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How Nurse-Led Practices Perceive Implementation of the Patient-Centered Medical Home

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ABSTRACT

PURPOSE: The Affordable Care Act (ACA) promotes the Patient-Centered Medical Home (PCMH) model as a way to improve healthcare quality, the patient experience, and has identified nurse-led primary care as a mechanism meeting the increasing demand for quality primary care. The purpose of this study was to investigate the implementation of a PCMH model in nurse-led primary care practices and to identify facilitators and barriers to the implementation of this model.

METHODS: Data were collected through in-depth interviews with providers and staff in nurse-led practices.

RESULTS: These data suggest two categories of processes that facilitate the integration of PCMH in the nurse-led practice setting: patient-oriented facilitators and organizational facilitators. In addition, a number of barriers were identified to implementing the PCMH model. Overall, these practices creatively engaged in the transformation process by structuring themselves as a complex adaptive system and building upon the core principles of nurse-led care.

CONCLUSION: Since the core principles of nurse-led care map onto many of the same principles of the PCMH model, this study discusses the possibility that nurse-led practices may experience fewer barriers when transitioning into PCMHs.

MeSH keywords: Primary Health Care; Organization and Administration; Delivery of Health Care; Primary Care Nursing

INTRODUCTION

The demand for, and provision of, primary care in the US is shifting. Increasing incidence of chronic disease, rising medical costs, and the predicted increase in demand related to improved access associated with the Patient Protection and Affordable Care Act (ACA)(*Patient Protection and Affordable Care Act*, 2010) have led healthcare systems to consider alternative models of care delivery. The ACA specifically included support for Patient-Centered Medical Homes (PCMH) in health centers. The PCMH model supports team-based coordination of care and patient self-management capacity in an effort to improve quality of care and associated health outcomes. PCMH has been widely adopted in primary care settings, including in nurse-led practices. Nurse-led practices (also referred to as nurse-managed healthcare) have shown promise in alleviating the US demand for primary care (Esperat, Hanson-Turton, Richardson, Tyree Debisette, & Rupinta, 2012) and have been identified as practice models for improving quality of care (Hansen-Turton, Bailey, Torres, & Ritter, 2010; Martinez-Gonzalez et al., 2014).

Current models of nurse-led care were developed in the 1980's in response to the demand for clinical training sites for nursing students and to serve the communities located near nursing schools (Hansen-Turton, 2005). Funding for these practices initially came from the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration and individual schools of nursing (Hansen-Turton, 2005). As a result of their early successes, there are now over 250 nurse-led US health centers (Holt, Zabler, & Baisch, 2014).

While there is no formal model for nurse-led practices, the National Nursing Centers Consortium outlines the following nurse-led practice priorities (NLPP) and characteristics:

"***Wellness*** **-** *We treat, educate, and heal from a holistic perspective that integrates preventive*

care and wellness maintenance into primary care.

Patients - *We know our patients and our patients know and trust us. We take the time to listen and to learn about the whole person, and consequently make the connections between a person's life and the state of his or her health.*

Families - *We treat the whole family, not as separate individuals but as a family whose members share an environment of health risks and health opportunities.*

Non-traditional and community-based services - *We expand our definition of healthcare to deal with some of the most serious problems facing American society today, including family, adolescent and neighborhood violence; drug, nicotine and alcohol addictions; grief, stress, and anxiety; and the environmental aspects of diseases such as asthma and birth defects"* (National Nursing Centers Consortium, 2011). Nurse-led centers emphasize the holistic model of care and integrate an understanding of the social determinants of health. Additionally, nurse-led centers often utilize the patient-provider team approach to care, which promotes patient autonomy and supports shared decision making – all key constructs in the PCMH model (Hansen-Turton, 2005; Moser, Houtepen, & Widdershoven, 2007).

In part because of this alignment, attention in the US has been refocused recently on nurse-led centers. The passing of the ACA in 2010 codified the definition of nurse-led health centers, and created a specific funding mechanism to aid existing nurse-led clinics under Title V-Sec.5208 (*Patient Protection and Affordable Care Act*, 2010). Additionally, the National Committee for Quality Assurance (NCQA) recognized nurse-led practices for PCMH certification in 2010 after a long history of only recognizing physician-led practices (National Committee for Quality Assurance, 2010). NCQA recognition created an opportunity for nurse-

led practices to receive financial incentives to support PCMH transformation (National Committee for Quality Assurance, 2010).

As originally envisioned by the American Academy of Pediatrics (AAP), the purpose of the PCMH is to provide centralized and consistent care. The PCMH model facilitates a team-based approach to care, wherein providers coordinate care across all elements of the larger healthcare system. This includes efforts to partner with specialists, hospital systems, home healthcare networks, and agencies providing support in the community. Well aligned with the professional values of the nurse-led paradigm of care, the model emphasizes a holistic, relationship-based approach to primary care, where the whole person is the center of treatment and the team works with families and support networks respecting patient's needs, preferences, culture and values (National Committee for Quality Assurance, 2011). However, given that PCMH models are relatively new and most work has focused on adoption of the model in the physician-led setting, it is especially important to examine integration in the nurse-led practices setting. This study examined the adoption of the PCMH model in four Pennsylvania nurse-led practices. The specific aim of this study was to assess the barriers and facilitators to integrating the PCMH model in the nurse-led practice setting.

METHODS

Sample

Data for this study are nested within a parent project funded by the Agency for Healthcare Research & Quality (AHRQ R18HW019150) and the Aetna Foundation. It was designed as a mixed-methods investigation of PCMH implementation and transformation in 25 primary care practices (19 physician-led practices and six nurse-led practices) in Southeastern

PA. Surveys, site visits, focus groups, and individual interviews were conducted at participating sites. The sub-investigation described here focuses only on interview data collected at four of the participating nurse-led practices.

Data Collection

Key informant interviews were conducted between September 2010 and September 2011 (n=32) with nurse practitioners, nurses, social workers, certified nurse assistants, medical assistants, support staff, and practice administrators at four sites. Interviews lasted approximately 60-90 minutes and were audio-recorded with the consent of each participant. Audio recordings were transcribed verbatim and de-identified. To ensure the validity of the data, standard guidelines were implemented including: 1) rigorous training of interviewers; 2) use of a standardized interview guide; and 3) conducting interviews in private locations. The interview guide addressed the following areas: Understanding of the PCMH model, motivation for involvement, practice commitment, barriers to implementation, practice culture, and communication (see Appendix A for full interview guide).

Data Analysis

De-identified transcripts were imported into a qualitative software program [QSR NVivo (9.2)] used to facilitate analyses. The research team developed a codebook and coded all the transcripts. Coding accuracy was evaluated by the senior researcher on the team and coding discrepancies were reviewed and resolved by consensus. The codes were organized into two thematic categories: facilitators and barriers. Quotes from the transcripts were then chosen to illustrate the findings and to ensure that emerging themes were firmly grounded in the data.

RESULTS

Thirty-two key informants from four nurse-led practices participated in this study. Their roles in the practice varied and included nurse practitioners, nurses, social workers, certified nurse assistants, medical assistants, support staff, and practice administrators. Practice characteristics are described in Table 1. The analysis yielded a set of themes that were organized into two broad thematic categories: ***facilitators*** and ***barriers*** to the integration of the PCMH model in the nurse-led practice setting. The themes identified as facilitators were the patient's role in their care, including one-to-one encouragement, using outcome reports, facilitating care, and the formal structure of PCMH, including frequent meetings and use of reports, physical environments that facilitate communication, and horizontal responsibility. Themes categorized as barriers included changing electronic medical record (EMR), time, complex patient needs, and poorly defined practice roles. These themes are described below with representative illustrative quotations.

Practice Study ID	Practice Type	Service Area	Number of interviews
1	FQHC	Urban	9
11	FQHC	Urban	4
14	FQHC	Urban	10
23	FQHC	Suburban	5

Table 1: Practice Characteristics

FACILITATORS

Respondents identified key practices and policies that were in line with the PCMH model's patient-centered framework. Respondents highlighted ways to enhance access to care and foster the patient-provider relationship.

The Patient's Role in Their Care

Patient-oriented enhancements were defined by practice members as policies or procedures that enhanced the patient's engagement in their own care and emphasized patient responsibility for self-management goals. This thematic category included: One-to-one encouragement, using outcome reports to keep patients on track, and enhancing procedures for removing barriers to care with a focus on enhancing follow-up and referral.

One-to-one encouragement. This strategy involves one-to-one face time spent with the patient when the care team member directly encourages the patient to take an active role in their health. These educational moments were described as a way to assist patients' understanding of their diabetes or other health issues such as smoking, diet, and the role of family support of those with chronic health issues. Respondents stressed that patient education was critical to engage the patient in their care and often emphasized education as a core component of the nursing model. Targeted reinforcement was described as modeling shared decision making framing the provider-patient relationship as a partnership. For example, a team member from Practice 23 shared the following:

> *…I remember [a] diabetic [patient] somewhere around the third visit looking at me and saying, "I'm understanding that you and I are partners in this." And so I said, "Okay. Yeah. That's right." So I think we just do it a lot better. […]I think we're less focused on pathology and more focused on the client and that client status (Practice 23; Nurse Practitioner).*

Using outcome reports. Some nurse-led practices took advantage of using clinical data reports to show patients where they had made improvements and where there was additional potential (e.g. blood pressure or A1c levels). Some practices also used outcome reports and data on trends as a way promote an office-wide culture of increased performance awareness. Practices described using improved outcome data to celebrate and reinforce positive patient behaviors

from the receptionist all the way to the primary provider, helping demonstrate the concept of a team for patients during their office visit.

> *…And then [name] will get them and he'll go, "Look, his A1c." And then we'll go "Yay." You know we almost have like a little party thing for the patient. And when the patient comes in then we reward them […]. And we celebrate with them so they'll know that […] was a big accomplishment, what they did, and it's better for them (Practice 23; Medical Assistant).*

Facilitating care. Practice members described a relationship between patient demographics and methods of facilitating care. Some examples of practices used to facilitate care included: the use of translators, helping to procure transportation, consolidating appointments into one building, making referrals to social services, and addressing nutritional needs by connecting patients to sources of local produce. Respondents described the need to do more than just refer patients to social services, noting that attention must be paid to the social, environmental, and behavioral needs of the patients demonstrating an incorporation of social determinants of health into practice changes. The following example illustrates the variety of other needs the providers in these practices try to meet for their patient populations.

> *…a lot of our patients are kind of hard to get ahold of. So then we've got to get ahold of them and tell them to bring an interpreter. So it's not as easy to get the service as just making the referral. It's a lot of logistics in terms of getting patients to any specialist in general when they need care. (Practice 23; Nurse Practitioner)*

Respondents also reported how EMR systems facilitated care. Practices used their EMR to track and maintain referrals to specialty services, such as eye care and podiatry. A wide variety of EMRs were used across practices, making specifics difficult to identify. However, across all practices, participants credited the EMR with enhancing staff follow-up with patients, ensuring patients were coming in on a regular basis and receiving the treatment necessary to

make clinical progress, as a way to improve patient engagement. Follow-up was also an area where PCMH goals helped strengthen practice procedures related to specific NCQA standards. Being able to track and follow up with patients was a particular concern to practices 14, 23, and 25, who encountered populations who were more transient for a variety of reasons (e.g. housing instability, migrant workers, fluctuating insurance status, etc.).

Descriptions of enhanced follow-up included office staff (usually a care manager) developing personal relationships with patients so that follow-up conversations could better account for factors contributing to missed appointments and could provide targeted encouragement for the patient to increase their engagement with the practice. In most interviews, practice members were quick to qualify their statements about the limits of following up with patients. Respondents pointed out that even the most dedicated follow-up attempt cannot guarantee a patient will come in, noting that it is ultimately dependent on the patient. However, practices described making great efforts to help make this happen (e.g. removing potential access barriers and providing emotional encouragement).

> *That entails multiple things, one in particular has to do with identifying our highest risk patients and working side by side, partnering with the nurse practitioners to not only support the plan of action associated with that particular patient but then provide the education and the follow-up as well and the telephonic oversight and monitoring in terms of just keeping folks engaged, aware, and turned on to maintaining or at least following through with their commitment to engaging the plan and coming back for visits. Sometimes successful, sometimes not. (Practice 1; Nurse)*

Formal structure of PCMH

The ways in which providers perceived that PCMH enhanced their clinics was not limited to patient-oriented changes but also included organizational changes. Organizational enhancements were viewed as essential to the success of patient-oriented strategies.

Respondents did not perceive that PCMH transformation had a radical impact on the basic principles by which they operated; rather the initiative provided a formal structure for organizing and applying core principles in a way that could be replicated efficiently and consistently. As illustrated by the following comment, the PCMH model provided the tools for change in the form of educational opportunities for the practices in patient-centered chronic care management, the required implementation of an EMR system, access to the use of outcome data, a connection to peer support by other providers and practices, and financial incentives.

> *It was a wonderful fit. I think that being part of this has helped to expand our knowledge base and skills and empowering patients and educating them and getting tools and networking with other people … to discover new tools that can be used (Practice 23; Nurse Practitioner).*

Frequent meetings and use of reports. Meetings to discuss areas for improvement were popular in nurse-led practices. Though time pressures made meetings challenging, they were seen as essential for understanding PCMH-related shifting job responsibilities. Practices described the importance of team meetings for providing a space for practice improvement and addressing necessary patient-oriented enhancements driven by outcome reports.

Physical environments that facilitate communication. Respondents described physical space and co-location as a driver of a positive team atmosphere. Shared space reportedly facilitated frequent and informal communication about patient care. However, limited space was viewed as a constraint to how many patients could be comfortably and privately cared for.

Horizontal responsibility. Horizontal responsibility, where responsibilities are distributed across the care team, was seen as a facilitator to productive team meetings as well as important to the patient follow-up process. A sense of horizontal responsibility was reported to help everyone from the front to the back of the clinic feel as though their role was vital to the

overall functioning of the practice and patient care experience. Respondents described the sense of a collective agreement in which every staff member can have an effect on patient health, including the patient.

> *We share [monthly outcome reports] with staff so that we can see where we're failing, and we problem solve. And it's not just the providers. I bring in the MAs and the receptionist in…Everybody has good ideas. Everybody has a different perspective. And it all works to really try to match the solution to the problem. (Practice 23; Nurse Practitioner).*

BARRIERS

Barriers were defined as processes or policies that inhibited the patient-oriented and organizational enhancements associated with the implementation of PCMH in nurse-led settings. Respondents noted that some barriers were likely not unique to nurse-led practices.

Time. Respondents spoke about time as a barrier to smooth adaptation of the PCMH model, noting specifically that data entry and EMR systems came with a significant initial time commitment. Respondents acknowledged that the time issue would resolve itself as everyone became more familiar with the new electronic processes. Additionally, providers described wanting more time for one-on-one patient education, but were grateful when this role could be filled by educators and care managers.

Changing EMR system. For practices that adopted or changed an EMR system, the learning curve was seen as a serious impingement on administrator time, especially when too little time was allocated for learning how to use new EMR systems and properly understanding their functions prior to implementation. Some practice members expressed concern about switching to new EMR systems, particularly at practices that switched several times during the intervention period. Respondents had to relearn entirely new data entry protocols and, in some

cases, were unable to merge old databases with new ones and lost data on patient progress as a result. Not all practice members saw this as an insurmountable hurdle; rather a necessary stepping-stone that caused initial stress but would ultimately help the practice function more efficiently.

> *…unfortunately we've gone through two systems now. When we went from one system to the next system a lot of the information hasn't come through. So I don't know what's been done on half of my patients…so I spend hours, a whole lot of time, and I hate to waste time, looking for information in that system, because you know the next patient's waiting. (Practice 14; Nurse Practitioner).*

> *They made it sound like an upgrade. But it was really a whole new system. So it was like learning an EMR from scratch. There's some concepts that are the same, but it was too different the software. It wasn't like upgrading from version eight to nine. It was like a totally different software. So I think people found that challenging. There are always some providers that took to it better than others. But I think now we're kind of six months or more into it, so they're kind of getting use to it. (Practice 14; Data Manager)*

Complex patient needs. Practice members described the impact of life and social stressors as a significant competing demand for patient self-management. Patient attributes such as having a low income, having active substance abuse issues, being part of a transient population, or having housing instability were regarded as significant obstacles to care that needed to be addressed, often before health issues could become a priority.

> *I think nurse-managed health centers need to be recognized for where they practice. It's not going to be any university setting. I've been in primary care my whole career, and most of the practices I've been in have been university-based outpatient settings. And it's usually a mix of people, and this is clearly people who are more at risk and high risk (Practice 1; Diabetes Educator/ RN).*

Staffing and staff rolls. Confusion over job responsibilities and high staff turnover rates during the PCMH transition period were identified as barriers to PCMH implementation. These

issues also led to concerns among providers about continuity of care for their patients. In addition, concerns were stated over the transfer of responsibility from one provider to another as interrupting systems of horizontal responsibilities and disruption of the cohesiveness of the care team.

DISCUSSION

This study is the first to explore the integration of the PCMH model in the nurse-led primary care setting. Our findings demonstrate that important facilitating factors include the *patient's role* in their care (one-to-one encouragement, the use of outcome reports, and efforts to facilitate care) and the characteristics of the formal PCMH structure (frequent meetings, the use of reports, the design of physical environment to improve communication, and horizontal responsibility), are separate, but complementary components of PCMH model and are consistent with nurse-led practice priorities (NLPP) care provision. The concepts subsumed under the categories of patient-oriented and organizational enhancements were tangible practices or policies that could be constructed and carried out, not just a set of values or philosophies about how one believes a provider and patient should work together in the nurse-led setting. Additionally, nurse-led practices faced several barriers to PCMH implementation closely tied to the learning curve and time commitments associated with changes related to PCMH implementation.

Study findings shed light on the overlapping and complementary nature of NLPP and PCMH functions (Figure 1) through the assessment of facilitators and barriers associated with PMCH transformation. The first NLPP, promoting patient wellness, is consistent with the PCMH function of promoting comprehensive care, the second and third NLPPs, focusing on care for

patients and families, aligns with the patient-centered function of PCMH, and the fourth NLPP, non-traditional and community-based services, mirrors the accessible care functions of PCMH. Arguably, all of the above are vital to the promotion of quality and coordinated patient care.

Identified facilitators and barriers were related. For example, the expanded role of EMRs and performance data highlighted in the PCMH transformation process provided a venue viewed by members of nurse-led practices as enhancing their ability to empower patients in their own care through automated organizational practices which were viewed as improving coordination and quality of care. However, when data entry or EMR systems were not fully functional or providing appropriate output data, patient care teams noted the challenges to not having access to accurate information upon which to base patient care or practice improvement decisions. Patient care and practice transformation may be impacted by the quality of information in the EMR and the learning curves and workflow adjustments associated with proper and appropriate use.

Practices appeared to absorb potential enhancement and progress disruptions during the transformation process by approaching their implementation of PCMH from what could be described as a complex adaptive systems (CAS) framework (Holland, 1992). The idea of a CAS is a dynamic and adaptive network of agents in which actions are reciprocally reactive and influence the system as a whole (The Health Foundation, 2010). CAS is used often in health services research to describe complicated health processes and is illustrated especially in the way that nurses address healthcare problems from a systems perspective (Holden, 2005). The CAS framework has also been adopted to describe the way that practice redesign is carried out. Miller et al (Miller, Crabtree, Nutting, Stange, & Jaen, 2010). discuss the CAS framework specifically in regards to PCMH implementation. The authors suggest that adaptation is the key component of understanding an organization as a CAS. Adaptation is described as both the ability to

"…respond to changes in the local environment as well as to intentionally create change in that environment"(Miller et al., 2010). They go on to list several key themes of primary care practices as CAS. The themes most salient to this paper include: 1) the potential for any action or practice has the ability to impart consequences on the environment and thus influence other actions, 2) unintentional consequences and surprises should be expected, and 3) purposeful change should seek to improve but realize the limitations of not being able to reach perfection; this requires an iterative process of evaluation, feedback and the opportunity for learning (Miller et al., 2010).

Clancy (Clancy, 2011) has argued that the use of a CAS framework for practice restructuring is paramount if practices are to achieve meaningful changes. Clancy used the phrase "evolutionary optimization" to describe "an alternative approach to planning [that] define[s] broad project objectives and then use[s] stepwise processes that accommodates adaptation and learning in small increments" (Clancy, 2011). This mirrors the same elements of CAS described by Miller et al (Miller et al., 2010).

Using the CAS framework for understanding the restructuring process of PCMH transformation can be helpful as CAS allows for organizational creativity and iteration in the assessment of what works and what does not. The built-in flexibility of CAS complements and highlights the high level of horizontal responsibility described by respondents across the practices.

Nurse-led practice-level adaptation was described as drawing on all team members when troubleshooting problems – a concept that these participants identified as being important to their transformation process. Horizontal responsibility is also a likely driver of buy-in at a practice level (Bleser et al., 2014). Directly participating in the troubleshooting process can ensure that providers and staff will support the restructuring as they are investing in their own ideas to make

transformation successful. This is in contrast to a top-down implementation framework where one person or leader outlines the steps and goals to be followed.

By understanding nurse-led practices as a CAS we can better understand how PCMH is enhancing organizational and patient-level transformations in care delivery and responding to unintended consequences and adapting to identified barriers. The practices in this sample described implementation experiences that could have derailed PCMH progress: complex patient needs, challenging new technologies, and novel requirements for becoming a PCMH. Yet by remaining adaptive, incorporating feedback, and embracing horizontal responsibility, transformation continued to evolve.

The CAS model allowed us to shed light on the transition to a PCMH model in the nurse-led setting. Nurse-led practices that rest on the National Nursing Centers Consortium's core principles (NLPPs) – wellness, patients, families, non-traditional and community-based services, and structuring care and framing practice priorities – have a head start on functioning as a PCMH. Respondents described the PCMH model as helping them further enhance their values through patient-oriented enhancements, organizational changes, and a focus on care coordination and quality.

Some limitations should be considered when interpreting the results of this study. The qualitative results should be used for hypothesis generation rather than making causal inferences. Issues of generalizability or transferability should be considered with possible over-representation of the perspectives of stakeholders choosing to work in urban underserved communities with site designations as federally qualified health centers. In considering our sample size, the research team felt that the data reached saturation on the concepts presented in this study.

Nurse-led practices have demonstrated they can use the PCMH model to facilitate change within their own settings and that the model is complementary to the priorities set forth by the National Nursing Centers Consortium for nurse-led practices. While the priorities of NLPP and PCMH functions are similar, work must be done to explore the unique opportunities and challenges to implementing a PCMH model in nurse-led settings, many of which are located in medically underserved areas and serve marginalized patient populations. Future research should seek a clearer picture of what the PCMH model means for patients in the context of nurse-led practice transformation. Other areas for research could include direct comparisons between nurse-led and physician-led practices to explore how clinicians with different training, and perhaps differing organizational philosophies, influence the integration of the PCMH model in practice.

References

Bleser, W. K., Miller-Day, M., Naughton, D., Bricker, P. L., Cronholm, P. F., & Gabbay, R. A. (2014). Strategies for achieving whole-practice engagement and buy-in to the patient-centered medical home. *Annals of Family Medicine, 12*(1), 37–45. http://doi.org/10.1370/afm.1564

Clancy, T. R. (2011). Improving processes through evolutionary optimization. *The Journal of Nursing Administration, 41*(9), 340–342. http://doi.org/10.1097/NNA.0b013e31822a705d

Esperat, M. C. R., Hanson-Turton, T., Richardson, M., Tyree Debisette, A., & Rupinta, C. (2012). Nurse-managed health centers: safety-net care through advanced nursing practice. *Journal of the American Academy of Nurse Practitioners*, *24*(1), 24–31. http://doi.org/10.1111/j.1745-7599.2011.00677.x

Hansen-Turton, T. (2005). The nurse-managed health center safety net: a policy solution to reducing health disparities. *The Nursing Clinics of North America*, *40*(4), 729–738, xi. http://doi.org/10.1016/j.cnur.2005.08.005

Hansen-Turton, T., Bailey, D. N., Torres, N., & Ritter, A. (2010). Nurse-Managed Health Centers. *American Journal of Nursing*, *110*(9), 23–26. http://doi.org/10.1097/01.NAJ.0000388257.41804.41

Holden, L. M. (2005). Complex adaptive systems: concept analysis. *Journal of Advanced Nursing*, *52*(6), 651–657. http://doi.org/10.1111/j.1365-2648.2005.03638.x

Holland, J. H. (1992). *Adaptation in natural and artificial systems: an introductory analysis with applications to biology, control, and artificial intelligence*. Cambridge, MA: MIT Press.

Holt, J., Zabler, B., & Baisch, M. J. (2014). Evidence-based characteristics of nurse-managed health centers for quality and outcomes. *Nursing Outlook, 62*(6), 428–439. http://doi.org/10.1016/j.outlook.2014.06.005

Martinez-Gonzalez, N. A., Djalali, S., Tandjung, R., Huber-Geismann, F., Markun, S., Wensing, M., & Rosemann, T. (2014). Substitution of physicians by nurses in primary care: a systematic review and meta-analysis. *BMC Health Services Research, 14*, 214. http://doi.org/10.1186/1472-6963-14-214

Miller, W. L., Crabtree, B. F., Nutting, P. A., Stange, K. C., & Jaen, C. R. (2010). Primary care practice development: a relationship-centered approach. *Annals of Family Medicine, 8 Suppl 1*, S68–79; S92. http://doi.org/10.1370/afm.1089

Moser, A., Houtepen, R., & Widdershoven, G. (2007). Patient autonomy in nurse-led shared care: a review of theoretical and empirical literature. *Journal of Advanced Nursing, 57*(4), 357–365. http://doi.org/10.1111/j.1365-2648.2007.04105.x

National Committee for Quality Assurance. (2010). *Recognizing nurse led practices for patient centered medical homes*. Retrieved from http://www.aanp.org/NR/rdonlyres/CAD37402-48A6-4C5C-9123D6EB547AC411/4480/PPCPCMHNurseLedPracticesFactSheet.pdf

National Committee for Quality Assurance. (2011). *NCQA Patient-Centered Medical Home 2011*. Washington, D.C.

National Nursing Centers Consortium. (2011). *About Nurse-Managed Care*. Retrieved from http://www.nncc.us/site/index.php/about-nurse-managed-care

Patient Protection and Affordable Care Act, Pub. L. No. 111-148 (2010).

The Health Foundation. (2010). *Evidence Scan: Complex adaptive systems*. London, UK: The Health Foundation.

Figure Legend

Figure 1: Complementary nature of NLPP and PCMH functions