Patient Experience Journal

Volume 5 | Issue 3 Article 10

2018

Racial/ethnic and geographic differences in access to a usual source of care that follows the patient-centered medical home model: Analyses from the Medical Expenditure Panel Survey data

Zo Ramamonjiarivelo
Texas State University-San Marcos

Delawnia Comer-HaGans
Governors State University

Shamly Austin
Gateway Health

Karriem Watson
University of Illinois at Chicago

Alicia Kaye Matthews
University of Illinois at Chicago

Recommended Citation

Ramamonjiarivelo Z, Comer-HaGans D, Austin S, Watson K, Matthews AK. Racial/ethnic and geographic differences in access to a usual source of care that follows the patient-centered medical home model: Analyses from the Medical Expenditure Panel Survey data. *Patient Experience Journal*. 2018; 5(3):65-80. doi: 10.35680/2372-0247.1246.

PXJ Patient Experience Journal
Volume 5, Issue 3 – 2018, pp. 65-80

Research

Racial/ethnic and geographic differences in access to a usual source of care that follows the patient-centered medical home model: Analyses from the Medical Expenditure Panel Survey data

Zo Ramamonjiarivelo, *Texas State University, zhr3@txstate.edu*
DeLawnia Comer-HaGans, *Governors State University, dcomer-hagans@govst.edu*
Shamly Austin, *Gateway Health, saustin@gatewayhealthplan.com*
Karriem Watson, *University of Illinois, kswatson@uic.edu*
Alicia Kaye Matthews, *University of Illinois, Aliciak@uic.edu*

Abstract
This study examined racial and geographic differences in access to a usual source of care (USC) and it further explored these differences among individuals who had a USC that followed the patient-centered medical home (PCMH) model. Using cross-sectional data from the Household Component of the Medical Expenditure Panel Survey (2008-2013), our sample consisted of non-institutionalized US civilians ages 18-85 (n= 146,233; weighted n = 229,487,016). Our analysis included weighted descriptive statistics and weighted logistic regressions. Although 76% of the respondents had a USC, only 11% of them had a USC that followed the PCMH model. Among respondents who had a USC that followed the PCMH model, 80% were White, 13% Black, 5% Asian, and 12% were of Hispanic ethnicity. Across U.S. regions, 88% percent of those who had a USC that followed the PCMH model resided in metropolitan statistical areas (MSAs), 22% resided in the West, 26% in the Northeast, 25% in the Midwest, and 27% in the South. Results from logistic regression analyses indicated that race and ethnicity were not significant predictors of having a USC that followed the PCMH model. Northeastern U.S. residents (OR: 1.30; 95% CI:1.06-1.61) were more likely to have a USC that followed the PCMH model compared with southern residents. In conclusion, only a small percentage of respondents in our sample had a USC with the PCMH model. Further, race and ethnicity were not predictors of having a USC with the PCMH model.

Keywords
Access to care, primary care, patient-centered care, patient's perception of care

Introduction

Primary care plays a major role in health care delivery. It is defined as "first-contact, continuous, comprehensive, and coordinated care provided to populations undifferentiated by gender, disease, or organ system" (p. 1129).[1,2] It is important that access to primary care ensures the delivery of coordinated preventive, curative, and specialized health care services.[1] Multiple studies have reported the benefits of having a primary care provider.[2] Primary care is found to be associated with lower mortality rates, premature death rates, and hospitalization rates for ambulatory care sensitive conditions.[2] In addition, individuals who have a primary care provider are more likely to report fewer emergency department visits, to receive timely preventive screenings, to receive better treatment for chronic conditions, and to report higher patient satisfaction.[2] Therefore, having a primary care provider is essential for receiving preventive care and disease treatment.

The emphasis on primary care has grown with the implementation of the 2010 Affordable Care Act (ACA) as well as due to population growth, aging,[3] and the increasing number of U.S. adults with multiple chronic conditions.[4] Moreover, the ACA has several provisions to reform primary care.[3,5] The ACA, in its focus on primary care reform, encourages the adoption of the patient-centered medical home (PCMH) model, which is a high-quality primary care delivery model where a team of health care providers led by the primary care physician work with patients to manage their chronic, acute, and preventive care as well as the coordination of the patient's full spectrum of medical, behavioral, and social service needs.[6] The purpose of the PCMH model is to provide care that is relationship-based with an emphasis on the whole person by respecting his/her needs, culture, values, and preferences. A PCMH provides coordinated care across the healthcare system including specialty care, hospitals, home health, community services, and support. With extended hours for care and around the clock telephone and electronic mail access, a PCMH is responsive to

patients' preferences in accessing care. It follows evidence-based guidelines and uses clinical decision support tools to ensure quality and safety in care.[7] The PCMH care is accessible, comprehensive, and coordinated, thus ensuring value-based care through better patient experience, service quality, patient safety, clinical outcomes, as well as increased efficiency and reduced costs.[8,9]

Evidence from prior studies suggest access to a PCMH resulted in increased use of preventive screenings and immunizations,[8,10,11] better health outcomes, [12-15] reduced emergency room visits and costs,[13-17] and lower hospitalizations,[13,15] as well as enhanced patient experience,[14,18] patient satisfaction,[15] and staff satisfaction.[15] Extant studies on factors associated with access to PCMH have focused on specific U.S. populations, such as children,[19,20,21,22,23] and adults with specific ethnicity, such as the Latino population,[24] or populations from specific health care providers.[25] However, little is known about the factors associated with access to a usual source of care (USC) that follows the PCMH model in the general U.S. population and whether such access varies based on race/ethnicity and region of residence.

The specific aims of this study are to: (1) build on prior PCMH studies by examining whether there are differences in having a USC based on race/ethnicity and geography (region of residence and area of residence); and (2) explore whether there are racial/ethnic and geographic differences in access to a USC that follows the PCMH model. Exploring racial/ethnic and geographic differences in access to a USC that follows the PCMH model is important because these differences are among the factors associated with health disparities. Therefore, addressing disparities in access to a USC that follows the PCMH model may help reduce health disparities.[26]

Methods

Data source and study sample

This study used pooled cross-sectional data from the Household Component of the Medical Expenditure Panel Survey (MEPS -HC) for years 2008-2013. MEPS-HC contains data on health care access, utilization, financing, and costs, as well as on health care status, demographic, and socio-economic profiles of the respondents.[27]MEPS-HC sampling frame is based on a complex survey design, which provides a nationally representative sample of the non-institutionalized U.S. civilian population. It also oversamples for minorities including Asians, Blacks, and Hispanics, as well as "policy relevant subgroups", such as low-income households.[27] In addition, sampling weight variables are included in the data to correct for non-response bias.[27] The weights are also used to generate "the estimates of totals, means, percentages, and rates for individuals and families of the civilian non-institutionalized population" and prevent the distortion of the population estimates "by a disproportionate contribution from oversampled subgroups".[27]MEPS data have been recommended by the National Committee on Vital and Health Statistics as one of the appropriate data to conduct studies on PCMH and they have been used in several empirical studies on USC and PCMH.[16,24,28-32] Our study sample consisted of non-institutionalized civilian adults18-85 years old (unweighted n = 146,233; weighted n= 229,487,016).

Dependent Variables

Our dependent variables "access to a USC" and "access to a USC that follows the PCMH model" were identified from MEPS data based on 13 items. These items were previously used in the literature to assess the PCMH concept from the respondents' perspective.[16,24,29,30] The first item asked (1) whether the respondent had a USC, a dichotomous item (Yes=1; No=0). A USC is defined by the Agency for Healthcare Research and Quality (AHRQ) as a "particular doctor's office, clinic, health center, or other place that the individual usually goes to if he/she is sick or needs advice about health care".[27] Having a USC is important because it is the port of entry to the healthcare system. If the respondent had a USC, he/she was asked to answer 12 dichotomous items that measure whether the USC follows the PCMH model. These 12 items were classified according to the following three domains: the USC role in care domain, which assessed the role of the provider in total care for the patient using four dichotomous items (Yes=1; No=0). These items asked: (1) whether family members go to the USC for new health problems, (2) whether family members go to the USC for preventive care, (3) whether family members go to the USC for referral requests, and (4) whether family members go to the USC for ongoing problems.

The USC accessibility domain, assessed accessibility of the provider using four dichotomous items: (1) whether it is difficult to contact the USC by phone, coded as "0" if "very difficult or difficult" and as "1" if "not difficult or not difficult at all" ; (2) whether the provider has office hours at night or during weekends (Yes=1; No=0); (3) whether it is difficult accessing the USC by travel, coded as "0" if "very difficult or difficult" and as "1" if "not difficult or not difficult at all" ; and (4) whether it is difficult to access the provider after hours, coded as "0" if "very difficult or difficult" and as "1" if "not difficult or not difficult at all".

The patient engagement domain assessed whether the USC involved the respondent in his/her health care regimen. The domain was measured using the following four dichotomous items: (1) whether the USC usually asks about prescription medicine and other treatment from other providers; (2) whether the USC asks about and shows respect for medical, traditional and alternative

treatments the person is happy with; (3) whether the USC asks the person to help make decisions between treatment choices; and (4) whether the USC presents and explains all options to the person.[27] All responses were coded "1" if "yes" or "usually or always" and coded "0" if "no" or "never or sometimes".

In congruence with Beale et al.[24] and Xin et al.,[29,30] we determined that a respondent had a USC that followed the PCMH model if the respondent scored 1 on each of the 12 items that measured PCMH. A key step moving toward patient-centered care is better patient experience. MEPS measured respondents' experience with their usual source of care through the above domains and questions.

Independent Variables

Our primary independent variables were race, ethnicity, U.S. region of residence, and area of residence. Race was a categorical variable with four categories: White only (no other race), Black only (no other race), Asian only (no other race), and other races (multiple races, America Indian/Alaskan, native Hawaiian). Ethnicity was a dichotomous variable categorized as whether a respondent was Hispanic or not. Region of residence was a categorical variable with four categories: West, Northeast, Midwest, and South. The area of residence variable determined whether the respondent resided in a metropolitan statistical area (MSA) or not. Metropolitan statistical areas refer to areas that "contain at least one urbanized area of 50,000 people or more".[33]

Covariates

Based on Litaker at al.'s framework, our covariates included predisposing factors, enabling factors, and need-related factors. Predisposing factors pertain to the biological characteristics that may increase the chance that the individual may seek health services, as well as the social structure that determines the individual's ability to deal with challenges of seeking care.[34] Predisposing factors included age, gender, and education.[34] Enabling factors consisted of the individual profiles that may facilitate or impede a person's access to care. Our enabling factors included employment status, marital status, personal income, health insurance, having difficulty speaking English, and type of facility where the respondent received care. Facility type may affect access to a USC and access to a USC that follows the PCMH model. It was categorized as hospital-affiliated clinic or hospital outpatient department, hospital emergency room, and non-hospital affiliated facility, such as a stand-alone clinic or a freestanding emergency department. Need-related factors refer to a person's health status that may urge a person to use health services. Our need-related factors included four items: (1) whether the respondent had any physical or cognitive limitations; (2) physical health status measured by the Physical Component Summary (PCS); and (3) mental health status measured by the Mental Component Summary (MCS) scores from the Short-Form 12 version 2 (SF-12v2 ®). SF-12v2® is a validated and widely used instrument to measure physical and mental health-related quality of life; and (4) the number of chronic conditions based on 10 health conditions including high blood pressure, coronary heart disease, other heart disease, stroke, emphysema, high cholesterol, diabetes, arthritis, asthma, and cancer. Each health condition was a dichotomous variable coded as Yes = "1" and No = "0". The summated score of these 10 health conditions was used to measure the number of chronic conditions.[27,35] Table 1 (found at end of article) summarizes the operational definitions of the dependent, independent, and control variables.

Analysis

Our analyses involved two steps. The first step assessed the factors associated with having a USC. We used our original sample (unweighted n = 146,233; weighted n= 229,487,016) of respondents who answered "Yes" or "No" to the question "Do you have a USC?" The second step assessed whether a respondent has a USC that follows the PCMH model. Therefore, we removed respondents who did not have a USC (unweighted n= 42,557) from our sample because the subsequent twelve questions only pertained to respondents who had a USC. In addition, we dropped the hospital emergency room category for the facility type variable (unweighted n =709) because 100% of the respondents who had hospital emergency room as USC facility type did not have a USC with the PCMH model. Therefore, the unweighted sample size for our second step was 102,967 (weighted n= 173,771,105). We conducted weighted Pearson's chi-square tests and independent samples t-tests followed by weighted logistic regressions for the samples used in the first and second steps. We used the "SAQWT" weight provided by MEPS-HC documentation because we used questions from the MEPS-HC self-administered questionnaire.[27] Data management and analyses were conducted using STATA version 14.

Results

Bivariate Analyses

The results of the Pearson's Chi-square tests and independent samples t-tests are summarized in Tables 1 and 2. We reported the weighted frequencies and the weighted percentages. Overall, 76% of the respondents reported having a USC. Among respondents who reported having a USC, 82% were Whites, 11% Blacks, 5% Asians, 11% Hispanics, 84% were MSA residents, 23% resided in the west region, 20% in the northeast region, 23% in the Midwest region (23%), 35% in the south region, 7% reported having difficulty speaking English, 9% were uninsured, 60% were 45 years old or older, 55% female, 60% had more than a high school education, and 61% were employed. In addition, respondents who reported

having a USC had a median personal income of $21,759 and an average perceived physical condition score of 48; 30% reported having any physical or cognitive limitation. The average number of health conditions for respondents who had a USC was 1.63 (Table 1).

Table 2 (found at end of article) provides the characteristics of the sample of respondents who had a USC that followed the PCMH model and those who had a USC that did not. A USC followed the PCMH model if the respondent scored 1 on each of the 12 items evaluating the experience with his/her respective USC. With respect to the sample of respondents who had a USC, 11% reported having a USC with the PCMH model. Among respondents who reported having a USC that followed the PCMH model, 80% were Whites, 13% Blacks, 5% Asians, 12% Hispanics, and 88% resided in MSAs, 22% resided in the west region, 26% in the northeast, 25% in the Midwest, and 27% in the south. With regard to the covariates, among respondents with a USC that followed the PCMH model, 52% were 45 years old or older, 45% were male, 5% had difficulty speaking English, 62% had more than high-school education, 67% were employed, 92% were insured, and 68% had a stand-alone USC (Table 2.)

In addition, respondents who had a USC that followed the PCMH model tended to be healthier in terms of their physical health status (PCS 50 vs. 48), their mental health status (MCS 52 vs. 50), and the average number of health conditions (1.37 vs. 1.66), compared with respondents who had a USC without the PCMH model. All chi-square tests and independent samples t-tests were significant at $p \leq .05$ or less, except for the variables ethnicity, sex, and education, which were not statistically significant (Table 2).

Multivariate Analyses

Table 3 (found at end of article) summarizes the results of the weighted logistic regressions. Our first logistic regression assessed the factors associated with having a USC. With respect to the independent variables, compared with Whites, Blacks (OR = 0.86; 95% CI: 0.78 - 0.96) and Asians (OR= 0.70; 95% CI: 0.58 - 0.84) were less likely to have a USC. Compared with non-Hispanics, Hispanics were less likely to have a USC (OR =0.85; 95% CI: 0.77 - 0.94). Compared with individuals residing in the West, individuals residing in the Northeast were more likely to have a USC (OR = 1.27; 95% CI: 1.06 -1.52), whereas residents in the South were less likely to have a USC (OR= 0.76; 95% CI: 0.67- 0.85).

With respect to the predisposing factors, we found that compared with the youngest group ages 18-24, respondents ages 25-44 were less likely to have a USC (OR=0.83; 95% CI: 0.75 -0.92), but respondents ages 45-64 (OR=1.38; 95% CI: 1.23 - 1.55) and 65-85 (OR=1.98; 95% CI: 1.65-2.37) were more likely to have a USC. Compared with males, females were more likely to have a USC (OR = 1.71; 95% CI: 1.61 - 1.82). Compared with individuals who did not have difficulty speaking English, those who had difficulty speaking English were less likely to have a USC (OR = 0.74; 95% CI: 0.64 - 0.86).

With respect to enabling factors, our findings suggest that compared with singles, married individuals were more likely to have a USC (OR = 1.37; 95% CI: 1.26 -1.49). Compared with the uninsured, individuals with private insurance (OR = 4.11; 95% CI: 3.68 - 4.58), and individuals with public insurance (OR = 3.19; 95% CI: 2.83 - 3.59) were more likely to have a USC. Regarding need-related factors, individuals with any physical or cognitive limitations were more likely to have a USC (OR = 1.12; 95% CI: 1.01-1.24) compared with individuals without any physical or cognitive limitations. We also found that every additional chronic condition was associated with a 51% increase in the odds of having a USC (OR = 1.51; 95% CI: 1.45 - 1.57).

Our second logistic regression (Table 3) assessed the factors associated with having a USC that follows the PCMH model. Regarding the independent variables, only U.S. region of residence had a significant association with having a USC with the PCMH model; residents in the Northeast region were more likely to have a USC with the PCMH model, compared with residents in the West (OR = 1.30; 95% CI: 1.06 - 1.61).

With respect to predisposing factors, only the variables age and having difficulty speaking English were associated with having a USC with the PCMH model. Compared with respondents ages 18-24, respondents ages 45-64 (OR = 0.79; 95% CI: 0.65-0.97) and 65-85 (OR = 0.65; 95% CI: 0.51 - 0.83) were less likely to have a USC with the PCMH model. Respondents who had difficulty speaking English were less likely to have a USC with a PCMH model compared with respondents who did not have difficulty speaking English (OR = 0.67; 95% CI: 0.47 - 0.94). With respect to enabling factors, marital status and type of facility were associated with having a USC with the PCMH model. Compared with single respondents, married people were more likely to have a USC with the PCMH model (OR = 1.22; 95% CI: 1.06 - 1.41). Compared with respondents who had a USC affiliated with a hospital, individuals who had a stand-alone USC were less likely to follow the PCMH model (OR = 0.68; 95% CI: 0.57- 0.81). Regarding need-related factors, compared with respondents who did not have any physical or cognitive limitations, respondents with some physical or cognitive limitations were less likely to have a USC with the PCMH model (OR = 0.74; 95% CI: 0.63 - 0.86). Need-related factor MCS was statistically significant but its effect size was minimal (OR = 1.01; 95% CI: 1.00 - 1.02).With regards to contextual-level factors, individuals who had a non-hospital affiliated USC were less likely to have a USC

with the PCMH model (OR = 0.68; p≤.01), compared with individuals who had a hospital/clinic affiliated USC.

Discussion

We examined racial/ethnic and geographic (U.S region and area of residence) differences in having a USC and having a USC that followed the PCMH model. Our key finding indicates that about 76% of respondents reported having a USC. Among the respondents who had a USC, only 11% reported having a USC that followed the PCMH model. Although racial/ethnic disparities were observed in the group who had a USC, these were not observed among respondents who had a USC with the PCMH model. In addition, respondents in the Northeast region were more likely to have a USC and more so to have a USC associated with a PCMH.

According to the Agency for Healthcare Research and Quality, revitalizing the primary care system is the foundation to achieve high quality, accessible, and efficient care for Americans.[7]A PCMH model provides better service quality through a team of health care providers. The team is led by a primary care physician which attends to both physical and mental healthcare needs of patients including preventive, wellness, acute, and chronic care.[7]Although, there is ample evidence about the potential of a PCMH to transform primary care, fewer primary care facilities follow the PCMH model. This is implied by our finding that non-hospital affiliated, stand-alone, clinics were less likely to provide care that follows the PCMH model compared with primary care facilities affiliated with hospitals. These stand-alone clinics may not have all the resources needed to provide care following the PCMH model. Hospital-affiliated clinics may find it easier to provide comprehensive, coordinated, and patient-centered care given their close association with and support from their parent hospitals. Transformation to a PCMH is challenging; it requires significant and more than incremental changes in health care provision.[8] Other challenges to effectively implement a PCMH include recruiting and retaining health care providers.[36] Primary care providers need intensive coaching from external facilitators and consultants to move from care that is physician-centered to team-based and patient-centered.

We found some racial/ethnic and region-based differences in having a USC. First, Hispanics, Blacks, and Asians were less likely to have a USC, compared with their White and non-Hispanic counterparts. Our findings support prior studies that showed racial/ethnic disparities in having a USC. [32] In general, minorities have lower education levels and lower income; they are also less likely to have health insurance. All these factors may decrease the likelihood of having a USC among racial/ethnic minorities. However, we did not find any racial/ethnic disparities in having a USC that follows the PCMH model. Our finding implies that, regardless of race and ethnicity, all patients who have a USC may receive care that follows the PCMH model, which is focused on evidence-based care, shared decision making, and greater patient-provider interaction. Further, residents in the Northeast region are more likely to have a USC and residents in the South are less likely to have a USC, compared with residents in the West. The Northeast region has, on average, the highest per capita income and the Southern region has the lowest per capita income compared with other regions; income is a factor that affects having a USC.[37] Furthermore, residents in the Northeast region are more likely to have a USC that follows the PCMH model than residents in the West. The Northeast region is densely populated and has a higher number of physicians per capita than the West. A study found that the number of physicians per capita, especially primary care physicians, is generally associated with increased health care quality ranking.[38]The high number of physicians per capita may intensify competition among providers. Providing care that follows the PCMH model may be one of the strategies that physicians use to attract and retain patients and health plans. This may explain the increased likelihood of having a USC that follows the PCMH model in the Northeast region.[38] We did not find any significant difference in having a USC, as well as having a USC that follows the PCMH model between MSA and non-MSA residents. This finding suggests that both MSA and non-MSA residents have equal access to a USC, as well as to a USC that fallows the PCMH model.

We also found some predisposing, enabling, and needs factors associated with having a USC. More precisely, our findings suggest that predisposing factors, such as age, gender, English proficiency; enabling factors, such as marital status, and health insurance, as well as need-related factors, such as physical or cognitive limitations and the number of health conditions are associated with having a USC.

With respect to the predisposing factor, individuals ≥ 45 years old and female are more likely to have a USC compared with their younger and male counterparts, respectively; these findings are consistent with a prior study.[39] As people age, the number of chronic conditions increases, which may increase the need for a USC.[32] However, our findings suggest that individuals ≥ 45 years old do not have a USC with the PCMH model. The finding that females are more likely to have a USC may be because women tend to use more health care services than men due to reproductive biology that may span from teenage years to post-menopausal life, higher rates of morbidity among women than men, as well as women's tendency to utilize more preventive and curative care than men.[40]

Furthermore, having difficulty speaking English decreases the likelihood of having a USC as well as the likelihood of

having a USC that follows the PCMH model. This finding is consistent with prior studies.[24,39] People with language barriers have been found to be less likely to have a USC because difficulty to communicate may prevent them from having a good job that provides health insurance.[41] In addition, language barriers may make it difficult to have effective interaction between the provider and the patient. It is also challenging for individuals with language barriers to navigate the U.S. health care system. Given that there are about 24 million individuals who have difficulty speaking English, the use of translators and health navigators may help providers to adequately communicate and coordinate care for these individuals.[42,43]

With respect to the enabling factors, our study suggests that married individuals are more likely to have a USC than their single counterparts, which is consistent with a prior study.[39] Spouses may exert some influence on their partners regarding health services utilization.[44] In addition, our study suggests that having health insurance, regardless of insurance type, is the strongest predictor of having a USC, compared with other factors. Having health insurance is the key determinant of access to at least the basic health care services, such as those provided by a USC. Several studies have found having health insurance to be associated with having a USC.[39,45,46]

With respect to the need factors, individuals with a higher number of health conditions, as well as those with some physical or cognitive limitations tend to have a USC. As individuals with multiple chronic conditions tend to utilize more health services than healthier individuals,[47] they tend to have a USC. In addition, physical or cognitive limitations may be the result of some health conditions; individuals with these types of limitations may need to use more health care services than individuals who have no limitations. However, individuals with cognitive or physical limitations are less likely to report having a USC with the PCMH model. Given their limitations, the health care expectations of individuals with some cognitive or physical limitations may be higher; they may need additional attention, tighter care coordination, and richer interaction from their USCs than individuals without limitations.

Finally, individuals who have stand-alone USCs (non-hospital affiliated USCs) are less likely to have USCs that follow the PCMH model compared with individuals who have hospital-affiliated USCs. Stand-alone USCs may not have the resources needed to adopt/follow the PCMH model, whereas hospital-affiliated USCs, given the resources and support from their parent hospitals/ health systems, may find it easier to adopt/follow the PCMH model that provides care that is comprehensive, coordinated, and patient-centered.

Limitations

Our study has some limitations with respect to the data. First, we used cross-sectional data; therefore, our findings do not imply causal relationships. Second, we used survey data which may involve some recall and desirability biases. Third, our data do not have a zip-code variable which may provide richer geographic information in differences in access to a USC that follows the PCMH model because regions and MSAs may be too large to detect such information. Future studies should examine regional differences in access to a USC and a USC with the PCMH model based on zip-codes.

Conclusions

Our study found racial/ethnic and regional differences in having a USC. However, no racial or ethnic differences but regional differences were found in having a USC that follows the PCMH model. Our study implies that USCs that follow the PCMH model are better at reducing/ addressing racial/ethnic disparities with respect to receiving primary care. In spite of the PCMH model's potential to improve access to care, better quality care and clinical outcomes, as well as reduced costs, only a few respondents reported having a USC that follows the PCMH model. Future research should focus on qualitative studies investigating the reasons for low PCMH adoption.

References

1. Starfield B. Is primary care essential? The Lancet. 1994; 344(8930):1129-1133.
2. Shi L. The impact of primary care: A focused review. *Scientifica*. 2012; 2012: 1-22.
3. Petterson SM, Liaw WR, Phillips RL, Rabin DL, Meyers DS, Bazemore AW. Projecting US primary care physician workforce needs: 2010-2025. *The Annals of Family Medicine*. 2012;10(6):503-509.
4. Rothman AA, Wagner EH. Chronic illness management: What is the role of primary care? *Annals of Internal Medicine*. 2003;138(3):256-261
5. Abrams M, Nuzum R, Mika S, Lawlor G. Realizing Health Reform's Potential: How the Affordable Care Act Will Strengthen Primary Care and Benefit Patients, Providers, and Payers. The Commonwealth Fund Web Site. http://www.commonwealthfund.org/publications/issue-briefs/2011/jan/strengthen-primary-care. Published January 2011. Accessed February 24, 2017.
6. Rich E, Lipson D, Libersky, J. Parchman M. Coordinating Care for Adults with Complex Care Needs in the Patient-Centered Medical Home: Challenges and Solutions. White Paper (Prepared by Mathematica Policy Research under Contract No. HHSA290200900019I/HHSA29032005T). AHRQ Publication No. 12-0010-EF. Rockville, MD: Agency for Healthcare Research and Quality Web Site. https://pcmh.ahrq.gov/sites/default/files/attachmen

ts/Coordinating%20Care%20for%20Adults%20with%20Complex%20Care%20Needs.pdf. Published January 2012. Accessed March 12, 2017.
7. Defining the Patient Centered Medical Home. The Agency for Healthcare Research and Quality Web Site. https://www.pcmh.ahrq.gov/page/defining-pcmh. Accessed October 30, 2015.
8. Janamian T, Jackson CL, Glasson N, Nicholson C. A systematic review of the challenges to implementation of the patient-centered medical home: Lessons for Australia. *The Medical Journal of Australia*. 2014;201(3):69-73.
9. Porter ME. What is value in health care? *New England Journal of Medicine*. 2010;363(26):2477-2481.
10. Ferrante JM, Balasubramanian BA, Hudson SV, Crabtree BF. Principles of the patient-centered medical home and preventive services delivery. *The Annals of Family Medicine*. 2010;8(2):108-116.
11. Markovitz AR, Alexander JA, Lantz PM, Paustian ML. Patient-centered medical home implementation and use of preventive services: the role of practice socioeconomic context. *JAMA Internal Medicine*. 2015;175(4):598-606.
12. Rosenthal TC. The medical home: Growing evidence to support a new approach to primary care. *The Journal of the American Board of Family Medicine*. 2008;21(5):427-440.
13. Nielsen M, Olayiwola JN, Grundy P, Grumbach K. The Patient-Centered Medical Home's Impact on Cost and Quality: An Annual Update of the Evidence, 2012-2013. Patient-Centered Primary Care CollaborativeWeb Site. file:///C:/Users/zrama/Downloads/1%20-%20Annual%20Report%20FINAL%203-10-2014.pdf. January 2014. Accessed May 12, 2018.
14. Jackson GL, Powers BJ, Chatterjee R, et al. The patient-centered medical home: A systematic review. *Annals of Internal Medicine*. 2013;158(3):169-178.
15. Bojadzievski T, Gabbay RA. Patient-centered medical home and diabetes. *Diabetes Care*. 2011;34(4):1047-1053.
16. Stockbridge EL, Philpot LM, Pagan JA. Patient-centered medical home features and expenditures by Medicare beneficiaries. *The American Journal of Managed Care*. 2014;20(5):379-385.
17. Xin H, Kilgore ML, Sen B. Is access to and use of patient perceived patient-centered medical homes associated with reduced nonurgent emergency department use? *American Journal of Medical Quality*. 2016; 32 (3): 246-253.
18. Reid RJ, Fishman PA, Yu O, et al. Patient-Centered Medical Home Demonstration: A Prospective, Quasi-Experimental, Before and After Evaluation. *The American Journal of Managed Care*. 2009;15(9):e71-e87.
19. Aysola J, Orav EJ, Ayanian JZ. Neighborhood characteristics associated with access to patient-centered medical homes for children. *Health Affairs*. 2011;30(11):2080-2089.
20. Barradas DT, Kroelinger CD, Kogan MD. Medical home access among American Indian and Alaska Native children in 7 states: National Survey of Children's Health. *Maternal and Child Health Journal*. 2012;16(1):6-13.
21. Knapp C, Alford S, Ranka R. Factors associated with a patient centered medical home among obese and overweight children. *Journal of Community Medicine & Health Education*. 2015;5 (1): 1-5.
22. Liem RI, O'Suoji C, Kingsberry PS, et al. Access to patient-centered medical homes in children with sickle cell disease. *Maternal and Child Health Journal*. 2014;18(8):1854-1862.
23. Knapp C, Woodworth L, Fernandez-Baca D, Baron-Lee J, Thompson L, Hinojosa M. Factors associated with a patient-centered medical home among children with behavioral health conditions. *Maternal and Child Health Journal*. 2013;17(9):1658-1664.
24. Beal A, Hernandez S, Doty M. Latino access to the patient-centered medical home. *Journal of General Internal Medicine*. 2009;24(3):514-520.
25. Tabler J, Scammon DL, Jim J, Farrell T, Taomoaia-Cotisel A, Magill MK. Patient care experiences and perceptions of the patient-provider relationship: A mixed method study. *Patient Experience Journal*. 2014;1(1):75-87.
26. The Institute of Medicine. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. Washington:DC: National Academies Press; Institute of Medicine;2003; 1-781
27. MEPS-HC 163: 2013 Full Year Consolidated Data File. Agency for Healthcare and Quality Web Site. https://meps.ahrq.gov/data_stats/download_data/pufs/h163/h163doc.shtml. Published September 2015. Accessed December 12, 2015.
28. Health Information Policy and the Patient-Centered Medical Home: Notes from an NCVHS Hearing. National Committee on Vital and Health Statistics Web Site https://www.ncvhs.hhs.gov/wp-content/uploads/2014/05/080519sm.pdf. Published May 2014. Accessed September 15, 2016.
29. Xin H, Kilgore ML, Menachemi N, Sen BP. The relationships between access to and use of a patient-centered medical home and healthcare utilization and costs: A cohort study using Medical Expenditure Panel Survey data from 2007 to 2010. *Health Services Management Research*. 2014;27(3-4):70-81.
30. Xin H, Kilgore ML, Sen BP. Is access to and use of primary care practices that patients perceive as having essential qualities of a patient-centered medical home associated with positive patient experience? Empirical evidence from a us nationally representative sample. *Journal for Healthcare Quality*. 2015; 39 (1): 4-14. doi: 10.1097/01.JHQ.0000462688.01125.c2.

31. Jones AL, Cochran SD, Leibowitz A, Wells KB, Kominski G, Mays VM. Usual primary care provider characteristics of a patient-centered medical home and mental health service use. *Journal of General Internal Medicine*. 2015;30(12):1828-1836.
32. Shi L, Chen C-C, Nie X, Zhu J, Hu R. Racial and socioeconomic disparities in access to primary care among people with chronic conditions. *The Journal of the American Board of Family Medicine*. 2014;27(2):189-198.
33. U.S. Census Bureau. 2010 Census Special Reports, Patterns of Metropolitan and Micropolitan Population Change: 2000 to 2010. U.S. Census Bureau Web Site; https://www.census.gov/data/tables/time-series/dec/c2010sr-01.html. January 2017. Accessed May 17,2018..
34. Andersen RM. Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health And Social Behavior*. 1995; 36(2)1-10.
35. Litaker D, Koroukian SM, Love TE. Context and healthcare access: Looking beyond the individual. *Medical Care*. 2005;43(6):531-540.
36. Helfrich CD, Sylling PW, Gale RC, et al. The facilitators and barriers associated with implementation of a patient-centered medical home in VHA. *Implementation Science*. 2016;11(1):24.
37. Posey KG. Household Income: 2015. United States Census Bureau Web Site. https://www.census.gov/content/dam/Census/library/publications/2016/demo/acsbr15-02.pdf. Published September 2016. Accessed December 13, 2016.
38. Cooper RA. States with more physicians have better-quality health care. *Health Affairs*. 2009;28(1):w91-w102.
39. Chang E, Chan KS, Han H-R. Factors associated with having a usual source of care in an ethnically diverse sample of Asian American adults. *Medical Care*. 2014;52(9):833-841.
40. Bertakis KD, R. A, Helms LJ, Callahan EJ, Robbins JA. Gender differences in the utilization of health care services. *Journal of Family Practice*. 2000;49(2):147-152.
41. National Research Council of the National Academies.. Hispanics and the Future of America. Panel on Hispanics in the United States. Washington, DC: National Academies Press; 2006.
42. Martin LT, Plough A, Carman KG, Leviton L, Bogdan O, Miller CE. Strengthening integration of health services and systems. *Health Affairs*. 2016;35(11):1976-1981.
43. Schiaffino MK, Nara A, Mao L. Language services in hospitals vary by ownership and location. *Health Affairs*. 2016;35(8):1399-1403.
44. Wood RG, Goesling B, Avellar S. The effects of marriage on health: A synthesis of recent research evidence. Department of Health and Human Services Web Site https://aspe.hhs.gov/system/files/pdf/75106/report.pdf. Published June 19, 2007. Accessed July 25, 2017.
45. Ryvicker M, Gallo WT, Fahs MC. Environmental factors associated with primary care access among urban older adults. *Social Science & Medicine*. 2012;75(5):914-921.
46. McCarthy M. Medicaid expansion is associated with improved access to care and self-reported health, US study finds. *British Medical Journal*. 2016; 354 (i.4455): 1-1. doi: https://doi.org/10.1136/bmj.i4455
47. McPhail SM. Multimorbidity in chronic disease: Impact on health care resources and costs. *Risk Management and Healthcare Policy*. 2016;9: 143-156.

Table 1: - Pearson's Chi-square tests and Independent Samples t-tests – Have USC vs. Do not have USC[a]

		Have USC vs. Do Not Have USC (Unweighted n = 146,233; Weighted n= 229,487,016)[b]		
	Operational Definitions	**Weighted frequencies (Weighted %) or Mean**	**Weighted frequencies (Weighted %) or Mean**	**p-value**
Sample		Have a USC 174,630,895 (76%)	Do not have a USC 54,856,121 (24%)	
Independent variables				
Race	White only, no other race	143,148,120 (82%)	42,424,803 (77%)	≤.001
	Black only, no other race	19,259,468 (11%)	7,536,583 (14%)	
	Asian only, no other race	7,908,163 (5%)	3,469,905 (6%)	
	Other races	4,315,145 (3%)	1,424,830 (3%)	
Ethnicity	Hispanic	19,825,904 (11%)	13,234,005 (24%)	≤.001
	Non-Hispanic	154,804,992 (89%)	41,622,116 (76%)	
MSA	MSA	121,250,358 (84%)	39,269,904 (87%)	≤.001
	Non-MSA	23,524,059 (16%)	6,089,938 (13%)	
Region	West	39,416,240 (23%)	13,886,314 (25%)	≤.001
	Northeast	34,517,216 (20%)	7,344,415 (13%)	
	Midwest	40,030,502 (23%)	9,674,838 (18%)	
	South	60,665,642 (35%)	23,950,554 (44%)	

Table 1 cont'd.

		Have USC vs. Do Not Have USC (Unweighted n = 146,233; Weighted n= 229,487,016)[b]		
	Operational Definitions	**Weighted frequencies (Weighted %) or Mean**	**Weighted frequencies (Weighted %) or Mean**	**p-value**
Predisposing Factors				
Age	18 - 24	17,837,324 (10%)	11,151,509 (20%)	≤.001
	25 - 44	52,641,594 (30%)	27,472,276 (50%)	
	45 - 64	66,405,965 (38%)	13,587,381 (25%)	
	65 - 85	37,746,012 (22%)	2,644,954 (5%)	
Gender	Male	78,456,384 (45%)	32,306,839 (59%)	≤.001
	Female	96,174,512 (55%)	22,549,282 (41%)	
Difficulty speaking English	Yes	5,321,875 (7%)	4,423,134 (16%)	≤.001
	No	73,152,822 (93%)	22,612,926 (84%)	
Education	12th grade and lower, no high school diploma	11,356,886 (13%)	4,873,740 (18%)	≤.001
	GED of high school graduate	24,076,190 (27%)	8,477,677 (31%)	
	Beyond high school, some college, associate degree	25,536,794 (29%)	7,740,585 (28%)	
	Bachelor's, master's, doctorate, professional degree	27,094,163 (31%)	6,675,155 (24%)	
Enabling Factors				
Employment status	Employed	106,469,169 (61%)	38,460,071 (70%)	≤.001
	Unemployed	68,033,171 (39%)	16,281,043 (30%)	
Marital status	Married	99,583,413 (57%)	23,189,905 (42%)	≤.001
	Singles	75,047,483 (43%)	31,666,216 (58%)	
Personal income $	Median	21,759	16,595	≤.001

Table 1 cont'd.

		Have USC vs. Do Not Have USC (Unweighted n = 146,233; Weighted n= 229,487,016)[b]		
	Operational Definitions	**Weighted frequencies (Weighted %) or Mean**	**Weighted frequencies (Weighted %) or Mean**	**p-value**
Health insurance	Uninsured	15,039,752(9%)	20,150,231 (37%)	
	Any private insurance	125,954,104 (72%)	28,395,449 (52%)	≤.001
	Public insurance only	33,637,039 (19%)	6,310,440 (12%)	
Type of facility	Hospital/clinic affiliated outpatient department	-	-	
	Stand-alone facility	-	-	
Need Related Factors		Have a USC	Do not have a USC	
Any physical or cognitive limitation	Some limitation	52,737,059 (30%)	7,787,253 (14%)	≤.001
	No limitation	120,651,918 (70%)	46,401,361 (86%)	
Physical condition PCS42	Continuous (ranges between 0 to 100)	48	52	≤.001
Mental condition MCS42	Continuous (ranges from 0 to 100)	46	44	≤.001
Number of health conditions	Number of chronic conditions (ranges between 0 and 10)	1.63	0.55	≤.001

[a] For some variables, percentages may not add up to 100% due to rounding.
[b] All chi-square tests and independent samples t-test significant at p ≤.001
[c] All chi-square tests and independent samples t-test significant at p ≤.05, at most, except for ethnicity, gender and education that were not statistically significant

Table 2:Pearson's Chi-square tests and Independent Samples t-tests – Have USC with PCMH model vs. Have USC without PCMH Model[a]

		Have USC with PCMH Model vs. USC without PCMH Model (Unweighted n= 102,967; Weighted n = 173,771,105)[c]		
	Operational Definitions	**Weighted frequencies (Weighted %) or Mean**	**Weighted frequencies (Weighted %) or Mean**	**p-value**
Sample		Have a USC that follows the PCMH model	Have a USC that does not follow the PCMH model	
		19,368,271 (11%)	154,402,834 (89%)	
Independent variables				
Race	White only, no other race	15,488,543 (80%)	127,138,089 (82%)	≤.05
	Black only, no other race	2,470,739 (13%)	16,487,925 (11%)	
	Asian only, no other race	936,864 (5%)	6,954,360 (5%)	
	Other races	472,125 (2%)	3,822,461 (3%)	
Ethnicity	Hispanic	2,367,153 (12%)	17,313,444 (11%)	=0.08
	Non-Hispanic	17,001,119 (88%)	137,089,390 (89%)	
MSA	MSA	14,404,811 (88%)	106,252,539 (83%)	≤.01
	Non-MSA	1,996,082 (12%)	21,417,414 (17%)	
Region	West	4,357,800 (22%)	34,978,109 (23%)	≤.001
	Northeast	4,945,187 (26%)	29,377,888 (19%)	
	Midwest	4,783,398 (25%)	35,064,036 (23%)	
	South	5,281,885 (27%)	54,981,507 (36%)	
Predisposing Factors				
Age	18 - 24	2,576,987 (13%)	15,121,883 (10%)	≤.001
	25 - 44	6,712,371 (35%)	45,583,222 (30%)	
	45 - 64	7,158,873 (37%)	58,936,398 (38%)	
	65 - 85	2,920,041 (15%)	34,761,331 (23%)	

Table 2 cont'd.

		Have USC with PCMH Model vs. USC without PCMH Model (Unweighted n= 102,967; Weighted n = 173,771,105)[c]		
	Operational Definitions	**Weighted frequencies (Weighted %) or Mean**	**Weighted frequencies (Weighted %) or Mean**	**p-value**
Gender				
	Male	8,748,577 (45%)	69,252,974 (45%)	=.57
	Female	10,619,694 (55%)	85,149,860 (55%)	
Difficulty speaking English	Yes	461,031 (5%)	4,821,236 (7%)	≤.01
	No	8,204,364 (95%)	64,615,733 (93%)	
Education	12th grade and lower, no high school diploma	1,211,491 (13%)	10,012,381 (13%)	=.07
	GED of high school graduate	2,497,784 (26%)	21,421,964 (27%)	
	Beyond high school, some college, associate degree	3,004,391 (31%)	22,438,776 (29%)	
	Bachelor's, master's, doctorate, professional degree	2,953,598 (31%)	24,111,054 (31%)	
Enabling Factors				
Employment status	Employed	12,971,073 (67%)	93,001,001 (60%)	≤.001
	Unemployed	6,380,010 (33%)	61,292,391 (40%)	
Marital status	Married	11,799,156 (61%)	87,524,191 (57%)	≤.001
	Singles	7,569,116 (39%)	66,878,643 (43%)	
Personal income $	Median	24,019	21,557	≤.001
	Mean	33,109	31,038	

Table 2 cont'd.

		Have USC with PCMH Model vs. USC without PCMH Model (Unweighted n= 102,967; Weighted n = 173,771,105)[c]		
	Operational Definitions	**Weighted frequencies (Weighted %) or Mean**	**Weighted frequencies (Weighted %) or Mean**	**p-value**
Health insurance	Uninsured	1,590,367 (8%)	13,137,489 (9%)	
	Any private insurance	14,824,386 (77%)	110,802,602 (72%)	≤.001
	Public insurance only	2,953,518 (15%)	30,462,744 (20%)	
Type of facility	Hospital/clinic affiliated outpatient department	4,956,602 (32%)	26,709,102 (24%)	≤.001
	Stand-alone facility	10,501,472 (68%)	83,693,662 (76%)	
Need Related Factors		Have a USC with PCMH model	Have a USC without PCMH model	
Any physical or cognitive limitation	Some limitation	4,302,184 (22%)	48,146,169 (31%)	≤.001
	No limitation	14,907,142 (78%)	105,182,717 (69%)	
Physical condition PCS42	Continuous (ranges between 0 to 100)	50	48	≤.001
Mental condition MCS42	Continuous (ranges from 0 to 100)	52	50	≤.001
Number of health conditions	Number of chronic conditions (ranges between 0 and 10)	1.37	1.66	≤.001

[a] For some variables, percentages may not add up to 100% due to rounding.
[b] All chi-square tests and independent samples t-test significant at p ≤.001
[c] All chi-square tests and independent samples t-test significant at p ≤.05, at most, except for ethnicity, gender and education that were not statistically significant

Table 3: Weighted Logistic Regressions

			Have USC vs. No USC		Sample of respondents who have a USC with PCMH Model vs. a USC without PCMH Model
Independent Variables	**Operational Definitions**	**Odds Ratio**	**(SE)[a] [95% CI][b]**	**Odds Ratio**	**(SE)[a] [95% CI][b]**
Race	White only, no other race (reference group)				
	Black only, no other race	0.86***	(0.05) [0.78; 0.96]	1.17*	(0.10) [0.99; 1.39]
	Asian only, no other race	0.70****	(0.06) [0.58; 0.84]	0.93	(0.16) [0.67; 1.30]
	Other races	1.01	(0.14) [0.76; 1.32]	1.21	(0.20) [0.86; 1.68]
Ethnicity	Non-Hispanic (reference group)				
	Hispanic	0.85****	(0.04) [0.77; 0.94]	1.07	(0.11) [0.87; 1.31]
MSA	Non-MSA (reference group)				
	MSA	0.86	(0.08) [0.71; 1.04]	1.23	(0.17) [0.93; 1.63]
Region	West (reference group)				
	Northeast	1.27***	(0.12) [1.06; 1.52]	1.30**	(0.14) [1.06; 1.61]
	Midwest	1.13	(0.09) [0.96; 1.33]	1.17	(0.14) [0.93; 1.47]
	South	0.76****	(0.05) [0.67; 0.85]	0.91	(0.11) [0.72; 1.15]
Predisposing Factors					
Age	18 – 24 (reference group)				
	25 - 44	0.83****	(0.04) [0.75; 0.92]	0.92	(0.10) [0.75; 1.14]
	45 - 64	1.38****	(0.08) [1.23; 1.55]	0.79**	(0.08) [0.65; 0.97]
	65 - 85	1.98****	(0.18) [1.65; 2.37]	0.65****	(0.08) [0.51; 0.83]
Gender	Male (reference group)				
	Female	1.71****	(0.05) [1.61; 1.82]	1.01	(0.04) [0.94; 1.09]
Difficulty speaking English	No (reference group)				
	Yes	0.74****	(0.06) [0.64; 0.86]	0.67**	(0.12) [0.47; 0.94]
Education	12th grade and lower, no high school diploma (reference group)				
	GED and high school graduate	0.92	(0.05) [0.82; 1.03]	0.96	(0.09) [0.80; 1.15]
	Beyond high school, some college, associate degree	1.07	(0.07) [0.95; 1.22]	0.97	(0.09) [0.82; 1.16]
	Bachelor's, master's, doctorate, professional degree	1.08	(0.08) [0.94; 1.24]	0.87	(0.09) [0.71; 1.05]

Table 3 cont'd.

			Have USC vs. No USC	Sample of respondents who have a USC with PCMH Model vs. a USC without PCMH Model	
Independent Variables	**Operational Definitions**	**Odds Ratio**	**(SE)[a] [95% CI][b]**	**Odds Ratio**	**(SE)[a] [95% CI][b]**
Enabling Factors					
Employment status	Unemployed (reference group)				
	Employed	0.99	(0.04) [0.91; 1.09]	1.08	(0.07) [0.95; 1.22]
Marital status	Singles (reference group)				
	Married	1.37****	(0.06) [1.26; 1.49]	1.22***	(0.09) [1.06; 1.41]
Personal income $	Continuous	1.00***	(0.000) [1.00; 1.00]	1.00	(0.00) [1.00; 1.00]
Health insurance	Uninsured (reference group)				
	Any private insurance	4.11****	(0.23) [3.68; 4.58]	1.04	(0.12) [0.83; 1.31]
	Public insurance only	3.19****	(0.19) [2.83; 3.59]	0.83	(0.11) [0.64; 1.07]
Type of facility	Hospital/clinic affiliated outpatient department (reference group)	N/A	N/A		
	Stand-alone facility	N/A	N/A	0.68***	(0.06) [0.57;0.81]
Need Related Factors					
Any physical or cognitive limitation	Some limitations	1.12**	(0.06) [1.01; 1.24]	0.74****	(0.06) [0.63; 0.86]
	No limitation (reference group)				
Physical condition – PCS42	Continuous (ranges between 0 to 100)	0.99****	(0.002) [0.99; 0.99]	1.00	(0.004) [0.99; 1.01]
Mental condition – MCS42	Continuous (ranges from 0 to 100)	1.00*	(0.002) [0.99; 1.00]	1.01***	(0.003) [1.00;1.02]
Number of health conditions	Number of chronic conditions (between 0 and 10)	1.51****	(0.03) [1.45; 1.57]	1.01	(0.02) [0.96; 1.05]
Overall F-Test			108.99****		7.41****

[a]standard error [b]95% confidence interval
*p<.10 **p<.05 ***p<.01 ****p<.001