



Published in final edited form as:

Med Care. 2018 June ; 56(6): 497–504. doi:10.1097/MLR.0000000000000910.

Organizational Processes and Patient Experiences in the Patient-Centered Medical Home

Jaya Aysola, MD, MPH^{1,2}, Marilyn M. Schapira, MD, MPH^{1,2,3}, Hairong Huo, PhD¹, and Rachel M. Werner, MD, PhD^{1,2,3}

¹Division of General Internal Medicine, Department of Medicine, Perelman School of Medicine, University of Pennsylvania

²Leonard Davis Institute of Health Economics, University of Pennsylvania

³Crescenz VA Medical Center, Philadelphia PA

Abstract

Background—There is increasing emphasis on the use of patient-reported experience data to assess practice performance, particularly in the setting of patient-centered medical homes. Yet we lack understanding of what organizational processes relate to patient experiences.

Objective—Examine associations between organizational processes practices adopt to become PCMH and patient experiences with care

Research Design—We analyzed visit data from patients (n=8356) at adult primary care practices (n=22) in a large health system. We evaluated the associations between practice organizational processes and patient experience using generalized estimating equations (GEE) with an exchangeable correlation structure to account for patient clustering by practice in multivariate models, adjusting for several practice-level and patient-level characteristics. We evaluated if these associations varied by race/ethnicity, insurance type, and the degree of patient comorbidity

Measures—Predictors include overall PCMH adoption and adoption of six organizational processes: access and communications, patient tracking and registry, care management, test referral tracking, quality improvement and external coordination. Primary outcome was overall patient experience.

Results—In our full sample, overall PCMH adoption score was not significantly associated with patient experience outcomes. However, among subpopulations with higher comorbidities, the overall PCMH adoption score was positively associated with overall patient experience measures [0.2 (0.06, 0.4); p=0.006]. Differences by race/ethnicity and insurance type in associations between specific organizational processes and patient experience were noted.

Corresponding Author: Jaya Aysola, MD, MPH, Division of General Internal Medicine, Perelman School of Medicine, 1229 Blockley Hall, 423 Guardian Drive, Philadelphia, PA, 19104-6201, Phone: 215-573-9475; Fax: 215-573-8778; jaysola@upenn.edu.

Conflicts of Interest Disclosure: The funders had no role in the design and conduct of the study; the collection, management, analysis, and interpretation of the data; or the preparation, review, or approval of the manuscript.

Conclusion—While some organizational processes relate to patients' experiences with care irrespective of the background of the patient, further efforts are needed to align practice efforts with patient experience.

INTRODUCTION

The concept of the patient-centered medical home (PCMH) has gained support over the past decade from multiple stakeholders interested in strengthening the primary care delivery system.(1-3) Despite its implied goal of making care more 'patient-centered', to date PCMH standards have not utilized patient-reported outcomes to evaluate practices' achievement of and adherence to the intended goals of PCMH implementation.(4) Only recently, the National Committee for Quality Assurance (NCQA) offered practices already recognized as PCMHs the option to submit patient experience results, however it is unclear how they will utilize these results to evaluate practices.(5)

Meanwhile, there is increasing emphasis on the use of patient-reported experience in the evaluations of outpatient primary care practice and provider performance.(6) It is unclear what primary care organizational processes relate to patient experiences with care, even in the setting of PCMHs, where these processes are adopted most often. We do know that the organizational processes that constitute best practice for PCMH reflect the original intent of the model to provide care that is accessible, well integrated/coordinated and managed, comprehensive and continuous, patient/family-centered and culturally effective.(1, 2, 7, 8) Prior work has demonstrated a positive relationship between patient experience and adoption of primary care processes that improve accessibility(9, 10), comprehensiveness and continuity(11), care coordination and management of services.(12, 13) There lacks consensus on the operational definition of patient-centeredness(14), although there is agreement that patient/family-centeredness is comprised of factors previously shown to improve patient experience, such as cultural effectiveness/competency/humility and shared-decision making.(15-17) Patient experience measurement offers practices one strategy to demystify patient-centered care.(18) Patient experience measures may guide where practices concentrate their efforts by revealing which organizational processes patients perceive and which practices must modify or adopt to achieve patient-centeredness.(19, 20)

Despite evidence for the relationship between key components of the PCMH model and patient experiences with care, prior work found variable effects on overall patient experience among practices that underwent PCMH implementation. (21-26) One rationale posited is the existence of many pathways to obtain PCMH recognition and therefore the tremendous variation among PCMH designated practices.(27) Coupled with this is our lack of understanding of PCMH implementation outcomes, such as fidelity, or the degree to which practices adopt the processes they report to NCQA to achieve recognition.(28) The fidelity of the PCMH adoption impacts its reach within the intended population, which may be captured best by whether patients actually perceive the processes that practices adopt. In a previous qualitative study, we contrasted patient feedback from practices characterized as high PCMH adopters versus low PCMH adopters and found patients uniformly lacked knowledge of practice transformations with no differences between practices in perceived improvements.(24) Studies to date, however, have not evaluated the differential influences

on patient experiences by comorbidity burden, race/ethnicity, or insurance type. In addition, Burnett et.al. found no significant correlations between the organizational processes that pediatric practices adopted to become PCMHs and family reported experiences.(29) We are not aware of prior work examining a similar question in adult patients. Therefore, our work contributes to the growing evidence on patient experience within PCMHs in two important ways. First, we evaluated the relationships between organizational processes and patient-reported experiences in the network of University of Pennsylvania Health System (UPHS) adult primary care practices. Second, we examined how overall PCMH adoption, as well as by specific organizational processes varied in its relationship to patient-reported experiences by patients' degree of comorbidities, race/ethnicity, or insurance type.

METHODS

Data Sources

To conduct this study, we merged data from two sources. The first was data from a practice-level survey of managers from primary care practices affiliated with UPHS that served adult patients, had three or more providers, and had completed the 2008 or 2011 NCQA PCMH recognition process. A diverse group of twenty-two urban and suburban primary care practices in New Jersey and Pennsylvania met these eligibility criteria. The second was visit-triggered survey data (sent to all patients after an ambulatory care visit) collected between January 2012 and July 2014 from primary care patients at the 22 eligible primary care sites (n=8356). For those patients who completed more than one visit survey during this process (n=959), we randomly selected one. We also obtained data from Penn Medicine's Clinical Data Warehouse on those patients that had a visit during our study period, but didn't respond to the visit triggered patient-experience survey, with permissions to use in aggregate without personal identifiers. The Institutional Review Board of the University of Pennsylvania approved this study.

Dependent Variable: Patient Experience

Our dependent variable was a measure of overall patient experience from a 34-item visit-triggered survey, that assessed patient reported experiences with five subdomains. The first subdomain, access, gauges patients' perceptions of how easy it is to reach practice personnel via phone, the convenience of the practice's office hours, the ease of scheduling an appointment, the approachability and courtesy of registration/front desk staff. The second subdomain assesses the experience of moving through the medical encounter (visit), including wait times and the degree patients were informed about any delays. The third subdomain assesses patient perceptions of ancillary staff (nurse, medical assistant) and whether or not they demonstrate courtesy, friendliness and concern for patients' problems or inquiries. The care provider subdomain asks patients if their care provider is courteous, provides clear and concise explanations, demonstrates concern for patients' worries or questions, includes them in treatment decisions, and ensures understanding of medications and treatment plans. In addition, it elicits the patient assessment of the amount of time the provider spent with them and their overall confidence in their care provider. The last subdomain, patient safety and privacy (no reported issues with safety or privacy), evaluates patient perceptions of overall cleanliness of the practice space and whether practice staff

were sensitive to their needs and any unique requirements, respected their privacy, and adhered to hygiene and safety practices (e.g. hand washing). The survey was designed to generate a score (0 to 100) within a subdomain from each five-point Likert-scale question as follows: very poor (score = 0), poor (25), fair (50), good (75) and very good (100). The scores for all questions within each subdomain are averaged to generate a mean score for that subdomain. Then the overall experience with care is calculated from the mean scores from the five subdomains weighted equally. (30) Reliability estimates from prior psychometric analyses for the subdomains range from a Cronbach's alpha of .81 to .97 and methodological details of the survey are described elsewhere(31).

Practice-level Covariates

Our independent variables came from the practice-level survey using the Safety Net Medical Home Scale (SHCHS), that we administered in 2012 to practice managers at our eligible sites via email, with a 100% response rate. The survey quantifies a practice's degree of PCMH adoption and captures elements pertinent to serving diverse socioeconomic populations in a variety of primary care settings and not exclusively safety net clinics.(32, 33) The 52-item survey assesses six organizational processes (subdomains): Access and Communication, Patient Tracking and Registry, Care Management, Test and Referral Tracking, Quality Improvement, and External Coordination. The access/communication subdomain evaluates whether patients can contact their clinician on a timely basis and whether translation services are available when needed. The care management subdomain evaluates the ability to proactively manage a patient population through reminders, follow-up calls, patient education, and care coordination. The external coordination subdomain assesses the ability of providers to secure outside referrals for their patients and receive updates on care that occurs outside of the clinic. The patient tracking subdomain evaluates the ability to create lists of patients with particular clinical characteristics for population management. The test/referral tracking subdomains assesses the ability to monitor tests or specialist/subspecialist referrals from the time of order to the time results or referral reports reach clinicians. Finally, the quality improvement subdomain evaluates the ability to systematically collect measures of clinician and practice quality of care performance. (33) The survey generates an overall PCMH adoption score (scale 0 to 100) using a scoring algorithm that incorporates responses to questions from the six organizational processes. Full details on survey methodology, with complete survey and scoring algorithm are described elsewhere.(32) We examined the six PCMH organizational processes as well as overall PCMH adoption score as predictors of patient experience in our models. Prior evaluation of this medical home scale reports that an average overall PCMH adoption score of 61 reflects a practice that has a good foundation for the PCMH model, but room for improvements.(32) We interpret the results of our analysis in terms of 10-point differences in PCMH scores, differences that are operationally meaningful. Prior work provides us with examples to interpret a 10-point difference in overall PCMH scores, when comparing hypothetical practice A to B. With all other survey responses equal between two hypothetical practices, a 10-point difference could result from an aggregation of the following three differences: 1) Practice A reports they have weekend hours for regular/ well visits in addition to weekday appointments available before 8:30am and after 6pm. Practice B reports they have weekday afterhours appointments for regular/well visits available before

8:30 am and after 6pm, but no weekend appointments available for regular/well care; 2) Practice A reports taking less than 24 hours versus Practice B reports taking one week to generate patient lists that track who are due or overdue for preventive tests/care, patients with a certain disease (e.g. Diabetes), and/or a certain risk factor (e.g. smoking); 3) Practice A responds 'usually' (75-100% of the time) and Practice B responds 'sometimes' (25-49% of the time) to the question, "*How often, if ever, are: patients sent reminder notices when it is time for regular preventive or follow-up care (e.g., flu vaccine or HbA1C for diabetic patients).*" (32, 33)

Statistical Analysis

We first generated a description of practice organizational variables and patient experience measures using means and frequencies in aggregate and by practice site. Second, we compared the characteristics of responders and non-responders to the visit-triggered patient experience survey as well as the practice and provider characteristics associated with their medical encounters. Third, to investigate the relationship between practice-level organizational processes and patient-reported experience, we used generalized estimating equations (GEE) with an exchangeable correlation structure to account for patient clustering by practice. We fit one multivariate model with all of the individual PCMH organizational processes as predictors and a second model with the overall PCMH score as a predictor. In all multivariate models, we included practice-level covariates measuring, practice type (suburban, urban), patient panel size, number and type of providers, as well as the following patient-level covariates: age, gender, race/ethnicity, place of residence (resides in low income zip code surrounding the University or not), insurance status, visit year, and clinical comorbidities (Charlson Comorbidity Index (CCI)(34)). Lastly, to determine if these relationships varied by the degree of patient comorbidity (categorical CCI (0, 1, 2, >2), race/ethnicity, and insurance type, we performed the above GEE models stratified by these variables.

RESULTS

Table 1 provides the distribution and degree of variation of both our independent and dependent variables, or organizational processes and patient experience measures respectively. The overall PCMH adoption median score for the 22 practices in our study was 60.6 and interquartile range (IQR) of 4.3, with a minimum score of 28.5 and maximum score of 71.6. Practices with the two lowest PCMH adoption scores had just submitted their application for PCMH designation. The interquartile range, however, was narrow for overall PCMH adoption score. In contrast, the lowest IQR for the subdomain PCMH adoption scores was 9.7, with the remaining subdomain scores having IQRs far greater (Table 1). Therefore it is reasonable to interpret our findings in terms of a 10-point change in PCMH subdomain adoption scores. The overall patient experience score, our dependent variable, ranged from 1.05 to 100, with a median score of 92.2, and an interquartile range of 19.8.

The mean age (SD) of the 8356 patients in the study (responders to survey) was 57 (17.5) and about 64% were female, 24% were Black, 5.3 % had Medicaid, and 5.3 % had multiple comorbid conditions (CCI>2). In comparison, the mean age (SD) of patients that did not

complete a survey (non-responders) was 47.8 (18.1), and about 36% were Black, 10.6% had Medicaid, and 10.3% had multiple comorbid conditions (CCI>2). There were significant differences in all characteristics between responders and non-responders (Table 2).

Among the entire patient sample, the multivariate models revealed no significant associations between the degree to which practices adopt PCMH (overall PCMH adoption score) and patient reported experiences with care, both for overall experience as well as each of the subdomains of patient experience. There were some notable associations, however, detected between the six organizational processes that contribute to the overall PCMH adoption score and patient experience scores (Table 3). Higher adoption scores in PCMH organizational processes related to access and communication, patient tracking and registries, and care management were positively associated with patient overall experience as well as their experiences with access and visits. In contrast, higher adoption scores in organizational processes related to test tracking or quality improvement were negatively associated with patient overall experience scores as well as patient experiences with access, visits, and ancillary staff (Table 3). There were no significant associations between any organizational process adopted by practices and patient experiences with their care providers.

To contextualize these estimates, consider two hypothetical practices. A 10-point difference in the care management subdomain score between Practice A and B, with all else equal, could result from a difference in response to the following single item: Practice A responds usually (75-100% of the time) and Practice B responds sometimes (25-49% of the time) to the question, “*How often, if ever, are: patients sent reminder notices when it is time for regular preventive or follow-up care (e.g., flu vaccine or HbA1C for diabetic patients).*”[†] This 10 point increase in the care management score from Practice B to Practice A would result in a 1 point increase in overall patient experience score (Table 3). Prior evidence suggests that even a half point decrease in overall patient experience scores, given known ceiling effects, would correspond to a substantial decrease in the percentile rank score by which practices are incentivized. (35, 36)

Among patients with comorbidity index (CCI) of 2 and greater as compared to those patients with CCI of less than 2, there were statistically significant positive associations between practice overall PCMH adoption scores and overall patient experience, even after adjusting for a robust set of patient, provider, and practice characteristics (Table 4). Stratified models revealed differences in associations between organizational processes adoption scores and patient experience outcomes by race/ethnicity. For example, we found significant but negative associations between adoption scores for quality improvement and external coordination processes and patient experience scores among non-hispanic black patients (Table 5). We also detected significant differences in associations between organizational processes practices adopted and patient experience scores by insurance type. Practices adopting organizational processes pertaining to access and communications and patient registries and tracking were associated with significantly higher patient overall experiences scores among patients with private insurance, but significantly lower patient experience scores among patients with Medicaid. Conversely, higher practice scores for adoption of care management processes were associated with higher overall patient experience scores

among those with Medicaid as compared to private insurance (Table 5). In sensitivity analyses, we estimated patient-level associations between patients' insurance type and patient experience scores, given the uneven distribution of Medicaid patients by practice. We found no significant differences in reported experience scores for patients insured by Medicaid and those privately insured ($p=0.15$).

DISCUSSION

In this cross-sectional analysis of patient experience data over a two-year period across 22 practice sites, our findings suggest that organizational processes may relate to patient experiences and that these associations may be stronger in some patient populations over others. We found that the IQRs of the subdomain scores were far greater than the IQR of the overall PCMH adoption score, consistent with prior work highlighting that practices may choose which organizational processes they wish to adopt or focus on to become a PCMH. (27)

Among our entire study population, we found no significant relationship between the degree of PCMH adoption, reflected by overall PCMH adoption scores, and overall patient experience. While overall PCMH adoption scores did not appear to predict overall patient experiences, we found significant patterns of associations between specific organizational processes required for PCMH adoption and overall patient experience. Practices that report higher degree of adoption of processes related to providing access and care management, were significantly associated with higher overall patient experience scores. This is not necessarily surprising, as patients directly experience changes in processes related to care management as prior work suggests.(35) In contrast, practices with higher scores in processes related to quality improvement and tracking tests and referrals, were significantly associated with lower overall patient experience scores. One rationale for this finding is that practices may require a greater focus on technology to adopt quality improvement and test and referral tracking processes, which may overshadow other efforts that promote greater interpersonal interactions or patient satisfaction. These practices adopted the NCQA PCMH standards (2008 or 2011), which specifically emphasizes technology for quality of care performance measurement and electronic tracking of referrals and tests.(4) The significant negative associations we found between these processes and patient experiences with ancillary staff lend some support to this theory. This hypothesized tension between “high tech” versus “high touch” is not new within the ongoing discourse on how best to deliver patient-centered care in the era of primary care redesign.(37, 38) We need further qualitative evaluation to gain a better understanding of how practices can adopt each of these processes without compromising other aspects of the care experience for patients.

Among patients that had greater comorbidities ($CCI \geq 2$), we found that practices with higher PCMH adoption scores were associated with higher overall patient experience scores. It is not surprising that individuals with greater comorbidities would benefit from PCMH organizational processes. Patients with greater co-morbidities may engage with the practice more frequently and thereby provide more accurate perceptions of practice implementation of organizational processes or they may derive greater benefits. The historical intent of the PCMH was to serve a high comorbidity patient population, and so many of the PCMH

organizational processes that enhance care coordination and management readily benefit those with multiple chronic conditions over those patients with minimal health problems.(1, 2) Our findings support this notion and prior work suggesting that practices implementing the PCMH model may benefit from targeting their efforts towards patients with greater health care needs, akin to the original intent of the model.(22, 24, 25, 39)

We found associations between practices adopting processes related to access and communication and higher patient experience scores in patients with private insurance, but lower scores in patients insured by Medicaid. Within our sample of practices, Medicaid patients were not evenly distributed. Thus, this finding could either reflect differences in scoring between patients with private insurance as compared to Medicaid or differences in experience based upon practice organizational processes. We therefore estimated patient-level associations between insurance type and patient experience scores in attempt to disentangle our findings. We found no significant differences in reported experience scores for patients insured by Medicaid and those privately insured. This finding supports previous evidence that patients with Medicaid insurance have significantly greater difficulty in accessing primary care services as compared to other insurance types, even among practices that reportedly accept Medicaid, irrespective of the PCMH status of the practice.(40, 41) A follow-up study demonstrated that increased Medicaid reimbursement to primary care providers, as mandated in the ACA, was associated with improved appointment availability for Medicaid enrollees among participating providers without generating longer waiting time. (42) This study highlights financial reimbursements as one modifiable contributor to this disparity. While our study suggests that these challenges in access persist for patients insured by Medicaid, we also found that practices adopting care management processes were associated with higher experience scores for Medicaid patients as compared to private patients.

Lastly, our findings reveal associations between practice efforts in adopting organizational processes required to become PCMHs and patient experience scores varied by the race/ethnicity of the survey respondent. For example, we found that adoption scores in areas such as quality improvement and external coordination were negatively associated with patient experience scores in black patients. Such differences may reflect that either certain patients experience the processes differently or that practices are applying the processes differently to different patients based on their race/ethnicity. We are limited in our ability to distinguish this; however, this is not unique to our study, but rather examining patient experience data at large. A recent study found similar racial/ethnic disparities among Medicare beneficiaries care coordination experiences (43) and is consistent with prior consumer assessments of access and use of health care.(44) Our study may also shed some light on prior work that found that PCMH did not appear to reduce disparities in care quality in both pediatric and adult populations.(45, 46) Our results echo the sentiment that a “one size fits all” approach to primary care redesign may not be the answer to improving patient experiences. Organizational processes related may benefit from targeted approaches that encompass culturally sensitive training for the practice team and front line staff.(47) In both hospital and ambulatory settings, patient experience measures are not routinely stratified by personal characteristics, such as race/ethnicity or primary language. Ongoing measurement is the first

critical step in redesigning organizational processes to tackle disparities in patient experience, while ensuring accuracy of data and reliability of findings.(48-50)

Our study had limitations. First, we cannot infer causality, given our cross-sectional design. Second, these findings may lack generalizability, as we conducted this study in one network of practices. However, UPHS primary care practices are a diverse group of suburban and urban practices in New Jersey and Pennsylvania. Third, this study is likely subject to nonresponse bias. Reported patient experiences from responders to the survey who took the time to complete the survey, likely reflect a more engaged patient population. An important caveat to this limitation is that currently all organizations utilizing licensed vendors to measure patient experience for operations, performance incentives, public reporting, and research have similar response rates and response bias. Given this, while perhaps this provides an overestimate of associations, we posit, that our findings from engaged patients remain insightful to any health care organization utilizing patient experience measures in the capacity described above. Lastly, we did not collect serial measurements of PCMH organizational processes and therefore, cannot speak to changes in practice processes over the two year period. Future evaluations may benefit from ongoing measurement of practice adoption of organizational processes.

There has been a movement to restructure and revitalize primary care with PCMHs and an increasing emphasis on patient experience metrics as a key method to assess practice and provider performance. Therefore, it is increasingly important to understand how our organizational processes relate to patient experience and what processes improve experiences for which patients. Our study suggests that certain organizational processes, such as care management, positively relate to all patients' experiences with care irrespective of their background. Interestingly and perhaps not surprisingly, we found patient experiences with their care provider were consistent irrespective of the patient's background or the organizational processes adopted by the practice. This finding aligns with prior work describing the unique role of the care provider in dictating patients experiences with care. (24)

Our work also reveals areas for future inquiry. It is not clear whether our findings reflect variation in patient perceptions based on their background or reflect a variation in practice application of PCMH processes or both. Also, in order for practices to utilize patient experience metrics to assess practice transformation we need to build upon our current understanding with nation-wide evaluations of what constitutes a meaningful change in patient experience scores.(35)

This study does highlight the utility of patient experience measurement in evaluating the adoption of PCMH organizational processes and determining whether practice reported policies translate into the realities of daily operations. Our findings reveal the critical role of patient experience measurement in examining implementation outcomes such as fidelity of PCMH adoption and its reach within the intended population. Lastly, key to elevating our understanding of PCMH adoption is determining whether its reach is uniform, by stratifying patient experience measures by personal characteristics such as race/ethnicity or insurance status in order to identify and address disparities in care experiences.

Acknowledgments

We would like to thank Dr. Eve Higginbotham and the Office of Inclusion and Diversity for their support of this study.

Financial Disclosure: Jaya Aysola was funded by the grant AHRQ's PCOR Institutional Award (K12 HS021706-01) for the implementation and analysis of the results of this study. Rachel Werner is funded in part by K24-AG047908 from the National Institute on Aging.

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Table 1

Descriptive Statistics for Practice Organizational Processes and Patient Report Experience Measures

Practice Organizational Processes	25 th Percentile	Median	75 th percentile	Quartile Range
Access & Communication	68.4	75	85.7	17.2
Patient Tracking and Registry	58.3	75	75.0	16.7
Care Management	39.6	54.2	64.6	25.0
Test Referral Tracking	33.3	41.7	45.8	12.5
Quality Improvement	41.7	50	51.4	9.7
External Coordination	62.5	79.2	83.3	20.8
Overall PCMH Adoption Score	57.7	60.6	62.0	4.3

Patient Reported Experience Outcomes	25 th Percentile	Median	75 th percentile	Quartile Range
Access	75	90.6	100	25.0
Visit	75	83.3	100	25.0
Nurse/Staff	75	100	100	25.0
Care Provider	87.5	100	100	12.5
Patient safety and privacy	75	95	100	25.0
Overall Experience	79.2	92.2	99.0	19.8

Table 2

Comparisons of Patient and Medical Encounter (Visit) Characteristics between Respondents and Non-Respondents¹

	Respondents (n=8355)	Non-Respondents (n=28202)
Patient Characteristics		
Age in Years, Mean (SD)	57.1 (17.5)	47.8 (18.1)
Charlson Score (0-11 high), Mean (SD)	0.5 (1.1)	0.8 (1.5)
Charlson Group, no. (%)		
0 (Charlson Score=0)	5937 (71.8)	15225 (59.0)
1 (Charlson Score=1)	1343 (16.2)	5527 (21.4)
2 (Charlson Score=2)	555 (6.7)	2390 (9.3)
3 (Charlson Score>2)	436 (5.3)	2661(10.3)
Gender, no. (%)		
Male	3014 (36.1)	10705 (38.0)
Female	5341 (63.9)	17497 (62.0)
Race/Ethnicity, no. (%)		
Non-Hispanic White	5593 (66.9)	15486 (54.9)
Non-Hispanic Black	2023 (24.2)	10070 (35.7)
Other	739 (8.9)	2646 (9.4)
Place of Residence in Low-Income Zip Code², no. (%)		
Yes	1286 (15.4)	5545 (19.7)
No	7069 (84.6)	22657 (80.3)
Insurance type, no. (%)		
Private	6062 (72.6)	22492 (80.1)
Medicare	1774 (21.2)	2439 (8.7)
Medicaid	445 (5.3)	2982 (10.6)
Self-Pay	74 (0.9)	155 (0.6)
Medical Encounter (Visit) Characteristics		
Provider Type, no. (%)		
Physician	6862 (82.1)	22244 (79.4)
Resident	616 (7.4)	4211 (15.0)
Nurse Practitioner/Physician Assistant	832 (10.0)	1522 (5.4)
Other (e.g. pharmacist, social worker)	45 (0.5)	28 (0.1)
Practice Number of Providers, Mean (SD) ⁴	9.8 (3.5)	10.1 (3.3)
Practice Number of Patients, Mean (SD) ⁴	12977.7 (4732.8)	13322.8 (4749.4)

	Respondents (n=8355)	Non-Respondents (n=28202)
Practice Type, no. (%)³		
Suburban	5049 (60.4)	15818 (56.1)
Urban	3306 (39.6)	12384 (43.9)

¹ p<0.05 in all comparisons

² Low income zip codes specifically in West Philadelphia, the area surrounding the University of Pennsylvania versus all other zip codes

³ Type of practice where medical encounter occurred (University-affiliated suburban practices versus University urban practices)

⁴ Size characteristics of practice attended by patient (respondent or non-respondent)

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Table 3

Adjusted Results: Practice Organizational Processes Associations with Patient Reported Experiences with Care

	Patient Reported Experience Measures and Overall Experience						
	Access	Visit	Nurse/Staff	Care Provider	Patient safety and privacy	Overall Experience	
	β-Coefficient (95% CI) p value						
Practice Organizational Processes	Access & Communication	0.1 (0.03, 0.2) <i>p</i> =0.009*	0.1 (-0.001,0.3) <i>p</i> =0.05	0.07 (-0.005,0.1) <i>p</i> =0.07	0.07 (0.02,0.1) <i>p</i> =0.005*	0.08 (0.02,0.1) <i>p</i> =0.006*	0.09 (0.03,0.2) <i>p</i> =0.007*
	Patient Tracking and Registry	0.2 (-0.001,0.4) <i>p</i> =0.05	0.2 (-0.01,0.4) <i>p</i> =0.07	0.1 (-0.01,0.2) <i>p</i> =0.08	0.1 (0.02,0.2) <i>p</i> =0.01*	0.1 (0.01,0.2) <i>p</i> =0.02*	0.1 (0.01,0.3) <i>p</i> =0.03*
	Care Management	0.1 (-0.02,0.2) <i>p</i> =0.10	0.3 (0.1,0.4) <i>p</i> =0.002*	0.08 (-0.01,0.2) <i>p</i> =0.09	0.07 (0.001,0.1) <i>p</i> =0.07	0.1 (0.05,0.2) <i>p</i> =0.002*	0.1 (0.03,0.2) <i>p</i> =0.007*
	Test Referral Tracking	-0.1 (-0.3, -0.05) <i>p</i> =0.005*	-0.1 (-0.2, -0.03) <i>p</i> =0.02*	-0.08 (-0.1, -0.02) <i>p</i> =0.01*	-0.06 (-0.1, 0.002) <i>p</i> =0.05	-0.07 (-0.1, -0.02) <i>p</i> =0.006*	-0.1 (-0.2, -0.03) <i>p</i> =0.004*
	Quality Improvement	-0.09 (-0.3,0.1) <i>p</i> =0.46	-0.1 (-0.4,0.09) <i>p</i> =0.22	-0.07 (-0.2,0.07) <i>p</i> =0.34	-0.06 (-0.2,0.03) <i>p</i> =0.17	-0.09 (-0.2,0.05) <i>p</i> =0.21	-0.09 (-0.3,0.07) <i>p</i> =0.28
External Coordination	-0.04 (-0.2,0.09) <i>p</i> =0.57	-0.07 (-0.2,0.1) <i>p</i> =0.43	-0.04 (-0.1,0.05) <i>p</i> =0.39	0.01 (-0.05,0.08) <i>p</i> =0.76	-0.03 (-0.1,0.04) <i>p</i> =0.34	-0.03 (-0.1,0.07) <i>p</i> =0.45	
Overall PCMH Adoption Score	0.1 (-0.1,0.4) <i>p</i> =0.29	0.2 (-0.1,0.4) <i>p</i> =0.24	0.04 (-0.1,0.2) <i>p</i> =0.63	0.1 (-0.002,0.3) <i>p</i> =0.06	0.09 (-0.06,0.2) <i>p</i> =0.22	0.1 (-0.07,0.3) <i>p</i> =0.22	

Table 4 Adjusted Results: Practice Processes Associations with Patient Reported Overall Experience with Care Stratified by Charlson Groups

	Patient Reported Overall Experience				
	Charlson Score				
	0 (N=5340)	1 (N=1251)	2 (N=525)	>2 (N=420)	
	β -Coefficient (95% CI) p value				
Practice Organizational Processes	Access & Communication	0.09 (0.02,0.2) <i>p</i> =0.02*	0.09 (0.02,0.1) <i>p</i> =0.01*	0.1 (-0.01,0.3) <i>p</i> =0.06	0.09 (0.02,0.2) <i>p</i> =0.02*
	Patient Tracking and Registry	0.1 (-0.01,0.3) <i>p</i> =0.06	0.1 (0.02,0.2) <i>p</i> =0.01*	0.2 (-0.06,0.4) <i>p</i> =0.12	0.02 (-0.1,0.1) <i>p</i> =0.93
	Care Management	0.1 (0.04,0.3) <i>p</i> =0.01*	0.1 (0.03,0.2) <i>p</i> =0.008*	0.1 (-0.02,0.2) <i>p</i> =0.10	0.1 (0.04,0.2) <i>p</i> =0.003*
	Test Referral Tracking	-0.1 (-0.2, -0.03) <i>p</i> =0.01*	-0.1 (-0.2, -0.06) <i>p</i> <0.001*	-0.05 (-0.2,0.05) <i>p</i> =0.31	-0.1 (-0.2, -0.06) <i>p</i> <0.001*
	Quality Improvement	-0.1 (-0.3,0.09) <i>p</i> =0.28	-0.06 (-0.2,0.04) <i>p</i> =0.24	-0.03 (-0.2,0.1) <i>p</i> =0.72	0.09 (-0.04,0.2) <i>p</i> =0.14
External Coordination	-0.02 (-0.1,0.09) <i>p</i> =0.67	-0.04 (-0.1,0.03) <i>p</i> =0.26	-0.05 (-0.2,0.1) <i>p</i> =0.51	0.06 (-0.06,0.2) <i>p</i> =0.27	
Overall PCMH Adoption Score	0.1 (-0.09,0.3) <i>p</i> =0.26	0.06 (-0.09,0.2) <i>p</i> =0.49	0.3 (0.05,0.4) <i>p</i> =0.01*	0.2 (0.06,0.4) <i>p</i> =0.006*	

Table 5

Adjusted Results: Practice Organizational Processes Associations with Patient Overall Experience with Care Stratified by Race and Insurance

		Patient Reported Overall Experience						
		β -Coefficient (95% CI) p value						
		Race/Ethnicity			Insurance Type			
		Non-Hispanic White (N=5547)	Non-Hispanic Black (N=1989)	Private (N=5408)	Medicaid (N=410)	Medicare (N=1653)	Self-Pay (N=65)	
Practice Organizational Processes	Access & Communication	0.09 (0.04,0.1) <i>p</i> =0.001*	0.09 (0.03,0.2) <i>p</i> =0.002*	0.1 (0.04,0.2) <i>p</i> =0.004*	-0.1 (-0.2, -0.02) <i>p</i> =0.01*	0.08 (-0.03,0.2) <i>p</i> =0.15	0.5 (0.1,1.0) <i>p</i> =0.01*	
	Patient Tracking and Registry	0.06 (-0.07,0.2) <i>p</i> =0.28	0.1 (0.03,0.2) <i>p</i> =0.009*	0.2 (0.02,0.3) <i>p</i> =0.02*	-0.09 (-0.2,0.05) <i>p</i> =0.23	0.04 (-0.1,0.2) <i>p</i> =0.57	0.9 (0.6,1.2) <i>p</i> <0.0001*	
	Care Management	0.1 (0.04,0.2) <i>p</i> =0.006*	0.1 (0.06,0.2) <i>p</i> =0.001*	0.1 (0.02,0.2) <i>p</i> =0.01*	0.3 (0.2,0.5) <i>p</i> <0.0001*	0.1 (0.02,0.2) <i>p</i> =0.008*	0.1 (-0.2,0.4) <i>p</i> =0.58	
	Test Referral Tracking	-0.1 (-0.2, -0.05) <i>p</i> <0.001*	-0.1 (-0.2, -0.06) <i>p</i> =0.001*	-0.1 (-0.2, -0.04) <i>p</i> =0.002*	-0.1 (-0.2,0.05) <i>p</i> =0.2	-0.08 (-0.1, -0.01) <i>p</i> =0.02*	-0.2 (-0.5,0.04) <i>p</i> =0.10	
	Quality Improvement	0.009 (-0.1,0.2) <i>p</i> =0.93	-0.1 (-0.2, -0.02) <i>p</i> =0.02*	-0.09 (-0.3,0.09) <i>p</i> =0.34	-0.02 (-0.1,0.1) <i>p</i> =0.76	0.01 (-0.1,0.2) <i>p</i> =0.84	-0.2 (-0.8,0.3) <i>p</i> =0.36	
External Coordination	0.03(-0.06,0.1) <i>p</i> =0.59	-0.1 (-0.2, -0.01) <i>p</i> =0.02*	-0.07 (-0.2,0.04) <i>p</i> =0.20	0.04 (-0.1,0.2) <i>p</i> =0.62	0.08 (-0.02,0.2) <i>p</i> =0.13	-0.5 (-0.8, -0.12) <i>p</i> =0.006*		
Overall PCMH Adoption Score	0.2 (0.02,0.3) <i>p</i> =0.03*	-0.03 (-0.2,0.1) <i>p</i> =0.67	0.1 (-0.1,0.3) <i>p</i> =0.35	0.09 (-0.1,0.3) <i>p</i> =0.45	0.2 (0.02,0.3) <i>p</i> =0.04*	0.4 (-0.05,0.9) <i>p</i> =0.08		