

# Metrics for Assessing Improvements in Primary Health Care

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primary care, primary health care, measurement, metrics, quality improvement, family, community, population health

## Abstract

Metrics focus attention on what is important. Balanced metrics of primary health care inform purpose and aspiration as well as performance. Purpose in primary health care is about improving the health of people and populations in their community contexts. It is informed by metrics that include long-term, meaning- and relationship-focused perspectives. Aspirational uses of metrics inspire evolving insights and iterative improvement, using a collaborative, developmental perspective. Performance metrics assess the complex interactions among primary care tenets of accessibility, a whole-person focus, integration and coordination of care, and ongoing relationships with individuals, families, and communities; primary health care principles of inclusion and equity, a focus on people's needs, multilevel integration of health, collaborative policy dialogue, and stakeholder participation; basic and goal-directed health care, prioritization, development, and multilevel health outcomes. Environments that support reflection, development, and collaborative action are necessary for metrics to advance health and minimize unintended consequences.

## INTRODUCTION

The purpose of metrics is to focus attention on what is important that may be overlooked amidst pressing day-to-day concerns. In translating knowledge into action, metrics offer guidance and direction. Metrics can prompt us to contemplate the meaning and impact of activities too easily routinized (30). They allow us to consider what is being done well (111), what might be better left undone (48), what needs to be changed (121) and what is essential and therefore needs to be remain unchanged (139).

Metrics in primary health care serve three uses: to assess performance (processes and outcomes), to inform reflection on purpose, and to foster aspirational conversations that lead to ongoing development. Linking performance metrics to payment may increase the quality of narrowly defined care in the short term (19) but risks unintended consequences in the longer term (9, 19, 87). In environments that support reflection, development, and collaborative action, metrics can enable primary health care to heal and develop itself (79) so that it can deliver on its promise to heal and develop the health of individuals, families, and communities (141). Below we describe what is important about primary health care, relevant metrics and their effective use, and environments needed to help metrics do more good than harm.

## WHAT IS IMPORTANT ABOUT PRIMARY HEALTH CARE

**Table 1** highlights the concepts of primary care, primary *health* care, community-oriented primary care, and the outcomes of improving primary health care. Primary care involves the complex

### GLOSSARY OF WORD PAIRS

**Action/Reflection:** Action refers to activity, usually focused on trying to accomplish something. Reflection refers to pausing to contemplate what is important. Together they represent a cycle for accomplishing something meaningful.

**Quality/Development:** Quality is usually understood as excellence and conformance to specifications. Development involves bringing toward potential.

**Commodity/Service/Relationship:** A commodity is an interchangeable article of commerce. A service is an action intended to help someone. Relationship refers to being connected.

**Contextualized/Rigorous:** Context refers to conditions that affect the meaning of something. Contextualized means considering something in light of what provides meaning. Rigorous refers to conditions that are severe, exact, rigid. It often is used to identify the kind of decontextualized research information used to develop metrics.

**Metric/Measure:** “The terms metric and measure have some overlap. We use measure for more concrete or objective attributes and metric for more abstract, higher-level, or somewhat subjective attributes . . . Measures help us approximate less tangible metrics” (99).

**Proactive/Responsive Care:** proactive care pushes services toward people; responsive care involves tailoring to the unique characteristics of people.

**Patient/Person/People:** Patient refers to a person receiving health care. It also means to wait without becoming upset. A person is a human being with particular traits that transcend their role as a patient. People refers to groups of persons with a particular identity.

**Population/Community:** Population refers to the whole number of people in an area. Community refers to a group of people with a shared identity within an ecological context.

**Personalize/Depersonalize:** Personalization involves making the general relevant to the particular person. Depersonalization is the frequent experience of health care in a fragmented system.

**Table 1 What's important about primary care**

<b>Tenets of primary care (35, 137)</b>
<p><b>The value of primary care emerges from synergy among:</b></p> <ul style="list-style-type: none"> <li>■ Accessibility as the first contact with the health care system</li> <li>■ Accountability for addressing a large portion of personal health care needs (comprehensiveness)</li> <li>■ Coordination of care across settings and integration of care of acute and (often comorbid) chronic illnesses, mental health, and prevention, guiding access to more narrowly focused care when needed</li> <li>■ Sustained partnership and personal relationships over time with patients known in the contexts of family and community</li> </ul>
<p><b>Primary health care</b></p> <p>According to the World Health Organization (161), “the ultimate goal of primary health care is better health for all. WHO has identified five key elements to achieving that goal:</p> <ul style="list-style-type: none"> <li>■ reducing exclusion and social disparities in health (universal coverage reforms);</li> <li>■ organizing health services around people’s needs and expectations (service delivery reforms);</li> <li>■ integrating health into all sectors (public policy reforms);</li> <li>■ pursuing collaborative models of policy dialogue (leadership reforms); and</li> <li>■ increasing stakeholder participation.”</li> </ul>
<p><b>Principles of community-oriented primary care (28, 109)</b></p> <ul style="list-style-type: none"> <li>■ Primary care tenets</li> <li>■ Taking responsibility for a defined geographical or social community</li> <li>■ A process that includes <ul style="list-style-type: none"> <li>- defining and characterizing the community</li> <li>- conducting a community diagnosis</li> <li>- developing and implementing an intervention</li> <li>- monitoring the impact of the intervention</li> <li>- involving the community to carry out the preceding four steps</li> </ul> </li> </ul>
<p><b>Outcomes of primary health care (4, 138, 141)</b></p> <ul style="list-style-type: none"> <li>■ Better population health</li> <li>■ Less health imbalance and inequity</li> <li>■ Better health care quality</li> <li>■ Less health care expenditure</li> </ul>

interaction of accessibility, comprehensive attention to the full scope of an individual’s needs, and integration and coordination of care across multiple needs and settings, all within the context of sustained and ongoing relationships with individuals, families, and communities (35, 91, 133, 137).

The concept of primary *health* care, espoused by the World Health Organization (161) and others, positions primary care within larger social and political principles, including equity, population needs, multisectoral integration, collaborative policy dialogue, and stakeholder participation.

Community-oriented primary care (COPC) “is a model of primary care which puts into practice the idea that community context plays a role in the health of the person” (163, p. 101). Widespread implementation of this vision, espoused for more than six decades (71, 83), has been limited by the accessibility and linkability of community and clinical data and by fee-for-service payment mechanisms (98). In the Information Age, and time of health care and public health reform, opportunities abound for more fully actualizing the community focus of primary care (27, 109, 147). An emerging paradigm of primary care/public health integration (27) is evidenced by the recent revival of the concept (45) and examples of “communities of solution” (56) and calls for a “third revolution” (16) of public health focused on quality of life (40).

Health care systems based on primary care have better population health (82, 140, 141), less inequality (25, 141), lower expenditures (50, 55, 82, 138), and greater quality (4). This added value occurs despite apparently poorer quality of care for individual diseases compared with care

by specialists in those diseases (131). Thus, the value of primary health care emerges from the complex interaction of its attributes (127).

### Implications for Metrics

The integrative focus of primary care in a fragmented health care system and society has important implications for developing primary health care metrics that do more good than harm. Recent scientific understanding shows that complex systems are more than the sum of their parts (105, 144). Treating primary health care as a series of commodities, rather than as a set of relationships (145), risks killing the emergent properties of primary care that are responsible for its value. Strong metrics of primary health care assess both the parts and the interactions of those parts (125) to create a whole of health and high-value health care.

The scientific evidence needed to support primary care metrics is often lacking in studies focused on disease-specific care (125) that specifically exclude critical contextual factors (132, 150) such as the multimorbidity (47) that is common among people seen in primary care (46). Metrics of quality in primary health care must account for context (132, 156), complexity (146), relationships (7), and emergence (57).

A major asset of primary care is its local adaptability. Recent international comparative research (92) shows that primary care manifests very differently to meet the needs of people in diverse sociopolitical environments (92). Appropriate metrics may vary considerably for these diverse manifestations. It is important to recognize and manage the tension between standardized measurement and the support of desirable heterogeneity based on local needs.

## METRICS OF PRIMARY HEALTH CARE

Below we highlight domains of relevant primary health care metrics and their use to inform performance, purpose, and aspiration.

### Domains of Metrics

The field of primary health care is in the midst of a paradigm shift (78) that is attempting to merge the benefits of personalized care and a population focus. **Table 2** shows what we believe are the emerging metrics of primary health care and lists some existing measurement tools from which measures for assessing the emerging metrics might be drawn. As the field evolves, it will be helpful to have support for developing standardized measures. In the United States, the National Committee on Vital Health Statistics would be a logical home for such efforts (69).

**The tenets of primary care.** Despite widespread agreement on the basic tenets of primary care (see **Table 1**) (35, 137, 141), these tenets rarely are used as metrics for quality (135). Some can be assessed from administrative or health care records, but many require report by the patient (43, 75, 76, 81, 136).

**Basic care.** Among basic care for acute and chronic illness, mental health and psychosocial care, preventive service delivery, and help with problems of living, metrics for clinical preventive service delivery and chronic disease management are most commonly measured. This is because it is relatively easier to devise metrics and obtain data for care based on risk factors and follow-up of already diagnosed illness. It is much more challenging to develop useful metrics for care for acute or undifferentiated illness, symptom reduction, problems of living, and psychosocial issues, even though they constitute the vast majority of problems seen in primary care (136). That challenge is exacerbated by the comprehensive, whole-person focus that is one of the essences of primary care:

**Table 2 Metrics of primary health care and some potential sources of measures**

Metrics	Possible sources from existing measures <sup>a</sup>
Tenets of primary care	
Accessibility	PCAT (22, 120), ACES (113), CAHPS <sup>b</sup> , NCQA (101)
Whole-person, comprehensive focus	PCAS (114), PCAT (22, 120), CPCI (41, 42, 44)
Sustained partnership and personal relationships over time	CQI (93), MHI (29), CPCI (41, 42, 44), PCAS (114), PCAT (22, 120), ACES (113), CARE (94), CAHPS <sup>b</sup>
Focus on family and other important relationships	PCAT (22, 120), CPCI (41, 42, 44), ECHO <sup>c</sup> , MHI (29), ACES (113), PCC (13), ACIC (15), CBI (21)
Community knowledge and focus	PCAT (22, 120), CPCI (41, 42, 44), ECHO <sup>c</sup> , MHI (29), ACES (113), PCC (13), ACIC (15)
Integration of care (of acute and often comorbid chronic illnesses, mental health and prevention, guidance for access to more narrowly focused care when needed)	PCAS (114), PCAT (22, 120), CPCI (41, 42, 44)
Coordination of care across settings and providers	MHI (29), CPCI (41, 42, 44), PCAS (114), ACES (113), PCAT (22, 120), ACIC (15), NCQA (101)
Basic care	National Quality Forum (100)
Care for acute illness	ACQA Starter Set <sup>d</sup> , Hospitalizations for Ambulatory Care Sensitive Condition (3, 49), SNOT-20 (104)
Care for chronic illness	ACQA Starter Set <sup>d</sup> , ACIC (15), MHI (29), Efficacy (84), PACIC (53), NCQA (101)
Clinical preventive service delivery	ACQA Starter Set <sup>d</sup> , IPHR (76)
Mental health and psychosocial care	VHA Measure (26), SF-36 (89), HIQ (24), NHP (88), SIP (10), PHQ-9 (77), GAD-7 (124)
Help with problems of living	SIP (10), IADL (80)
Symptom reduction	ESAS (17)
Principles of primary health care (161)	
Reduction of exclusion and social disparities in health (universal coverage reforms)	Health Literate Care (74), Census-LEP (72), IPC (142)
Organization of health services around people's needs and expectations (service delivery reforms)	Global Practice Experience (66)
Integration of health into all sectors (public policy reforms)	WHO Integrated Health Services (159)
Pursuit of collaborative models of policy dialogue (leadership reforms)	Policy Dialogue (1)
Increase in stakeholder participation	PAM (59, 60), OPTION (37), PDM (70)
Goal-directed care	
Care that is focused on helping people do/be what is important to them	Patient Enablement Index (61)
Appreciation of and unmasking potential	
Avoidance of unnecessary care	Medication Regime Complexity (51), Choosing Wisely <sup>e</sup>
Satisfaction with care	PSQ-18 (86)
Prioritization	
Balance, focus, and prioritization of health care and health promotion to/across the unique needs of individuals, communities, and populations, linking information on what works, on average, with what works for a particular person, family, community, population, situation, and time	WHO Integrated Health Services (159), HCQI <sup>f</sup>

*(Continued)*

Table 2 (Continued)

Metrics	Possible sources from existing measures <sup>a</sup>
Multilevel health outcomes	
Health of people, populations, community	HALE (160), ICF (157), SF-36 (89), HIQ (24), QWB (18), NHP (88), SIP (10), WHO-DAS (107), CBI (21), PROMIS (23), SWB (102), Sense of Coherence (39), Resilience (11, 153)
Development	
Life course (of individuals, families, communities)	Developing Human Capacity (103)
Support systems for health and healing	
Information technology	Meaningful Use <sup>g</sup> , MHI (29), NCQA (101)
Team function and organizational capacity	MHI (29), Work Relationship Index (148), Global Practice Experience (66), CPCQ (122), ORCA (58), Adaptive Reserve (65, 67, 96)
Health network collaboration	Social Network Scale (85), Relational Coordination (151)
Public engagement	MHI (29), Community Engagement (155)
Payment commensurate with the tasks of primary health care	Blended payment (32, 118)

<sup>a</sup> See the cited references and websites (noted below) for details and full program names.

<sup>b</sup> <https://cahps.ahrq.gov/>.

<sup>c</sup> <http://www.hcp.med.harvard.edu/echo/>.

<sup>d</sup> <http://www.ahrq.gov/qual/aqastart.htm>.

<sup>e</sup> <http://www.choosingwisely.org>.

<sup>f</sup> <http://www.oecd.org/health/hcqi>.

<sup>g</sup> [http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful\\_Use.html](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html).

The top 20 diagnosis clusters seen in primary care make up less than half the visits (115, 136), compared with many specialties (e.g. dermatology or cardiology) in which the top 6 diagnosis clusters account for 85–90% of visits (110).

Another reason for the preponderance of metrics that represent chronic disease and preventive service delivery is that recent efforts to improve care quality are pushing primary care away from care that acts in response to the patients' requests and toward care that is driven by evidence-based prevention and disease management, as reflected in the popularity of the chronic care model (152) and its application to preventive service delivery (52). The resulting shift emphasizes proactive delivery of services and has tended to deemphasize responsive meeting of patient needs and relationship development. Recent attempts to activate patients (59) and engage them more fully in their care (36) may be seen as attempts to partially compensate for diminished primary care relationships (34).

**Principles of primary health care.** The outward-looking principles of primary health care emphasize reforms directed toward universality of coverage, service delivery, public health policy, collaborative leadership, and stakeholder participation (161). These principles can serve as metrics for the equity and health (as opposed to health care) focus of the health system and of the fundamental bridging function of primary care that personalizes efforts to focus society on the collective good of health. The recent expansion of the chronic care model provides a framework for primary health care and for COPC metrics (6).

**Goal-directed care.** Goal-directed care attempts to focus care on what is most important to the person. It involves appreciating and unmasking potential (108). Sometimes it involves avoiding

unnecessary and risky health care (48). Relevant measures ask patients the degree to which health care helps them to do or be what is important to them (7, 61). The six-item patient-enablement index explicitly asks patients how they are better able to cope with life and illness as a result of their health care (61). Goal-directed care also attempts to balance the goals of the patient and various other stakeholders (97), managing the tensions in responding to the needs of both people and populations (131, 146).

**Prioritization.** The prioritizing function of primary health care involves managing the trade-offs in diverse care options for individuals and also balancing the needs of individuals, communities, and populations. For example, prioritizing may involve balancing an individual's desire for an expensive, patented medication with what might be good for the population, such as using economical generic medications that free up additional resources for other health care or health determinants. Doing so requires “an acquaintance with the particulars” (90) while also “raising our gaze” (129) to consider the whole system.

**Multilevel health outcomes.** The health of people, populations, and communities is a definitive metric for primary health care. Overarching measures such as the health-adjusted life year (160) provide a bottom-line metric. To be relevant to the whole-person, whole-system focus of primary care (149), relevant health metrics require a broad definition of health that goes beyond biomarkers to include function, meaning, social role, resilience, sense of coherence, and the inevitability of death, and therefore the capacity for restraint and the ability to let go as life fades (106).

**Metrics of development.** Metrics of development include a life course perspective on individuals, families, and communities. Relevant metrics include integrating and personalizing use of information technology; primary health care team capacity, joy, and adaptive reserve; health network collaboration; public engagement; and payment that supports key primary health care processes, relationships, and outcomes. (See sidebars on Metrics in Primary Care: A Cautionary Tale on RBRVS and RVU Payment, and on the recent political manifestation of primary care, the Patient-Centered Medical Home).

## Use of Metrics to Inform Performance

Metrics are most useful if they both allow assessment of performance of basic functions and encourage using these functions to develop the relationships necessary for higher-order functions that involve integrating and prioritizing care. This investment creates a bank account of shared knowledge and relationship that can be drawn on when the chips are down—when a personal illness or community crisis requires abiding and sometimes letting go.

The processes of primary health care and their metrics may be understood in a sort of ladder, or what Arthur Koestler described as a holarchy: a hierarchy in which higher levels include but transcend the one below (73, 162). As shown in **Figure 1**, a holarchy of primary health care moves from metrics of fundamental care to care that is integrated and prioritized and involves healing, abiding, and transcendence—sticking with people and communities even when a cure or healing is not possible. Primary health care work done on the lower levels helps to establish the relationships, trust, and shared understanding that allow the higher levels of care to be realized (127).

In day-to-day practice, most metrics are used to assess lower-level processes of care associated with short-term biomedical outcomes that often have little to do with the integrating, personalizing, prioritizing, and abiding that are important to advance health.

A balanced portfolio of metrics across multiple domains is particularly important for primary care to help guard against the dangerous predilection to optimize each part, assuming that will



## METRICS IN PRIMARY CARE: A CAUTIONARY TALE ON RBRVS AND RVU PAYMENT

In 1988 a group of Harvard health services researchers set out to change the way Medicare pays for medical service. They were particularly concerned that the cognitive work done by primary care physicians was not adequately compensated (63). They originally developed the RBRVS (resource-based relative value scale) to measure the value of physician work in nonmonetary units (62). An important component of this scale is the relative value unit (RVU), composed of work, practice expense, and malpractice components. Although initially touted as a way to better value the cognitive work that physicians in nonprocedure-oriented specialties provided, this metric is now being used as a metric of “productivity” and has had the unintended consequence of contributing to undervaluing primary care work. RVU measures work by accounting for time, complexity, and acuity. However, complexity is estimated from self-reports by a panel that is dominated by procedure-based medical specialists (14). So the unintended consequence is that the cognitive work of primary care is undervalued and work that is not properly aligned with health promotion and prevention is incentivized.

make the whole (person, family, community) better. Doing a broad and tailored amount of “good enough” lower-level care, while focusing on relationships (7) and development (127) over time, paradoxically may be the best primary health care (131).

### Use of Metrics to Inform Purpose

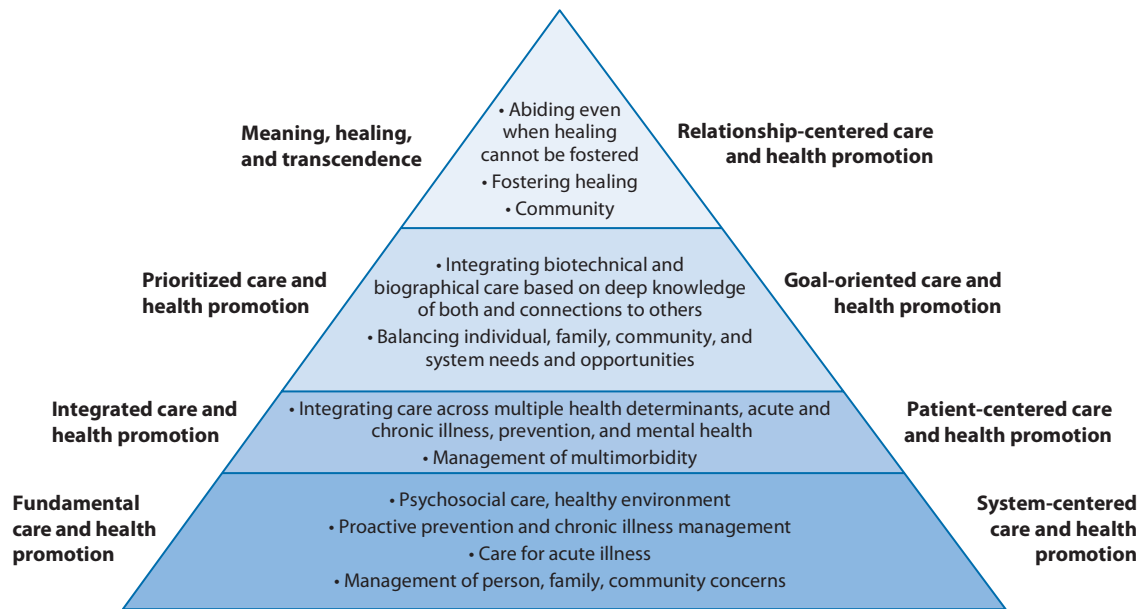
Purpose in primary health care is about improving the health of people and populations in the contexts where they live, work, and play (91). This goal requires a long-term perspective that brings together different ways of knowing. Ken Wilber has identified an inner and an outer aspect to ways of knowing, each with individual and collective facets. The resulting four ways of knowing involve an inner-individual “I” component of personal experience, an inner-collective shared “we” experience, an outer-individual “it” aspect, and an outer collective “its” aspect that represents systems understanding (162). **Figure 2** applies these ways of knowing to health and health care (128, 134).

## METRICS FOR THE PCMH

In the United States, the most recent political manifestation of primary care is the patient-centered medical home (PCMH) (135), consisting of the fundamental tenets of primary care, which are access, comprehensiveness, integration, and relationship; new ways of organizing practice; development of practices’ internal capabilities; and health care system and reimbursement changes. The social contract of the PCMH is that primary care will reform itself for a new era and that the health care system and payers will provide reimbursement to support both the needed changes and the aspects of primary care that require investment at the practice level for benefits at the levels of the patient, health care system, and population.

Metrics for assessing the PCMH have tended to emphasize the technical, easy-to-measure, and instrumental aspects of care (101), raising concern that the relationship-centered attributes of primary care that provide much of its value may be unintentionally devalued (31). This concern is augmented by recent evidence demonstrating that practices that merely meet metrics proposed by recognition or certifying organizations have not made the desired transformative changes, but rather have focused more on “ticking the boxes” (123). Recent efforts to overcome this problem have suggested including the patient voice or participation or greater emphasis on a developmental approach over time (96).





**Figure 1**  
Use of metrics to inform performance across a holarchy of health care. Adapted from Reference 127.

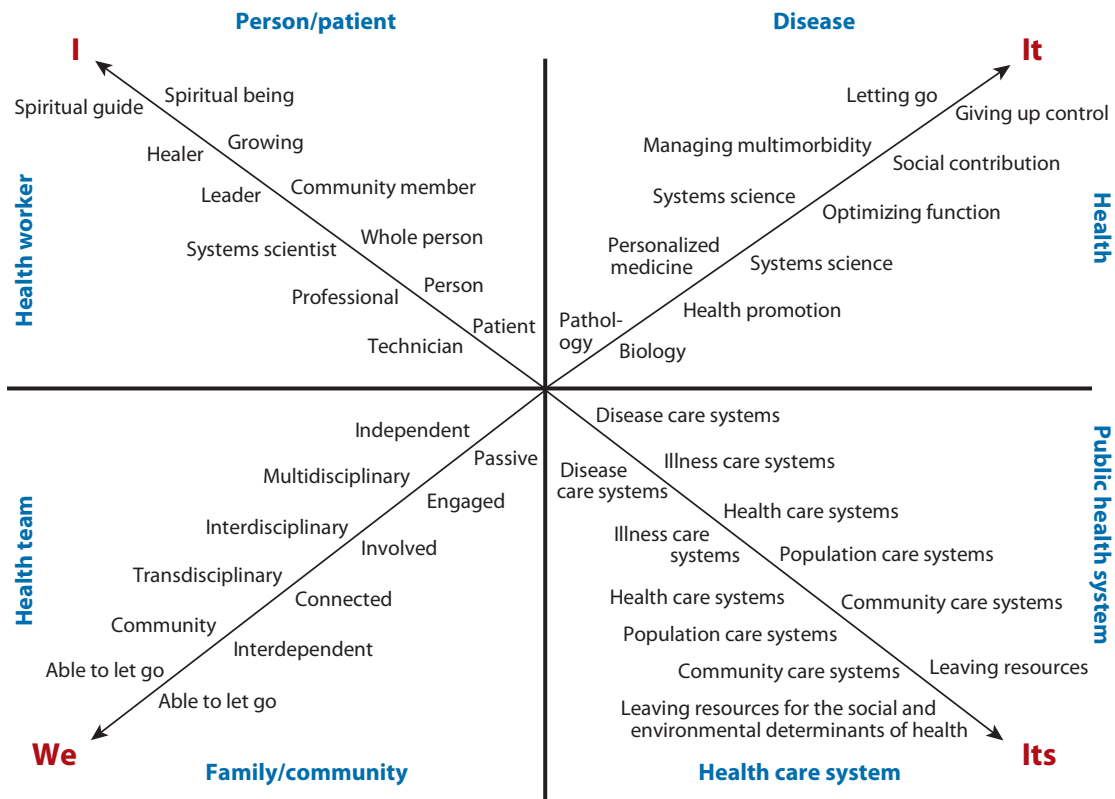
In any situation, all four ways of knowing are always present. Consideration of each perspective can enhance the use of metrics to inform purpose and meaning. For example, when finding that an “it” metric of disease care is substandard, it makes sense to examine the health care and community systems (“its” metrics) that support or hinder that care. It also is vital to consider the individual and collective experiences of person/family/community and clinician/health care team. These different perspectives bring together biomedical and systems metrics to the person and population health goals of primary health care.

### Use of Metrics to Inform Aspiration

Aspirational uses of metrics inspire looking at what is next and using that emerging vision to continually improve. This important use of metrics is best served by a developmental perspective that involves a sequence of changes toward higher levels of differentiation, effectiveness, and

	Inner	Outer
Individual	<p>“I”</p> <p>Patient, clinician, worker, policy maker</p>	<p>“It”</p> <p>Disease, treatment</p>
Collective	<p>“We”</p> <p>Family, practice, team, community</p>	<p>“Its”</p> <p>Systems, organization</p>

**Figure 2**  
Use of metrics to inform purpose: 4 ways of knowing about health and health care. Adapted from Reference 128.



**Figure 3**

Use of metrics to inform aspiration.

significance (96). **Figure 3** depicts development in each of the four ways of knowing in health and health care. This development moves health care and health promotion from basic to personalized, integrated, prioritized, healthy/healing, and transcendent.

Balancing development in each of the four ways of knowing is most likely to further the ability of primary health care to improve health. Development in each quadrant moves metrics from data to information to knowledge to understanding and creates the possibility for wisdom (2, 8, 12, 127).

Metrics that are aligned with primary health care aspirations enable the emergence of higher-level primary health care and its outcomes and balance people/population interests with individual/contextual needs. When a metric becomes a target in itself, it ceases to be useful (54). Metrics used solely to measure goal attainment—teaching to the test (164)—become a distraction from development and actually block work to identify potential and inspire aspiration (143). In contrast, aspirational uses of metrics inspire individual reflection, collective conversation, shared learning, new understanding, and work to develop systems to support movement toward a better place (165).

## THE ENVIRONMENT IN WHICH METRICS ARE USED

This article has emphasized the dual-edged potential of metrics to foster positive development or to cause potentially harmful unintended consequences. Which side the metric knife cuts depends in

large part on the environment in which it is used. Settings that use metrics punitively promote isolation rather than helpful conversation (68). In contrast, organizations that use metrics to foster reflection, experimentation, and assessment advance knowledge, healing, and health (112, 116, 117).

To be helpful, metrics need to be used to create a sensing system that can monitor and improve performance rather than represent simply a set of measures that are mindlessly heeded (130). Such settings allow metrics to uncover unrecognized tensions, stimulate mindful reflection (38), and foster learning conversations (79) where boundaries are being crossed (129). Metrics are likely to be most useful in environments that enable individual reflection, promote safe, diverse interpersonal communication, and have supportive systems for shared rapid-cycle learning, deep remembering, and collective action (148).

Settings that use metrics punitively promote isolation rather than helpful conversation (68). Organizations, groups, and cultures that use metrics to foster reflection, experimentation, and assessment help practitioners to advance knowledge, not just deliver knowledge that was advanced elsewhere (112). Such settings focus on effectiveness, not just efficiencies, emphasizing long-term goals over short-term productivity (164, 165). Healthy environments bring together the subjective and the objective to interpret metrics. Transparency plus an overemphasis on objectivity leads to unbalanced and crude central control (119). In contrast, environments that use narrative to inform their numbers and stories to enrich their statistics provide space in which metrics can be used to foster growth around locally relevant core values (5).

A culture of improvement, rather than self-justification, is most likely to choose and use metrics to make things better (64). Metrics that provide a starting point for understanding, and environments that support envisioning an audacious goal, and taking a next incremental step toward that goal, are likely to see progress over time.

What emerges in environments with these characteristics of focusing on sensing, effectiveness, subjectivity and objectivity, positive change, and interaction is a wider shared field of vision. These environments are characterized by greater self-disclosure, interpersonal feedback, and inquiry-centered exploration that foster both focusing on the particulars (90, 132, 150) and putting the details of each metric into a larger context (132, 150). An iterative process that pivots the gaze from the particulars to the big picture and back again is part of the generalist approach (126) that can turn data into information and information into knowledge and shared understanding. Such environments create the possibility for the emergence of shared wisdom (2, 8, 12, 127).

## A COMPOSITE EXAMPLE

Community Family Practice is a federally qualified community health center with four practice sites purposefully located in the pockets of greatest social and economic deprivation in their Midwestern city. The practice gathers performance data from multiple sources. These data reflect primarily preventive service delivery and evidence-based chronic disease management, with more limited data on patient experience and early-stage “meaningful use” of electronic health records (95). Individuals and teams are encouraged to reflect on personalized reports in light of what is meaningful to them personally and what is important in their goal to improve the health of the individuals, families, and communities they serve.

At quarterly meetings that include all practice sites, patient representatives, and community partners, metrics are shared and changes over time are graphed. Participants are encouraged to compare processes in light of outcomes, to learn from each other, and to reflect together on what is meaningful. Appreciative group exercises (20) create space to imagine and plan how they could be more effective in their service and joyful in their work, progressing from technician to professional, systems thinker, leader, healer, and spiritual partner (see **Figure 3**).

The practice was a vanguard for obtaining recognition as a patient-centered medical home (see sidebar, Metrics for the PCMH). They hoped that recognition would be accompanied by additional resources from payers and insurers. Therefore, in light of shortcomings in their metrics for meeting their patients' needs in the realms of the social, behavioral, and environmental determinants of health (158), they invested in new staffing to help integrate behavioral and medical care, to develop practice-based and community-linked programs for healthy diet and activity, and to advocate for employment initiatives. When the added payments beyond fee-for-service were not forthcoming, they struggled to pay for these additional personnel and services.

Motivated in part by funding shortfalls and by the growing recognition that their vision for a healthy community required other partners, Community Family Practice joined the local research and development collaborative that publicly shares health care metrics from partners across the competing local health care systems and shares neighborhood-level health and health-determinant data from the partnering local health department. This partnership was just the sort of information that Community Family Practice needed to help them actualize their vision of COPC. Biannual learning collaboratives parallel the health center's practice meetings, but by including a wider range of metrics and a broader array of partners, they bring together a more expansive range of potential solutions and provide the opportunity to work on health problems further upstream from the very ill people often seen in practice.

Two participating hospital systems initially were resistant to the partnership. However, after seeing the potential for sharing both shortage and abundance, they now are highly motivated to partner around changes needed to become an accountable care organization and to acquire help with the community health needs assessments that the Affordable Care Act requires to continue their tax-exempt status. In addition, employers, motivated by their need for a healthy workforce, by the need for cost reduction among high health care utilizers, and by civic pride, are pressuring insurers and sometimes working directly with health care and public health providers to develop programs to promote health and to integrate, personalize, and prioritize health care delivery. The learning collaborative serves as a convener that helps diverse partners to expand their metrics from health care to community health and to begin to work together to develop whole-systems solutions (149).

## CONCLUSION

Nothing is more important to the development of a high-value health care system than the support and transformation of primary health care (25, 33). Metrics can help or hurt the necessary development. Building a balanced set of metrics and using metrics to focus on purpose and aspiration in environments that foster ongoing shared learning and development can help to foment and support the needed (r)evolution.

### SUMMARY POINTS

1. The opportunity to influence complex interactions among multiple determinants of health is what is powerful about primary health care.
2. Evidence shows that the outcomes of improved primary health care include better population health, greater health care quality, greater equity in health care and health, and a higher-value health care system (less expenditure for greater health).

3. Aspects of primary care thought to lead to these outcomes include accessibility as the first contact with the health care system; a comprehensive, whole-person focus; integration of care across multiple acute and chronic illnesses, health promotion and disease prevention, mental health and family care, and coordination of care across multiple health care providers and venues; and provision of care in the context of ongoing relationships with individuals, families, and communities.
4. Assessing primary health care requires a balanced portfolio of measures that reflect performance, purpose, and aspiration and provide enough flexibility to support individualization and a developmental process to do what is best for the health of particular people and communities in the long term, even if it makes the metric look subpar in the short term.
5. Maximizing each individual metric in isolation risks diminishing the whole.
6. To be useful, metrics must be used in an environment that stimulates self-reflection, development, and shared learning among key stakeholders.
7. Improved population health will require increasing health care access and quality, while decreasing expenditure on health care, to enable increased investment in the social determinants of health that include education, employment, safety, housing, and community connection. The most effective way to accomplish this goal is by advancing primary health care.

## FUTURE ISSUES

1. How can we create local- and higher-level political space for real conversations about trade-offs, winner/losers, long- versus short-term needs/gains?
2. Can we find a helpful relationship between payment and metrics?
3. In a time that feels like shortage, how can diverse contributors to health create a sense of abundance? Stated differently, how can we use metrics to focus attention on long-term benefit in a time when primary care is valued primarily for its potential for cost savings (as it was during the managed care era that gave us the gatekeeper identity)?
4. How can we come to value metrics that balance both narratives and numbers, both stories and statistics?
5. How can we come to sufficiently value relationship, meaning, and long-term development over meeting short-term metrics?
6. How can we understand and minimize the unintended negative consequences of metrics?
7. How can we develop metrics and use them in ways that foster the reinvention of primary health care in ways that retain fundamental values while developing new approaches to their actualization in the Information Age?
8. How can we measure the value that is created at the level of the system/community/society from investment that occurs at the level of local primary health care?

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## LITERATURE CITED

1. Abdool S, Amin A, Jara L, PAHO (Pan Am. Health Org.)/World Health Org. (WHO). 2010. *A policy dialogue on better evidence to improve women's health through gender and health statistics*. Policy Dialogue to Strength. Evid. to Improv. Women's Health through Gend. and Health Stat. Meet. rep., Oct. 25–27, Washington, DC. [http://www.paho.org/hq/index.php?option=com\\_docman&task=doc\\_view&gid=17254&Itemid=](http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&gid=17254&Itemid=)
2. Ackoff RL. 1989. From data to wisdom. *J. Appl. Syst. Anal.* 16:3–9
3. Ansari Z, Laditka JN, Laditka SB. 2006. Access to health care and hospitalization for ambulatory care sensitive conditions. *Med. Care Res. Rev.* 63:719–41
4. Baicker K, Chandra A. 2004. Medicare spending, the physician workforce, and beneficiaries' quality of care. *Health Aff. (Millwood)* Suppl. Web Exclus.:W4-184–97
5. Balasubramanian BA, Chase SM, Nutting PA, Cohen DJ, Strickland PA, et al. 2010. Using Learning Teams for Reflective Adaptation (ULTRA): insights from a team-based change management strategy in primary care. *Ann. Fam. Med.* 8:425–32
6. Barr VJ, Robinson S, Marin-Link B, Underhill L, Dotts A, et al. 2003. The expanded Chronic Care Model: an integration of concepts and strategies from population health promotion and the Chronic Care Model. *Hosp. Q.* 7:73–82
7. Beach MC, Inui T, Relatsh.-Cent. Care Res. Netw. 2006. Relationship-centered care. A constructive reframing. *J. Gen. Intern. Med.* 21(Suppl. 1):S3–8
8. Bellinger G, Castro D, Mills A. 2004. *Data, information, knowledge, and wisdom*. Syst. Think. website. <http://www.systems-thinking.org/dikw/dikw.htm>
9. Berenson RA, Rich EC. 2010. US approaches to physician payment: the deconstruction of primary care. *J. Gen. Intern. Med.* 25:613–18
10. Bergner M, Bobbitt RA, Carter WB, Gilson BS. 1981. The Sickness Impact Profile: development and final revision of a health status measure. *Med. Care* 19:787–805
11. Berkes F, Colding J, Folke C. 2008. *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. Cambridge, UK: Cambridge Univ. Press
12. Bierly PE III, Kessler EH, Christensen EW. 2000. Organizational learning, knowledge and wisdom. *J. Organ. Change Manag.* 13:595–618
13. Bobiak SN, Zyzanski SJ, Ruhe MC, Carter CA, Ragan B, et al. 2009. Measuring practice capacity for change: a tool for guiding quality improvement in primary care settings. *Qual. Manag. Health Care* 18:278–84
14. Bodenheimer T, Berenson RA, Rudolf P. 2007. The primary care-specialty income gap: why it matters. *Ann. Intern. Med.* 146:301–6
15. Bonomi AE, Wagner EH, Glasgow RE, VonKorff M. 2002. Assessment of chronic illness care (ACIC): a practical tool to measure quality improvement. *Health Serv. Res.* 37:791–820
16. Breslow L. 2004. Perspectives: the third revolution in health. *Annu. Rev. Public Health* 25:xiii–xviii

17. Bruera E, Kuehn N, Miller MJ, Selmsler P, Macmillan K. 1991. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. *J. Palliat. Care* 7:6–9
18. Bush JW. 1984. General Health Policy Model/Quality of Well-being (QWB) scale. In *Assessment of Quality of Life in Clinical Trials of Cardiovascular Therapies*, ed. NK Wenger, ME Mattson, CD Furberg, J Elinson, p. 189. New York: LeJacq
19. Campbell SM, Reeves D, Kontopantelis E, Sibbald B, Roland M. 2009. Effects of pay for performance on the quality of primary care in England. *N. Engl. J. Med.* 361:368–78
20. Carter CA, Ruhe MC, Weyer SM, Litaker D, Fry RE, Stange KC. 2007. An appreciative inquiry approach to practice improvement and transformative change in health care settings. *Qual. Manag. Health Care* 16:194–204
21. Caserta MS, Lund DA, Wright SD. 1996. Exploring the Caregiver Burden Inventory (CBI): further evidence for a multidimensional view of burden. *Int. J. Aging Hum. Dev.* 43:21–34
22. Cassady CE, Starfield B, Hurtado MP, Berk RA, Nanda JP, Friedenber LA. 2000. Measuring consumer experiences with primary care. *Pediatrics* 105:998–1003
23. Cella D, Riley W, Stone A, Rothrock N, Reeve B, et al. 2010. The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005–2008. *J. Clin. Epidemiol.* 63:1179–94
24. Chambers LW. 1988. The McMaster Health Index Questionnaire: an update. See Ref. 154, pp. 113–31
25. Chan M. 2009. Primary health care as a route to health security. *Lancet* 373:1586–87
26. Charbonneau A, Rosen AK, Ash AS, Owen RR, Kader B, et al. 2003. Measuring the quality of depression care in a large integrated health system. *Med. Care* 41:669–80
27. Comm. Integr. Primary Care Public Health of the Board on Popul. Health Public Health Pract. 2012. *Primary Care and Public Health: Exploring Integration to Improve Population Health*. Washington, DC: Natl. Acad. Press
28. Connor E, Mullan F, eds. 1983. *Community Oriented Primary Care: New Directions for Health Service Delivery*. Washington, DC: Natl. Acad. Press
29. Cooley WC, McAllister JW, Sherrieb K, Clark RE. 2003. The Medical Home Index: development and validation of a new practice-level measure of implementation of the Medical Home model. *Ambul. Pediatr.* 3:173–80
30. Crabtree BF, Nutting PA, Miller WL, McDaniel RR, Stange KC, et al. 2011. Primary care practice transformation is hard work: insights from a 15-year developmental program of research. *Med. Care* 49(Suppl.):S28–35
31. Crabtree BF, Nutting PA, Miller WL, Stange KC, Stewart EE, Jaén CR. 2010. Summary of the National Demonstration Project and recommendations for the Patient-Centered Medical Home. *Ann. Fam. Med.* 8:S80–90
32. Davis K. 2007. Paying for care episodes and care coordination. *N. Engl. J. Med.* 356:1166–68
33. Dentzer S. 2010. Reinventing primary care: a task that is far ‘too important to fail.’ *Health Aff.* 29:757
34. Doherty WJ, Mendenhall TJ. 2006. Citizen health care: a model for engaging patients, families, and communities as coproducers of health. *Fam. Syst. Health* 24:251–63
35. Donaldson MS, Yordy KD, Lohr KN, Vanselow NA, eds. 1996. *Primary Care: America’s Health in a New Era*. Washington, DC: Natl. Acad. Press
36. Elwyn G, Edwards A, Mowle S, Wensing M, Wilkinson C, et al. 2001. Measuring the involvement of patients in shared decision-making: a systematic review of instruments. *Patient Educ. Couns.* 43:5–22
37. Elwyn G, Edwards A, Wensing M, Hood K, Atwell C, Grol R. 2003. Shared decision making: developing the OPTION scale for measuring patient involvement. *Qual. Saf. Health Care* 12:93–99
38. Epstein RM. 1999. Mindful practice. *JAMA* 282:833–39
39. Eriksson M, Lindstrom B. 2005. Validity of Antonovsky’s sense of coherence scale: a systematic review. *J. Epidemiol. Community Health* 59:460–66
40. Fielding JE, Teutsch S, Breslow L. 2010. A framework for public health in the United States. *Public Health Rev.* 32:174–89
41. Flocke SA. 1997. Measuring attributes of primary care: development of a new instrument. *J. Fam. Pract.* 45:64–74



42. Flocke SA. 1998. Primary care instrument. *J. Fam. Pract.* 46:12
43. Flocke SA, Goodwin MA, Stange KC. 1998. The effect of a secondary patient on the family practice visit. *J. Fam. Pract.* 46:429–34
44. Flocke SA, Miller WL, Crabtree BF. 2002. Relationships between physician practice style, patient satisfaction, and attributes of primary care. *J. Fam. Pract.* 51:835–40
45. Folsom Group, Am. Board Fam. Med. Young Lead. Advis. Group. 2012. Communities of solution: the Folsom Report revisited. *Ann. Fam. Med.* 10:250–60
46. Fortin M, Bravo G, Hudon C, Vanasse A, Lapointe L. 2005. Prevalence of multimorbidity among adults seen in family practice. *Ann. Fam. Med.* 3:223–28
47. Fortin M, Dionne J, Pinho G, Gignac J, Almirall J, Lapointe L. 2006. Randomized controlled trials: Do they have external validity for patients with multiple comorbidities? *Ann. Fam. Med.* 4:104–8
48. Franks P, Clancy CM, Nutting PA. 1992. Gatekeeping revisited—protecting patients from overtreatment. *N. Engl. J. Med.* 327:424–29
49. Freund T, Campbell S, Geissler S, Ursula Kunz S, Mahler C, et al. 2013. An exploration of potentially avoidable hospitalizations for ambulatory care sensitive conditions. *Ann. Fam. Med.* 11:363–70
50. Friedberg MW, Hussey PS, Schneider EC. 2010. Primary care: a critical review of the evidence on quality and costs of health care. *Health Aff.* 29:766–72
51. George J, Phun YT, Bailey MJ, Kong DC, Stewart K. 2004. Development and validation of the medication regimen complexity index. *Ann. Pharmacother.* 38:1369–76
52. Glasgow RE, Orleans CT, Wagner EH. 2001. Does the chronic care model serve also as a template for improving prevention? *Milbank Q.* 79:579–612
53. Glasgow RE, Wagner EH, Schaefer J, Mahoney LD, Reid RJ, Greene SM. 2005. Development and validation of the Patient Assessment of Chronic Illness Care (PACIC). *Med. Care* 43:436–44
54. Goodhart CAE. 1984. The problems of monetary management: the UK experience. In *Monetary Theory and Practice: The UK Experience*, ed. CAE Goodhart, pp. 91–121. London: Macmillan
55. Greenfield S, Nelson EC, Zubkoff M, Manning W, Rogers W, et al. 1992. Variations in resource utilization among medical specialties and systems of care. Results from the medical outcomes study. *JAMA* 267:1624–30
56. Griswold KS, Lesko SE, Westfall JM. 2013. Communities of solution: partnerships for population health. *J. Am. Board Fam. Med.* 26:232–38
57. Heath I, Rubenstein A, Stange KC, van Driel M. 2009. Quality in primary health care: a multidimensional approach to complexity. *BMJ* 338:b1242
58. Helfrich CD, Li YF, Sharp ND, Sales AE. 2009. Organizational readiness to change assessment (ORCA): development of an instrument based on the Promoting Action on Research in Health Services (PARIHS) framework. *Implement. Sci.* 4:38
59. Hibbard JH, Mahoney E. 2010. Toward a theory of patient and consumer activation. *Patient Educ. Couns.* 78:377–81
60. Hibbard JH, Mahoney ER, Stockard J, Tusler M. 2005. Development and testing of a short form of the patient activation measure. *Health Serv. Res.* 40:1918–30
61. Howie JG, Heaney DJ, Maxwell M, Walker JJ. 1998. A comparison of a patient enablement instrument (PEI) against two established satisfaction scales as an outcome measure of primary care consultations. *Fam. Pract.* 15:165–71
62. Hsiao WC, Braun P, Dunn D, Becker ER. 1988. Resource-based relative values. An overview. *JAMA* 260:2347–53
63. Hsiao WC, Braun P, Dunn DL, Becker ER, Yntema D, et al. 1992. An overview of the development and refinement of the Resource-Based Relative Value Scale. The foundation for reform of U.S. physician payment. *Med. Care* 30:NS1–12
64. Inst. Med. 2008. *Learning Healthcare System Concepts v. 2008*. Washington, DC: Inst. Med.
65. Jaén CR, Crabtree BF, Palmer RF, Ferrer RL, Nutting PA, et al. 2010. Methods for evaluating practice change toward a Patient-Centered Medical Home. *Ann. Fam. Med.* 8(Suppl. 1):S9–20
66. Jaén CR, Ferrer RL, Miller WL, Palmer RF, Wood R, et al. 2010. Patient outcomes at 26 months in the patient-centered medical home National Demonstration Project. *Ann. Fam. Med.* 8:S57–67

67. Jaén CR, Palmer RF. 2012. Shorter adaptive reserve measures. *Ann. Fam. Med.* 8(Suppl. 1):1–2
68. Jordan ME, Lanham HJ, Crabtree BF, Nutting PA, Miller WL, et al. 2009. The role of conversation in health care interventions: enabling sensemaking and learning. *Implement. Sci.* 4:15
69. Kanaan SB, Natl. Comm. Vital Health Stat. 2012. *The Community as a Learning System for Health: Using Local Data To Improve Local Healthb.* Washington, DC: US Dep. Health Hum. Serv.
70. Kaplan SH, Gandek B, Greenfield S, Rogers W, Ware JE. 1995. Patient and visit characteristics related to physicians' participatory decision-making style. Results from the Medical Outcomes Study. *Med. Care* 33:1176–87
71. Kark SL, Cassel J. 2002. The Pholela Health Centre: a progress report. *Am. J. Public Health* 92:1743–47
72. Karliner LS, Napoles-Springer AM, Schillinger D, Bibbins-Domingo K, Pérez-Stable EJ. 2008. Identification of limited English proficient patients in clinical care. *J. Gen. Intern. Med.* 23:1555–60
73. Koestler A, Smythies JR, eds. 1971. *Beyond Reductionism: New Perspectives on the Life Sciences.* Boston: Houghton Mifflin
74. Koh HK, Brach C, Harris LM, Parchman ML. 2013. A proposed 'health literate care model' would constitute a systems approach to improving patients' engagement in care. *Health Aff. (Millwood)* 32:357–67
75. Krist AH, Glenn BA, Glasgow RE, Balasubramanian BA, Chambers DA, et al. 2013. Designing a valid randomized pragmatic primary care implementation trial: the my own health report (MOHR) project. *Implement. Sci.* 8:73
76. Krist AH, Peele E, Woolf SH, Rothemich SF, Loomis JF, et al. 2011. Designing a patient-centered personal health record to promote preventive care. *BMC Med. Inform. Decis. Mak.* 11:73
77. Kroenke K, Spitzer RL, Williams JB. 2001. The PHQ-9: validity of a brief depression severity measure. *J. Gen. Intern. Med.* 16:606–13
78. Kuhn TS. 1996. *The Structure of Scientific Revolutions.* Chicago/London: Univ. Chicago Press. 3rd ed.
79. Lanham HJ, McDaniel RR Jr, Crabtree BF, Miller WL, Stange KC, et al. 2009. How improving practice relationships among clinicians and nonclinicians can improve quality in primary care. *Jt. Comm. J. Qual. Patient Saf.* 35:457–66
80. Lawton MP. 1988. Scales to measure competence in everyday activities. *Psychopharmacol. Bull.* 24:609–14
81. Lévesque JF, Haggerty J, Beninguisse G, Burge F, Gass D, et al. 2012. Mapping the coverage of attributes in validated instruments that evaluate primary healthcare from the patient perspective. *BMC Fam. Pract.* 13:20
82. Lewin S, Lavis JN, Oxman AD, Bastias G, Chopra M, et al. 2008. Supporting the delivery of cost-effective interventions in primary health-care systems in low-income and middle-income countries: an overview of systematic reviews. *Lancet* 372:928–39
83. Longlett SK, Kruse JE, Wesley RM. 2001. Community-oriented primary care: historical perspective. *J. Am. Board Fam. Pract.* 14:54–63
84. Lorig KR, Sobel DS, Ritter PL, Laurent D, Hobbs M. 2001. Effect of a self-management program on patients with chronic disease. *Eff. Clin. Pract.* 4:256–62
85. Lubben JE. 1988. Assessing social networks among elderly populations. *Fam. Community Health* 11:42–52
86. Marshall GN, Hays RD, Mazel R. 1996. Health status and satisfaction with health care: results from the medical outcomes study. *J. Consult. Clin. Psychol.* 64:380–90
87. McDonald R, Roland M. 2009. Pay for performance in primary care in England and California: comparison of unintended consequences. *Ann. Fam. Med.* 7:121–27
88. McEwen J. 1988. The Nottingham Health Profile. See Ref. 154, p. 95
89. McHorney CA, Ware JE Jr, Raczek AE. 1993. The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. *Med. Care* 31:247–63
90. McWhinney IR. 1989. 'An acquaintance with particulars. . .'. *Fam. Med.* 21:296–98
91. McWhinney IR, Freeman T. 2009. *Textbook of Family Medicine.* New York: Oxford Univ. Press
92. Meads G. 2006. *Primary Care in the Twenty-First Century.* Seattle, WA: Radcliffe

93. Mercer SW, Howie JG. 2006. CQI-2—a new measure of holistic interpersonal care in primary care consultations. *Br. J. Gen. Pract.* 56:262–68
94. Mercer SW, Maxwell M, Heaney D, Watt GCM. 2004. The consultation and relational empathy (CARE) measure: development and preliminary validation and reliability of an empathy-based consultation process measure. *Fam. Pract.* 21:699–705
95. MGMA Gov. Aff. Dep. 2010. CMS defines ‘meaningful use’. Proposed rule outlines requirements for EHR incentive payments. *MGMA Connex* 10:10–13
96. Miller WL, Crabtree BF, Nutting PA, Stange KC, Jaén CR. 2010. Primary care practice development: a relationship-centered approach. *Ann. Fam. Med.* 8:S68–79
97. Mold JW, Blake GH, Becker LA. 1991. Goal-oriented medical care. *Fam. Med.* 23:46–51
98. Mullan F, Epstein L. 2002. Community-oriented primary care: new relevance in a changing world. *Am. J. Public Health* 92:1748–55
99. Natl. Inst. Stand. Technol. 2013. *Metrics and measures*. Softw. Assur. Metrics Tool Eval. [http://samate.nist.gov/index.php/Metrics\\_and\\_Measures.html](http://samate.nist.gov/index.php/Metrics_and_Measures.html)
100. Natl. Quality Forum. 2012. *Report from the National Quality Forum: 2012 NQF Measure Gap Analysis*. Washington, DC: Natl. Quality Forum. [http://www.qualityforum.org/Publications/2013/03/2012\\_NQF\\_Measure\\_Gap\\_Analysis.aspx](http://www.qualityforum.org/Publications/2013/03/2012_NQF_Measure_Gap_Analysis.aspx)
101. NCQA. 2011. *2011 PCMH Standard and Guidelines Electronic Pub (Single User)*. Washington, DC: NCQA. [https://inetshop01.pub.ncqa.org/publications/product.asp?dept\\_id=2&pf\\_id=30004-301-11](https://inetshop01.pub.ncqa.org/publications/product.asp?dept_id=2&pf_id=30004-301-11)
102. OECD. 2013. *OECD Guidelines on Measuring Subjective Well-Being*. Paris: OECD. <http://www.oecd.org/statistics/Guidelines%20on%20Measuring%20Subjective%20Well-being.pdf>
103. Payne RK. 2012. *From Understanding Poverty to Developing Human Capacity*. Highlands, TX: aha! Process
104. Piccirillo JF, Merritt MG Jr, Richards ML. 2002. Psychometric and clinimetric validity of the 20-item Sino-Nasal Outcome Test (SNOT-20). *Otolaryngol. Head Neck Surg.* 126:41–47
105. Plsek PE, Greenhalgh T. 2001. The challenge of complexity in health care. *BMJ* 323:625–28
106. Promot. Health Across Bound. (PHAB). 2012. *What is health?* PHAB, Cleveland, Ohio. <http://www.phab.us/about/what-is-health/>
107. Rehm J, Üstün TB, Saxena S, Nelson CB, Chatterji S, et al. 1999. On the development and psychometric testing of the WHO screening instrument to assess disablement in the general population. *Int. J. Methods Psychiatr. Res.* 8:110–22
108. Reuben DB, Tinetti ME. 2012. Goal-oriented patient care—an alternative health outcomes paradigm. *N. Engl. J. Med.* 366:777–79
109. Rhyne R, Bogue R, Kukulka G, Fulmer H, eds. 1998. *Community-Oriented Primary Care: Health Care for the 21st Century*. Washington, DC: Am. Public Health Assoc.
110. Rosenblatt RA, Cherkin DC, Schneeweiss R, Hart LG. 1983. The content of ambulatory medical care in the United States: an interspecialty comparison. *N. Engl. J. Med.* 309:892–97
111. Ruhe MC, Bobiak SN, Litaker D, Carter CA, Wu L, et al. 2011. Appreciative inquiry for quality improvement in primary care practices. *Qual. Manag. Health Care* 20:37–48
112. Saba GW, Villela TJ, Chen E, Hammer H, Bodenheimer T. 2012. The myth of the lone physician: toward a collaborative alternative. *Ann. Fam. Med.* 10:169–73
113. Safran DG, Karp M, Coltin K, Chang H, Li A, et al. 2006. Measuring patients’ experiences with individual primary care physicians. Results of a statewide demonstration project. *J. Gen. Intern. Med.* 21:13–21
114. Safran DG, Kosinski MI, Tarlov AR, Rogers WH, Taira DA, et al. 1998. The Primary Care Assessment Survey: tests of data quality and measurement performance. *Med. Care* 36:728–39
115. Schneeweiss R, Rosenblatt RA, Cherkin DC, Kirkwood CR, Hart G. 1983. Diagnosis clusters: a new tool for analyzing the content of ambulatory medical care. *Med. Care* 21:105–22
116. Schön DA. 1990. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*. San Francisco, CA: Jossey-Bass
117. Schön DA. 1991. *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books
118. Schroeder SA, Frist W. 2013. Phasing out fee-for-service payment. *N. Engl. J. Med.* 368:2029–32
119. Scott JC. 2012. *Two Cheers for Anarchism: Six Easy Pieces on Autonomy, Dignity, and Meaningful Work and Play*. Princeton, NJ: Princeton Univ. Press

120. Shi L, Starfield B, Xu J. 2001. Validating the adult primary care assessment tool. *J. Fam. Pract.* 50:161W–75
121. Shojania KG, Grimshaw JM. 2005. Evidence-based quality improvement: the state of the science. *Health Aff.* 24:138–50
122. Solberg LI, Asche SE, Margolis KL, Whitebird RR. 2008. Measuring an organization's ability to manage change: the change process capability questionnaire and its use for improving depression care. *Am. J. Med. Qual.* 23:193–200
123. Solberg LI, Crain AL, Tillema J, Scholle SH, Fontaine P, Whitebird R. 2013. Medical home transformation: a gradual process and a continuum of attainment. *Ann. Fam. Med.* 11:S108–14
124. Spitzer RL, Kroenke K, Williams JB, Lowe B. 2006. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch. Intern. Med.* 166:1092–97
125. Stange KC. 2002. The paradox of the parts and the whole in understanding and improving general practice. *Int. J. Qual. Health Care* 14:267–68
126. Stange KC. 2009. The generalist approach. *Ann. Fam. Med.* 7:198–203
127. Stange KC. 2009. A science of connectedness. *Ann. Fam. Med.* 7:387–95
128. Stange KC. 2010. Ways of knowing, learning, and developing. *Ann. Fam. Med.* 8:4–10
129. Stange KC. 2011. Refocusing knowledge generation, application and education: raising our gaze to promote health across boundaries. *Am. J. Prev. Med.* 41(4 Suppl. 3):S164–69
130. Stange KC. 2013. Mindfulness in practice and policy. *Ann. Fam. Med.* 11:398–99
131. Stange KC, Ferrer RL. 2009. The paradox of primary care. *Ann. Fam. Med.* 7:293–99
132. Stange KC, Glasgow RE. 2013. *Considering and Reporting Important Contextual Factors in Research on the Patient-Centered Medical Home*. Rockville, MD: Agency for Healthcare Res. Qual. (AHRQ) Publ. No. 13-0045-WF
133. Stange KC, Jaén CR, Flocke SA, Miller WL, Crabtree BF, Zyzanski SJ. 1998. The value of a family physician. *J. Fam. Pract.* 46:363–68
134. Stange KC, Miller WL, McWhinney I. 2001. Developing the knowledge base of family practice. *Fam. Med.* 33:286–97
135. Stange KC, Nutting PA, Miller WL, Jaén CR, Crabtree BF, et al. 2010. Defining and measuring the patient-centered medical home. *J. Gen. Intern. Med.* 25:601–12
136. Stange KC, Zyzanski SJ, Jaén CR, Callahan EJ, Kelly RB, et al. 1998. Illuminating the black box: a description of 4454 patient visits to 138 family doctors. *J. Fam. Pract.* 46:377–89
137. Starfield B. 1998. *Primary Care: Balancing Health Needs, Services, and Technology*. New York: Oxford Univ. Press
138. Starfield B. 2009. Primary care and equity in health: the importance to effectiveness and equity of responsiveness to people's needs. *Humanit. Soc.* 33:56–73
139. Starfield B. 2010. Reinventing primary care: lessons from Canada for the United States. *Health Aff.* 29:1030–36
140. Starfield B, Shi L, Grover A, Macinko J. 2005. The effects of specialist supply on populations' health: assessing the evidence. *Health Aff. (Millwood)* Suppl. Web Exclus. W5-97-W5-107
141. Starfield B, Shi L, Macinko J. 2005. Contribution of primary care to health systems and health. *Milbank Q.* 83:457–502
142. Stewart AL, Nápoles-Springer AM, Gregorich SE, Santoyo-Olsson J. 2007. Interpersonal processes of care survey: patient-reported measures for diverse groups. *Health Serv. Res.* 42:1235–56
143. Strathern M, ed. 2000. *Audit Cultures: Anthropological Studies in Accountability, Ethics and the Academy*. London: Routledge
144. Sturmberg JP. 2007. Systems and complexity thinking in general practice. Part 2: application in primary care research. *Aust. Fam. Phys.* 36:273–75
145. Sturmberg JP, Cilliers P. 2009. Time and the consultation—an argument for a 'certain slowness'. *J. Eval. Clin. Pract.* 15:881–85
146. Sweeney K. 2006. *Complexity in Primary Care: Understanding Its Value*. Oxon, UK: Radcliffe
147. Sweeney SA, Bazemore A, Phillips RL Jr, Etz RS, Stange KC. 2012. A re-emerging political space for linking person and community through primary health care. *Am. J. Public Health* 102:S336–41

148. Tallia AF, Lanham HJ, McDaniel RR Jr, Crabtree BF. 2006. Seven characteristics of successful work relationships. *Fam. Pract. Manag.* 13:47–50
149. Thomas P. 2006. *Integrating Primary Health Care: Leading, Managing, Facilitating*. Oxford, UK: Radcliffe
150. Tomoaia-Cotisel A, Scammon DL, Waitzman NJ, Cronholm PF, Halladay JR, et al. 2013. Context matters: the experience of 14 research teams in systematically reporting contextual factors important for practice change. *Ann. Fam. Med.* 11:S115–23
151. Valentine MA, Nembhard IM, Edmondson AC. 2014. Measuring teamwork in healthcare settings: a review of survey instruments. *Med. Care*. In press
152. Wagner EH, Austin BT, Von Korff M. 1996. Organizing care for patients with chronic illness. *Milbank Q.* 74:511–44
153. Walker B, Holling CS, Carpenter SR, Kinzig A. 2004. Resilience, adaptability and transformability in social-ecological systems. *Ecol. Soc.* 9:5
154. Walker SR, Rosser RM, eds. 1988. *Quality of Life: Assessment and Application*. Lancaster, UK: MTP
155. Weaver L, ed. 2010. *Approaches to Measuring More Community Engagement*. Waterloo, ON: Tamarack
156. Weiner SJ, Schwartz A, Weaver F, Goldberg J, Yudkowsky R, et al. 2010. Contextual errors and failures in individualizing patient care: a multicenter study. *Ann. Intern. Med.* 153:69–75
157. WHO (World Health Org.). 2001. *International classification of functioning, disability and health*. WHO, Geneva. <http://www.who.int/classifications/icf/en/>
158. WHO (World Health Org.). 2008. *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health. Final Report of the Commission on Social Determinants of Health*. Geneva: WHO
159. WHO (World Health Org.). 2008. *Integrated health services—what and why*. Tech. Brief No. 1, May, WHO, Geneva. [http://www.who.int/healthsystems/technical\\_brief\\_final.pdf](http://www.who.int/healthsystems/technical_brief_final.pdf)
160. WHO (World Health Org.). 2013. *Health status statistics: mortality*. WHO, Geneva. <http://www.who.int/healthinfo/statistics/indhale/en/>
161. WHO (World Health Org.). 2013. *Primary health care*. WHO, Geneva. [http://www.who.int/topics/primary\\_health\\_care/en/](http://www.who.int/topics/primary_health_care/en/)
162. Wilber K. 1995. *Sex, Ecology, Spirituality: The Spirit of Evolution*. Boston, MA: Shambhala
163. Williams RL. 2004. Motherhood, apple pie, and COPC. *Ann. Fam. Med.* 2:100–2
164. Willis J. 2001. *Friends in Low Places*. Abingdon, UK: Radcliffe Med. Press
165. Willis J. 2002. *The Paradox of Progress*. Abingdon, UK: Radcliff Med. Press