Implementing Effective Care Management in the Patient-Centered Medical Home

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Background: There is growing evidence that practice-based care management can improve clinical quality and reduce costly healthcare utilization.

Objectives: To explore how a disparate group of patient-centered medical homes (PCMHs) embedded care management in their team care environment to identify best practices.

Study Design: A positive deviance approach was used to contrast care management implementation in practices having the greatest and least improvement on clinical measures of diabetes, the initial target disease for a multipayer-supported statewide initiative involving 25 National Committee on Quality Assurance–recognized PCMH practices participating in a regional learning collaborative.

Methods: Practices were ranked according to their average absolute percentage point increase from baseline to 18 months on 3 diabetes quality measures. Semistructured interviews were conducted with 136 individuals in 21 of the 25 practices. Interview data were analyzed using grounded theory with NVivo 9.0 software. To develop hypotheses related to care management best practices, we compared and contrasted emerging themes across clinical performance tertiles.

Results: Practices with the greatest diabetes improvement described (1) more patient-centered care manager duties, (2) better use of the electronic medical record (EMR) for messaging and patient tracking, and (3) stronger integration of the care manager into the care team compared with practices with the least diabetes improvement.

Conclusions: PCMHs may want to ensure that care managers are available to meet with patients during visits, support patient self-management, fully leverage the EMR for team messaging and patient tracking, and ensure integration into the care team with office huddles and ongoing communication.

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The patient-centered medical home (PCMH) is a new and increasingly widespread[1] model of healthcare delivery that shows significant promise for improving patient care. The PCMH emphasizes team-based care, coordinated and integrated care, and whole-person care,[2,3] and has been associated with improved measures of quality care and cost reduction.[4,5] The process of becoming a PCMH involves practice transformation often centered on the development of a care management plan and infrastructure.[6-9]

Care management involves more intensely caring for high-risk patients through the establishment and monitoring of care plans, more frequent follow-up visits, regular outreach between office visits to assess health status, extensive support for disease management and self-care, tracking and coordination of specialty and other services, and linkages with community resources.[10,11]

Care management has traditionally been conducted by insurer-based nurses providing telephonic outreach to patients identified as either high cost or high risk by claims-based predictive modeling software. However, this method has provided inconsistent care improvement results.[12,13] Some successful models of care management include community-based care managers,[14,15] health plan care managers embedded in primary care practices,[16] and health system–based nurse teams working with primary care practices.[17,18]

This study examined the development of care management within 25 heterogeneous primary care practices in southeastern Pennsylvania implementing the PCMH focused initially on improving diabetes care. Diabetes is a common chronic disease used as a starting point for many PCMH initiatives.[19] A recent review described team-based care and care management as critical components in improving the care of patients with chronic conditions such as diabetes.[20] With care management and team-based care both representing key elements of the PCMH[3] and growing evidence that practice-based care management is highly effective in improving clinical quality and reducing costly healthcare utilization,[21,22] it is important to better understand the implementation of care management in primary care practices. Although care management is an important addition to primary care, there is tremendous variation in the definition and implementation of the role at the practice level, making the implementation of care management an important

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This study used a positive deviance approach to explore how 25 patient-centered medical homes (PCMHs) embedded care management within the PCMH team.

- Practices with the greatest reported improvement on diabetes quality measures described more patient-centered care manager duties, more effective electronic capabilities, and stronger integration of the care manager into the team than practices with the least improvement on those measures.
- Results suggest PCMHs should ensure care managers are available to meet with patients during visits, fully leverage the electronic medical record for messaging and patient tracking, and maintain ongoing communication with providers and other team members.

research topic. This is one of the first studies to explore how a disparate group of unaffiliated primary care practices embedded care management within the team care environment of a PCMH. We used a positive deviance approach contrasting care management implementation in higher- and lower-performing practices to identify a collection of potential best practices synthesized from individual higher-performing practices.

The practices studied were part of the first regional rollout of a statewide, multipayer PCMH initiative consisting of regional learning collaborative meetings, practice facilitation support, and monthly clinical data and narrative reports describing PCMH and care management implementation. All 25 practices were recognized PCMHs by the National Committee on Quality Assurance (NCQA), and 6 regional payers provided pro rata payments to the practices to support PCMH and care management implementation. Practices were expected to take an all-payer approach to population management, including planned chronic and preventive care for all patients and, specific to this study, care management for the highest risk patients. Using a positive deviance method, performed by calculating high and low performance on standard measures of diabetes management and developing hypotheses related to the description of top-performing practices,[23,24] we analyzed and characterized care management implementation in the PCMH setting. We aimed to identify best practices for primary care sites seeking to develop embedded care management services.

METHODS

This mixed-methods study involved (1) rank-ordering the sites based on practice-reported diabetes data to determine the highest and lowest performing practices and (2) analyzing qualitative data collected from interviews to contrast care management implementation in high- and low-performing practices.

Positive Deviance Stratification

The highest and lowest performing practices were identified using practice-reported diabetes data, the initial clinical focus of the statewide initiative. The 25 practices participating in the collaborative were ranked according to their improvement from baseline to 18 months across 3 diabetes performance measures most closely associated with minimizing morbidity and mortality: the percentage of diabetes patients (1) whose latest glycated hemoglobin (A1C) result was less than 7%, (2) whose blood pressure was less than 130/80 mm Hg, and (3) whose low-density lipoprotein cholesterol was less than 100 mg/dL. The resulting improvement index was calculated as the arithmetic mean of the absolute percentage improvement in the 3 clinical diabetes measures. Practices were divided into performance tertiles based on their calculated improvement index. The improvement indexes were statistically significantly different between performance tertiles (1-way analysis of variance $P < .001$).

Qualitative Interviews

Semistructured interviews were conducted with 136 individuals, including clinicians (n = 56), practice managers (n = 15), care managers (n = 13), and other staff (n = 52), in 21 of the 25 practices. Interviews were framed by interview guides with extra questions related to finances for practice leaders and office administrators. Interviews were conducted by 2 teams of 2 trained researchers, with 1 person asking questions and the other taking notes. Both teams followed the same semistructured interview guide and recorded notes from the interviews that were used to assess and ensure inter-observer consistency within and across the interviewer teams. In addition, members of the 2 interviewer teams each observed 1 of the other team's on-site interview sessions to identify and address any differences in interviewer style or delivery of the questions. Members of both interviewer teams also participated in weekly team meetings to review discrepancies and reach consensus. Most interviews were conducted on-site, during office hours, in private locations. Additional interviews were conducted through focus groups or phone calls if key personnel were not available in person. Participants were not compensated for their interview time.

Participants were asked to describe their understanding of the PCMH and their experiences with implementing the PCMH, including their role, level of adoption across the practice, key leadership, accountability, surprises, and lessons learned. Interviews ranged from 15 to 120 minutes and were audio-recorded and professionally transcribed.

Data Analysis

Transcripts were entered into NVivo version 9, a software package for qualitative analysis.[25] Using grounded-theory methods, individual interviews were analyzed for themes and patterns.[26,27] Grounded theory is a methodology that involves iterative development of theories about what is occurring in the data as they are collected.[28] The process develops themes that emerge "from the ground" based on responses to the open-ended questions developed for this study.[26] Broad codes reflecting stakeholder responses to questions about the PCMH were created by a multidisciplinary team of investigators from primary care and communication that coded and analyzed the transcripts. Discrepancies in coding were resolved by group consensus. Keyword searches were run of all interviews identifying use of the terms "care manager," "care management," and "high risk." Topics developed from care manager interviews were used to create further nodes and searches identifying care management mentioned in relation to payment incentives, team-based care, hiring and firing, technology, and roles and responsibilities. In order to develop hypotheses around best practices related to care management, emergent themes were compared between higher- and lower-performing tertile practices. Emerging themes clustered in 3 clear categories that correlated with tertiles of practice performance measures.

RESULTS

Practices included in the study included 4 solo/partner, 8 small, 10 medium, and 3 large practices (**Table 1**). These included private practices, residencies, systems, and federally qualified health centers. Within the first year, 8 practices had level 3 PCMH recognition from the NCQA, 3 practices had level 2, and 14 practices had level 1. No direct correlation was seen between diabetes care improvement measured by the improvement index and any practice demographics, including NCQA recognition levels. The study was not powered to detect differences between diabetes improvement and the educational background of care managers, including registered nurses, social workers, and medical assistants.

We determined the mean baseline for all 3 practice tertiles in regard to the percentage of patients achieving A1C levels less than 7%, blood pressure less than 130 mm Hg, and low-density lipoprotein cholesterol less than 100 mg/dL. The most improved practices reported 41.8%, 40.8%, and 36.4%, respectively. The middle-performing practices reported 38.9%, 40.7%, and 38.0%, respectively. The least improved practices reported 44.4%, 42.9%, and 44.8%, respectively.

Comparing interviews of care managers in the upper and lower tertiles, 3 topics were most salient for implementing successful care management. Practices with the greatest improvement indices described (1) patient-centered care manager duties, (2) using the electronic medical record (EMR) system to its fullest patient-tracking capabilities, and (3) stronger integration of the care manager in the care team as evidenced by extensive information sharing. In contrast, the practices with the lowest improvement indices described more administrative care manager duties, little EMR use, and minimal integration of care management and information sharing.

Care Manager Duties

Care managers in the upper-tertile practices described performing duties best characterized as patient centered, including focusing specifically on diabetic and high-risk patients, following up with patients after visits, providing self-management health coaching and patient education, and providing care for their own roster of patients (**Table 2**). A care manager from a practice in the upper tertile described her duties:

> I do all the phone calls with the patients. I remind [them of] their appointments … all the high-risk patients … I follow the dialysis roster. I look for the missing things, like they need labs, they need appointments, and I bring them back.

Care managers in the lower-tertile practices did not describe having a roster of high-risk patients and described doing mostly telephonic follow-up with patients, managing other staff, and delegating patient follow-up to others, suggesting they serve in more of an administrative role instead of providing direct patient care. A lower-tertile care manager described her position as:

> … Overseeing the nurse practitioners, and overseeing the medical assistants, to make sure that everything flows, and that the clinical side of everything goes smoothly.

Use of the Electronic Medical Record

Care managers at upper-tertile practices reported using the EMR for tracking patients in a diabetes registry and coordinating their care, developing smart forms, and documenting care management services in the EMR (**Table 3**). An upper-tertile care manager praised the EMR:

> With this EMR, it's so much easier to track patients that have been missed out of the system.... So I just think the EMR makes it a little easier because, once they're in there, you can't take them out of there until you do something with their appointment.

Table 1. Practice Demographics[a]

Practice	Rank	Practice Size[b]	Practice Type	Service Area	2008 NCQA Level	Improvement Index as of December 2009
Practice A	1	Small	Private	Urban	2	21.7401
Practice B	2	Small	FQHC	Suburban	1	18.1850
Practice C	3	Small	Private	Urban	3	11.7749
Practice D	4	Medium	Private	Urban	3	10.9800
Practice E	5	Medium	Private	Suburban	3	9.3641
Practice F	6	Solo/partner	Private	Suburban	1	9.1102
Practice G	7	Medium	FQHC	Urban	1	8.5659
Practice H	8	Medium	FQHC	Urban	1	8.2775
Practice I	9	Small	FQHC	Urban	1	7.2423
Practice J	10	Solo/partner	FQHC	Urban	1	6.0248
Practice K	11	Large	FQHC	Urban	1	5.3583
Practice L	12	Large	Residency	Urban	3	3.3042
Practice M	13	Medium	Residency	Suburban	1	1.7500
Practice N	14	Medium	Residency	Urban	1	1.5443
Practice O	15	Medium	Private	Urban	3	–0.0817
Practice P	16	Large	Residency	Urban	3	–0.2072
Practice Q	17	Small	Private	Suburban	1	–0.3150
Practice R	18	Small	Private	Suburban	2	–2.7666
Practice S	19	Medium	System	Suburban	3	–3.1253
Practice T	20	Small	FQHC	Urban	1	–6.0377
Practice U	21	Small	FQHC	Urban	1	–8.3074
Practice V	22	Medium	System	Suburban	1	–9.0498
Practice W	23	Solo/partner	Private	Suburban	3	–11.5520
Practice X	24	Medium	Private	Suburban	2	–11.6774
Practice Y	25	Solo/partner	Private	Urban	1	–14.9826

FQHC indicates federally qualified health center; FTE, full-time equivalent; NCQA, National Committee for Quality Assurance.
[a]There was no direct connection between practice demographic and diabetes care improvement as determined by the improvement index.
[b]Practice size was based on the number of FTE providers in each practice, as follows: solo/partner, 1-2 FTE providers; small, 3-4 FTE providers; medium, 5-9 FTE providers; large, 10+ FTE providers.

Care managers at lower-tertile practices reported not using the EMR for patient tracking, not owning an EMR, or not having time to use the EMR during patient visits. They also reported not being able to develop a way to use the EMR for tracking patients via a registry or inputting forms for specific follow-up. A lower-tertile care manager expressed frustration with the EMR:

> The small health maintenance came embedded in the EMR, and we didn't like it … we're not using it. It's not really helpful. It's not doing anything for us.

Overall, care managers in the upper-tertile practices benefited from earlier work in their practices to develop registry capabilities within their EMRs, including patient tracking systems, use of structured data fields, and standardized documentation processes.

Integration and Information Sharing

Many care managers in upper-tertile practices described meeting with providers to discuss patients on a regular basis, holding quick huddles with providers and other staff nearly every day, and having ongoing discussions about patient care in the EMR (Table 4). Less structured communication in the form of ad hoc huddles was also described as useful among upper-tertile care managers to allow for consultations on new or difficult cases while the patient was still in the office. A care manager in an upper-tertile practice described the proactive nature of their regular meetings:

> We do the weekly touch base, and I do daily huddles with the MAs in the back, and with the report cards and everything, and then they have operation meetings which is on a weekly basis.

Table 2. Duties Performed by Upper- and Lower-Tertile Care Managers[a]

Care Manager Duties	Upper Tertile	Lower Tertile
Patient population of focus	High-risk and diabetic patients only	Mix of high-risk, diabetic, and other patients
Patient follow-up	In person and phone	Phone only
Laboratory reconciliation	Input new labs regularly; identified missing laboratory results	Not mentioned
Self-management support	Performed by care manager on-site	Referred to outside health educator
Saw own patients	Maintained personal roster	No specific roster
Other administrative duties	No other duties discussed	Oversaw nurses/assistants and performed administrative duties

[a]Upper-tertile care managers had more patient-centered duties, while lower-tertile care managers performed more administrative tasks.

Table 3. Electronic Medical Record Use in Care Management in Upper- and Lower-Tertile Practices[a]

Use of EMR	Upper Tertile	Lower Tertile
Patient tracking	More structured recording of appointments, specialist visits, laboratory results, risk assessment	Less structured recording of appointments, specialist visits, laboratory results, risk assessment
Care management forms	Created and used electronic forms	Used paper forms
Documentation during patient visits	Documentation done during visit	Documentation done after visit often on paper

EMR indicates electronic medical record.
[a]Upper-tertile practices described more structured use of and documentation in the EMR than lower-tertile practices.

Some of the care managers in lower-tertile practices reported far less regular or frequent meetings that focused more on work flow issues and less on patient care issues. Few mentioned huddles or their EMR as effective methods for discussing patient care.

> We need to set aside that time and say, "OK, this person is coming in ... this is what we need to do. That person is coming in … that's what we need to do." We haven't really done that. I hate to say that we are flying by the seat of our pants, but that is kind of the feeling that I'm getting.

Case Study

An example of care management in an upper-tertile practice illustrates a number of the best practices described above. Practice C is a family medicine practice in an urban neighborhood consisting of 5 physicians, 2 registered nurses, 3 medical assistants, and additional supporting office staff. This practice achieved an NCQA level 3 rating. The registered nurses are long-time employees and share the care management duties. They have protected time to do care management because the practice shifted administrative and general nursing responsibilities to the assistants and assigned 1 medical assistant to assist the care managers. They focus on high-risk and diabetic patients, track patients referred to specialists, help patients develop short-term and long-term health goals, see patients as they visit the office, and hold frequent meetings with the physicians in the practice to discuss their diabetic and high-risk patients, as described below:

> But we're also doing huddles … the other nurse and I, and then we set it up so that it's one doctor each day of the week. And then we look forward at the next week's schedule to see who's coming and what we have to do for that.

The care managers use the EMR to reconcile laboratory reports, track emergency department (ED) reports from the local hospital, and add notes about their patients. They use color coding to identify care management patients in the EMR and have set up reports they can send to the ED when patients present there. A physician in the practice said the EMR facilitates team-based care and helps the doctors feel comfortable with delegation of patient care to the care managers and other staff because they can always see what everyone is doing in the EMR.

Another physician described the care managers as "quality control" for the practice, noting the care managers see patients from all of the doctors' panels, "making us better doctors." A third doctor agrees they are "delivering better care."

DISCUSSION

This positive deviance study suggests a number of best practices in implementing practice-based care management as part

Table 4. Types of Integration and Information Sharing in Upper and Lower-Tertile Practices

Integration and Information Sharing	Upper Tertile	Lower Tertile
Care management meetings	Regular one-on-one meetings with physicians/ providers to discuss patients	Some patient discussion during routine staff meetings
Huddles	Daily consultations and planning meetings	Not regularly done
Ongoing conversations about patient care	Discussed patients regularly through EMR; electronically documented conversations	Some patient discussion; paper trail

EMR indicates electronic medical record.
[a]Upper-tertile practices implemented scheduled meetings, huddles, and ongoing EMR conversations about patient care. Lower-tertile practices described no specific care management meetings, infrequent huddles, and a paper trail to capture ongoing conversations about patient care.

of a PCMH implementation. By stratifying participating practices into tertiles based on diabetes improvement (the initial clinical focus), it was possible to identify distinct differences in care management implementation between the higher- and lower-performing practices. Upper-tertile care managers performed patient-centered duties; fully leveraged the potential of the EMR for communication, patient tracking, and information sharing; and had open and frequent communication with physicians and office staff. In contrast, lower-tertile care managers performed administrative duties, were unable to harness the communication and tracking potential of the EMR, and had less frequent intraoffice communication.

As with any new role, questions remain around what care managers should do and the background and training care managers should have in a PCMH. While the majority of the care managers in the practices we studied were registered nurses or nurse practitioners, some care management was being done by medical assistants and social workers in conjunction with providers. Dejesus and colleagues[29,30] found that both providers and patients prefer a nurse care manager, and care manager job descriptions provided to practices in this initiative and in the Qualis Safety Net Medical Home Initiative suggest a nurse is needed to provide essential care management duties such as medication reconciliation, medication management, patient assessment, and care transition support.[11] Likewise, although previous studies showed improved health outcomes and improved adoption of healthy behaviors with telephonic patient outreach by physicians and care managers,[31,32] additional studies are needed to evaluate the effect of in-person care management in conjunction with primary care office visits.

EMRs can both facilitate and hinder integration of care management in a PCMH. For upper-tertile care managers, the EMR functioned as a way to track and document patient visits and outreach, look for laboratory results, manage referrals, create patient forms, and assess and stratify patient risk in an ongoing manner, functions that have been studied in the past.[33-35] Care managers in the lower tertile struggled with using the EMR to track patient care, document services, and create useful forms, at times even describing the EMR as a barrier to high-quality clinical care, a result that has been seen when the goals of EMR implementation and usage are not effectively discussed within a practice.[36,37]

In addition to having clearly defined duties and integrating care management into the EMR, care managers in the upper-tertile practices also were well integrated into the practice team, meeting regularly with providers and other staff to discuss patient care and using the EMR for ongoing discussions on patient care. In previous studies, diabetes outcomes improved more when care managers met regularly with physicians to discuss patient management decisions and planning.[38,39] Previous studies have also noted how an EMR can support communication by making messaging faster, ensuring delivery, and creating reminders for physicians and team members.[40-43] Leveraging the messaging features of an EMR allows care managers to communicate with team members in a venue that supports access to and inclusion of pertinent clinical information from the patient record.

Interestingly, despite the focus on EMR functionality in the 2008 version of NCQA's PCMH recognition program and the differences in EMR usage noted between upper- and lower-tertile practices, NCQA recognition in this study was not correlated with the diabetes improvement index. It would be interesting to study whether NCQA's 2011 version is better correlated with clinical improvement in these or other practices that have worked to embed more clearly defined care management services as part of managing their patient population.

Several limitations should be considered when scrutinizing the conclusions of this study. As a qualitative study, our findings should be used to generate hypotheses and new lines of research in assessing the features that support effective development of the PCMH model rather than seeking causality. The PCMH transformation process is multifaceted in nature with multiple changes in the role and responsibility of care team members at the practice level. As such, it should not be concluded that the described care management implementation led to the improved outcomes; however, many previous

studies have shown care management does improve diabetes care.[40,44-47] In addition, we have already observed that baseline structural capabilities of these practices were an important predictor of improvement index.[48]

While there is abundant evidence indicating patients with better A1C, blood pressure, and cholesterol control have fewer diabetes complications over time, these clinical diabetes measures may not relate significantly to the patient-centeredness of care or long-term health outcomes, key measures of effective care management that were unavailable. Recently, the American Diabetes Association has advocated more individualized patient-centered goals for A1C and a blood pressure goal of less than 140/90 mm Hg.[49] Further research is necessary to explore whether the clinical effects of care management are compounded by implementing care management in the context of a PCMH. In general, no single practice incorporated all of these elements and it remains to be seen whether an amalgamation of best practices within a specific clinic may be associated with more robust improvement.

Another limitation is the depth of questions about care management that were asked during interviews. The focus of the interviews was on understanding overall PCMH implementation, not just the implementation of care management and the associated tools such as the EMR. However, practices of different sizes and locations were well represented in the sample, which helped support generalizability, although these practices received financial incentives and instructions for developing care management services. Respondents may have biased their responses toward those perceived as socially desirable. Interviews were conducted in private settings with assurances of confidentiality that were aimed at limiting the impact of potential information bias.

CONCLUSIONS

This study used a positive deviance approach to look at the implementation of care management in the PCMH, a development that has not been well explored. For practices looking to become PCMHs and to include embedded care management, it may be important to ensure that care managers are focused on only the highest risk patients; are available to meet with patients during visits; provide self-management support; have access to and fully leverage the potential of the EMR for communication, patient tracking, and information sharing; and maintain open and ongoing communication with providers and other practice team members.

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