

The Impact of Primary Care Practice Transformation on Cost, Quality, and Utilization

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Executive Summary

The PCMH model has evolved and new models of high performing primary care are emerging. This dynamism is exciting but assessment and scaling is challenging.

In the decade since the “Joint Principles of the Patient-Centered Medical Home”² were published, it has become widely accepted that primary care practice transformation and delivery are essential to achieving the nation’s Quadruple Aim - improving patient and provider experience and the health of the population while decreasing cost. Over that same time span, evidence that lights the path towards transformation, of the sort best suited to accomplishing these aims and realizing high-performing primary care, continues to emerge.

As this year’s evidence report reaffirms, the Patient-Centered Medical Home (PCMH) has demonstrated improved outcomes in terms of quality, cost and utilization, but not uniformly. It also confirms important lessons for payers and policymakers: like any form of evolution, meaningful transformation takes time, is dynamic in nature, and displays considerable variations in quality, cost and utilization outcomes. The evidence also reveals some concrete modifications to the initial model, learned from best practice PCMHs over the past 10 years, which have improved primary care and its outcomes. For example, it is quite clear that team-based interventions, including case management, and having a usual source of care have positively impacted the patient experience. That said, there is no single ‘implementation manual’ that meets the needs of all.

CHANGES TO THE REPORT

This update to the Patient-Centered Primary Care Collaborative (PCPCC) annual report, led by a new team of investigators, remains true to its predecessors in aims and spirit, with several differences worth noting. **Its PCPCC, Milbank Memorial Fund, and Robert Graham Center planners declared early an intent to broaden the gaze of the review**

to capture any evidence relevant to ‘high performing primary care,’ not merely the PCMH, to broaden the bibliometric data sources reviewed, and to apply rigorous methods of both peer-reviewed and grey literature systematic review. An agreed upon standardized definition of high performing primary care remains a work in progress. That said, a coalition of about 300 leaders across diverse stakeholder groups came together to create the 2017 Shared Principles of Primary Care. These Shared Principles, to be released in October 2017, define the most important features of advanced primary care. Some of the seven Shared Principles are already evident in leading practices across the country: the full collection of Shared Principles represent an aspirational goal for primary care.

The report takes a featured look at Blue Cross Blue Shield of Michigan, which leads one of the oldest PCMH programs, now in its eighth year with seven years of data. Important to note, **the Michigan experience is one of the largest, with 4,534 primary care doctors at 1,638 practices and with published peer-reviewed reports. The statewide transformation of care has resulted in a 15% decrease in adult Emergency Department (ED) visits and a 21% decrease in adult ambulatory care sensitive inpatient stays.**³ That these returns contrast considerably with those reported in the past year from near-neighbor Pennsylvania reinforces the notion that primary care transformation efforts can vary significantly not only in approach, but in outcomes.

OUR RESEARCH APPROACH

To broadly assess the landscape, we systematically reviewed evidence from the last year of peer-reviewed and grey literature that analyzed value of care delivered in terms of cost, quality and

DIFFERENCES IN COST



Take home: In general, the PCMH showed a decrease in overall cost, with a more positive trend for more mature PCMHs and for those patients with more complex medical conditions.

utilization of purported high-performing primary care practices across the nation. We divided our peer-reviewed analysis into subgroups of studies that looked at PCMH outcomes and those that looked at practices who attempted to transform the delivery of care in novel ways, but who weren't necessarily a PCMH. For each group, we studied the effects on quality, cost and utilization. **A total of 45 reports from the peer-reviewed literature were assessed. We then turned our attention to outcomes from CMS initiative reports and independent state evaluations, once again reporting on the effects on cost, quality and utilization.**

HIGHER QUALITY AT LOWER COST

That systems and organizations built around a core primary care function can deliver higher quality, lower cost and more equitable care is well-established, not only by Barbara Starfield,⁴ a seminal figure in health services research, but in previous findings from other countries and evaluations of microsystem transformation within the U.S.^{5,6,7,8} **The challenge is one of scaling the most effective processes, principles and cultures of transformation.** In that context, we placed particular emphasis on findings from two Medicare innovation programs: the Comprehensive Primary Care Initiative (CPCI) and the Multi-Payer Advanced Primary Care Practice (MAPCP) transformation.

Over the past year, peer-reviewed studies on the impact of primary care practice transformation on cost generally supported the idea that **becoming or advancing one's status as a PCMH was associated with decreases in overall cost.** This association was stronger for mature PCMHs and for those caring for patients with more complex medical conditions. Interestingly, the CPCI reports showed less favorable cost outcomes. Although the average per beneficiary per month (PBP) Medicare expenditures were lower for CPC attributed patients as opposed to controls, the savings were not enough to offset the care management fees paid PBP.

When looking at individual states, such as Oregon and Colorado, cost savings were seen, but it is difficult to parse out the effects of CPCI from other state initiatives and grants that were running concurrently. One would expect that if costs decreased, utilization outcomes should have also been more homogeneously favorable. This discrepancy could be attributed to the varying costs for different measures of utilization. For example, the state evaluators from Colorado commented that overall costs decreased despite mixed utilization results because inpatient hospitalizations, presumably the driver of most healthcare costs in their system, decreased.⁹

In the context of efforts to leverage primary care to shift the overall health system from volume towards value, **we discovered some positive quality results across nationwide evaluations but not in every instance.** State-specific data showed either a trend towards a positive effect on outcomes, or no effect on quality outcomes. In the peer-reviewed literature, the positive quality outcomes varied greatly as few studies reported on the same quality measures in the same way. This may have less to do with flaws in study design or validity, and more to do with a need for more harmonized measures in general. Interestingly, all reports that commented on the patient experience showed positive quality results. Overall, studies this year showed us that the longer a practice had been transformed, and the higher the risk of the patient pool in terms of comorbid conditions, the more significant the positive effect of practice transformation.

We found no studies this year that reported specifically on the impact of the PCMH on provider satisfaction, yet two systematic reviews examined interventions to reduce physician burnout in general. These studies showed that organizational changes aimed at fostering a culture of teamwork, a key component of the PCMH, could lead to reductions in physician burnout.^{73,74} Previous studies have also shown that other features of advanced primary care practices such as scribes and enhanced teams also contribute

DIFFERENCES IN QUALITY



Take home:

Effects on quality are mixed but, excluding one outlier, were either positively correlated with PCMH or showed no difference in quality measures from control. Like the data for utilization, heterogeneity in study design and measures studied could account for these differences. All the studies that examined the patient experience showed positive outcomes.

Implementation of primary care reform models differ; there is no one size fits all.

DIFFERENCES IN UTILIZATION



Take home:

Overall, data on utilization of services is mixed, but trends towards positive findings. Studies tend to show an increase in PCP use but the data is inconsistent on whether this increase in PCP use leads to a concomitant change in specialty services, ER utilization, or hospitalizations.

to patient satisfaction and efficiency.^{75,76} A deeper dive into the effect of the PCMH on provider satisfaction would be an important addition to next year's report as we move towards the Quadruple Aim of providing high quality care and increasing patient and provider satisfaction while containing costs.

When looking at utilization outcomes, the peer-reviewed studies overall showed an increase in PCP use for patients enrolled in the PCMH when compared to those who are not. The data are inconsistent on whether this increase in PCP use leads to a concomitant decrease in specialty services, ER utilization, or hospitalizations for PCMH attributed patients. The CPCI and MAPCP reports also report mixed outcomes on appropriate utilization of services, with some states showing more favorable outcomes than others. The heterogeneity of study design, the differences in populations studied, as well as the varying implementation of PCMH (both in terms of actual practices and maturity) could explain the inconsistent results.

This year, many studies started to investigate the impact of primary care enhancements on previously transformed practices. Many of these studies focused on the impact of adding team members such as case managers or pharmacists to their already-transformed practices. These studies showed promising results, and **demonstrated that we are exiting an era of evaluating the impact of the PCMH into an era of continuing evolution of high performing primary care.**

HIGHLIGHTS FROM THIS EVIDENCE REVIEW

- New this year, we attempted to include quality outcomes in addition to cost and utilization. Peer-reviewed, CMS-initiative and state-specific data showed either a trend towards a positive effect on quality, or no impact on quality, though few results were statistically significant. The positive outcomes varied greatly as few studies reported on the same quality measures in the same way. This may have

less to do with flaws in study design or validity and more to do with a need for more harmonized outcomes measures, in general.

- All studies that reported on patient satisfaction showed positive results.
- Team-based interventions, including case management, and having a usual source of care have positively impacted the patient experience.
- Overall, analysis of the studies revealed that the longer a practice had been transformed, and the higher the risk of the patient pool in terms of comorbid conditions, the more significant the positive effect of practice transformation, especially in terms of cost savings. While nationwide evaluations of CPCI and MAPCP showed less significant impacts of cost, evaluations of state-specific programs did show cost savings. CPCI and MAPCP participants noted that, in general, without payments from the federal government, cost savings would not be sufficient to cover the costs associated with transformation and continued implementation of their programs. Few peer-reviewed studies that showed cost savings commented on the cost of transformation or whether they took this into consideration in their analysis.
- Utilization outcomes were mixed. While most studies and state reports did show an increase in outpatient visits, this didn't uniformly result in a concomitant decrease in ER visits or inpatient stays.
- A best practice PCMH program, Blue Cross Blue Shield of Michigan, is featured. See Figure 1. Blue Cross Blue Shield of Michigan leads one of the oldest PCMH programs, now in its eighth year with seven years of data. Important to note, the Michigan experience is also one of the largest, with 4,534 primary care doctors at 1,638 practices. The statewide transformation of care has resulted in a 15% decrease in adult ED visits and a 21% decrease in adult ambulatory care sensitive inpatient stays.²

FIGURE 1

Program Spotlight: Blue Cross Blue Shield of Michigan

Blue Cross Blue Shield of Michigan has the largest and longest running Patient Centered Medical Home. A key to their success, as outlined here, has been using lessons learned from other advanced primary practices⁷¹ as the building blocks⁷⁷ for their practice transformation.

LESSON #1

Nurture effective and stable leadership

The Physician Group Incentive Program (PGIP) has catalyzed the formation of over 40 Physician Organizations (POs) that have led and supported practices in revolutionizing the delivery of health care in Michigan.

LESSON #2

Gather together (get everyone around the table)

BCBSM's facilitation of quarterly meetings with all PO leaders (approximately 350) has led to cross-collaboration and synergistic partnerships among providers across the state, as well as the formation of a Primary Care Leadership Committee that provides review and guidance on PGIP policies and programs.

LESSON #3

Spark physician enthusiasm

"Relentless incrementalism" is a PGIP motto, and PGIP initiatives are designed to support and reward step-by-step progress through the celebration of provider and program best practices at quarterly meetings.

LESSON #4

Demand federal commitment, action and coordination

PGIP medical leaders have testified before Congress regarding the value-based reimbursement model and the importance of the federal government supporting and recognizing regional practice transformation efforts.

LESSON #5

Offer meaningful financial support

The PGIP program has used a combination of incentive reward payments to POs and value-based reimbursement for individual physicians to ensure providers have the financial support needed to succeed.

LESSON #6

Encourage multi-payer participation

The PGIP program provided the foundation for the five year Michigan Multi-Payer Advanced Primary Care Practice Demonstration program.

LESSON #7

Offer technical assistance and collaborative learning

PGIP provides practices with technical assistance and opportunities for collaborative learning by hosting learning collaboratives, providing education and guidance and funding a Care Management Resource Center.

LESSON #8

Embrace team-based approaches that extend beyond the practice

POs and practices deliver multi-disciplinary team-based care through access to a Provider-Delivered Care Management (PDCM) program, behavioral health providers and embedded pharmacist care managers.

LESSON #9

Establish realistic time tables for evaluation

Underlying the PGIP philosophy of relentless incrementalism is the understanding that practice transformation is a long-term process, and programs must be allowed to stabilize and mature before results are evaluated.

LESSON #10

Obtain timely, accessible and useful data

The PGIP PCMH/PCMH-N program provides financial support to POs and practices to build the capacity for population management through use of integrated patient registries and performance reporting.

Glossary

ACC

Accountable Care Collaborative

BP

Blood pressure

CCO

Collaborative Care Organization

CMMI

Center for Medicare and Medicaid Innovations

CMS

Centers for Medicare and Medicaid Services

CPCI

Comprehensive Primary Care Initiative

HCH

Health Care Homes

IT

Information technology

MAPCP

Multi-Payer Advanced Primary Care Practice

NCQA

National Committee for Quality Assurance

PBPM

Per beneficiary per month

PCMH

Patient-Centered Medical Home

PCP

Primary Care Physician

PCPCH

Patient-Centered Primary Care Home

Safety Net

California's safety net is a patchwork of programs and providers that serve people with low incomes, no private insurance coverage, or other special needs. Not all safety nets are under the umbrella of Federally Qualified Health Centers.^{1*}

VA PACT

Veterans Affairs Patient Aligned Care Team

Background

TRANSFORMING PRIMARY CARE PRACTICE: WHAT IS KNOWN

The “Joint Principles of the Patient Centered Medical Home,” developed in 2007, created a blueprint for a primary care delivery system that could bend the cost curve of health care while simultaneously improving patient outcomes and the patient experience. A decade since these principles were set, the PCMH model has spread throughout the United States: 44 states and the District of Columbia have passed or introduced at least 330 laws to define or demonstrate the medical home concept and it is estimated that 45% of family physicians practice within a PCMH.¹⁰ Although the concept of the PCMH is widespread, the framework used to transform practices and the specific interventions made within each framework have widely varied, as have their impacts on health care cost, quality and utilization.

With a shifting political landscape comes inevitable discussion of a potential change in healthcare access, delivery and finance. It is more important than ever to critically evaluate transformed practices and to understand their true impact on the health care system. Previous analysis performed by the PCPCC and others have summarized successful PCMH initiatives across the country. The analysis has shown that the PCMH has moved our healthcare system closer to the Quadruple Aim of enhancing the patient and provider experience, and improving the health of the population while containing costs.^{11,12,13,14} In particular, if one looks at data from the PCMH transformation program in Michigan, the largest state-level

implementation program in the United States to date, the success of the medical home is evident.^{11,12,13}

The PCMH transformation program in Michigan has shown:

- Practices that have fully implemented the PCMH model have expected savings of \$26.37 lower per member per month adult medical costs¹³
- Implementation of a PCMH was associated with higher breast, cervical and colorectal cancer screening rates for Michigan PCMH patients regardless of socioeconomic status¹⁵
- Both level and amount of change in PCMH practices is positively associated with quality of care and use of preventive services¹³
- Hospital utilization was reduced by 13.9 percent for PCMH-targeted conditions versus only 3.8 percent for other conditions ($p = .003$)¹¹
- ED utilization decreased by 11.2 percent for PCMH-targeted conditions versus 3.7 percent for other conditions ($p = .010$)¹¹
- Hospital PMPM cost was reduced by 17.2 percent for PCMH-targeted conditions versus only 3.1 percent for other conditions ($p < .001$)¹¹
- ED PMPM cost decreased by 9.4 percent for PCMH targeted conditions versus 3.6 percent for other conditions ($p < .001$)¹¹

Other evaluations have shown a less sizeable return for their investment:

- In Pennsylvania, pilot participation in the Southeastern Pennsylvania Chronic Care Initiative, one of the earliest and largest multi-payer medical home pilots conducted in the United States, was associated with statistically significantly greater performance improvement on only 1 of 11 investigated quality measures: nephropathy screening in diabetes (adjusted performance of 82.7% vs 71.7% by year 3, $P < .001$). Pilot participation was not associated with statistically significant changes in utilization or costs of care.¹⁶
- A recent systematic review in *Health Affairs*, examining cost and quality outcomes of PCMH initiatives in 11 regions across the country, showed that although PCMH initiatives were associated with a 1.5 percent reduction in the use of specialty visits and a 1.2 percent increase in cervical cancer screening among all patients, they were not associated with changes in the majority of outcomes studied, including primary care, ED, and inpatient visits and four quality measures.¹⁷

Given the substantial cost and time needed for practice transformation,¹⁸ it is essential to continue to understand the impact of the PCMH as practices nationwide continue to adopt its principles. To this end, our goal this year was to objectively and systematically study the literature on PCMH and advanced primary care models published over the last year with a special focus on determining and analyzing their true impact on cost, quality and utilization.

STRUCTURE OF CURRENT REPORT

Our current report is divided into two main sections: an analysis of peer-reviewed literature and an analysis of the grey literature. (We defined grey literature as

evaluations of PCMH that had not been published in peer-reviewed format, but still presented some discussion of study design and/or methodology when presenting results. These included state reports, industry reports and multi-payer evaluations.)

Our primary outcomes of cost, quality and utilization are discussed within each section. We expanded our search criteria to include practices that were formally labeled as a PCMH, as well as advanced primary care practices that had features of a PCMH without being formally labeled as such. In our review of the literature, we label the former as “PCMH Implementation” and the latter as “Features of PCMH Care Delivery Studies.” We also identified articles that studied enhancements to established PCMHs and we label those as “PCMH Enhancement Studies.”

The grey literature this year was limited to pieces published between November 1, 2015 to February 28, 2017 that had some discussion of study design and methods when reporting findings, but had yet to be published in formats other than reports. This limited our use of many industry sponsored reports and some state sponsored reports. The final CPCI and MAPCP reports are included here, as are state reports from Colorado, Minnesota and Oregon.

Compared with the 2014-2015 report, our expanded inclusion criteria resulted in a notable increase in articles, especially those using quality as an independent outcome (sixteen studies reported on quality alone). In last year’s peer-reviewed studies, articles that utilized chart review/claims data were reviewed in combination with those using survey data, whereas we chose to separate out survey data into the features of PCMH care delivery, given we were unable to verify that care deemed PCMH-like by survey respondents actually occurred within a PCMH.

A decade since the Joint Principles were set, the PCMH model has spread throughout the United States: 44 states and the District of Columbia have passed or introduced at least 330 laws to define or demonstrate the medical home concept and it is estimated that 45% of family physicians practice within a PCMH.

Methods

APPROACH

Before beginning our systematic review, we reviewed previous systematic reviews on the PCMH including previous PCPCC Annual Evidence Reports. We also identified and contacted content experts, including past authors of those reports, to request their input on our proposed definitions, MESH headings and search terms, databases to include, and approach. With this input, we compiled a list of relevant bibliographic databases deemed appropriate to search, and narrowed our definition and strategy for extracting grey literature of scholarly value.

We explored several search engines in the process and modified our original date restrictions, limited to calendar year 2016, to a slightly wider date range of November 1, 2015 to February 28, 2017. This was done to create a search continuum from the end of the date range searched in the previous PCPCC annual evidence review through the latest date that could be accommodated by our own project calendar, in hopes of releasing the most contemporary evidence available in this dynamic content area. We also limited our search to studies available in the English language.

To improve the rigor of our methods and search, we finalized both under consultation with two library scientists, one from the American Academy of Family Physicians (AAFP) and the other from Georgetown Medical Dahlgren Memorial Library (KD and GC). Institutional review board approval was not applicable. Our primary search terms and full inclusion criteria can be accessed in Appendix 1.3. The focus of the search terms was on capturing articles evaluating the PCMH and/or high performing primary care metrics by the main study outcomes of cost, quality and/or utilization.

BIBLIOGRAPHIC DATABASES

For the peer-reviewed articles, PubMed MEDLINE, EMBASE, CINAHL, and Cochrane Library databases were searched. For grey literature, Web of Science (screening for non-peer-reviewed articles), ProQuest, Open Grey, Metalab, data.gov, openDOAR, and EPPI-Centre were utilized. Additional grey literature was reviewed using Kaiseredu.org, National Academy for State Health Policy (NASHP), the Agency for Healthcare Research and Quality (AHRQ), and the World Health Organization (WHO).

An initial review of conference abstracts and presentations from the 2016 American Academy of Family Physicians (AAFP), North American Primary Care Research Group (NAPCRG), Academy Health, Society of Teachers of Family Medicine (STFM), and Institute for Healthcare Improvement (IHI) conferences was performed, but conference material was ultimately excluded from this review, due to a lack of consistently accessible text.

GREY LITERATURE

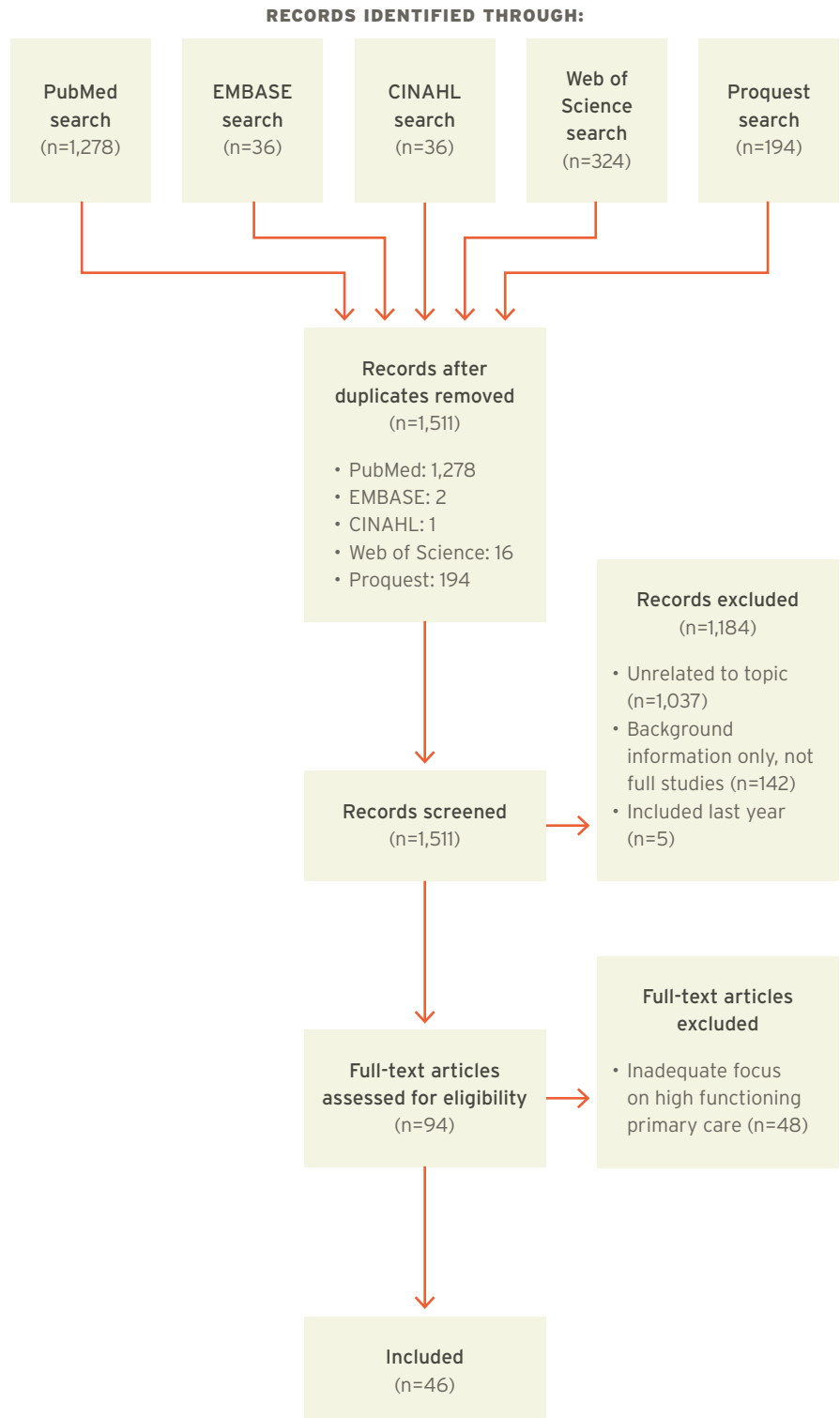
Grey literature, or “that which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers” likely outnumbers the peer reviewed literature in quantity, but exists outside of the traditional academic publishing channels that feed the bibliographic databases listed above.¹⁹ Given the novelty and dynamic nature of primary care practice transformation studied, inclusion of the grey literature was deemed an important source of information for this review synthesis. Furthermore, systematic reviews based on traditional bibliographic

databases may be subject to “publication bias,” as studies with more positive results are several times more likely to be published than ones which show little or no positive effect for an intervention.²⁰ Including grey literature in a systematic review can unearth unpublished trials demonstrating interventions which resulted in neutral or negative findings, potentially significantly impacting the conclusions of a systematic review. However, many characteristics of grey literature make it difficult to search systematically, and there is no ‘gold standard’ to guide rigorous grey literature search methods.

We used past systematic reviews on the PCMH and expert opinion to guide our approach.¹⁰ We considered multiple search strategies and engines, and settled on Google Scholar and Advanced Google searches to screen for state published and industry reports from November 1, 2015 to February 28, 2017. Six state-based and three industry reports were identified. Three of the state-based reports met our inclusion criteria and quality evaluation for inclusion; none of the industry reports were included due to inability to confirm methods. More specifically, the reports published directly from the state governments or industries did not always have full information on how outcomes were measured, who the comparison group was or whether their results met statistical significance, and were thus excluded. Four independent reviews of federal initiatives (by RTI or Mathematica) met our study criteria.

One author (EHD) screened 1,278 PubMed, 22 EMBASE, 1 CINAHL, 16 Web of Science, and 194 ProQuest articles after screening for duplicates between the databases (see Figure 2 for PRISMA flow diagram). There were no non-duplicate relevant Cochrane Library, Open Grey, Metalab, data.gov, openDOAR, EPPI-entre, Kaiseredu.org, NASHP, AHRQ, or WHO articles for the review.

FIGURE 2
PRISMA Flow Diagram



Two authors (YJ and EHD) reviewed 94 full text peer-reviewed articles, with 45 peer-reviewed articles included in the final review; thirteen grey literature articles and independent reviews of federal initiatives were reviewed by both authors, with five being included in the final review. Articles were excluded if they did not focus on either a PCMH or high performing primary care initiative (encompassing a focus on any of the seven elements of a PCMH), and cost, quality and/or utilization outcomes.

Throughout the process we engaged secondary reviewers (AB, MC, PG, AG, RS) to help review our search decisions and to conduct independent reviews of selected article types that were on the threshold for inclusion or exclusion. Furthermore, we engaged an advisory group in the form of tertiary reviewers to ensure that additional articles of value weren't excluded and to gauge the merit of threshold articles.

ELIGIBILITY CRITERIA

Inclusion criteria was defined as studies that evaluated the PCMH or other practices with PCMH features and looked at quality, utilization or cost outcomes. (See Appendix 1.3 for search terms and detailed criteria.)

We identified 45 peer-reviewed reports published from November 1, 2015 through February 28, 2017 that met our inclusion criteria; 17 studies evaluated PCMH implementation initiatives versus traditional care (hereby referred to as PCMH implementation); 15 studies evaluated features of the PCMH model, taken as proxies for aspects of high performing primary care without formal PCMH recognition or a method to verify that care was within a PCMH (hereby referred to as features of PCMH care delivery); and 13 studies evaluated enhancement initiatives within an established PCMH versus baseline PCMH care (hereby referred to as PCMH enhancement), and are

discussed separately under the section on PCMH enhancement. See Appendices 1.1 and 1.2 for specific details on individual studies.

PCMH Implementation Studies

Of the PCMH implementation studies, eight were multi-state or regional initiatives,^{21,22,23,24,25,26,27,28} with five utilizing NCQA PCMH standards (primarily 2008 standards),^{21,22,23,24,25} two occurred within populations that defined themselves as medically underserved with unspecified PCMH recognition type,^{20,26} and one study focused on a Veterans Administration Patient Aligned Care Team (VA PACT).²⁷ Seven of the eight studies evaluated the transformed PCMH setting against a control (traditional care), with some additional pre-/post-transformation analyses; the VA PACT study evaluated only pre-/post-PACT transformation, and was also the only regional PCMH study that included data before 2007, owing to the utilization of pre-PCMH transformation data.

Five studies were state-based PCMH initiatives, with four being state-specific Medicaid PCMH programs,^{29,30,31,32} and only one a multi-payer state initiative (Minnesota Health Care Home [MN HCH]).³³ All but the Carlin et al. MN HCH report evaluated patients from the PCMH initiatives against a traditional care cohort; Carlin et al. evaluated outcomes based on stage of PCMH transformation (distinguished as early, intermediate or late stage). Four studies were insurance or health system PCMH initiatives, three from BlueCross BlueShield^{34,35,36} and one from Geisinger Health System.³⁷

The majority of articles reviewed utilized data from 2008 through 2013, with a couple outliers, including the VA PACT study noted above (using pre- and post-PACT implementation data from 2003 to 2013),²⁷ and a state Medicaid PCMH program that was conducted from 2005 through 2010.²⁹

Only two implementation studies, both NCQA-certified regional PCHM initiatives, reported on all three of our report outcomes (utilization, cost and quality),^{21,25} both NCQA-certified regional PCHM initiatives. Five studies focused on utilization^{20,27,31,32,33} alone (two regional,^{27,20} two state-based^{31,32} and one insurance-based³³ initiative). Two insurance or health system-based initiatives reported only on cost.^{34,35} Four studies reported only on quality (three regional^{23,24,26} and one insurance-based initiative).³³ Cost and utilization were both reviewed in three state-based initiatives,^{28,29,30} and one regional NCQA initiative reported on utilization and quality.²²

Features of PCMH Care Delivery Studies

Of the studies evaluating features of PCMH care delivery, eight utilized survey data,^{38,39,40,41,42,43,44,45} four of which used Medical Expenditure Panel Survey (MEPS) data to distinguish a usual source of care (USOC) from elements of PCMH-type care,^{37,40,42,43} and one study each used the safety-net medical home survey (SNMHS),³⁹ Massachusetts Behavioral Risk Factor Surveillance System (MA-BRFSS) survey,³⁶ the National Ambulatory Medical Care Survey (NAMCS),⁴¹ and the National Survey of Children with Special Health Care Needs (NSCSHN) survey.³⁸ The remaining seven studies included a mix of chart review or claims data, evaluating elements of a medical home without noted PCMH recognition. Two of the studies were of pediatric populations,^{38,46} two included only breast cancer patients,^{47,48} two focused on mental health,^{40,47} one took place within the safety-net,⁴⁹ and one was a Canadian study evaluating team-based care and alternative payment structures.⁵⁰

Similar to the PCMH implementation studies, the majority of articles examining features of PCMH care delivery had study dates ranging from 2007 through 2014, but

with variability. The Kern et al. Canadian study compared data from 2001 and 2011,⁵² a study of breast cancer patients enrolled in PCMHs took place from 2003 through 2007,⁴⁶ and one study did not specify dates.⁴⁷ Of note, one of the four studies using MEPS data included 2004 survey data (full study period 2004-2011)⁴⁰ when it was less feasible to distinguish PCMH-type care; the study was still included, given the majority of data was collected post-2004.

None of the features of PCMH care delivery reviewed all three report outcomes. Four studies reported on only utilization,^{38,40,51,52} and seven studies reported on only quality.^{36,37,39,41,44,45,48} Only one reported on cost,⁴⁶ reviewing both cost and utilization. Only two studies reported on both utilization and quality.^{42,47}

PCMH Enhancement Studies

The thirteen PCMH enhancement studies focused primarily on team-based care interventions, including two studies evaluating pharmacy interventions,^{53,54} one evaluating a team-based approach to mental health,⁵⁵ and three studies looking at complex care and case management.^{56,57,58}

One study evaluated the impact of an alternative payment model⁵⁹ and two focused on information technology (IT) interventions.^{60,61} Five of the articles took place in NCQA-certified PCMH initiatives (2008 or 2011 standards)^{51,53,54,59,62} and four within a VA-PACT.^{55,56,59,63} The remaining articles noted that they occurred in a PCMH, but did not specify type of recognition or accreditation. All studies that specified a timeframe took place between 2008 and 2014; one study did not note the study time frame.⁵⁸ It is expected that studies would not include data pre-2008, given that they all focused on initiatives within already established PCMHs.

FIGURE 3

Categorization of Included Peer Reviewed Articles

PCMH Implementation Studies

PCMH vs traditional care (n=17)

Features of PCMH Care Delivery Studies

Non-PCMH or not mentioned if PCMH but with PCMH like features as compared to traditional care (n=15)

PCMH Enhancement Studies

Mature PCMH's that study the impact of specific PCMH components (i.e. team based care, telehealth) (n=13)

Findings

PEER-REVIEWED STUDIES

Overall, our review demonstrated mixed results in terms of cost, quality and utilization outcomes. The PCMH enhancement studies, outlined in Figure 5, had the most encouraging findings.

Differences in Cost



Take home: In general, the PCMH showed a decrease in overall cost, with a more positive trend for more mature PCMHs and for those patients with more complex medical conditions.

Studies on quality suggest that having a consistent clinic (usual source of care) may be one of the most impactful features of the PCMH.

PCMH Implementation Studies

Seven of the PCMH implementation studies reported on cost, with a trend toward cost savings. Only one of the seven studies demonstrated increased overall cost,²¹ with another study showing statistically significant increased costs only for patients with comorbid chronic and mental health conditions, but not overall.²⁸ The Flieger article that reported higher costs was also notably the only study evaluating cost over only a single year of data. Five of the PCMH transformation studies showed a reduction in cost,^{36,29,30,34} though one lacked statistical significance.²⁵ When reported on, clinics showed increased cost savings over time and with increasing chronic conditions.^{28,30,34,64} This suggests it takes time for cost savings to be realized, and patients with more chronic conditions can have the most cost savings when in a PCMH, which is not unexpected given that patients with more complex medical conditions could be seen as having the most to gain from patient-centered, coordinated care.^{31,33}

Studies that reported on both cost and utilization showed varying results. For one NCQA initiative evaluating outcomes over four years,²⁵ there was a reduction in ambulatory-care sensitive ED visits (0.7 per 1000 member months), with no difference in PCP, specialty, overall ED visits or inpatient admissions, and a non-significant reduction in cost (reduction in total cost of care of \$7,679 per 1,000 member months). In the Flieger NCQA initiative,²¹ there were no statistically significant differences in any utilization or quality metric, but increased total costs (excluding pharmacy). The increased costs of care could be attributed to previously unfilled demand, especially given the single year of data analyzed, and long-term outcomes remain to be seen. Two of three Medicaid PCMH initiatives that evaluated both cost and utilization^{29,30} showed a decrease in utilization and a corresponding decrease in costs.

Features of PCMH Care Delivery Studies

Only one article reported on cost, with the Kohler et al. article noting increased cost.⁴⁶ The Kohler article was a Medicaid PCMH initiative focused only on breast cancer patients, and reported higher outpatient PCP and non-oncology specialty care services, but no impact on ED visits or hospitalization, and higher unadjusted monthly Medicaid costs, likely attributable to the increase in outpatient utilization. The Kohler et al. study utilized data from 2003 to 2007, being the oldest data set of all the peer-reviewed articles in this report.

PCMH Enhancement Studies

Team-based care enhancement programs had neutral to positive effects on cost. Of the three team-based care intervention studies that examined cost, one noted an increase in person-level costs without impacting other costs within a VA PACT,⁵⁶

and two NCQA PCMH studies showed lower overall revenue.^{54,60} Both studies that showed lower revenue from insurance payments also showed improvement in quality measures.^{54,60} Salzberg et al.’s risk-adjusted payment structure study showed no impact on overall cost,⁵⁷ though did show reduced pharmaceutical expenditures especially among patients with more medical co-morbidity; in the report, one of the two IT interventions reported reduced healthcare costs within a VA PACT.⁵⁹ While the Salzberg study didn’t comment on quality, the VA PACT article showed improvements in both quality and utilization.^{57,59}

Differences in Quality



Take home: Effects on quality are mixed but, excluding one outlier, were either positively correlated with PCMH or showed no difference in quality measures from control. Like the data for utilization, heterogeneity in study design and measures studied could account for these differences. All the studies that examined the patient experience showed positive outcomes.

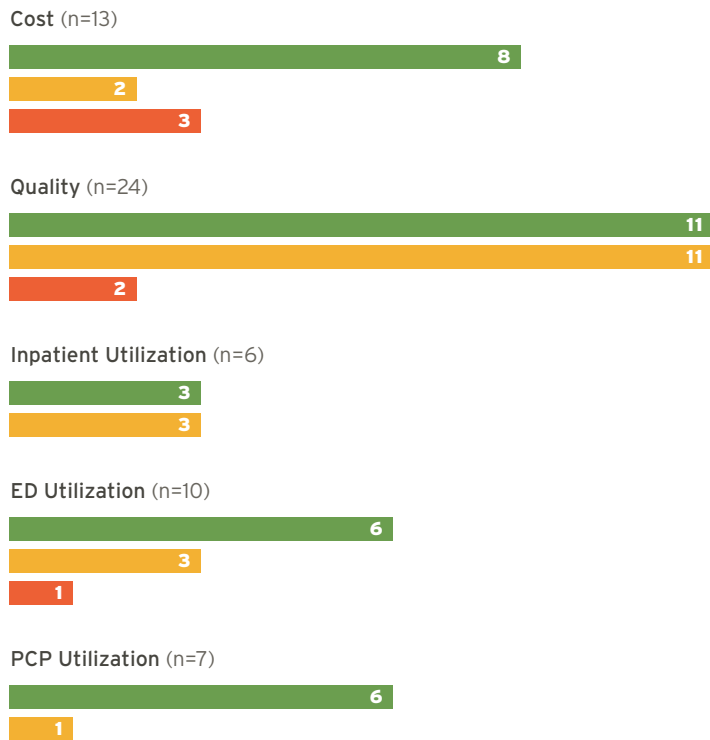
Quality, being a difficult metric to define and evaluate due to inconsistencies in how data is collected or reported on, is a highly important core component of the Quadruple Aim, and thus included as its own outcome in this year’s report.

Given that the quality measures studied in the peer reviewed literature were not harmonized, results were generally mixed. Interestingly, the studies that looked at patient satisfaction as a secondary outcome, though limited in number, did all show positive results. The three studies that examined the patient experience showed higher rates of patient satisfaction for patients in the PCMH enhancements group.^{38,55,57} Two of these studies examined

FIGURE 4

Summary of Outcomes: Peer Reviewed Articles

Number of articles reporting: ■ Positive results ■ Mixed results ■ Negative results



adding a case manager to the PCMH, and one looked at the impact of usual source of care.

In addition, two systematic reviews this year looked at physician burnout.^{73,74} Although these studies were not looking at the PCMH specifically, they found that organizational elements common to many PCMH’s reduced physician burnout. Specifically, the practices that fostered communication between members of the health care team, and cultivated a sense of teamwork were more likely to reduce physician burnout.⁷⁴

PCMH Implementation Studies

Seven of the PCMH implementation initiatives reported on quality, using a variety of metrics. Five of the studies reported on receipt of preventive services, most typically, but not exclusively,

FIGURE 5
PCMH Enhancement Studies:
Evaluation of Additional Members

Adding team member had: ■ Positive results ■ Negative results

TEAM MEMBER	NUMBER OF STUDIES	OUTCOMES
Care Manager (Nurses, Health technicians)	2	Short term costs increased with team-based care, but could lower overall long term costs, given quality outcome benefits. ⁵⁵ Improved LDL control and increase rate of aspirin use in coronary heart disease patients, significant improvement in blood pressure control. ⁶²
Pharmacist	2	No improvement in BP or DM control compared to control, ⁵⁴ Decrease in readmission rates. ^{53**}
Community Based (Community agencies, Community Health Workers, Health Coaches)	2	Improvement in DM control, access (small sample size). ⁵⁹ 19.0% reduction in emergency department use and a 34.7% reduction in hospitalizations. ⁵⁶
Behavioral Health Specialist or Training*	2	Improvement in depression treatment response when patients saw MHP. ⁵³ Lower overall payment, higher screening of depression, lower rates of ED and ACSH. ⁶¹
Not specified	1	Team based care to improve blood pressure control is cost effective. ⁵⁷

* One study trained all team members in mental health concepts without incorporating a mental health specialist.

** Significant for face to face pharmacist visits vs control. Not significant for telephone visits with pharmacist vs control

comprised of: breast, colon and cervical cancer screening; flu vaccinations; and routine diabetic management (hemoglobin A1C, cholesterol and nephropathy screening).^{21,22,23,25,26} One study each reported on only medication adherence²⁴ and only post-discharge follow-up.²⁰ Overall, there were highly mixed results in terms of quality. Two studies demonstrated an increase in over half of the quality metrics measured, whereas another showed

increased lipid screening in diabetic patients only²⁵ (out of six quality metrics reviewed), and the Flieger study of eight quality metrics showed no statistically significant improvements in any measure over the one year study period.²¹ The majority of studies showed no significant difference in quality, or differences only for very specific patient populations. Of the studies evaluating only one quality metric, PCMH transformed clinics showed improved medication adherence²⁴ and an increase in percentage of patients seen within 7 days of hospital discharge.³³ Notably, despite being seen within 7 days, these patients were seen by their PCP for the discharge visit less frequently than the comparison group. There was no uniformity between articles in terms of quality metrics measured, which likely contributes to the mixed quality outcomes between articles.^{21,24,33}

For the two studies evaluating cost, utilization, and quality, the Flieger article, as mentioned previously, showed no statistically significant outcomes in utilization or quality, but increased cost.²¹ The Rosenthal et al. article had a drop in ambulatory care-sensitive ED visits, but no overall utilization changes, no statistically significant impact on cost, and an increase in lipid screening for diabetic patients only.²⁵ Kern et al. analyzed both utilization and quality, demonstrating that increased PCP visits did not correlate to a statistically significant improvement in quality metrics.²²

Features of PCMH Care Delivery Studies

Ten of the 15 studies that focused on features of a PCMH reported on quality.^{36,37, 39,41,42,43,44,45,47,48} Similar to the PCMH transformation studies, quality metrics differed between studies, with five studies measuring receipt of preventative screening.^{39,41,44,45} One study reported on breast cancer screening alone,⁴⁵ another on diabetes care alone,³⁹ one on a variety of care process measures,⁴¹ and another

on preventative services for the first 14 months of life.⁴⁴ For the eight studies that utilized survey data, all outcomes were patient or parent (for pediatric patients) reported, having its own inherent limitations. Overall, there were mixed outcomes, but a trend toward positive. Three studies looked at quality differences for patients in PCMH labeled clinics versus patients with a usual source of care not in a PCMH. They demonstrated that there were limited differences in PCMH-type care versus usual source of care quality outcomes, especially within the studies utilizing MEPS data.^{37,42,43} These studies suggest that having a consistent clinic (usual source of care) may be one of the most impactful features of the PCMH. One study negatively correlated PCMH to screening (limited to only breast cancer patients; not a survey).⁴⁵ Eight of the studies showed improvement in at least one of the quality outcomes assessed.^{36,37,42,43,44,47,48,51} A study in the safety-net showed no correlation between PCMH-type care and quality outcomes.³⁹

PCMH Enhancement Studies

As mentioned previously, most of the PCMH enhancement studies measured the inclusion of additional team members on quality. Of the studies that reported on quality, three showed improvements in process measures,^{55,60,62} including LDL control,⁵⁵ hypertension control,⁶² depression screening⁵⁴ and use of the patient portal.⁶⁰ Two studies showed mixed results, with some process measures improving and others getting worse.^{57,61} In one study, the addition of a team pharmacist actually resulted in longer median time to achieve blood pressure control.⁵² Three studies in this group looked at patient satisfaction and they all showed that adding an additional team member increased patient reported satisfaction scores.^{38,55,57}

Differences in Utilization



Take home: Overall, data on utilization of services is mixed, but trends towards positive findings. Studies tend to show an increase in PCP use but the data is inconsistent on whether this increase in PCP use leads to a concomitant change in specialty services, ER utilization, or hospitalizations.

PCMH Implementation Studies

Of the 17 PCMH implementation articles, 11 reported on utilization.^{21,22,25,20,28,29,30,31,32,33,27} All but one of the studies reported on ED utilization, the outlier focusing solely on PCP utilization.²⁷ Hospitalizations^{28,32,20,21,33,29,25,22} and PCP or general outpatient visits^{20,21,22,25,27,28,31} were each reported in eight studies. Three studies included utilization metrics for only pharmacy data^{28,29,32} and two included only hospital readmission data.^{22,20}

Overall, studies published in the past year generally revealed favorable associations between transformation and utilization outcomes. Studies generally looked at PCP visits, ED visits and hospitalizations. In terms of outpatient visits, six studies showed an increase in primary care and/or outpatient visits,^{20,22,27,28,29,32} while two studies found no significant difference in the number of outpatient visits.^{21,25} An increase in outpatient visits would suggest more appropriate utilization of the healthcare system if it led to less ED visits or hospitalizations. Yet the two studies that looked at PCP use and ED use came to different conclusions.^{20,22} While Chu et al. reported increased PCP visits and decreased ED visits in its article,²⁰ Kern et al. reported increased PCP visits and increased ED visits,²² suggesting that evaluating PCP visits alone does not account for frequency of ED visits. In terms of ED use, two studies reported an increase,^{22,31} whereas five studies reported a decrease in utilization,^{20,25,29,30,33} suggesting an overall positive impact of PCMH on appropriate ED utilization (Appendix 1.2).

Patient-centeredness and having more coordinated care might help reduce readmission and ED use, especially in more vulnerable populations, and both are core components of the joint principles of the PCMH.

Although the studies on PCP and ED use suggest a positive impact of PCMH on utilization, the studies that looked at hospitalization were less clear. While a study of the Pennsylvania PCMH Medicaid initiative²⁹ demonstrated a decrease in inpatient hospitalizations for patients with comorbid medical and psychiatric conditions, no other studies found any significant impact of PCMH transformation on hospitalization.^{20,21,22,25,28,32,33} One of the NCQA PCMH initiatives notably found no statistically significant outcomes for any of the six utilization metrics measured²¹ (Appendices I.1 and I.2).

Two of the reviewed reports are notable for their ability to offer insight into the impact of transformation stage on various utilization outcomes.^{32,33} Carlin et al. separated its analyses into categories—early, intermediate or late stage transformation, analyzing the effects of each stage on five domains: health care organization, delivery system redesign, clinical information systems, self-management support and

decision support. This demonstrated some evidence that later stage transformation contributed to fewer outpatient visits for diabetics and patients with cardiovascular disease, though results were not consistently positive. Furthermore, there were fewer outpatient visits overall, but that didn't correspond to statistically significant differences in inpatient admissions or ED visits. The report also tried to explore the impact of the five domains individually on utilization outcomes with mixed or inconsistent results.³² Hearld et al. reviewed PCMH capacity, which was defined in 12 domains separated into two capacities (interpersonal and technical), and demonstrated that technical capacity had a greater impact on utilization than interpersonal, and time since transformation was the most significant variable on ED utilization.³³ Although these two studies attempt to understand the characteristics of a PCMH that contribute to more appropriate utilization, more studies or a longer study period are needed before any consistent patterns can be identified.

FIGURE 6
Program Spotlight: PACT Enhancements

■ Positive results
 ■ Mixed results
 ■ Negative results

P artnering with veterans
 A ccess to care
 C oordinated care
 T eam-based care

PROGRAM NAME	INTERVENTION	UTILIZATION	COST	QUALITY
H-PACT vs PACT	Increased access to care with open-access, walk-in capacity, flexible scheduling, outreach to homeless veterans, on site community programs (food, hygiene), intensive health care management with care managers	Higher utilization of outpatient services, 19% reduction in ED visits and 34.7% reduction in hospitalizations pre/post intervention		
Im-PACT vs PACT	Intensive outpatient program: multidisciplinary team, comprehensive patient assessment, tracking of patient goals, care management, frequent contact, community interventions, weekly team discussions of high risk patient	Increased PCP visits. No change in inpatient or ED utilization	Significant increase in monthly person-level primary care cost	No significant difference in mortality Increased patient satisfaction
EQBI-PACT vs PACT	Evidence based quality improvement	EBQI-PACT had decreases mean primary care encounters and increases in mean telephone care encounters	No difference	EBQI-PACT had higher use of secure messaging and higher rates of contact after discharge compared to PACT-only sites

Features of PCMH Care Delivery Studies

Seven of the 15 articles examining features of PCMH care delivery reported on utilization. Four articles reported on ED visits,^{42,46,47,49} three of which also evaluated outpatient visits and hospitalization,^{46,47,49} three reported on readmissions,^{38,49,50} and one on use of mental health services.⁴⁰ Compared with the PCMH implementation studies, there were mixed and primarily neutral impacts of PCMH type care on utilization. In studies where there were significant positive findings on utilization, there was no consensus as to which PCMH-like feature was most important in achieving these outcomes. A study in pediatric patients showed that PCMH did not impact readmission or ED visits, but usual source of care did,³⁸ suggesting that having consistent care was more meaningful than the added benefit of other features of the PCMH. Additionally, in another study, separating by individual factors of a PCMH, having access to a usual source of care and insurance status were the only two reported characteristics that were associated with a lower likelihood of ED visits.⁴²

Two studies showed an increase in PCP visits with PCMH-like interventions,^{46,47} yet it is unclear if higher PCP visits necessarily meant more appropriate utilization of care. In the Kohler et al. article that demonstrated higher PCP visits, there were also higher specialty visits without any impact on hospitalization or ED use.⁴⁶ Druss et al. also shows higher PCP utilization with concomitant increase in appropriate preventive service use, but no difference in other utilization markers including mental health visits, ED visits or hospitalizations.⁴⁷ The Garrison et al. study was unique in evaluating the impact of “visit entropy”—a marker of disorganized primary care delivery—and hospital readmissions.⁵⁰ This study showed that more disorganized care, and thus less PCMH-type care, led to higher odds of readmission within a PCMH highlighting the importance of consistent primary care provider visits. The definition, and best metric, of coordinated care within the evolving model of team-based

care remains debatable. One study of a high-needs Medicaid population showed a reduction in ED visits without impact on hospitalizations or readmission.⁴⁹

In reviewing the studies on features of PCMH care delivery, it is important to keep in mind that patient reported data was used in eight of the 15 studies, and accounting for three of the seven articles evaluating utilization. Given that there was little to no consistency in terms of insurance type, setting or survey data used, it is difficult to comment on the potential impact of individual factors across studies. Most of the studies, as noted above, showed little change or value over having a usual source of care. Patient-centeredness and having more coordinated care might help reduce readmission and ED use, especially in more vulnerable populations, and both are core components of the joint principles of the PCMH.

PCMH Enhancement Studies

A majority of the PCMH enhancement studies focused on the impact of teams and team members on clinical outcomes. As with the PCMH implementation and features of PCMH care delivery studies, there were mixed utilization outcomes with a trend toward positive. Two team-based care interventions within NCQA PCMHs and one IT program in a VA-PACT reported a decrease in overall utilization in all of their study measures, correlating with the lower revenue and lower overall costs for the same studies noted above.^{54,59,60} A team-based care study targeting homeless veterans reported increased utilization of outpatient services and a corresponding drop in ED visits and hospitalizations.⁵⁵ Another NCQA PCMH team-based care study noted lower readmissions with a pharmacy intervention, though not statistically significant.⁵² The Emerson et al. study focused on piloting a virtual visit program within a PCMH model serving uninsured patients, demonstrating feasibility of the program and willingness of patients to utilize alternative visit models, but not reporting on typical utilization outcomes.⁵⁸

between the two groups.⁶⁵ It is important to note that the reported CPC findings are a roll-up of seven different regions into national results, yet state specific findings, as reviewed below, are more favorable.

Findings of State Reports within CPCI

The Accountable Care Collaborative (ACC) was launched in 2011 with the stated goal of improving the health of Medicaid members in Colorado by creating seven regional care collaborative organizations (RCCO's) that are responsible for coordinating patient care and connecting members with non-medical services. Primary care medical providers (PCMPs) contract with RCCOs to become medical homes for Medicaid members in the collaborative. These RCCOs and PCMPs in return receive incentive payments based on their performance on key metrics. It is important to note that the ACC was a subset of programs in Colorado that participated in CPC.⁸

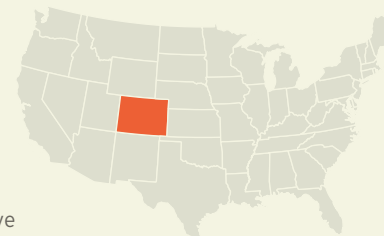
In Oregon, a similar program called the Patient Centered Primary Care Home (PCPCH) developed in 2009, taking the concepts of the medical home and applying them to primary care clinics throughout the state. The PCPCH provided support for practice transformation, identified and disseminated best practices of a medical home and encouraged individuals covered by Oregon's Health Plan to enroll in PCPCH clinics.⁶⁶ As with Colorado's CPC program, not all CPC sites were PCPCH clinics.

Differences in Cost

Independent state evaluations of programs that participated in CPC, the ACC in Colorado and the PCPCH program in Oregon, have shown cost savings to different degrees.^{8,64} Over the time period of July 2009 through July 2015, the ACC was shown to save about \$60 per member per month (PMPM) on adults and \$20 PMPM on children as compared to eligible members who were not enrolled in an ACC



FIGURE 8
STATE SPOTLIGHT
Colorado



Program Name

Accountable Care Collaborative

Program Description

1) Created seven regional care collaborative organizations (RCCO's) that are responsible for coordinating patient care and connecting members with non-medical services; 2) Primary care medical providers (PCMPs) contract with RCCO's to become medical homes for Medicaid members in the collaborative; 3) RCCO's and PCMP's receive incentive payments based on performance on key metrics

Payment for Programs

CPCI funding, Medicaid and Grant funding

Program Outcomes

Cost: Reduced costs about \$60 per member per month (PMPM) on adults and \$20 PMPM on children as compared to eligible members who were not enrolled in an ACC over the same time period. In dual eligible beneficiaries this cost savings was about \$120 PMPM. *

Utilization: Well child checks for children ages 3-9 increased from 20.6% for clients who were enrolled less than 6 months to 43% for those enrolled for 7 months or more. They also found that follow up care after hospital discharge increased from 41.2% to 49.4% the longer the patient was enrolled in the program. As time enrolled in the program increased, utilization of ER services decreased by 5% and 30 day all-cause readmissions decreased. **

Quality: No difference in key performance indicators

* Cost savings even shown when controlling for CPCI and grant funding

** Significance testing not done or not reported

over the same time period.⁸ In dual eligible beneficiaries, this cost savings was about \$120 PMPM.⁸ The independent evaluators note that grant funding and CMMI initiatives also contributed to declines in spending, yet even when controlling for this, there was still a demonstrated cost savings.⁸

In terms of cost, Oregon's PCPCH also succeeded. Overall, the program reduced total service expenditures per person by 4.2%, or approximately \$41 per person per quarter.⁶⁴ Interestingly, as cost decreased, total service use increased, thus the total service expenditure is likely an underestimate of total savings to the program.⁶⁴

FIGURE 9

Program Spotlight: CPCI

Description of Intervention

Launched by CMMI in October 2012 as a method to improve primary care delivery and achieve better care. Designed as a multi-payer collaboration along the five key delivery functions below. Under each key delivery function there are milestones for 2015.

1 Access and continuity

- Enhance patient's ability to communicate with care team 24/7
- Implement asynchronous forms of communication (patient portal)
- Empowerment

2 Risk-stratified care management*

- Behavioral health integration
- Medication management
- Self-management support

3 Patient and caregiver engagement

- Assess patient experience through surveys
- Shared decision making using at least three decision aids

4 Planned care for chronic conditions and preventive care

- Continue to perform QI using EHR-based quality measures
- Review at least one payer data feedback report to identify a high-cost area and a strategy to reduce costs
- Participate in learning collaboratives

5 Coordination of care across the medical neighborhood*

- Follow up with patients within one week of ED visit
- Contact at least 7% of hospitalized patients within 72 hours of discharge
- Enact care compacts with at least two groups of high volume specialists

Identified Success and Challenges of Year 3

Successes	Challenges
<ul style="list-style-type: none"> • Peer-to-Peer Learning • Utilization of data for feedback • Small tests of change • Risk stratification 	<ul style="list-style-type: none"> • Burden of quality reporting • Adverse incentives of FFS payment • Lack of comprehensive and efficient health information exchange

Program Participation

	Year 1 (2013)	Year 2 (2014)	Year 3 (2015)
Number of Participating Payers (Baseline 39)	37	37	36
Number of Participating Practices (Baseline 502)	492	479	445*
Financial Support (median per practice)	\$227,800	\$203,900	\$175,775

Outcomes

Cost (With care management fees)	Decreased by 2%***	Decreased by 1%	No net savings. Increased cost in Ohio/Kentucky**
Utilization			
ED	Decreased by 1%	Decreased by 1%	Decreased by 2%***
Hospitalizations	Decreased by 2%	Decreased by 2%	Decreased by 1%
Quality (Urine protein testing in diabetics)****	Increase by 0.7%	Increase by 1.6%***	Decrease by 0.1%

* Most of the practices that left voluntarily withdrew to join Medicare ACOs.

** Shared-savings calculations (different than the evaluation) showed savings in Arkansas, Colorado, Oklahoma and Oregon.

*** Statistically significant result. All other reported results not statistically significant to P values < 0.05%.

**** Among quality of care process measures urine protein testing in diabetics was the only measure that showed a statistically significant change.

* Practices were expected to use one of the three methods listed to meet the key delivery function

Differences in Quality

The state evaluations reviewed were much less focused on quality measures than the peer-reviewed literature, and when quality was mentioned, it was done mostly via qualitative methods, making direct comparisons to non-medical home models less clear. The Colorado program did complete a quantitative study on the ACC's effect on Key Performance Indicators (KPI's), and found no difference in KPI's between ACC and fee for service (control) patients.⁸ Given that there was no change in KPI's, yet the program did see more appropriate utilization and decreased cost, it concluded that reduced spending in the program was done while keeping quality of care constant.⁸

Differences in Utilization

The findings for utilization in the state initiatives published this year trended towards positive findings as well, though not all results showed statistical significance. In Oregon, the PCPCH program resulted in an increase in primary care and pharmacy services, and a reduction in all other service types. Of these, only total, specialty and inpatient care decreases were statistically significant.⁶⁴ An increase in primary care, and as a result pharmacy services, as was seen in Oregon, is generally looked upon as favorable especially if it is associated with a decrease in ER visits and inpatient hospitalizations. Interestingly, mental health care usage, generally looked upon as a favorable use of healthcare resources, decreased.⁶⁴ The thought behind this finding is that primary care providers were likely treating patients with less serious mental health conditions, though there was no direct data to demonstrate this.

In Colorado, the results on utilization were also positive. Utilization results were expressed as increase or decrease in use over time of enrollment in the ACC. In other words, there was no direct comparison to similar patients not enrolled in the ACC. The program took this approach because,

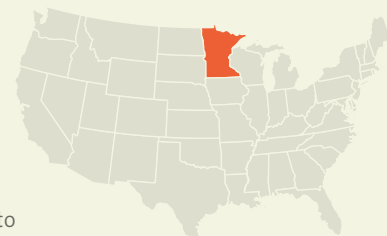
at the time of analysis, more than 70% of Medicaid clients in Colorado were enrolled in the ACC and the groups who were not enrolled differed significantly in medical comorbidities.⁸ Using this approach, evaluators of the program found that well child checks for children ages three to nine increased from 20.6% for clients who were enrolled less than six months, to 43% for those enrolled for seven months or more. The evaluators also found that follow-up care after hospital discharge increased from 41.2% to 49.4% the longer the patient was enrolled in the program. As time enrolled in the program increased, utilization of ER services decreased by 5% and 30 day, all-cause readmissions decreased.⁸ A few limitations exist for this data. First, it is unclear which, if any, of these results show

“One of the most important takeaways from CPC is showing the benefit and critical importance of aligning efforts across all of the payers in a region.”

—Russell Kohl, MD, FAAFP



FIGURE 10 STATE SPOTLIGHT Minnesota



Program Name

Health Care Home Initiatives (HCHI)

Program Description

1) Provided financial incentives for clinics to transform; 2) Developed a learning collaborative for participating clinics; 3) Developed certification standards and transformation assistance

Payment for Program

MAPCP

Program Outcomes

Cost: Demonstrated significant savings on their Medicare, Medicaid and Dual eligible beneficiaries as compared to non-health care home patients in the same time period

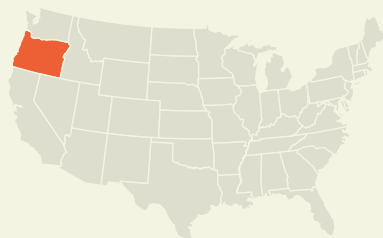
Utilization: 1) Increase in emergency department and skilled nursing home use relative to non-Health Care Homes; 2) Significant decreases in the use of inpatient hospital services; 3) Slight decrease in the use of prescription drugs. 3) Decreased hospital based outpatient visits;* 4) Increase in office based outpatient visits

Quality: 1) Better adjusted quality of care for patients with diabetes, lipid screening, asthma, depression and colorectal cancer screening; 2) Largest and most significant findings were in optimal asthma care; 3) Patient experience was unchanged

* Generally more expensive visits and usually comprise of specialty visits rather than primary care visits.



FIGURE 11
STATE SPOTLIGHT
Oregon



Program Name

Patient Centered Primary Care Home

Program Description

1) Provide financial support for practice transformation; 2) Identify and disseminate best practices of a medical home; 3) Encourage individuals who are covered by Oregon's Health Plan to enroll in PCPCH clinics

Payment for Program

CPCI funding and Medicaid

Program Outcomes

Cost: Reduced total service expenditures per person by 4.2%, approximately \$41 per person per quarter

Utilization: Increase in primary care and pharmacy services, and a reduction in all other service types. Of these, only total, specialty and inpatient care decreases were statistically significant

Quality: Not mentioned

Transformed and transforming practices need time to mature before significant improvements can be achieved. When looking at Michigan, the largest and longest running PCMH demonstration project, it is clear that the PCMH does have a positive impact on healthcare.

statistical significance, as this was not addressed in the methods. Second, although rates of well child visits increased and ER utilization decreased, ACC client were still below the state benchmark on both of these measures. Finally, there was no mention of rates of primary care visits in general, or avoidable inpatient hospitalizations, making the data on more appropriate usage of care less transparent. Although it is unclear how significant these findings are, the ACC did show a trend in the right direction and there was an obvious benefit, in terms of utilization, to staying in the program for longer periods of time.

Multi-Payer Advanced Primary Care Practice Demonstration (MAPCP)

Another CMS initiative aimed at practice transformation is the Multi-Payer Advanced Primary Care Practice Demonstration (MAPCP), which started in 2011 and included joint CMS and state initiatives promoting the principles of PCMH in eight states.

Each state was limited to a \$10 average PMPM payment, applied consistently by all participating payers, but each state had its own payment levels and established its own payment models. Some states paid practices differently based on their NCQA PCMH status, whereas others paid practices differently based on patient comorbidities. Each state had to integrate community-based resources along with its integration of PCMH practices; how they chose to do this was left up to the states.⁶⁷

Data from the most recent, or third round, of site visits occurring in October and November of 2014 showed only thematic data when looking across states. Interviews conducted as part of the MAPCP initiative report showed that states felt that care management or care coordination seemingly had the most significant impact on utilization and expenditures. Identifying and reaching out to patients who were recently hospitalized, as well as risk stratifying and allocating resources to high utilizers, were the two care management activities that impacted utilization the most.⁶⁵ This was also consistent with findings in the national GPC report.⁶³ The MAPCP report conclusions were based on thematic analysis of interviews with states and were not based on quantitative data, so it remains unclear whether care management had an independent positive effect on cost and utilization or if respondents felt this way because it was the most “visible” component of the state wide initiatives.

State specific quantitative data on cost, utilization and quality were reported for certain states. In New York and Vermont, commercial payers and Medicaid reported reductions in admissions, readmissions and ER visits. Other states such as Michigan, North Carolina and Rhode Island reported difficulty in influencing utilization and expenditures.⁶⁵ Only one state in the MAPCP, Minnesota, had a separate evaluation of quality, cost and utilization in its program.⁶⁸

Findings of State Reports in the MAPCP

Differences in Cost

Between 2010 and 2014, HCHs demonstrated significant savings on their Medicare, Medicaid and dual eligible beneficiaries, as compared to non-HCH patients in the same time period, even after correcting for differences in patient populations.⁶⁶

Differences in Quality

Minnesota conducted an independent evaluation of its MAPCP initiative, the Health Care Home (HCH) Initiative in 2016. In Minnesota, quality of care for HCH patients improved, showing better adjusted quality of care for patients with diabetes, lipid screening, asthma, depression and colorectal cancer screening. The largest and most significant findings were in optimal asthma care. Patient experience, on the other hand, was unchanged for HCH versus non-HCH clinics.⁶⁶

Differences in Utilization

In Minnesota, the HCH initiative also showed mixed results in utilization. HCHs actually saw an increase in ED and skilled nursing home use relative to non-HCHs. Yet, there were significant decreases in the use of inpatient hospital services. Interestingly, HCHs saw a slight decrease in the use of prescription drugs. The data also shows that hospital-based outpatient visits did decrease, whereas “professional encounters in a clinical setting,” or the correlate for office-based primary care visits, increased. The authors of the article viewed the decrease in hospital-based office visits as a positive given that these visits are generally more expensive, and usually comprise of specialty visits rather than primary care visits. Overall, the significant decreases in the use of inpatient hospital services was thought to be the primary driver for the cost savings noted above.⁶⁶

[A] common lesson in all states was the need for ample time and resources to bring about practice transformation, including adequate resources for program administration and oversight. Across states and stakeholder groups, many interviewees believed that 3 years was not enough time for the MAPCP Demonstration to show positive results.

RTI (Research Triangle Institute) International. Measurement, Monitoring, and Evaluation of the Financial Alignment Initiative for Medicare-Medicaid Enrollees; Evaluation of the Multi-Payer Advanced Primary Care Practice (MAPCP) Demonstration: Third Annual Report. April 2016.

Discussion

STUDY RESULTS

The review of current evidence for primary care practice transformation trends in addressing cost reductions, quality and utilization of care shows that the PCMH continues to have an impact in the way primary care is delivered. Several gains have been made although not uniformly.

In general, when looking at cost, peer-reviewed studies showed a positive impact, though not always with statistical significance. In addition, results on quality in the peer-reviewed literature showed either a trend towards positive results or no change in quality. Only a few of the positive results were statistically significant, and quality measures were not harmonized between studies. **The limited studies that did comment on patient satisfaction were uniformly positive. Finally, in terms of utilization, peer-reviewed literature showed mixed results.** Although there seemed to be increases uniformly in outpatient PCP visits, this wasn't always correlated with decreases in ER admissions or inpatient admissions. The studies that looked at both cost and utilization showed that more appropriate utilization of services led to cost savings.

Evaluation reports of two large Medicare Initiatives showed mixed⁶³ or no⁶⁵ results on cost. In the CPCI, while cost savings were seen overall, the savings did not offset the payments made to the programs by Medicare. Nonetheless, when evaluating programs such as CPCI, it is important to consider that overall value is comprised of cost, quality and utilization and not one element in isolation. **Given that CPCI demonstrated some positive effects to utilization and quality without any negative outcomes, one could argue that although**

they were no net-cost savings to the system as whole, the programs were spending smarter. Furthermore, state specific reports of CPCI and MAPCP regions generally showed more favorable results in terms of cost, quality and utilization, demonstrating that regional and program-specific differences contribute to the success of a PCMH and should be further studied in an attempt to understand best-practices of primary care transformation.

LIMITATIONS

A few limitations emerged in this review, both in the data and in the compilation of this report. Because of the heterogeneity of study design and outcome measurement, it was difficult to draw quantitative conclusions about cost, utilization or quality. Instead, we relied on a more thematic analysis, and reported general trends when analyzing the studies as a whole. Our comprehensive tables (Appendices 1.1 and 1.2), which include more quantitative data, as well as commentary on study quality and design, help to explain our conclusions, and were reviewed by two independent authors to help minimize bias.

In terms of limitations of the studies themselves, many were conducted over short periods, often one to two years after transformation, and had limited numbers of participants, and at times lack of controls. Assuming that practices at a more mature stage of transformation have better established outcomes, the short time span of the analysis may explain why many studies had mixed, neutral or non-significant results. Furthermore, supposing that practice transformation is most successful in high-risk patient populations, those

studies that focused on smaller populations of patients, or those in a less high-risk pool, may have had negatively skewed or neutral results. In fact, it has previously been reported that most studies on the PCMH are underpowered due to the small populations studied, resulting in a lack of significant findings.⁶⁹ Much of the data reported over the past 14 months was outdated, and assuming that PCMHs continue to learn and refine their practices, we may be underestimating the true current effect of practice transformation on the healthcare system. Yet, this is less of a flaw in our study design and more a commentary on the time and resources it takes to get studies ready for publication in peer-reviewed journals.

Finally, provider satisfaction was not studied in this report. As we move towards a healthcare system that strives to achieve the Quadruple Aim, we must try to understand the impact of practice transformation on the provider, and future iterations of this report should consider this.

LESSONS LEARNED

Despite these limitations and, in general, mixed or non-significant findings, there are some lessons to be learned. **First, patients with greater comorbidity and systems with these patients may show greater early strides in improved outcomes with the PCMH.** For example, although nationwide analysis of two Medicare Incentive Programs, CPCI and MAPCP, showed mixed findings, state specific reports, which focused on the Medicaid subgroups of these initiatives, were more favorable. Assuming Medicaid beneficiaries in these states have more previously unfilled healthcare needs than the average population, there are greater gains to be made in quality, cost and utilization. The peer-reviewed literature also supported this finding in that the studies that reported uniformly positive results for

quality, cost and utilization were focused on patients in a safety-net or community health center setting. Yet, results aren't always positive for patients with higher comorbidity and previous literature has argued that the PCMH can worsen disparities if not all patients have access to the same quality of care.^{70,71}

Second, transformed and transforming practices need time to mature before significant improvements can be achieved.

Whereas the CPC and MAPCP reports included analysis of three years of data, the state reports looked at four to six years of data. **The peer-reviewed findings this year also supported this claim in that a majority of the studies that looked at four years or more of data had positive results,**^{27,29,33,37,49,54,60,62} whereas many of the studies looking at two years of data or less had mixed or non-significant results.^{20,21,32,31,45,38,42,50} Furthermore, when looking at Michigan, the largest and longest running PCMH demonstration project, it is clear that the PCMH does have a positive impact on healthcare.^{2,11,12,13,14,15} This data suggests that the longer a practice has been transformed, the more positive its impact on quality, cost and utilization. Policy makers should realize that not supporting initiatives that show mixed or slightly negative results before they have had time to mature could be detrimental to the implementation and spread of positive ideas. In fact, despite the lack of statistically significant gains nationwide in CPCI, CMS and private payers were impressed enough with the first three years of findings to continue to expand the program into 14 regions. This new program, CPC+, aims to take lessons learned and best practices from CPCI and apply them to transforming more than 2,800 primary care practices.

Third, mixed results in the grey literature and peer-reviewed literature further the notion that we can't apply a one-size-fits-all approach to the implementation and evaluation of practice transformation.

As PCMH's proliferate it becomes hard for non-transformed practices to become totally immune to the uptake of PCMH concepts, thereby dampening the results of studies that attempted to look at "control" populations.

Regional differences in patient demographics as well as site-specific differences in implementation of the PCMH model likely contribute to mixed results. Two studies this year attempted to pinpoint the most successful characteristics of a PCMH, but were unsuccessful in doing so.^{32,33} Michigan's successful experience of using lessons learned from transformed practices as a blueprint for their own practice transformation (Figure 1)⁷² suggests that the framework for implementation is more important than any one specific feature of a PCMH, and future studies should evaluate the impact of different frameworks for implementation.

Finally, the mixed results seen in this review may be due to a positive spillover effect of transformed practices on practices that have yet to transform.

We are 10 years out from the creation of the "Joint Principles of the Patient Centered Medical Home," and practice transformation has been widely implemented.^{9,73} As PCMH's proliferate it becomes hard for non-transformed practices to become totally immune to the uptake of PCMH concepts, thereby dampening the results of studies that attempted to look at "control" populations.

IMPLICATIONS FOR THE FUTURE

Almost all of the authors of the 45 peer-reviewed studies, and five CMS and state reports, called for further analysis of contributing factors of PCMH care delivery, and longer-term follow-up. The authors are likely correct that it is difficult for care delivery to change over a few years, and continued in-depth analysis as we make our way toward optimized care delivery is vital to inform progress along the way. Judging by the success of practice transformation in Michigan, the longest running and largest PCMH demonstration project to date, as well as the successes of CPCI and MAPCP regions this year such as Oregon, Colorado and Minnesota, the PCMH concept has the potential to make great strides towards accomplishing the Quadruple Aim. With MACRA and a changing political climate upon us, it is more important than ever to understand how programs like Michigan achieved success and which payment models best support these functions. Continued efforts to study transformed practices, especially those that have reached a state of maturity, will help guide successful innovation and payment, and help demonstrate the need for a continued investment in access to high-performing primary care, the definition of which is embodied in the soon to be released 2017 Shared Principles.

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The patient-centered medical home is not a pill. It would be much easier to evaluate this primary care reform if it were.

Grumbach, Kevin (2013). JAMA Internal Medicine. The Patient-Centered Medical Home Is Not a Pill: Implications for Evaluating Primary Care Reforms. 173. 20. 1913-1914.

Appendix

APPENDIX 1.1

Overview of Peer Reviewed Studies: PCMH Transformation/PCMH-Like Transformation

Study/Reference	Year	Payment Model	Impact on Cost	Impact on Utilization			Impact on Quality
				PCP	ED	IP	
Rosenthal, et al. ²⁵	2007-2011	Multi-payer; financial incentive	Positive *		Positive		Positive
Flieger SP ²¹	2011	Multi-payer	Negative	Mixed or Equivocal			Mixed or Equivocal
Kern LM, et al. ²²	2008-2012	Multi-payer; financial incentive		Positive	Negative	Positive	Mixed or Equivocal
Chu, et al. ²⁰	2011-2013	Managed Medicaid plan		Positive	Positive	Mixed or Equivocal	
Shi L, et al. ²⁶	2012	Mix					Positive
Khanna N, et al. ²³	2011-2013	Maryland multi-payer					Positive
Lauffenburger, et al. ²⁴	2011-2013	Aetna					Positive
Baughman AW, et al. ⁴⁵	2012-2013	Multi-payer					Negative
Bronstein JM, et al. ²⁸	2010-2013	Medicaid patients	Mixed or Equivocal	Positive			
Rhodes KV, et al. ²⁹	1/2005-6/2010	Medicaid patients	Positive		Positive	Positive	
Shane DM, et al. ³⁰	1/2011-12/2013	Medicaid	Positive		Positive		
Carlin CS, et al. ³²	2010	Multi-payer		Positive			
Glover CM, et al. ³¹	2013	Medicaid			Negative		
Cuellar A, et al. ³⁴	2010-2013	Financial incentive	Positive				
Maeng DD, et al. ³⁶	2008-2013	Geisinger health system	Positive				
Hearld LR, et al. ³³	2008-2012	BCBS Michigan			Positive	Positive	Mixed
Wong ES, et al. ²⁷	2003-2013	VA		Positive			
Kohler RE, et al.	2003-2007	Medicaid	Negative	Positive			
Bitton A, et al. ³⁷	2009	Multi-payer					Positive
Reibling N. ⁴³	2010	Multi-payer			Positive		Positive
Coller RJ, et al. ³⁹	2012-2014	Multi-payer			Mixed or Equivocal	Mixed or Equivocal	
King J, et al. ⁴²	2012	Multi-payer					Positive
VanGompel EC ⁴⁴	2007-2010						Positive

Key

* Not statistically significant

PC: Primary Care Visits

ED: Emergency Room Visits

Inpatient Hospitalizations: for any cause

Positive utilization: Increased PCP visits, decrease ED visits, decreased inpatient stays

APPENDIX 1.2

Summary of Outcomes

PCMH Intervention

Positive results
 Mixed results
 Negative results

Participant or Population: 17 studies; 8-9 regional (5 NCQA, 2 safety-net, 1 PACT); 5 state-based (4 Medicaid, 1 multi-payer); 4 insurance (3 BCBS, 1 other commercial)
Settings: multi-state, regional, state-based AND insurance based

Intervention: PCMH transformation
Comparison: Traditional care in 7 regional/4 state-based; pre/post only Wong (regional); Stage transformation Carlin (state); Various metrics PCMH exposure/capacity for 4 insurance studies

Outcomes	Impacts	Quality of Evidence
Cost 7 studies	Overall: Positive <ul style="list-style-type: none"> 2 increased costs (1 NCQA, 1 Medicaid) 5 cost savings 1 savings only if chronic and mental health conditions (Alabama Medicaid) Increased savings over time/and with chronic conditions 	<ul style="list-style-type: none"> Flieger: Appear well-matched Rosenthal: PCMH had higher screen rate at baseline Bronstein: Pilot areas more urban, larger panel sizes Rhodes: Well matched comparison group Shane: Well matched Cuellar: Spending lower at baseline; drug spending was higher but ED and inpatient care costs were lower at baseline in always PCMH group Maeng: No control group
Utilization 11 studies	Overall: Mixed or Equivocal <ul style="list-style-type: none"> 1 NCQA with no statistically significant findings in utilization 2 with increased PCP visits (Alabama Medicaid, PACT [only if >65]) 1 non significant decrease ED visits (NCQA) 2 increased ED (NCQA & Medicaid) 5 decrease ED visits (1 NCQA, 1 safety-net, 2 Medicaid, 1 BCBS) 1 decrease inpatient hospitalization (Medicaid); otherwise no significant changes in 10 of 11 	<ul style="list-style-type: none"> Kern: PCMH patient younger/healthier at baseline Flieger: Appear well-matched Rosenthal: PCMH had higher screen rate at baseline Chu: PCMH clinics had lower ED visits at baseline, Medicaid patient specific Bronstein: Pilot areas more urban, larger panel sizes Rhodes: Seemingly well matched comparison groups; focus was on patients with co-morbid psych and/or substance use disorder Shane: Medicaid patients; well matched Carlin: Part survey data; no control Glover: MHN patients more likely to have asthma and higher acuity in ED but more likely to be discharged from ED Hearld: Includes survey data; no control group; part of BCBS payment reform Wong: No control group
Quality 7 studies	Overall: Mixed or Equivocal <ul style="list-style-type: none"> 1 study improved med adherence (NCQA) 1 study improved 7-day discharge follow up (BCBS MI) 2 studies with measures better than control, but screening decreased over time 3 with mixed improvements or lack of improvement (2 NCQA, 1 safety-net) 	<ul style="list-style-type: none"> Kern: PCMH patients younger/healthier at baseline Flieger: Appear well-matched Rosenthal: PCMH had higher screening rates at baseline Shi: PCMH clinics had ~2x revenue at baseline than control clinics, less uninsured patients, more CHC/HCH funding. Lower clinical performance in PCMH may have been secondary to the way data pulled (use of EHRs to report clinical performance)–potential bias chart review Khanna: Self-reported quality metrics; pre/post, no control Lauffenburger: Use NCQA roster 2014, but study dates 2011-13

Interventions aimed at features of PCMH

Positive results
 Mixed results
 Negative results

Participant or Population: 15 studies; 2 Pediatrics (Coller & Samaan), 2 breast cancer patients only (Baughman, Kohler), 2 mental health focus (Druss & Jones), 1 payment/Canadian (Kiran), 2 safety-net (Druss, Gunter)
Settings: 8 surveys (4 MEPS); all but 1 mixed insurance (1 with FFS vs. capitated-Kiran/Canadian); Kohler- NC medicaid; 2 safety-net

Dates: 2001-2014 (broad range), 1 not specified (Druss)
Intervention: To evaluate the impact of features of PCMH without recognition of PCMH status
Comparison: 10 with control groups (usual source of care), 1 pre/post only (Samaan), 1 compared clinic scores on SNMHI (index medical home characteristics), 2 regressions (Coller, Garrison [no control]), 1 transformation score (Baughman)

Outcomes	Impacts	Quality of Evidence
Cost 1 study	Overall: Negative	<ul style="list-style-type: none"> Kohler: Only study breast cancer patients
Utilization 7 studies	Overall: Mixed or Equivocal impact <ul style="list-style-type: none"> PCP: 2 increased PCP visits (safety-net patients with mental health needs; NC Medicaid) ED: Patient-centeredness decreased ED visits (MEPS), decrease ED visits with care coordination for high-need Medicaid (Medicaid); no difference 1 (Kohler); 1 correlate visit entropy with more ED (Garrison) Inpatient: No differences 1 (Kohler); Garrison-entropy results in more hospitalizations 	<ul style="list-style-type: none"> Reibling: MEPS survey data; no composite of all PCMH factors Coller: NSCSHN survey Jones: MEPS survey-includes 2004 data (to 2011) Kim: Unique program in each county; different funding per county; intervention gap with more African American/less Hispanic, more existing physical health conditions, similar utilization Druss: Started at very different primary care utilization rates Kohler: Only study breast cancer patients Garrison: No control; readmission gap for older patients and those with more comorbidity
Quality 10 studies	Overall: Mixed or Equivocal but trend toward Positive <ul style="list-style-type: none"> 1 study negatively correlated PCMH to screening (limited to breast cancer patients) 2 showed no difference 6 showed improvement in at least some screening 1 showed little difference from just usual source of care 	<ul style="list-style-type: none"> Baughman: Only focus women with breast cancer; no control group Bitton: Survey data; different baseline sex/race/ethnicity/education/insurance/age Bowdoin: MEPS data; focus on adults with mental illness Reibling: MEPS survey data; no composite of all PCMH factors King: NAMCS survey data; data for all office based providers except anesthesia/radiology/pathology) Kiran: Canadian study Samaan: No control; very targeted (pediatrics 0-14mo) VanGompel: MEPS; PSA no longer recommended Gunter: SNMHS data; safety-net specific Druss: Started at very different primary care utilization rates

PCMH enhancement interventions

■ Positive results
 ■ Mixed results
 ■ Negative results

Participant or Population: 13 studies; 1 diabetic patients only (Eisenstat), 1 uninsured only (Emerson), 1 homeless VA (O'Toole), 1 high-utilizers VA (Zulman), 3 safety-net (non-VA) (Emerson, Price-Haywood). 1 Medicare (Tedesco), 2 primarily publicly insured (Price-Haywood)
Settings: 5 NCQA, 4 VA PACT
Dates: Primarily 2009-2014 (Emerson not specified; Reiss-Brannan 2003-2013)

Intervention: Enhancement projects within already established PCMH clinics. Team based care (TBC) 10, 2 pharmacy (Price-Haywood clinical pharm & Tedesco), 1 mental health (Price-Haywood). 1 payment (Salzberg), 2 IT (Yoon, Emerson) 3 complex care management (Zulman, Kottke, O'Toole)
Comparison: Control PCMH pts (8), pre/post only 4 (Eisenstat, Kottke, O'Toole); 1 payment FFS vs. capitated (Salzberg)

Outcomes	Impacts	Quality of Evidence
Cost 5 studies	Overall: Positive <ul style="list-style-type: none"> 3 decreased costs 2 unchanged costs (payment report and PACT TBC) 	<ul style="list-style-type: none"> Kottke: Pre/post implementation groups were not same people; no control group Reiss-Brennan: Unclear what level NCQA the control clinics were (presume not level III); p values for baseline characteristics not reported Salzberg: Well-matched Zulman: Intervention group with statistically significant higher levels dementia at baseline; only 69% engaged with program, and those who engaged were more likely to have non-VA health insurance; less Hep C/alcoholism than non-engaged intervention patients
Utilization 7 studies	Overall: Mixed, trend toward positive <ul style="list-style-type: none"> 3 increase service utilization (IT intervention, TBC/PACT, care management/PACT) 2 decreased overall utilization (TBC/NCQA, IT/PACT) 2 decrease ED (TBC [1 in PACT] x2) 2 decreased hospitalization (TBC/PACT) 1 decrease ED but increase hospitalization (payment reform study) 	<ul style="list-style-type: none"> Emerson: Small study population, only 14 total virtual visits, only 4 patients in each study arm completed study Kottke: Finance impact TBC: pre/post implementation groups were not same people; no control group O'Toole: Unable to account for non-VHA utilization Reiss-Brennan: Unclear what level NCQA the control clinics were (presume not level III); p values for baseline characteristics not reported—told no differences Salzberg: Well-matched Tedesco: Compared 2 different clinics; intervention group had better team based care to begin with (care manager); very small sample; patients who received face to face visits may have been healthier to start Yoon: VA patients only; longitudinal data comparing EBQI PACT and 28 comparison clinics pre/post PACT
Quality 8 studies	Overall: Mixed, trend toward positive <ul style="list-style-type: none"> TBC improved diabetes mellitus (DM) control (in DM specific study) 1 Improved low density lipoprotein (LDL) control and appropriate aspirin use (NCQA) 1 improved blood pressure (bp) control (PACT) but less positive BP control in another (NCQA) Improved depression treatment response, higher overall prevention scores (NCQA) Care coordination improved communication/continuity but no mortality benefits (PACT) 	<ul style="list-style-type: none"> Eisenstat: Focused on DM patients only Kottke: Pre/post implementation groups were not same people; no control group Kravetz: Seems well matched Price-Haywood: Clinical pharmacy study: at baseline, group in pharmacy intervention were higher risk, worse control HTN and DM, more co-morbidities; more baseline PCP visits Price-Haywood: Collaboration study: more patients who saw a mental health provider had insurance and saw their PCP twice as much; up to PCP whether to refer to mental health or complex care management Reiss-Brennan: Unclear what level NCQA the control clinics were (presume not level III); p values for baseline characteristics not reported Zulman: Intervention group with statistically significant higher levels dementia at baseline; only 69% engaged with program, and those who engaged were more likely to have non-VA health insurance; less Hep C/alcoholism than non-engaged intervention patients

State initiative reports

Positive results
 Mixed results
 Negative results

Participant or Population: 4 studies; 2 insurance mixed (OR, MN), 2 Medicaid (CO and OK); dates 2010-2014
Settings: Colorado, Oklahoma, Oregon, Minnesota

Intervention: State-based PCMH interventions
Comparison: Non-PCMH clinics vs. prior years

Outcomes	Impacts	Quality of Evidence
Cost 4 studies	Overall: Positive <ul style="list-style-type: none"> (CO, OR, MN, OK), but some mixed results (MN had increased ED/ambulatory surgery costs; OR had increased individual costs for PCP visits, mental health, radiology/labs/pharmacy) 	<ul style="list-style-type: none"> Colorado: State reported; no p-values reported Oklahoma: State reported; no p values, not great methods section, hard to tell what's significant (excluded from narrative because of this) Oregon: State reported; p values comparing groups not listed; PCPCH group more Medicaid, younger, more behavioral health issues but overall less chronic disease Minnesota: State reported; per report "HCHs had younger patients, fewer female patients, and patients with lower disease burden, all of which should lower costs. But HCHs also saw more patients of color, which typically increases costs."
Utilization 4 studies	Overall: Positive <ul style="list-style-type: none"> ED: 1 decrease ED (CO), 2 increase ED (MN, OK), 1 no change (OR) PCP: Increase PCP visits (OK, CO, OR) 	See above
Quality 3 studies	Overall: Positive	See above

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Founded in 2006, the Patient-Centered Primary Care Collaborative (PCPCC) is a not-for-profit multi-stakeholder membership organization dedicated to advancing an effective and efficient health system built on a strong foundation of primary care and the patient-centered medical home. Representing a broad group of public and private organizations, PCPCC's mission is to unify and engage diverse stakeholders in promoting policies and sharing best practices that support growth of high-performing primary care and achieve the "Quadruple Aim": better care, better health, lower costs, and greater joy for clinicians and staff in delivery of care.

PCPCC is and will position itself as an advocacy organization—a coalition that serves as a "driver of change," educating and advocating for ideas, concepts, policies, and programs that advance the goals of high-performing primary care as the foundation of our health care system.

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