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Defining and Measuring the Patient-Centered Medical Home

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The patient-centered medical home (PCMH) is four things: 1) the fundamental tenets of primary care: first contact access, comprehensiveness, integration/coordination, and relationships involving sustained partnership; 2) new ways of organizing practice; 3) development of practices' internal capabilities, and 4) related health care system and reimbursement changes. All of these are focused on improving the health of whole people, families, communities and populations, and on increasing the value of healthcare.

The value of the fundamental tenets of primary care is well established. This value includes higher health care quality, better whole-person and population health, lower cost and reduced inequalities compared to health-care systems not based on primary care.

The needed practice organizational and health care system change aspects of the PCMH are still evolving in highly related ways. The PCMH will continue to evolve as evidence comes in from hundreds of demonstrations and experiments ongoing around the country, and as the local and larger healthcare systems change.

Measuring the PCMH involves the following:

- Giving primacy to the core tenets of primary care
- Assessing practice and system changes that are hypothesized to provide added value
- Assessing development of practices' core processes and adaptive reserve
- Assessing integration with more functional healthcare system and community resources
- Evaluating the potential for unintended negative consequences from valuing the more easily measured instrumental features of the PCMH over the fundamental relationship and whole system aspects

- Recognizing that since a fundamental benefit of primary care is its adaptability to diverse people, populations and systems, functional PCMHs will look different in different settings.

Efforts to transform practice to patient-centered medical homes must recognize, assess and value the fundamental features of primary care that provide personalized, equitable health care and foster individual and population health.

KEY WORDS: primary care; patient-centered medical home; measurement; quality improvement.

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The patient-centered medical home (PCMH) is emerging as a centerpiece of efforts to reform healthcare in the US and to establish a primary care basis for improving the value of healthcare.^{1–4} In contrast to currently beleaguered US primary care,^{5–9} what a PCMH looks like is not known outside of ongoing demonstration projects and a small number of practices that have sought to be recognized according to new standards set by the National Committee for Quality Assurance (NCQA).^{10–14} In contrast, the benefits of primary care for people and societies are well-established.^{15–19} Furthermore, the process and intended and unintended consequences^{20–25} of transforming current practices into patient-centered medical homes are only beginning to be understood.²⁶

Therefore, in this paper we carry out the following:

- Define the PCMH
- Compare this definition with the joint statement of PCMH principles by 4 physician organizations
- Propose principles for measuring the PCMH
- Overview current options for measuring the PCMH, including standards set by the NCQA for PCMH recognition and existing measures of primary care
- Propose relevant policy and research agendas

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DEFINING THE PATIENT-CENTERED MEDICAL HOME

We define the PCMH as a team of people embedded in the community who seek to improve the health and healing of the people in that community. They work to optimize the fundamental attributes of primary care combined with evolving new ideas about organizing and developing practice and changing the larger health care and reimbursement systems. Unlike more narrowly focused ways of organizing the delivery of commodities of healthcare, the PCMH aims to personalize, prioritize and integrate care to improve the health of whole people, families, communities and populations.

Thus, the PCMH consists of the following:

- 1) The fundamental tenets of primary care: access, comprehensiveness, integration and relationship
- 2) New ways of organizing practice
- 3) Development of practices' internal capabilities
- 4) Health care system and reimbursement changes

The PCMH concept links new approaches to health care organization^{1,27-34} with the well-established primary care function for improving the health of people and populations.³⁵ Below we overview each of these four aspects of the PCMH.

The Fundamental Attributes of Primary Care

Table 1 shows the core attributes of primary care are: first contact accessibility, comprehensiveness, integration & coordination, and relationships involving sustained partnerships over time.^{15,36-38}

First contact access in the PCMH increasingly involves distance and asynchronous communication and self-care, in addition to face-to-face contact with practice members and partners.³⁹⁻⁴¹ Comprehensiveness includes provision of services that account for the majority of patient needs, including mental health⁴²⁻⁴⁴ and care of often multimorbid⁴⁵⁻⁴⁷ chronic illnesses.⁴⁸⁻⁵³ Coordination involves guiding access to more narrowly focused care when needed;³⁸ integration of care involves optimizing and prioritizing delivery of needed services across acute and chronic illness, prevention, mental health and family care.⁵⁴ The PCMH emphasizes functional linkages with community organizations and with other healthcare entities such as hospitals, specialists, other service providers, urgent care, etc.^{39,55-57} Sustained partnership involves developing relationships⁵⁸ that are patient-centered⁵⁹⁻⁶² and grounded in local knowledge of the family and community.¹⁵

Health care systems with a primary care focus have better quality,⁶³ lower cost,⁶³⁻⁶⁵ less inequality in health care and health,^{16,18,66-69} and better population health^{16,65,70} when compared with systems based on other approaches to health care.

One of the critical and under-appreciated attributes of primary care is its flexibility in adapting to different sociopolitical climates, populations, communities, individual patients and available clinicians and practice workers.⁷¹ Indeed, in international comparisons, Meads has identified a typology of 6 different manifestations of primary care,⁷² all of which are manifested to some degree in different parts of the pluralistic US healthcare market.

Newer Aspects of the PCMH

New Ways of Organizing Practice. The PCMH moves beyond primary care as it is practiced now, to include new approaches to organizing practice to enhance its responsiveness to local patient needs. In various manifestations currently being tried,^{14,31,40,73-75} these include diverse instrumental elements such as same-day appointment, electronic visits, group visits, disease registries and management, greater patient engagement, care coordination, new collaborative relationships, team-based care, quality and safety initiatives, electronic prescribing and medical records. Many of these changes grow out of the recommendations of the Institute of Medicine for reforming health care,^{32,76} from learning collaboratives sponsored by the Institute for Healthcare Improvement^{77,78} and others.^{51,79,80}

Development of Practices' Internal Capability. Recent evidence shows that the large majority of primary care practices are not ready to become PCMHs.^{11,12,81-83} Experience from the first PCMH National Demonstration Project²⁶ shows that even for highly motivated practices, the transformation to a PCMH represents a developmental process that necessitates practice work on internal capabilities.⁸⁴ These capabilities consist of core structures and processes, adaptive reserve, and attentive connections to the local environment the relationship infrastructure, an aligned management model, and leadership development.⁸⁵ In most practices the intense effort to incorporate multiple improvements and changes in core processes and relationships reveals deficits in the practice's adaptive reserve that must be addressed as the transformation process proceeds. Thus, the transformation of primary care into PCMHs is best understood as a developmental process, with stops, starts, backslides, leaps and challenges.⁸⁵ If the PCMH is to be sustainable and to evolve in an environment of continual change, primary care practices must enhance their robustness and resilience and foster connections in order to be locally responsive.⁸⁵

Health Care System and Reimbursement Changes. Primary care does not operate in isolation, and one of its core functions is the effective and efficient integration of care both vertically (within disease categories) and horizontally (across the diverse needs of peoples, communities and populations).^{86,87} In light

Table 1. Attributes of Primary Care

The value of primary care emerges from synergy among:^{15,36-38}

- Accessibility as the first contact with the health care system
- Accountability for addressing a large majority of personal health care needs (comprehensiveness)
- Coordination of care across settings, and integration of care of acute and (often co-morbid) chronic illnesses, mental health and prevention, guiding access to more narrowly focused care when needed
- Sustained partnership and personal relationships over time with patients known in the context of family and community

of the co-evolving nature of the PCMH and the healthcare system within which it functions, the need for reform of the medical “neighborhood” increasingly is recognized,⁵⁵ in particular to help primary care to be more effective at integrating and prioritizing care.^{54,88}

Primary care in the US is under-resourced compared to specialty care.^{70,89,90} Blended payment^{91,92} and other reimbursement reforms^{29,93–96} have been proposed to redistribute resources toward the primary care function that provides the greatest value. Various minor reforms ranging from paying care management fees to reimbursing for specific components of the PCMH are included and are being evaluated in a number of the ongoing PCMH demonstrations and pilot projects.^{14,74} Involving patients in practice and healthcare system governance represents a particularly promising innovation.^{39,97,98}

Joint Principles of the PCMH

A 2007 joint statement⁹⁹ of four physician organizations whose members constitute the majority of primary care clinicians in the US identifies seven principles of the PCMH. These are summarized in Table 2.

Similar to our definition of the PCMH, the joint principles specifically include some of the fundamental tenets of primary care (access, coordination/integration), plus new ways of organizing practice (*enhanced* access, physician-directed team-oriented practice, focus on quality and safety), plus health care and reimbursement system changes (payment that recognizes added value). Other aspects of primary care are subsumed under other titles (such as relationship and comprehensiveness under personal physician and whole person orientation, which is similar to comprehensiveness).

The joint principles build on other operationalizations of the primary care and medical home concepts.^{1–4,13,27,28,30,35,40,57,60,61,100–111} They assume the well-established primary care function⁶¹ in the same way that the principles of primary care assume appropriate and adequate disease-specific quality of care and supportive systems and reimbursement.¹¹²

The principles are evolving in their on-the-ground operationalization in diverse contexts in hundreds of PCMH demonstrations ongoing around the US,^{14,113} as new collaborators are

brought to the partnership¹¹⁴ and as ongoing evaluations bring forth new evidence of intended and unintended consequences.^{4,12,26,39,71,73,75,83–85,97,105,115–129}

MEASURING THE PCMH

Principles

The rationale and goals for measuring the PCMH are diverse, and include evaluation of baseline status or changes, guiding development and improvement through a change process, certifying of practices as PCMHs, guiding reimbursement or investment, and generating new knowledge.

The goal, as well as the setting and available resources, guide many of the decisions for measuring PCMH. For example, in evaluating the first National Demonstration Project of the PCMH,^{75,118,130} our goals were to provide a rigorous evaluation that generated transportable new knowledge about the process of practice change^{73,84,85,116} and the outcome for practices^{73,116} and patients.¹¹⁹ We also sought to provide ongoing feedback to implementers to guide their change process and to inform policy and practice.^{26,75,85,117,121} The diverse practice and system settings across the US provided challenges; measurement resources were limited but more substantial than available for individual practices or for most systems.

In this setting, we chose a multimethod approach^{118,131–138} to foster understanding of meaning and context while also testing a priori and emerging hypotheses—that is, we measured and analyzed both numbers and narratives. We attempted to measure the instrumental aspects of the PCMH as envisioned by the implementation group,⁴⁰ and processes and outcomes from the perspectives of change facilitators, practice members, patients, and medical and financial records.

In other settings, goals and measurement are narrower. Many practices attempting to be recognized as PCMHs are only measuring NCQA criteria. Others attempting an iterative practice improvement process emphasize change processes and outcomes for the practice and patient.¹¹⁵ Systems deciding on investment in PCMH conversions tend to emphasize

Table 2. Joint Principles of the PCMH

- **Personal Physician:** Each patient has an ongoing relationship with a personal physician trained to provide first contact, continuous and comprehensive care
- **Physician Directed Medical Practice:** The personal physician leads a team of individuals at the practice level who collectively take responsibility for the ongoing care of patients
- **Whole Person Orientation:** The personal physician is responsible for providing for the entire patient’s healthcare needs and taking responsibility for appropriately arranging care with other qualified professionals
- **Care is Coordinated and/or Integrated:** across all elements of the complex healthcare system (e.g. subspecialty care, hospitals, home health agencies, nursing homes) and the patient’s community (e.g. family, public and private community based services). Care is facilitated by registries, information technology, health information exchange and other means
- **Quality and Safety:** are hallmarks of medical home by incorporating a care planning process, evidence based medicine, accountability, performance measurement, mutual participation and decision making
- **Enhanced Access:** to care is available through systems such as open scheduling, expanded hours and new options for communication between patients, their personal physician, and practice staff
- **Payment:** appropriately recognizes the added value provided to patients who have a patient-centered medical home beyond the traditional fee-for-service encounter

Summarized from:⁹⁹ American Academy of Family Physicians (AAFP), American Academy of Pediatrics (AAP), American College of Physicians (ACP), American Osteopathic Association (AOA). Joint principles of the patient-centered medical home. 2007. Available at: www.medicalhomeinfo.org/Joint%20Statement.pdf. Accessed February 2, 2010

cost and utilization outcomes, but also sometimes measure quality and the experience of staff and patients.^{39,56,97}

Despite the diversity of purposes, situations and resources, some principles for PCMH measurement can be specified:

- Emphasize the well-established tenets of primary care^{15,36-38} that have been shown to result in better quality⁶³ and health,^{16,65,70} and lower cost,⁶³⁻⁶⁵ and inequality^{16,66,139-142}
- Measure the changes in practice operations and the co-evolving healthcare and payment systems that are hypothesized to provide added value to the PCMH¹⁴³
- Measure the quality and function of relationships with patients, and healthcare system and community partners
- Assess practices' internal capabilities⁸⁵ that are necessary for development as a PCMH
- Avoid unintended negative consequences from emphasizing more easily measured instrumental aspects of the PCMH^{20-22,24,61,144,145} over the complexly interacting relationship aspects^{19,87,146-158} that are likely to provide much of its value^{88,147,149,158}
- Use both numbers and narratives (quantitative and qualitative methods)^{118,119} to measure the many context-dependent aspects of the PCMH⁷²
- Consider which perspective and level (e.g. patient, family, practice, system, community, population) is most relevant for assessing each domain and the whole
- Since the context for operationalizing the PCMH is still evolving based on what is being learned in many ongoing demonstrations,¹⁴ and since the healthcare system context is co-evolving, it is premature to recommend a single measurement standard (Good options from which to choose are outlined below and discussed in the online Appendix.)
- Recognize that many of the costs of transformation to the PCMH occur at the level of the practice and the system. But like the benefits of primary care, the value of the PCMH is likely to accrue at the level of the patient's lived experience outside of health care, and at the levels of the healthcare system, community, workforce and population.^{15,36} This is discussed in more detail in the paper by Rittenhouse et al¹⁵⁹ in this issue

Current NCQA Criteria

The National Committee for Quality Assurance's Physician Practice Connections®—Patient-Centered Medical Home™ tool¹⁶⁰ is a practice self-report measure and has become the de facto standard used by many demonstrations to judge "medical homeness." It is being used in most ongoing demonstrations.¹⁴ The NCQA PPC®-PCMH™ is based on considerable prior work^{110,161-165} and attempts to emphasize measurement reliability and practicality.¹⁶⁰ It assesses nine standards: access and communication, patient tracking and registries, care management, patient self-management support, electronic prescribing, test tracking, referral tracking, performance reporting and improvement, and advanced electronic communications.¹⁶⁰ The three-level scoring implicitly acknowledges that, for most practices, meeting these reporting standards will be a staged process.

The PPC®-PCMH™ contains 166 items, of which 46% assess practice report of functions that require use of some type of electronic information technology, 14% assess care for three specific chronic diseases the practice identifies as important to

their patient panel, 13% reflect systems for coordinating care, 9% assess accessibility, 5% relate to performance reporting, and 4% are about tools for organizing clinical data. Use of non-physician staff and collection of data on patient's experience of care are each reflected in 2% of items, and 1% of items represent each domain of preventive service delivery, continuity of care and patient communication preferences.¹⁶⁶

Criticisms of the NCQA's measure^{4,26,124,166,167} relate to the balance of items compared to the valued domains of primary care, the degree to which the items are measured by the most appropriate perspective, the degree to which the items distinguish between high and low quality primary care, the lack of a patient perspective, and the opportunity costs and potential unintended consequences of the PCMH measurement and recognition process.

On June 15, 2009 the NCQA articulated a "Planned Evolution of PPC-PCMH Requirements."¹⁶⁸ This document states an interest in "understanding better how to assess patient-centeredness and experience as well as quality and cost outcomes," and expresses an interest in assessing patient's experience of the PCMH. It identifies a need for "standards designed to realize quality and cost gains achieved through better coordination and integration across settings." The document also notes the need to capture "relationships to various types of community organizations," and to "recognize the role of providers other than physicians."

Other Measures of Primary Care Functions and PCMH Components

There are a number of measures that assess important aspects of primary care that can be a source of items for comprehensive measurement of the PCMH.^{15,36,84,116,118,119} Many of these domains are assessed from the patient point of view by the Primary Care Assessment Survey (PCAS)¹⁶⁹ and the Ambulatory Care Experiences Survey (ACES)¹⁷⁰ by Safran, the Primary Care Assessment Tool (PCAT)^{171,172} by Starfield, the Components of Primary Care Instrument (CPCI)¹⁷³⁻¹⁷⁵ by Flocke, and the Clinician-Group Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS)¹⁷⁶ by the Agency for Healthcare Research and Quality. The PCAT and the CAHPS include versions for adults and children. The Assessment of Chronic Illness Care (ACIC)¹⁷⁷ assesses system support relevant to the Chronic Care Model.^{51,178,179} The Medical Home Index (MHI) was developed specifically to assess six domains of the pediatric PCMH (organizational capacity, chronic condition management, care coordination, community outreach, data management and quality improvement).¹⁸⁰ John Howie has created an important patient-level outcome measure of the effectiveness of care. The Patient Enablement Instrument (PEI) assesses the degree to which patients are better able to cope with life, understand and cope with their illness, and keep themselves healthy as a result of their healthcare.¹⁸¹⁻¹⁸³ In addition to further work in developing a Consultation And Relational Empathy (CARE) measure,¹⁸⁴ Howie's group has taken the interesting step of adding both relationship aspects and time to the PEI to create the Consultation Quality Index (CQI), based on empirical evidence that time is an essential for enablement, relationship development and patient-centered care.¹⁸⁵⁻¹⁸⁷

These different measures and others provide a wealth of possibilities for bringing the patient perspective and the core

feature of primary care into PCMH assessment and recognition. The patient perspective assesses different domains that quality measures often overlook.¹⁸⁸ While the self-report aspect of the NCQA measure has inherent biases, reliably gathering the patient perspective requires attention to selection factors and sample size as well as measurement reliability and validity. More than a research standard, practical considerations and an ability to understand local adaptation are vital if measures are to be widely applied to judge the PCMH qualifications of practices.

Measures of Each Domain

Table 3 depicts the components of the PCMH as articulated by the Joint Principles of the PCMH,⁹⁹ and the related domains of the primary care function, based on definitions by the Institute

of Medicine¹⁵ and by Starfield.^{36,189} The table highlights the component(s) of the NCQA measure that are relevant to each domain, identifies elements that are missing in current conceptualizations and measures, and provides examples of potential additional sources of items for measuring each domain. The fact that some instruments are listed for multiple domains is an indication that these measures have some common elements and assess some of the same domains, although often in different ways.

Comparative details about these measures are discussed in the online Appendix for readers who may be choosing measures for particular circumstances. In addition, a forthcoming supplemental issue of *Healthcare Policy* compares the psychometrics and performance of measures of primary care constructs,¹⁹⁰⁻¹⁹⁸ and provides an excellent starting point for those seeking to measure critical aspects of primary care and the PCMH.

Table 3. Measures of the PCMH and Primary Care

Domain		Current NCQA Measure Component (NCQA PPC®-PCMH) ¹⁶⁰	Missing Elements in Current Conceptualizations or Measures	Example Sources for Additional Measures
PCMH Principle ^a	Primary Care Functions ^b			
Personal physician	Sustained partnership & relationship	1. Access & Communication (Written standard for scheduling appointments with a personal clinician)	Relationships/partnerships with other members of the care team Patient-centered care ²⁰⁰ (RPAD ²⁰¹)	MHI ¹⁸⁰ CPCI ¹⁷³⁻¹⁷⁵ PCAS ¹⁶⁹ PCAT ^{171,172} ACES ¹⁷⁰ CARE ¹⁸⁴ CAHPS ¹⁷⁶
		3. Care Management	Team function Adaptive reserve & capacity for change (PCC ²⁰²)	CCI ²⁰² OA ²⁰³ ACIC ¹⁷⁷
Physician-directed team practice			Enabling relationships, leadership & communication (MHI ¹⁸⁰ ACES ¹⁷⁰)	Integration of the team ²⁰⁴
Whole-person orientation	Accountability for addressing a large majority of personal health care needs		Personalization of care based on knowing the person's medical and personal history & values	PCAS ¹⁶⁹ PCAT ^{171,172} CPCI ¹⁷³⁻¹⁷⁵
Coordination / integration of care	Coordination / integration of care	3. Care Management 7. Referral Tracking	Integration and prioritization of care across multiple co-morbid chronic illnesses, ^{45,205-210} acute and chronic illness, mental health, prevention & family care. ^{38,211-213}	>85% of problems managed in practice MHI ¹⁸⁰ CPCI ¹⁷³⁻¹⁷⁵ PCAS ¹⁶⁹ ACES ¹⁷⁰ PCAT ^{171,172} ACIC ¹⁷⁷
Quality & Safety		2. Patient Tracking & Registry	Person-level quality of care:	Disease-specific quality & safety: ACQA Starter Set ²¹⁹
		3. Care Management	Patient Enablement (PEI ^{182,187,214})	
		4. Self-Management Support	Protection from overtreatment ²¹⁵	ACIC ¹⁷⁷
		5. Electronic Prescribing		MHI ¹⁸⁰
		6. Test Tracking	Personalization of care	
		7. Referral Tracking	Patient-centered care (Epstein ²⁰⁰ RPAD ²⁰¹)	
		8. Performance Reporting & Improvement	Cultural competency (ECHO ²¹⁶ CCA-PC ^{217,218})	
Enhanced access	Accessibility as 1st contact with the healthcare system	1. Access & Communication 9. Advanced Electronic Communications	Defined population that represents community	PCAT ^{171,172} ACES ¹⁷⁰ CAHPS ¹⁷⁶
Payment for added value		(In some pilot, practices are paid more for being recognized at higher levels)	Recognition of the value of a primary care PCMH at other levels of the system Recognition of transition costs to PCMH ⁹³	Blended payment ^{91,92} for services, quality & enabling relationships
(Neighborhood)	Family & community (& system) context	8. Performance Reporting & Improvement	Family care ^{212,220} Seamless transitions between places and levels of care	PCAT ^{171,172} CPCI ¹⁷³⁻¹⁷⁵ ECHO ²¹⁶ MHI ¹⁸⁰ ACES ¹⁷⁰ PCC ²⁰² ACIC ¹⁷⁷

^a Based on the Joint Principles of the PCMH⁹⁹

^b Based on definitions by the Institute of Medicine¹⁵ and by Starfield^{36,189}

POLICY AND RESEARCH AGENDA RECOMMENDATIONS

This overview of the definition and measurement of the patient-centered medical home leads to a number of research and policy recommendations:

- The PCMH enhances the well-established benefits of the primary care function. This function cannot be realized outside of the context of continuous healing relationships between patients and clinicians. The PCMH also must be understood within the context of enabling relationships between primary care practice, other healthcare system components, payment systems and communities.
- Longstanding underinvestment in the primary care infrastructure and relationships that are the foundation for the PCMH mean that substantial development is needed to enable the PCMH to serve as a fundamental underpinning for a high value health care system.
- Investment is needed to enable functional relationships within the PCMH, between patients and their PCMH, and between the PCMH and its healthcare system and community partners.
- Primary care and the PCMH must be valued for their long-term ability to increase the quality, integration, personalization, and equity of healthcare and their beneficial effect on the functional health of people and populations. Valuing primary care and the PCMH only for the possibility of short-term cost-saving benefits risks setting up the PCMH experiment and the healthcare system for failure.
- Evaluation efforts should recognize that a long—perhaps 5–10 year—time horizon is needed to see the full health and economic effects of the PCMH.
- The value of primary care accrues at the level of the patient and the population, whereas the costs are at the level of the practice and the enabling systems. Reimbursement and evaluation should recognize the importance of assessing these multi-level effects, and of engaging multiple perspectives.
- New measures are needed that reflect the higher order primary care functions such as the integration, prioritization and personalization of care, and measures that assess the affect of the PCMH and primary care across multiple levels of health care, health and society.⁵⁴
- As an intermediate step, consideration should be given to reducing reporting burden in over-represented areas of the NCQA PPC®-PCMH™¹⁶⁰ measure, and adding the following domains:
 - Ongoing patient- and relationship-centered care (as assessed by the patient)
 - Patient enablement (ability to do valued functions as a result of the care)
 - Comprehensiveness of care
 - Integration of care across multiple co-morbid chronic illnesses, acute complaints, mental health, prevention and family care
 - Protection from over-treatment
 - Personalization of care
 - Patient engagement in practice improvement
 - Development of a system, community, family & population orientation to care organization
 - Degree to which information technology and systems enable the primary care functions and personalized, prioritized, integrated care
- Practices' adaptive reserve & capacity for change
- An emerging PCMH research agenda includes answering the following small sample of large questions:
 - What is the comparative effectiveness of different approaches to measuring and incentivizing transformation to PCMHs, including:
 - Pay-for-measurement
 - Enhanced reimbursement for primary care
 - Enhanced reimbursement for primary care and PCMH-enhancing infrastructure
 - What are the trade-offs in over-optimizing individual components of healthcare?
 - What is the added value of the PCMH beyond usual primary care in different settings and among different populations?
 - At what level do the costs and benefits of primary care and the PCMH accrue?
 - What is the time frame for PCMH implementation from different starting points? What resources are needed?
 - What processes and outcomes get worse before getting better during the transformation process?
 - How can the components of health care be integrated to optimize the health of individuals and populations, and the value of health care?
 - What does "productivity" mean when production is defined as optimizing health rather than producing healthcare?
 - What are the intended and unintended consequences of measuring and incentivizing different components of healthcare?
 - How can care be optimized across the domains of acute illness, multiple co-morbid chronic illnesses that are the norm among the elderly and primary care patients, prevention, mental health and family care?
 - What kinds of evidence are needed beyond disease-specific knowledge to optimize the care of whole people and the value of health care for populations and societies?
 - What is the optimal problem density, time allotment and support for different types of primary care encounters?
 - How might different reimbursement models combine with different practice and personal transformations to optimize care?

CONCLUSION

The PCMH, like primary care, is worthy of support, evaluation and evolution as a fundamental building block for a high-value health care system. In these efforts, it will be important to recognize the complex interactions of the PCMH at multiple levels, so that a narrow and short-term focus does not scuttle the potentially transformative nature of the PCMH before it has had a chance to make good upon its promise.

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Conflicts of Interest: Drs. Crabtree, Jaén, Miller, Nutting and Stange are members of an independent evaluation team for the patient-centered medical home National Demonstration Project conducted by the TransforMed subsidiary of the American Academy of Family Physicians. Dr. Gill performs research consulting for GE Health Care. The authors were offered an honorarium for preparing this manuscript, but in recognition that the importance of environmental and social determinants of health¹⁹⁹ in addition to the healthcare determinants highlighted in this paper, we asked the sponsors to donate the honorarium to: the Nature Conservancy (environment), the Rotary Foundation of Rotary International (education, poverty alleviation), and the Clinton Foundation (health security, economic empowerment, leadership development and citizen service, racial, ethnic and religious reconciliation).

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