Training Family Medicine Residents to Build and Remodel a Patient Centered Medical Home in Rhode Island: A Team Based Approach to PCMH Education

RABIN CHANDRAN, MD; CHRISTOPHER FUREY, MD; ARNOLD GOLDBERG, MD; DAVID ASHLEY, MD; GOWRI ANANDARAJAH, MD

ABSTRACT

Primary Care practices in the United States are undergoing rapid transformation into Patient Centered Medical Homes (PCMHs), prompting a need to train resident physicians in this new model of primary care. However, few PCMH curricula are described or evaluated in the literature. We describe the development and implementation of an innovative, month-long, team-based, block rotation, integrated into the Brown Family Medicine Residency Program, within the context of statewide PCMH practice transformation in Rhode Island. The PCMH resident team (first-, second- and third-year residents) gain PCMH skills, with progressive levels of responsibility through residency. In addition to traditional supervised direct outpatient care, learning activities include: active participation in PCMH transformation projects, population health level patient management, quality improvement activities, interdisciplinary teamwork, chronic disease management (including leading group medical visits), and PCMH specific didactics paired with weekly projects. This new clinical block rotation and team holds promise as a model to train residents for future PCMH primary care practices.

KEYWORDS: primary care, PCMH, patient centered medical home, residency training

INTRODUCTION

The national drive to provide patient care within Patient Centered Medical Homes (PCMHs) makes it is essential that we prepare the next generation of primary care providers with the skills to successfully build and remodel these "homes." The term "medical home" was first used in publication in 1967 by subspecialty pediatricians.[1] However, in recent years, the PCMH model has rapidly evolved and has been increasingly recognized as a future model for primary care, with the potential to improve the health outcomes of both individual patients and populations of patients. In 2004, the American Academy of Family Physician's Future of Family Medicine report called for every patient to have "a personal medical home,"[2] and by 2007 key primary care organizations had defined 16 essential components of a Patient Centered Medical Home (**List 1**).[3] Soon afterwards accrediting bodies, such as the National Committee for Quality Assurance (NCQA), began offering certification of PCMHs.

The PCMH model may be best understood as a state-of-the-art approach to primary care focusing on coordination of care, working in highly effective teams, and iterative improvement of systems to improve healthcare delivery to a population of patients. Thus the PCMH enhances the care provided during one-on-one doctor-patient encounters, using a variety of team and system-based techniques which improve quality and outcomes for both the individual patient and the population of patients served by a physician or practice. This approach is especially effective for such things as chronic disease management, prevention measures, and monitoring and management of high-risk patients within a practice (eg., severely ill, geriatric, adolescent, pregnant, or substance abusing patients).

Despite a widespread movement towards the PCMH as a new model for primary care delivery, there remain many questions regarding the exact form this model will take both in Rhode Island and the country as a whole. Additionally, educators are only just beginning to explore the training that will be necessary for primary care physicians to optimally

List 1. Joint Principles of the PCMH[3]

Enhanced access to care
Care continuity
Practice-based team care
Comprehensive care
Coordinated care
Population management
Patient self-management
Health information technology
Evidenced-based care
Care plans
Patient-centered care
Shared decision-making
Cultural competency
Quality measurement and improvement
Patient feedback
New payment systems

(from Berenson's summary of "Joint Principles of the PCMH" and Guidelines for PCMH and Accreditation Programs")[3]

List 2. Acronyms and Abbreviations

FCC	Family Care Center (the Brown Family Medicine's resident/faculty practice)
GMV	Group Medical Visit (an emerging method for chronic disease management)
HRSA	Health Resources Services Administration
NCQA	National Committee for Quality Assurance (accrediting body for PCMHs)
PCMH	Patient Centered Medical Home
PDSA	Plan-Do-Study-Act Quality Improvement Cycles

function within new PCMHs and take leadership roles in further development of the PCMH model. In this article we describe the development of a month-long, team-based, PCMH rotation for Brown family medicine residents, which was created within the context of a rapid transformation of our own resident-faculty practice into a PCMH. The overarching goals of this training program are to prepare residents to (1) practice within a PCMH, (2) actively participate in population health activities in the PCMH, and (3) assume leadership roles in the ongoing evolution of the PCMH.

GROWTH OF THE PCMH MODEL IN RHODE ISLAND

While several components of the PCMH model have been embraced by Rhode Island primary care practices for many years, a key step in the movement towards a statewide recognition of PCMH occurred in 1999 with the chronic disease management collaborative sponsored by the RI Department of Health.[4] Another major milestone occurred in 2008 with the creation of Chronic Care Sustainability Initiative (CSI), a program bringing together several major stakeholders in primary care: providers, insurers, state government, and patients. In 2008 the CSI provided funding to support early adoption of the PCMH model in five RI practices. The funding subsequently expanded in 2010, 2012 and 2013 adding eight, three and twenty practices, respectively. In 2014, the CSI initiative, now called the Care Transformation Collaborative, comprised practices caring for over 260,000 patients.[5] Several national initiatives have also helped shape the development of PCMH in RI. These include the Beacon Collaborative (a federally funded PCMH incentive program), Connect Care (the local Regional Health Information Organization for electronic health record interconnectivity), and the Meaningful Use electronic health record implementation initiatives from Medicare and Medicaid.

PCMH AT THE BROWN FAMILY MEDICINE RESIDENCY PROGRAM

The Brown Family Medicine Residency Program has focused on training primary care physicians since its inception in 1975. The main faculty/resident practice is the Family Care Center (FCC), at Memorial Hospital of Rhode Island, which serves a primarily urban underserved community from Pawtucket and Central Falls. The FCC covers 9,000 primary care patients and has over 25,000

Table 1. Objectives for the first-year residents (PGY-1)

By the end of the first year rotation, the resident will be able to:	ACGME Competency
General PCMH	
• Help represent the interdisciplinary team and coordinate with both the local FCC Operations Committee and PCMH Transformation Committee.	SBP 1
• Effectively communicate with staff and providers by collaborating with administrative support personnel to update PCMH bulletin board, newsletter, and "Tabletop Tips" in preceptor rooms.	SBP4
• Compare and contrast the implementation of the PCMH in at least one health center, one private/group practice site, and the FCC.	SBP2
• Be familiar with the most recent rendition of the three levels of NCQA recognition and newest meaningful use guidelines for the electronic health record.	SBP2
• Articulate the principles of the open access delivery system and the telephone coverage system in the FCC and its application to meet the goals of the PCMH	SBP4
• Actively participate in daily interdisciplinary "PCMH Morning Rounds"	PC 8
Chronic Disease Management/Population Health	
• Articulate the key elements of the Chronic Care Model.	SBP 2; PC 1 & 8
• Facilitate at least one interdisciplinary Group Medical Visit by helping prepare the pre-visit data, being present and supportive during the GMV, and assisting with documentation after the visit.	
• Synthesize and present current article related to chronic disease management during didactics.	PBLI 5
Quality Improvement and Monitoring	
• Demonstrate teamwork in the completion/dissemination of one brief PDSA (Plan-Do-Study-Act) cycle that assists the medical director with Quality Improvement in the FCC.	PBLI 1; PC 8
• Review their own Chronic Disease Dashboard(s) and the FCC chronic disease registries, and articulate the targets for their own practice improvement.	PBLI 1
Practice Management	
• Apply the correct CPT Evaluation and Management code to each of 4 outpatient FCC encounters on a standardized exercise.	SBP 2
• Present and provide a one page word document on an ambulatory case vignette, a key teaching point (or points), and a reference(s) in outpatient morning report.	PBLI 2,4,5
Care of Complex/Vulnerable Patients/Safety	
• Assist the PGY-3 in providing coordinated care on two Nursing Home/home bound patient encounters.	PC 8
• Work with the Pharm D student to conduct a medication review for one geriatric patient (preferably a home bound patient) from the PCMH PGY-3 resident panel and review with the PGY-3.	PC8; PBLI 4; MK 2
• Help facilitate coordinated care for a Centering Pregnancy Group Medical Visit	PC 7& 8
Provide Patient Care within a PCMH	
• Utilize PCMH resources appropriately for the care of their own patients in the FCC	PC 8
• See their own continuity patients in the FCC, appropriately utilizing PCMH resources, 2 to 3 sessions per week.	PC 8;SBP 2,4

Legend. ACGME: Accreditation Council for Graduate Medical Education; FCC:Family Care Center; MK: Medical Knowledge; PBLI: Problem Based Learning and Improvement; PC: Patient Care; PDSA:Plan Do Study Act; CPT: Current Procedural Terminology; SBP: Systems Based Practice; PGY: Post Graduate Year

patient visits per year. It is the primary continuity practice site for 39 residents and 14 faculty family physicians. Physicians follow their patients in multiple settings in addition to the FCC, including in nursing homes, patients' homes, and the hospital.

The FCC was an early adopter of the PCMH model, paralleling early statewide and national trends. Residency faculty and FCC staff participated in the RI Department of Health sponsored Chronic Disease Collaborative beginning in 2002, a first step towards PCMH practice transformation. Additional funding in 2005 from the Robert Wood Johnson Foundation and Institute for Healthcare Improvement for "improving care by engaging patients" helped establish many of the principles of the Chronic Care Model and PCMH in the FCC practice. Next, in early 2010 the FCC was invited to join the RI Chronic Care Sustainability Initiative (CSI) as one of the first resident physician PCMH training sites in RI. Later that year the FCC earned NCQA recognition as a Level 3 Medical Home, the highest of three possible levels of PCMH certification. During this time, consistent with other residency sites in early phases of PCMH transformation,[6,7,8] we primarily used residency-wide lectures and workshops, practicing in a functioning PCMH, and elective PCMH opportunities to convey PCMH concepts to residents.

NATIONAL TRENDS IN PCMH RESIDENCY TRAINING

As the PCMH has became increasingly recognized as a future model of primary care, leaders in primary care education have began to focus on preparing resident physicians for practice and leadership in this environment.[9] Several groups have articulated guidelines for PCMH-specific skills that residents should possess prior to graduation.[10,11,12] Initial curriculum development efforts have focused on transforming residency continuity clinics into PCMHs,[13,14,15] or applying PCMH transformation principles to specific aspects of care, such as chronic pain, substance abuse and prenatal care.[16,17,18] Unfortunately, many residency clinics do not meet all PCMH attributes and the process of transforming resident clinics can be challenging.[19] Other teaching strategies described include: didactic teaching on PCMH principles, supervised resident experiences in quality improvement, and individual two- to six-week block rotations.[6] There is some evidence that incorporating PCMH concepts into residency training can increase residents' sense of competence with and utilization of some important

Table 2. Objectives for the second-year residents (PGY-2)

By the end of the second year rotation, the resident will be able to:	ACGME Competency
General PCMH	
• Work collaboratively with the faculty practice leaders to set the agenda and run the residency clinic Team Meeting for this month, including presenting an update and distributing individual reports on the team's productivity and PCMH dashboards	PBLI 1; SBP 3
• Actively participate in daily interdisciplinary "PCMH Morning Rounds", assuming co-leader role with faculty physician when PGY3 resident is unavailable.	PC 8
Chronic Disease Management/Population Health	
• Review each team's chronic disease (CSI) Dashboard(s)/Registry on a rotating schedule and highlight outliers for each team.	PBLI 1
• Facilitate and help lead a Group Medical Visit helping provide motivational interviewing to patients during the visit, helping patients set self management goals, and assisting with the documentation after the visit.	PC 1,3,8; ICS 1,2
• Jointly care with a PCMH Nurse Care Manger for one chronic disease patient.	PC 8
Quality Improvement and Monitoring	
• Demonstrate teamwork and leadership in the completion of one brief PDSA (Plan-Do-Study-Act) cycle with the other PCMH residents that assists the medical director in Quality Improvement in the FCC.	PBLI 1; PC 8
Practice Management	
• Conduct chart audits each on patients of the PCMH PGY-1, the PCMH PGY-3, and a PCMH faculty member, to assess appropriateness of the Evaluation and Management coding and documentation.	SBP 2
• Review and update one office policy and present as a proposal at the FCC Operations Committee.	PC 8;PBLI 1; SBP 2
• Present and provide a one page word document on an ambulatory case vignette, a key teaching point (or points), and a reference(s) in outpatient morning report.	PBLI 2,4&5
Care of Complex/Vulnerable Patients/Safety	
• Work with Nurse Care Manager to identify and track patients being referred from the FCC, and transitioning out of the inpatient setting.	PC 8; SBP 3
• Conduct acute coordinated home visits and Nursing Home acute visits/admissions.	PC 4&8
Provide Patient Care within a PCMH	
• Appropriately triage and schedule patients identified from overnight calls into an acute visit in her/his schedule after taking sign-out from the on-call resident. This must include the notes of 4 examples that are reviewed with the PCMH faculty.	PC 4
• Conduct acute home visits and Nursing Home acute visits/admissions with the geriatric nurse practitioner and/or geriatric physician and jointly manage coordinated care related to that patient visit, 1 session per week.	PC 4&8
• See their own continuity patients in the FCC, appropriately utilizing PCMH resources, 4 sessions per week.	PC 8; SBP 2,4

Legend. CSI: Chronic Care Sustainability Initiative; ACGME: Accreditation Council for Graduate Medical Education; FCC: Family Care Center; MK: Medical Knowledge; PBLI: Problem Based Learning and Improvement; PC: Patient Care; PDSA:Plan Do Study Act; SBP: Systems Based Practice; PGY: Post Graduate Year.

PCMH components, such as team-based care, access to care, and quality improvement.[6] However, literature review does not reveal the optimal training model, or support the idea that clinic transformation alone will prepare residents for practice and leadership in the PCMH.

PCMH CURRICULUM DEVELOPMENT AT THE BROWN FAMILY MEDICINE RESIDENCY PROGRAM

We conducted a targeted needs assessment with interviews of all third-year residents in 2011, after the FCC had achieved Level 3 PCMH recognition. Since family medicine residency is heavily focused on preparing physicians for primary care practice, all residents are required to follow a panel of patients for all three years of residency with a minimum of 1650 continuity clinic encounters during residency. Third year residents at the Brown FM Residency spend 3-5 sessions per week in their FCC continuity clinic during most rotations, allowing for ample immersion in this PCMH practice. The needs assessment revealed that, despite practicing in a certified PCMH, resident education regarding the PCMH model was insufficient (manuscript submitted).[20] Residents did not perceive themselves as integral to PCMH activities, but rather simply as physicians who happened to practice in a PCMH. Additionally our primary teaching methods – residency-wide didactics and workshops, immersion in a PCMH practice, and elective PCMH opportunities – did not appear to offer adequate education on specific PCMH concepts or skills.

In order to improve PCMH training, we conducted a literature review, drew upon local expertise, and obtained funding through a Title VII HRSA Primary Care Training Grant. Our initial premise was that to meet the educational needs of family medicine residents in the rapidly changing healthcare environment, it is not sufficient to have achieved NCQA Level 3 status, to have excellent PCMH role models within the practice, or to have PCMH didactics. Instead, more in-depth, experiential, longitudinal training with opportunities for leadership and teaching was necessary.

THE CREATION OF THE PCMH BLOCK ROTATION AND RESIDENT TEAM

To meet these educational needs we created a new PCMH block rotation and resident team. We evaluated existing residency block rotations, reorganize rotations that already contained PCMH-related

Table 3. Objectives for the third-year residents (PGY-3)

By the end of the third year rotation, the resident will be able to:	ACGME Competency
General PCMH	
• Represent the interdisciplinary team and coordinate with the local FCC practice Operations Committee and PCMH Transformation Committee.	SBP 1
• Lead the PCMH team in preparing for maintenance of certification for NCQA recognition.	PBLI 1; SBP 2
• Co-lead daily interdisciplinary "PCMH morning rounds" with faculty physician leader	PC 4,8
Chronic Disease Management/Population Health	
• Lead a Group Medical Visit, including providing educational topic to patients, helping manage group dynamics, providing motivational interviewing, helping patients set self management goals, and assisting with documentation and billing after the visit.	PC1,3,5,8; ICS1&2
Quality Improvement and Monitoring	
• Demonstrate teamwork and leadership in the completion of one brief PDSA (Plan-Do-Study-Act) cycle with the other PCMH residents that assists the medical director in Quality Improvement in the FCC.	PBLI1;PC8
Practice Management	
• Demonstrate an attitude of helping lead change by preparing the agenda and facilitating the FCC Operations Committee and PCMH Transformation Committee meetings with the Medical Director	PC 8; ICS2; SBP 2
• Conduct four chart audits for quality care and documentation using the residency's chart audit EValue tool.	SBP 2
• Present and provide a one page word document on an ambulatory case vignette, a key teaching point (or points), and a reference(s) in outpatient morning report. Could be Morbidity and Mortality (near miss) presentation.	PBLI 2,4,5
Care of Complex/Vulnerable Patients/Safety	
• Facilitate the successful transitions, working with the Nurse Care Manager, of patients from the hospital to home/Nursing Home/Home Bound Residence including family and team communication.	PC 4,5,8 SBP 2, 3, 4 ICS 1
Provide Patient Care within a PCMH	
• Appropriately triage and schedule patients identified from overnight calls into acute visits in her/his schedule after taking sign-out from the on-call resident.	PC 4
• Conduct acute home visits and nursing home acute visits/ admissions and provide mentoring/teaching for PGY 1 resident, 4 sessions per week.	PC 4,8; PBLI 5
• See their own continuity patients in the FCC, appropriately utilizing PCMH resources and teaching medical students, 2 to 3 sessions per week.	PC 8; SBP 2,4

Legend. ACGME: Accreditation Council for Graduate Medical Education; FCC: Family Care Center; MK: Medical Knowledge; PBLI: Problem Based Learning and Improvement; PC: Patient Care; PDSA: Plan Do Study Act; SBP: Systems Based Practice; PGY: Post Graduate Year

content, and reclaimed time from rotations which exceeded ACGME family medicine training time requirements for certain content areas. Specifically, we restructured a first-year ambulatory rotation focused on practice management, a second-year ward medicine rotation (exceeded requirements by 3 months), and a third-year rotation focused on managing the FCC's complex nursing home and homebound patients. These changes required significant residency director leadership (GA).

Our goal was for residents to increase the number of individual continuity clinic visits they conducted during residency while gaining additional PCMH population health level expertise. To accomplish this goal, we created an interdisciplinary PCMH team, including a resident from each year of residency. The inclusion of senior residents on the team created a similar leadership structure to that of traditional inpatient ward teams, with senior residents accepting progressive levels of responsibility, modeling leadership qualities, and teaching junior residents (and potentially medical students). The resident and faculty physicians work closely with administrative staff, pharmacists, social workers, nurse care managers, and other staff in the practice. The primary focus of this team is to utilize PCMH and population health principles to manage the complex care of primary care patients seen in the FCC. We developed specific learning objectives based on our existing PCMH curriculum, literature review regarding proposed PCMH competencies, and deficiencies suggested by our needs assessment. (**Tables 1–3**). The total curricular time is 4 weeks per year for a total of 12 weeks during residency.

PCMH ROTATION EDUCATIONAL STRATEGIES

We use multiple educational strategies in this block rotation. These include direct patient care (both individual and in group medical visits), population health experiential activities, practice management activities, didactics, and progressive levels of responsibility with opportunities for teaching junior residents and students. The residents on the team remain embedded in our primary care practice site and continue to see their own patients several sessions per week. However, they are also given time and responsibility for conducting population health level patient care and quality improvement activities, as well as providing proactive direct care to FCC patients who are acutely ill or particularly complex or vulnerable.

There is a four-week repeating didactic curriculum with twice-weekly, two-hour sessions (see Table 4) that anchor each week on Monday and Friday afternoons, lead by the curriculum director (RC) or FCC medical director (AG, DA). Each week also has specific practical projects, such as: reviewing patient chronic disease registries and providing feedback to providers, performing chart audits, and preparing for and leading group medical visits focused on chronic disease management. Projects are assigned on Mondays, residents are assigned project time during the work week, and projects are reviewed on Fridays. Residents also help the FCC medical director and interdisciplinary PCMH team design and implement least one larger quality improvement project (PDSA cycle) each month. In addition, specific clinical content reinforces and helps provide a real life context

Table 4. Overview of Curriculum Content

Didactic themes: • Week 1 - PCMH, NCQA certification, PDSA cycles, registries • Week 2 - Patient Safety, trigger tool audits, root cause analysis • Week 3 - Practice Management, coding/leveling, chart auditing • Week 4 - Group Medical Visits, Chronic Disease Management, interdisciplinary teams
Examples of Clinical Content: *Daily Interdisciplinary PCMH Team Meetings ("PCMH Morning Rounds")* • Review of inpatient census – looking for "Hot Spots"[21] • Work with nurse care managers and geriatric team with transitions of care • Review overnight phone calls to the practice; triage patients needing acute visits (with ability to schedule patients from PCMH morning rounds) *Direct Patient Care* • Acute nursing home & home bound patient visits with geriatric interdisciplinary team. • Continuity clinic.
Examples of weekly projects: • Review with medical director and distribute chronic disease quality measures/registries to each resident and faculty provider. • Review safety concerns and present at practice wide monthly team meetings a safety pearl for the whole practice. • Perform chart audits for resident colleagues looking for quality use of the EMR and appropriate documentation. • Prepare for Group Medical Visit (PCMH resident team leads the group medical visit). Interdisciplinary team includes behavioral health, nutrition, pharmacy, nursing, physical therapy.
Examples of Monthly PDSA Cycles: • Improving ordering and documentation of hgbA1c values for diabetics. • Improving the process for ordering and tracking of referrals to consultants. • Improving the evaluation of osteoporosis patients that may need a holiday from bisphosphonate therapy.

to apply principles related to PCMH (**Table 4**). Finally, and importantly, daily morning interdisciplinary PCMH team rounds, lead by the PGY3 resident and faculty, anchor the management of complex FCC patients from a population health and case-management perspective, through activities such as reviewing and following up on overnight phone calls and reviewing hospital admissions and transitions of care of FCC patients. Interdisciplinary team members initially included: nurse care managers, the geriatrics team, behavioral health providers, a dietician, and pharmacy students.

EARLY OUTCOMES

As an early process measure, nine months into implementing the new curriculum, we (CF, RC) conducted an online survey of the third-year residents who had completed their first PCMH rotation to gather rotation feedback and resident self-assessment of learning. Although residents' confidence to "implement PCMH principles" after this short period of time remained moderate, there appeared to be an improvement in the number of group medical visits (GMVs), chart audits and PDSA cycles completed by residents, as well as confidence in their ability to incorporate PCMH components in their practice, compared to reports of comparison residents in the baseline needs assessment. A formal, multimethod curriculum evaluation process is underway including qualitative interviews with intervention residents, rotation evaluations, and concrete outcome measures.

NEXT STEPS

There is still no clear consensus in the literature on how best to prepare resident physicians to be leaders in PCMHs. Our preliminary process measures suggest that there is potential benefit to supplement existing longitudinal direct patient care experience in a PCMH with a resident team-based block rotation. There are currently no similar PCMH educational interventions described in the literature. We are implementing additional curricular elements to challenge senior residents as they progress through each year of this longitudinal curriculum, and our curriculum evaluation is ongoing.

CONCLUSION

The PCMH is emerging as a dominant model for primary care delivery in the US, and holds promise to improve quality of patient care and enhance health care outcomes. Given the rapid healthcare changes happening in Rhode Island and the United States, educators are challenged to train young physicians to practice in this new model of care and to lead further practice transformation. The PCMH block rotation and team approach described in this article may provide a model for other residency programs working to prepare the next generation of primary care physicians in evolving models of care delivery.

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Authors

Rabin Chandran, MD, is an Associate Professor (Clinical) in the Department of Family Medicine at the Alpert Medical School of Brown University, RI.

Christopher Furey, MD, is an Assistant Professor (Clinical) in the Department of Family Medicine at the Alpert Medical School of Brown University, RI.

Arnold Goldberg, MD, is an Associate Professor (Clinical) in the Department of Family Medicine at the Alpert Medical School of Brown University, RI and also at the Lehigh Valley Health Network/University of South Florida College of Medicine.

David Ashley, MD, is an Assistant Professor (Clinical) in the Department of Family Medicine at the Alpert Medical School of Brown University, RI.

Gowri Anandarajah, MD, is Professor (Clinical) and Director of Faculty Development in the Department of Family Medicine at the Alpert Medical School of Brown University, RI.

Correspondence

Rabin Chandran, MD
Department of Family Medicine
Memorial Hospital of Rhode Island
111 Brewster Street
Pawtucket, RI 02860
401-729-2237
Fax 401-729-2923
rchandran@carene.org