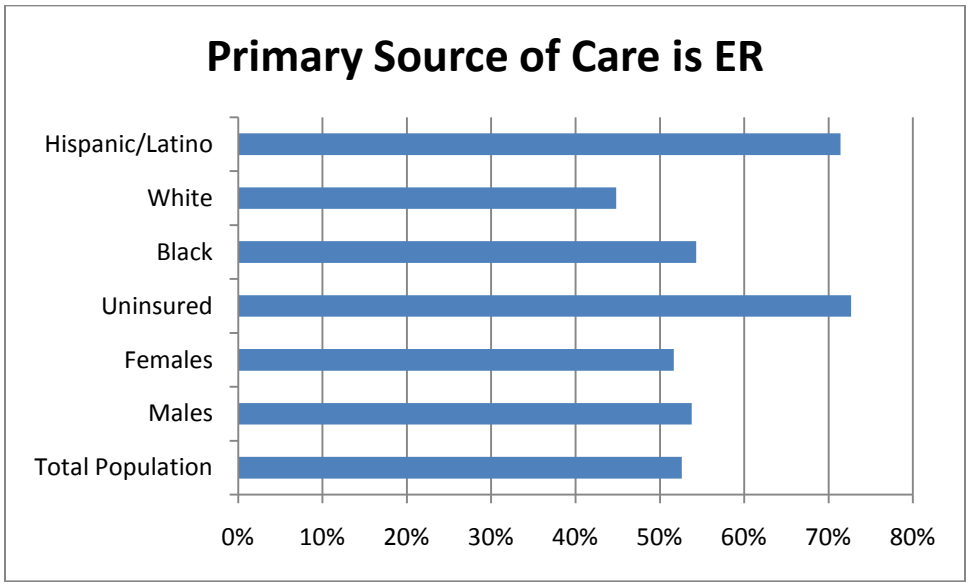
In New Orleans, access to primary health care has been a challenge for many years. Prior to Hurricane Katrina, the city used its public hospital, Charity Hospital, as the primary source of care for Medicaid and uninsured patients. Although a few primary care clinics existed, the number was insufficient to meet the need. With closure of Charity Hospital post-Katrina, the city has shifted its focus from the emergency room to community-based primary care. However, even with this shift, studies still indicate that a significant portion of residents have significant barriers in accessing health care. The target area, in comparison with the Parish as a whole, shows more barriers to care.

Health insurance status is one of the primary indicators of access to health care. In the target population, the Health Needs Survey found that 27% of the population report being uninsured compared with 20% for the Parish as a whole (Kaiser Family Foundation 2010).

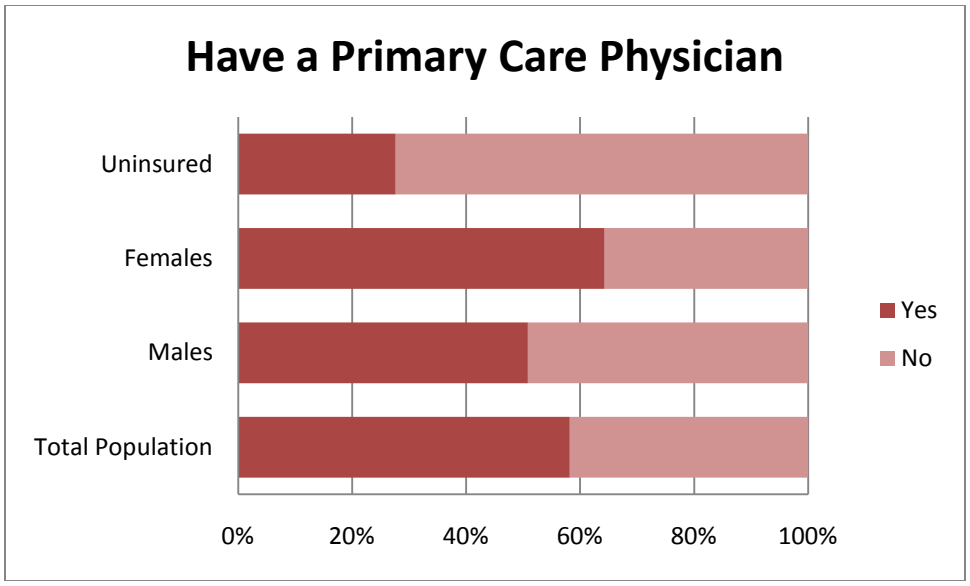




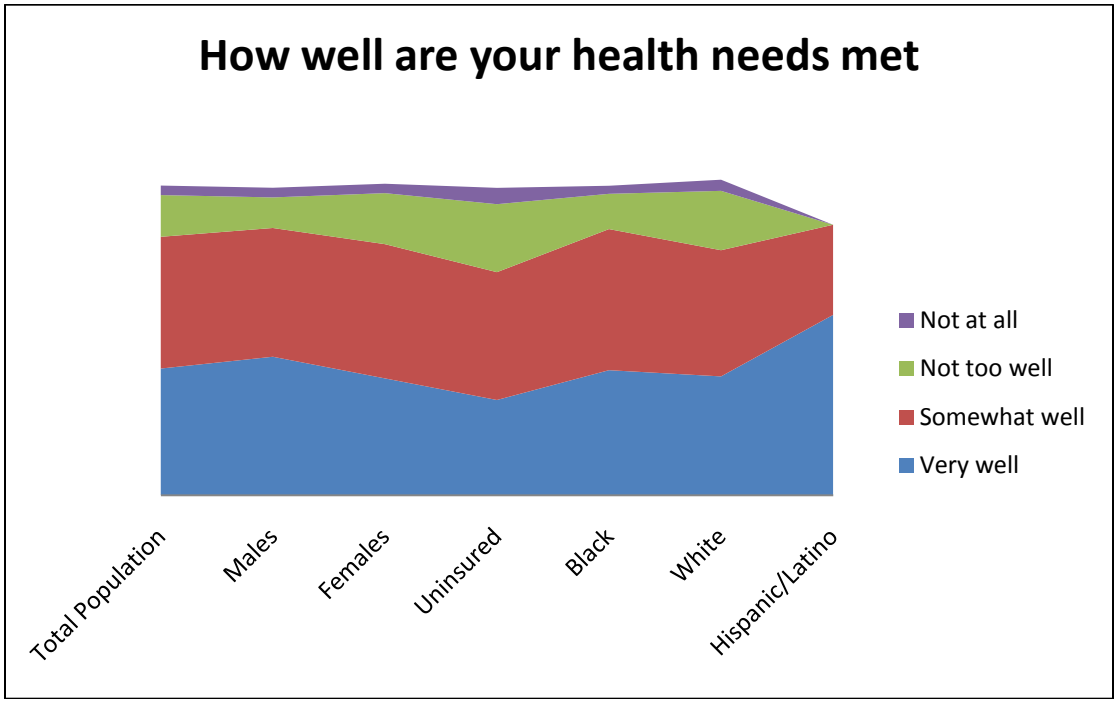
According to the Health Needs Survey, 53% of the population report using the emergency room as their primary source of care. Among the uninsured that number soars to 73%. For New Orleans as a whole, 27% of the population report using the emergency room as their usual source of care (Kaiser Family Foundation 2010).



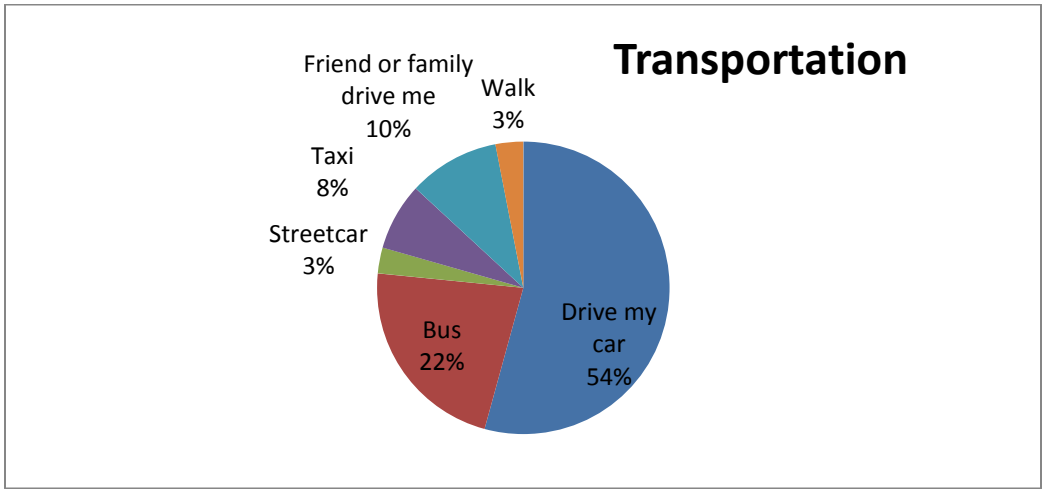
This high rate of ER usage is present even though 58% of the target population reports that they have a primary care physician.

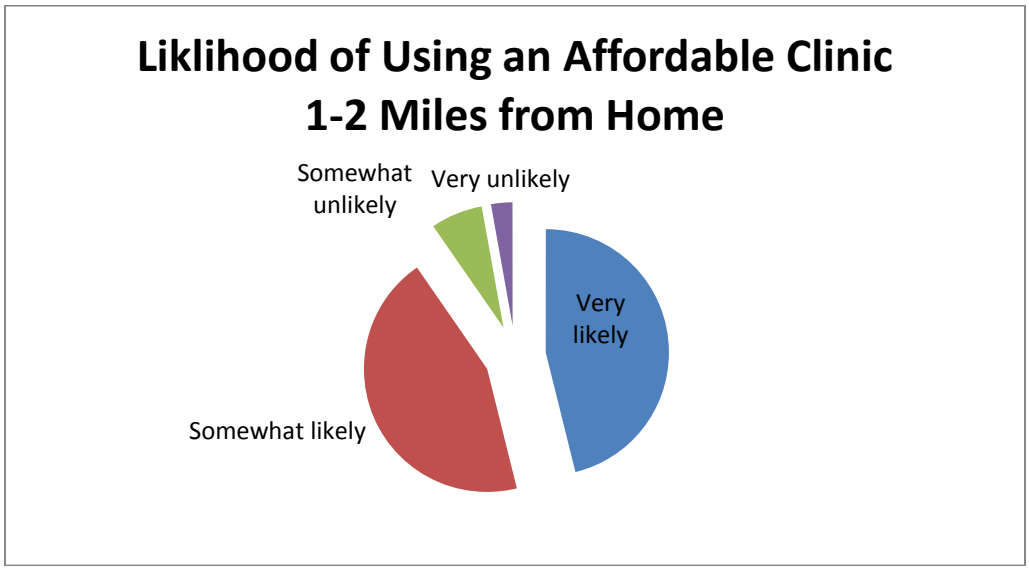


Overall, 16% of target population reports that their health needs are not being met well, which is similar to the 15% that Kaiser Family Foundation (2010) found for Orleans Parish. However, among the uninsured in the target population that number rises to 27%. One of the possible reasons that the health needs of the target population are not being met is because of a lack of clinic facilities in the target area. In fact, 86% of the target population could not identify a health care facility in the area that would accept them regardless of ability to pay. Among the insured, only 45% reported being able to get an appointment within 24 hours the last time they were sick, and 10% had to wait more than a week or were never able to get an appointment according to the survey.

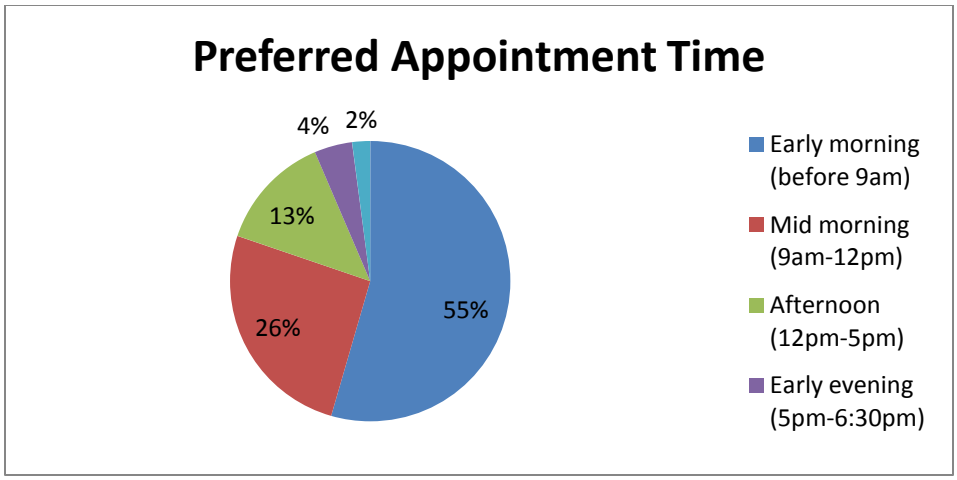


In fact, there are no full-time primary care clinics that offer discounted or free services for the uninsured within the proposed service area. However, 90% of the population reports that they would be very or somewhat likely to use a clinic if it were located 1-2 miles from them and accepted their insurance or offered discounted services for the uninsured. The location of the clinic is important because 64% of the target population do not use their own care to get to medical appointments.

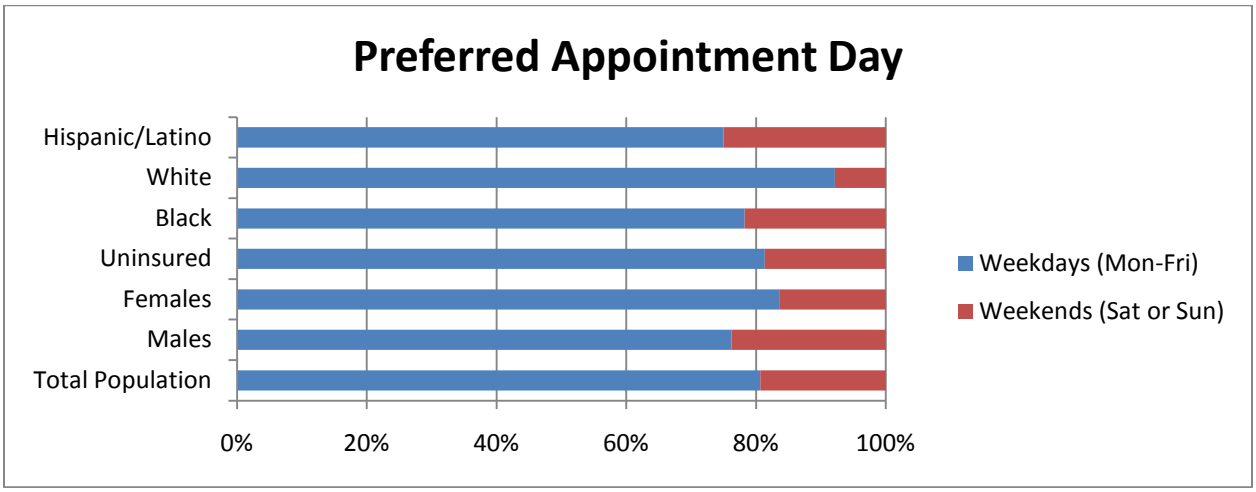




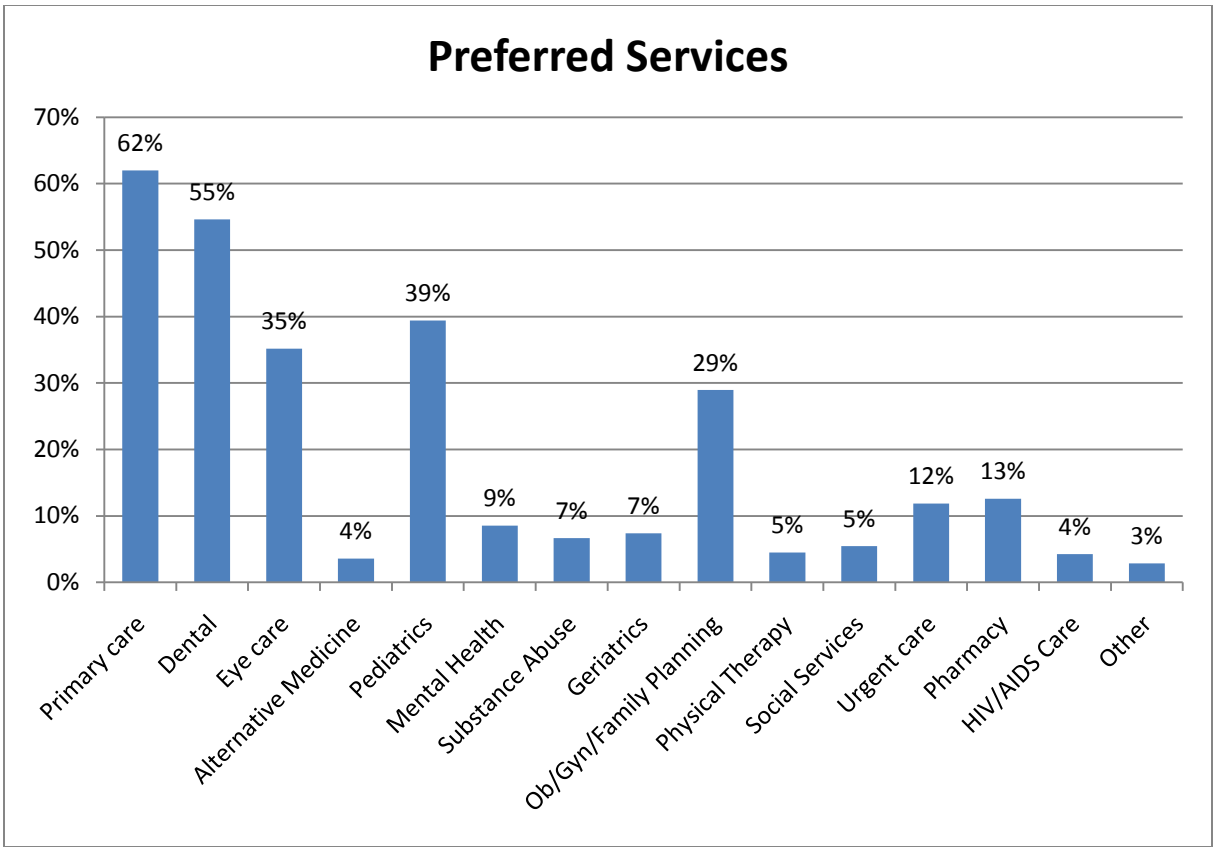
The target population also identified particular times of day and services that they would like in a community clinic. Overwhelmingly, the preferred appointment time was during the morning.



Evening and weekend appointments were important for 20% of the population, primarily for the black, Hispanic/Latino, and male respondents.



In terms of services provided, full-service primary care including well woman, pediatrics, dental and mental health services was deemed most important. When asked to identify the three most important services to have within their community, the top choices were primary care (62%), dental (55%), and pediatrics (39%).



The respondents were also asked to rate their likelihood to attend health education and wellness workshops, and 87% indicated they would be very or somewhat likely to participate. Finally, recognizing that improving community health status is not just about increasing access to providers, the survey also inquired about which social services were needed in the community. Again, respondents could choose up to three services. The top three responses were assistance with eligibility and enrollment in public programs including Medicaid and Medicare (29%), care coordination (13%), and health and nutrition education (11%). The survey also inquired as to the respondents' interest in support groups and 6% ranked this as an important service to be located within the community.

Conclusions

In comparison with the greater New Orleans community, the target population is experiencing a higher than average level of disease and lower access to primary care. This study indicates that the community would benefit from increased health and wellness education as well as increased access to primary care services.

Although this community indicates an increased level of disease, the mortality rates reveals that the residents are also not controlling their chronic illnesses. The significantly increased

mortality rates due to heart disease, cardiovascular disease, and diabetes. The indicators that the community would benefit from increased health and wellness education regarding their chronic illnesses as well as increased access to primary care services to reduce the impact of these diseases.

In addition, the results from the Kaiser Family Foundation indicate that the long-term effects of Katrina are taking a significant toll on the health of New Orleans residents as a whole. With the steadily increasing rate of hypertension, mental health disorders, pediatric and adult asthma, the morbidity and mortality rates are going to be negatively impacted unless steps are taken to avoid these outcomes.

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