

# Enhanced Primary Care and Impact on Quality of Care in Massachusetts

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Massachusetts was one of the leaders in insurance expansion with the 2006 Massachusetts Mandated Health Insurance Law.<sup>1</sup> Recent reports have cited positive outcomes from the Massachusetts reform effort, such as increases in the total number of Massachusetts residents insured, growing rates of employer-based insurance coverage, strong public and physician support, reductions in disparities in access based on race or ethnicity, increasing amounts of preventive services, fewer low-income or chronically ill adults reporting unmet medical needs,<sup>2</sup> and even lower mortality rate among those getting insurance.<sup>3</sup> However, insurance reform only addresses a small part of the deficiencies in the larger healthcare delivery system. Patient-centered medical homes (PCMHs) are generating significant state and national attention as one solution in what is generally a costly and ineffective system plagued with disparities in health outcomes and significant barriers to high-quality, integrated medical care.<sup>4</sup>

Most PCMH assessment surveys are based on individual practice or demonstration reports, and such surveys have been at the forefront of reports on the success of the PCMH model.<sup>5-8</sup> Although such demonstrations are a critical part of the evaluation process of new care models, they are context-specific and take time to generate evaluable data. Another approach to evaluate the effect of the PCMH-associated components is to use publically available survey data and parsimonious definitions of what factors compose a PCMH. One such evaluation was performed on the 2007 to 2008 National Survey of Children's Health, and it identified improvements in 6 of 10 quality measures among children in a PCMH, as defined by a 5-component measure.<sup>9</sup> Such patient care experience surveys are often unavailable, however, and to date, there is no state-level evidence on the availability of PCMH components in primary care practices or their association with quality of care.

The Behavioral Risk Factor Surveillance System (BRFSS) was developed by the CDC as a random-digit-dial landline telephone survey.<sup>10</sup> The CDC collects data monthly, using this sur-

## ABSTRACT

**Objectives:** Using Behavioral Risk Factor Surveillance System (BRFSS) telephone survey data, we evaluated whether individuals who reported access to enhanced primary care features experienced improved quality of care.

**Study Design:** Cross-sectional population-level survey.

**Methods:** We assessed a sample of 16,731 Massachusetts residents contacted by telephone using random-digit dialing, to complete the BRFSS in 2008. A randomized subset of 5693 respondents received an additional 5-question enhanced primary care assessment module. We defined an "enhanced" primary care group as those who reported having a regular, personal provider and responded that their provider "always" or "almost always" 1) had knowledge of their medical history, 2) gave them an appointment right away when necessary, 3) was up-to-date in their knowledge of the patient's specialist care, and 4) asked them about all of their medications. Multivariable logistic regression was used to compare the "enhanced" versus "usual care" groups and assess several quality process measures.

**Results:** Nearly one-third of participants endorsed having indicators of enhanced care, and this group reported significantly higher rates of diabetes process measures (56% vs 38%), cholesterol screening (89% vs 81%), influenza vaccination (57% vs 49%), pneumonia vaccination (51% vs 43%), and lower cost and/or access barriers to care (22% vs 33%).

**Conclusions:** Enhanced primary care was associated with improved self-reported quality outcomes in a statewide telephone survey. A brief, 5-question module provided a novel population measure of access to enhanced primary care. This is a scalable option for other states hoping to characterize their own primary care improvement efforts through the patient-centered medical home model.

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### Take-Away Points

We evaluated Behavioral Risk Factor Surveillance System telephone survey data from Massachusetts residents that included a patient-centered medical home (PCMH) assessment module.

- Patient-reported indicators of the PCMH correlated with improved quality process measures in diabetes, cholesterol screening, vaccination, and access to care.
- A brief, 5-question module provided a novel population measure of access to enhanced primary care.
- This may be a scalable option for other states hoping to characterize their own primary care usage and utility as health insurance expansion continues nationally.

vey in all states and territories of the United States. In order to evaluate the availability of primary care providers, PCMH components in primary care, and sociodemographic predictors of the preceding variables in Massachusetts, a 5-question module was added to the BRFSS for a subset of responders. Using the data provided by this module, we then evaluated the association of PCMH components with quality of care.

## METHODS

In preparation for statewide initiatives in medical homes, one of the authors, who was a member of the Massachusetts Executive Office of Health and Human Services, worked with experts in PCMHs to develop a 5-question short form survey module (Table 1). The questions were adapted from work on the Primary Care Assessment Survey (PCAS) by Safran et al.<sup>11</sup> Officials from the Massachusetts Department of Public Health, which administers the survey in the state, gave permission for the module to be piloted in a subset of participants in the 2009 Massachusetts BRFSS (MA-BRFSS) survey.

The MA-BRFSS survey was completed in 3 waves, and the experimental module was used in the second wave. We used descriptive statistics to characterize the subset of responders and a  $\chi^2$  test to look for statistical variance between the experimental module—wave 2—and the other survey waves. We then evaluated whether the responder had a primary care physician according to their survey results and used a multivariable logistic regression to test for associated subject characteristics between the subset of responders with a primary care physician and the subset without.

To determine whether having an enhanced primary care experience was related to completion of healthcare process measures, we divided responders into 2 groups. One group, termed the “enhanced primary care” group, endorsed having a primary care physician and responded that their provider “always” or “almost always” 1) had a knowledge of their medical history, 2) gave them an appointment right away when necessary, 3) was up-to-date in their knowledge of the patient’s

specialist care, and 4) asked them about all of their medications. A multivariable logistic regression was used to test for associated subject characteristics between the “enhanced primary care” group and the “usual care” group without these PCMH attributes. A  $\chi^2$  test was used to characterize the 2 groups.

We performed a multivariable logistic regression analysis to assess differences between the enhanced and usual care groups in several quality measures. We selected these

indicators because they are common measures of clinical quality in the management of chronic disease and preventive care. Quality measures included diabetes annual care processes (which includes an annual visit, eye exam, foot exam, cholesterol screening, and hemoglobin A1C testing); lipid screenings for patients with cardiovascular disease, diabetes, and hyperlipidemia; annual influenza vaccination in eligible patients (all patients aged  $\geq 6$  months)<sup>12</sup>; and pneumonia vaccinations in eligible patients (all adults  $\geq 65$  years and adults aged 19-64 years who smoke, have chronic pulmonary disease, or are immunodeficient).<sup>13</sup>

An additional binary quality measure assessing cost barriers and access to care was created based on the responses to the following: “Was there a time during the last 12 months when you needed to see a doctor but could not due to the cost?” and “About how long has it been since you last visited a doctor for a routine checkup?” Subjects who responded that they did forgo a visit to the doctor due to cost in the past year or that they had not had a checkup within 1 year were given a positive value on the “cost/access” variable; subjects who did not meet one or both criteria were not given a positive value. The regressions were controlled for age, sex, income, education, and insurance status as covariates.

This study was reviewed by the Institutional Review Board at both the Massachusetts Department of Public Health and the CDC, and was considered exempt due to being a low-risk study without any patient identifiers.

## RESULTS

### Subject Characteristics

Of the 16,731 respondents to the MA-BRFSS in 2009, 5693 respondents were randomized to receive the short form survey module. Table 2 summarizes subject characteristics for the respondents to the short form survey module (wave 2) compared with other respondents (waves 1 and 3). There were no significant demographic differences between the 2 groups, confirming that the random sampling for the survey module was successful.

■ **Table 1. Five-Question Patient-Centered Medical Home Module**

Category	Question	Responses <sup>a</sup>
Primary care/ medical home	In the last 12 months, when you called this doctor's or healthcare provider's office to get an appointment for care you needed right away, how often did you get an appointment as soon as you thought you needed it?	1 = Never 2 = Almost never 3 = Sometimes 4 = Usually 5 = Almost always 6 = Always 7 = Don't know/not sure 8 = I did not need care for an illness or injury in the last 12 months 9 = Refused
	In the last 12 months, how often did this doctor or healthcare provider seem to know the important information about your medical history?	1 = Never 2 = Almost never 3 = Sometimes 4 = Usually 5 = Almost always 6 = Always 7 = Don't know/not sure 9 = Refused
Primary care/ medical home	In the last 12 months, how often did this doctor or healthcare provider seem informed and up-to-date about the care you got from specialist doctors?	1 = Never 2 = Almost never 3 = Sometimes 4 = Usually 5 = Almost always 6 = Always 7 = Don't know/not sure 8 = I did not see any specialist doctors in the last 12 months 9 = Refused
	In the last 12 months, did this doctor or healthcare provider ask you about each of the different medicines you take, including medicines prescribed by other doctors?	1 = Yes 2 = No 3 = I do not remember 4 = I do not take any medicines prescribed by other doctors 7 = Don't know/not sure 9 = Refused
Healthcare access	Do you have one person you think of as your personal doctor or healthcare provider?	1 = Yes, only 1 2 = More than 1 3 = No 7 = Don't know/not sure 9 = Refused

<sup>a</sup>All available response options for each question are presented in the table (the corresponding numbers 1-9 were not always used for each set).

### Enhanced Primary Care Attributes

Among participants, 29.8% answered “always” or “almost always” to all 5 PCMH module questions, indicating that they had an enhanced primary care experience. Subjects who were aged 50 to 74 years ( $P = .012$ ) or who were women ( $P < .001$ ) were more likely to report having an enhanced primary care experience; subjects who were either uninsured ( $P < .001$ ) or were Asian, Native Hawaiian or Pacific Islander, American-Indian, multiracial, or selected “other” for their racial affiliation ( $P = .008$ ) were less likely (Table 3 and Figure 1).

### Quality Measures

A multivariate logistic regression adjusted for age, sex, income, education, and insurance status found significant differences between the enhanced and usual primary care groups in all quality measures tested. Subjects receiving enhanced care were more likely to receive diabetes care ( $P = .004$ ), the pneumonia vaccine ( $P = .025$ ), the flu vaccine ( $P = .012$ ), and a cholesterol check ( $P = .002$ ). Subjects in this enhanced group were also less likely to report experiencing barriers to access to care, measured by whether they reported an instance in the past 12 months where they needed to see a doctor but could not due to cost and by whether more than 1 year had elapsed since their last checkup ( $P < .001$ ) (Figure 2).

## DISCUSSION

Almost one-third of residents reported having access to a primary care practice with enhanced primary care attributes. Importantly, having enhanced primary care was associated with better performance on preventive, access, and chronic disease measures. Our findings have favorable implications for the wider adoption of the PCMH model—the main mode of primary care improvement and transformation nationwide in the United States. Our findings also contribute to a growing body of research showing that the PCMH-enabled primary care transformation may result in modest increases in quality measures early on by improving care processes, particularly in the area of prevention.<sup>14-20</sup>

For example, a recent prospective multi-payer study in Hudson Valley, New York, found that PCMH practices improved significantly more (from 1% to 9%) on 4 of 10 quality measures than practices with electronic health records and paper records.<sup>17</sup> In a single private payer demonstration project in New Jersey in 2011 with 8 medical home practices, mammography and nephropathy screening increased, although changes in 7 other HEDIS measures were not significant.<sup>21</sup> A separate randomized controlled trial in New York evaluating PCMH transformation over 2008 to 2010 among 32 practices (18 intervention practices) found improvements in 2 of 11 quality indicators: hypertensive blood pressure control and breast cancer screening.<sup>22</sup>

**Table 2.** Survey Respondent Characteristics by Survey Wave

Characteristic	Survey Wave 2 (PCMH module)	Survey Waves 1 and 3	P <sup>a</sup>
	n = 5693	n = 11038	
Sex			
Female	3559 (63%)	6956 (63%)	.52
Income			
<\$35,000	1771 (31%)	3535 (32%)	.63
\$35,000-\$75,000	1293 (23%)	2509 (23%)	
>\$75,000	1650 (29%)	3140 (29%)	
Not available	943 (17%)	1784 (16%)	
Race/ethnicity			
White, non-Hispanic	4546 (80%)	8916 (81%)	.55
Black, non-Hispanic	303 (5%)	561 (5%)	
Hispanic	501 (9%)	919 (8%)	
Other race	343 (6%)	642 (6%)	
Education			
<11th grade	620 (11%)	1168 (11%)	.44
High school or GED	1458 (26%)	2823 (26%)	
Some college	1279 (23%)	2598 (24%)	
College graduate	2302 (41%)	4384 (40%)	
Insurance status			
Not insured	125 (3%)	200 (3%)	.08
Age, years			
18-34	674 (12%)	1330 (12%)	.74
35-49	1462 (26%)	2825 (26%)	
50-74	2661 (48%)	5209 (48%)	
≥75	805 (14%)	1496 (14%)	

GED indicates General Educational Development test; PCMH, patient-centered medical home.  
<sup>a</sup>P <.05 denotes significance.

**Table 3.** Subject Characteristics of Survey Wave 2 (PCMH module)

Characteristic	Enhanced Primary Care Group	Usual Care Group	P <sup>a</sup>
	n = 1781	n = 3912	
Sex			
Female	1206 (68%)	2353 (60%)	.05
Income			
<\$35,000	538 (30%)	1233 (32%)	.05
\$35,000-\$75,000	427 (24%)	866 (22%)	
>\$75,000	571 (32%)	1079 (28%)	
Not available	245 (14%)	698 (18%)	
Race/ethnicity			
White, non-Hispanic	1526 (86%)	3020 (77%)	.05
Black, non-Hispanic	67 (1%)	236 (6%)	
Hispanic	116 (2%)	385 (10%)	
Other race	72 (1%)	271 (7%)	
Education			
<11th grade	149 (8%)	471 (12%)	.05
High school or GED	455 (26%)	1003 (18%)	
Some college	409 (23%)	870 (22%)	
College graduate	768 (43%)	1534 (40%)	
Insurance status			
Not insured	13 (1%)	112 (3%)	.05
Age, years			
18-34	151 (9%)	523 (14%)	.05
35-49	442 (25%)	1020 (27%)	
50-74	937 (53%)	1724 (45%)	
≥75	235 (13%)	570 (15%)	

GED indicates General Educational Development test; PCMH, patient-centered medical home.  
<sup>a</sup>P <.05 denotes significance.

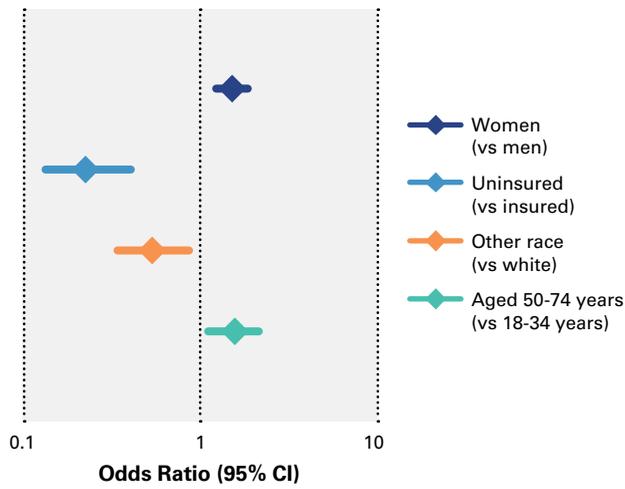
Notably, other PCMH studies have not shown significant impact on quality measures,<sup>23</sup> enforcing the need for additional research in this area to understand why some initiatives are associated with quality improvement while others are not. Understanding how the PCMH model can impact quality of care is critical for optimal primary care design, especially given the enormous and rapid uptake of the PCMH model. From 2009 to 2014, the number of patients covered by PCMH initiatives increased from nearly 5 million to almost 21 million across more than 100 state and federal initiatives.<sup>24</sup>

In addition, we need more efficient and effective methods to evaluate primary care and access to care, with a particular focus on the patient experience as medicine becomes increasingly patient-centered. A PCMH transformation study evaluating patient experiences in a pilot practice

in eastern Massachusetts with Lean enhancement and payment reform found that patient experience was sustained or improved across PCMH domains including the personal physician and communication domain.<sup>25</sup> Our study builds on this finding, utilizing a simple tool for evaluating access to enhanced primary care directly from patients in a large, state-based population survey of patient respondents. This 5-question survey module was a valuable addition to the BRFSS and provided a new population measure of access to enhanced primary care. This survey of critical primary care functions may be a replicable and scalable strategy that other states and healthcare systems can use to characterize their own primary care transformation efforts and reach.

While it may be that the enhanced primary care components evaluated are inseparable from what might be simply termed high-quality traditional primary care, such a

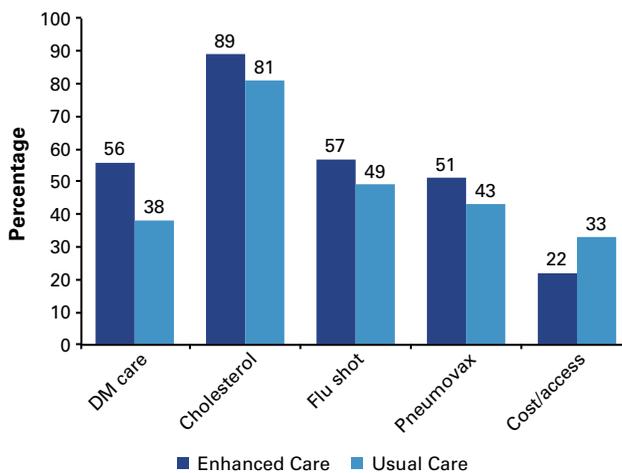
**Figure 1.** Enhanced Primary Care Group Attributes Among Survey Participants



The colored dots represent the odds ratio of an individual being in each of the categories, and the lines represent the 95% CI.

distinction may be irrelevant. The PCMH model provides structure and script for the delivery of better primary care. This is invaluable, as it allows struggling practices to implement a comprehensive plan for improvement rather than disparate quality improvement efforts that may fail due to their lack of integration into the central practice philosophy and administration. However, there is still great variability in how PCMHs are implemented from site to site,<sup>26</sup> and evaluations at a population level are important. In addition, evaluations within a single system may reflect char-

**Figure 2.** Adjusted Rates for Quality Processes Controlling for Race, Sex, Income, Education, and Insurance Status



All  $P < .05$ .

acteristics of that system only and may not be generalizable to PCMHs implemented in a broad array of practice types.

In spite of the demonstrable increases in quality and access to healthcare brought about by the Massachusetts healthcare reform law of 2006, healthcare costs continue to increase steadily. Reform efforts have not contributed to any additional rise in healthcare costs, but neither have they led to a significant decrease in overall costs.<sup>27</sup> One of the largest drivers of healthcare expenditure is preventable hospitalizations and emergency department visits.<sup>27</sup> There is evidence to suggest that these expenditures can be mitigated by high-quality, long-term, prevention-based primary care focused on managing the chronic conditions that often result in hospitalization when mis- or undermanaged.<sup>7,28,29</sup> Delivering such care is the goal of the PCMH, although it remains to be seen whether the continued expansion of this model results in the expected and sustained cost reductions.

**Limitations**

This study is a cross-sectional pilot study that includes only 1 year of data, although the sample is large and representative of the population of Massachusetts. A majority of the differences in quality outcomes in the enhanced primary care group were modest; however, the differences in diabetes care were quite large and may have been even larger had we not used a bundled care process measure, which can result in lower scores.<sup>30</sup> Furthermore, the 5-question module used in this study was validated as a measure of primary care quality,<sup>11</sup> but not as an indicator of whether a patient was treated by a PCMH. Thus, it is an indirect measurement of medical home attributes. As such, we cannot say with certainty that these differences in quality are a direct result of receiving enhanced care or are indicative of practices that are themselves medical homes, and we had no direct measure of which patients were receiving their care in a PCMH. The study is also limited by its reliance on self-report for all measures; however, this direct feedback from patients provides an important window into the patient perspective and experience.

**CONCLUSIONS**

Evaluation of the PCMH and how it affects patient experience and quality measures on a population level is critical to monitor the progress of reform measures, such as the ongoing large-scale adoption of medical homes. Other major health reforms, such as increased insurance coverage, are being deployed on a state level, and we need new population-level tools to evaluate these initiatives. The pilot implementation of the 5-question enhanced primary care module in the Massachusetts BRFSS provides a simple, low-cost model, which

other states may use to gather this crucial experience and quality data. We found that higher levels of enhanced primary care attributes at practices were associated with substantially improved quality for an array of measures, suggesting that this benefit may be realized even at the population level.

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