Core Measurement Needs for Better Care, Better Health, and Lower Costs: Counting What Counts: Workshop Summary

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Core Measurement Needs for Better Care, Better Health, and Lower Costs: Counting What Counts

Workshop Summary

Joe Alper, Julia Sanders, and Robert Saunders, *Rapporteurs*

Roundtable on Value & Science-Driven Health Care

INSTITUTE OF MEDICINE
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> *"Knowing is not enough; we must apply.*
> *Willing is not enough; we must do."*
> —Goethe

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This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published workshop summary as sound as possible and to ensure that the workshop summary meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the process. We wish to thank the following individuals for their review of this workshop summary:

John Auerbach, Northeastern University
Maureen Bisognano, Institute for Healthcare Improvement
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Sam Nussbaum, WellPoint, Inc
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Although the reviewers listed above have provided many constructive comments and suggestions, they did not see the final draft of the workshop summary before its release. The review of this workshop summary was overseen by **Gerry Shea,** National Quality Forum. Appointed by the Institute of Medicine, he was responsible for making certain that an independent examination of this workshop summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this workshop summary rests entirely with the rapporteurs and the institution.

Preface

Achieving progress in each aspect of health and health care requires strong measurement capabilities to guide improvement efforts, support decisions on what works best, and promote the development of a learning health system. To understand the challenges and opportunities associated with developing these measurement capabilities, the Institute of Medicine convened a workshop, with the support of the Blue Shield of California Foundation, on core metrics for measuring progress toward the health system's three-part aim of better care, better health, and lower costs. Individuals with a wide range of perspectives—including clinicians; patients and consumers; economists; researchers; leaders from health care organizations, payers, and industry; and experts from the fields of public health, health information technology, and others—met to consider the core measurement needs for assessing progress, understanding lessons learned from existing data and measurement systems, and assessing the opportunities and challenges for widespread implementation. This publication summarizes the meeting's discussions on the issues, options, and successful strategies for advancing measurement and enhancing collaborative efforts around measurement of the three-part aim.

The Roundtable's vision is of a health system that continuously learns and improves, generates new knowledge through each interaction with patients and people, and seamlessly applies new knowledge to improve health and health care. Since its inception in 2006, the Roundtable has advanced this vision by involving stakeholders, including senior leaders, across the health and health care system. In engaging these stakeholders in workshops and collaborative activities, Roundtable members and participants have provided guidance on the issues most important to advancing knowledge and promoting continuous improvement of the nation's health system.

Building on this groundwork, the objectives of the workshop were to discuss the vision for the nature, use, and impact of core health metrics; to identify the important principles, targets, infrastructure, processes, strategies, and policies; and to describe lessons from efforts at national, state, community, and organization levels. Through intensive discussions among breakout groups and among all workshop attendees, the workshop sought to explore the core measurement needs and requirements; to describe a range of priority metric categories; to consider specific metric options that will most reliably measure care outcomes, care costs, and health improvement; and to identify opportunities to accelerate the development of the digital infrastructure, including data capture, interoperability, and consistent measurement across systems. Finally, the sessions highlighted those implementation challenges and potentially successful strategies at the national, state, community, and organizational level that are important to engage if the nation is to successfully target and track the efforts most important to the efficiency and effectiveness of health and health care.

Multiple individuals contributed valuable time toward the development of the workshop and this publication. We are especially indebted to those who provided their counsel by serving on the workshop planning committee. We would like to acknowledge and offer strong appreciation for the speakers and workshop participants whose rich discussions are summarized in this publication. In addition, a number of Roundtable staff played instrumental roles in coordinating the workshop and translating the workshop proceedings into this summary, including Rob Saunders, Julia Sanders, Valerie Rohrbach, Barret Zimmermann, and Claudia Grossmann. We would like to acknowledge the efforts of Isabelle Von Kohorn, who spearheaded the early stages of this work. We would like to recognize Joe Alper for his assistance in drafting this publication. Finally, we want to thank Daniel Bethea, Marton Cavani, Laura Harbold DeStefano, and Chelsea Frakes for helping to coordinate various aspects of review, production, and publication.

Reliable assessment represents a foundational component of a continuously learning health system. The discussions summarized in this workshop explore the potential and challenges for expanding the measurement infrastructure and outline potential strategies and actions to catalyze progress. We believe *Core Measurement Needs for Better Care, Better Health, and Lower Costs: Counting What Counts* will be a valuable resource in efforts to build the needed measurement capabilities for improving health and health care for the nation and that it sets the stage for the deeper focused assessment that can lead to consensus core metrics to guide progress going forward.

Craig Jones, *Chair*
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Acronyms and Abbreviations

ACA	Affordable Care Act
ACO	accountable care organization
AF4Q	Aligning Forces for Quality
AHA	American Hospital Association
AHRQ	Agency for Healthcare Research and Quality
AMA	American Medical Association
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CCO	coordinated care organization
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare & Medicaid Services
DALY	disability-adjusted life year
EHR	electronic health record
HALY	health-adjusted life year
HEDIS	Healthcare Effectiveness Data and Information Set
HHS	U.S. Department of Health and Human Services
HIPAA	Health Insurance Portability and Accountability Act
HRSA	Health Resources and Services Administration
IHI	Institute for Healthcare Improvement
IOM	Institute of Medicine
IT	information technology
NCQA	National Committee for Quality Assurance
NIH	National Institutes of Health
NQF	National Quality Forum
OECD	Organisation for Economic Co-operation and Development
ONC	Office of the National Coordinator for Health Information Technology
OSHA	Occupational Safety and Health Organization
QALY	quality-adjusted life year
QASC	Quality Alliance Steering Committee
WCHQ	Wisconsin Collaborative for Healthcare Quality

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Introduction[1]

Initiatives are under way in all regions of the United States to improve health care quality, improve the health of the American population, and reduce health care costs. These initiatives take on increased urgency in the face of shortfalls with respect to what is possible in health and health care. Despite spending almost one-fifth of the economy's output on health care, the quality and safety of care remains uneven (Hartman et al., 2013; IOM, 2012). Patient harm remains too common, care is frequently uncoordinated and fragmented, care quality varies significantly across the country, and overall health outcomes are not commensurate with the extraordinary level of investment (Bastian et al., 2010; Classen et al., 2011; IOM, 2012; Landrigran et al., 2010; Levinson, 2010, 2012; McGlynn et al., 2003).

This profound disconnect between potential performance and current reality exists despite the best efforts of many individuals and organizations to close the gap. As a result of concentrated efforts, some areas of the health system have been able to perform impressively and lead the world in science, innovation, and outcomes. Yet, results remain variable, and the health of the public varies from state to state, city to city, and even neighborhood to neighborhood (Fisher et al., 2003; McCarthy et al., 2009; RWJF and UWPHI, 2013; Schoenbaum et al., 2011; United Health Foundation et al., 2012). The challenges stem largely from the structure of the health system, which adds unnecessary burdens; organizes its activities into silos that do not communicate or coordinate with one another; and does not center itself on the needs of patients, consumers, and the broader public. Overcoming these obstacles requires restructuring the current system into one that continuously learns, improves, and focuses its efforts on the health and well-being of patients and the public (IOM, 2012).

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[1] The planning committee's role was limited to planning the workshop, and the workshop summary has been prepared by the workshop rapporteurs as a factual summary of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and participants and are not necessarily endorsed or verified by the Institute of Medicine, and they should not be construed as reflecting group consensus.

THE ROLE OF MEASUREMENT IN A LEARNING HEALTH SYSTEM

While there are multiple obstacles to improving the nation's health care system, one essential element for sustained progress is the capacity to reliably and consistently measure progress across all aspects of health and the health care system. Accurate, reliable, and valid measurements are a prerequisite for achieving and assessing progress in areas such as improving the quality of health care delivered to patients, reporting on the status of the health care system, and developing payment policies and financial incentives that reward improvement (IOM, 2006). Without a strong measurement capability, the nation cannot learn what initiatives and programs work best, resources cannot be guided toward the most promising strategies, and there is little ability to promote accountability in results.

One of the major questions concerning measurement is its scope. Current measurement initiatives focus on health care quality as it affects individuals, often on narrow or technical aspects of care, which encourages improvement only on those areas being measured. Yet the goals of the health system are broader, including health outcomes at the individual and population level, the quality of care that is delivered, cost and resource use by the system, and engagement of patients and the public (Berwick et al., 2008). These areas are interconnected, and changes to any particular area would likely have effects on the others. Furthermore, there are multiple factors that influence a person's health, many of which lie outside of the traditional health system (IOM 2011b; Kindig and Stoddart, 2003; McGinnis and Foege, 1993; McGinnis et al., 2002).

Developing a more robust measurement enterprise will require overcoming several key challenges. Given the number of organizations involved in measurement and the large number of metrics currently in play, a key challenge is harmonization among the multiple metric development efforts that already are under way (AHRQ, 2013; Hussey et al., 2009; IOM, 2006; NQF, 2013; Wold, 2008). The current proliferation of measure sets and reporting requirements in health and health care can place a serious burden on individuals providing health services. These measurement requirements can require substantial effort, time, and resources while potentially diverting attention from addressing higher health priorities.

Similarly, the logistical challenges for routine measurement are significant. The data needed to populate measures can be lacking, especially when paper health records are used. It thus can be difficult to track metrics in real time and to provide routine feedback to clinicians on their care processes and outcomes. These data challenges intensify when moving beyond clinical care to assess the efforts of public health agencies, community-based organizations, and others in improving the health of all Americans (IOM, 2011b).

Yet new opportunities exist. The increased use of electronic health records and other digital tools has enhanced the ability to collect data routinely (IOM, 2011a). Beyond improving data collection, these tools also provide a means for measurement results to be fed back into clinical practice, patient self-management, and other care uses in near real time, allowing for regular, fine-tuned adjustments. Additionally, changes in payment and reporting policies have emphasized the importance of measurement and have increased interest in its advancement (Schneider et al., 2011). Thus, the country is poised for transformative change. By identifying current capacity for measurement and developing a shared strategy for future development, further progress will be made towards achieving a continuously learning health system.

THE ROUNDTABLE AND THE *LEARNING HEALTH SYSTEM* SERIES

The Roundtable on Value & Science-Driven Health Care has, since its founding at the Institute of Medicine (IOM) in 2006, brought together leaders from throughout the health system to accelerate the development of a continuously learning health system. A learning health system is one in which science, informatics, incentives, and culture are aligned to create a continuous learning loop, with evidence and best practices embedded in health and health care services and new knowledge routinely captured as a byproduct from each interaction with the system. Multiple steps have been taken to make progress toward this ambitious goal, including convening meetings of key health leaders, holding public workshops, stewarding collaborative projects that advance a learning system, and authoring reports and related publications.

Over the past seven years, 13 volumes have been produced in the *Learning Health System* series of publications, including this publication. These publications have spanned a number of elements necessary for system transformation, including clinical research, the digital infrastructure, engaging patients and the public, focusing on value and financial incentives, and applying lessons from other industries to health and health care. The publications have explored stakeholder perspectives on each issue, explored priorities for advancement, and discussed areas in need of collaborative action.

Another vehicle for this work is a series of Innovation Collaboratives that engage key health leaders in collaborative activities that advance the science and value in the health system. The Innovation Collaboratives currently focus on six overlapping and complementary areas: clinical effectiveness research, digital infrastructure, best practices, evidence communication, value, and systems approaches to improving health. These collaboratives foster information sharing and cooperation across the health and health care system, explore emerging issues facing particular sectors of the health system, and harness the talent and expertise of the participants in practical efforts to advance the field.

WORKSHOP SCOPE AND OBJECTIVES

Building on previous work to advance the learning health system concept, the IOM held a 2-day workshop to explore in depth the core measurement needs for population health, health care quality, and health care costs. This workshop drew participation from across the measurement landscape, including perspectives from health care delivery organizations, clinicians, patients and consumers, public health experts, researchers, payers, health economists, measure developers, standard-setting organizations, regulators, clinical research, health information technology, and community organizations.

The goal of this workshop was to understand how to improve the nation's measurement capacity to track progress in a core measure set for better care quality, lower cost, improved patient and public engagement, and better health outcomes. Furthermore, the workshop sought to consider the implementation of core measure sets, including the measurement burden, a measure's actionability, and its accuracy when used in regular practice. The workshop statement of task, shown in Box 1-1, guided the objectives for the workshop:

1. Discuss the vision for the nature, use, and impact of core health metrics.

2. Identify the important principles, targets, infrastructure, processes, strategies, and policies.
3. Describe lessons from efforts at national, state, community, and organization levels.
4. Specify core needs and requirements, and propose priority metric categories that will most reliably measure care outcomes, care costs, and health improvement.
5. Consider specific examples of metric options within categories.
6. Describe the implementation strategies—national, state, community, organizational.

To address these objectives, the workshop was divided into a series of sessions that explored different aspects of measurement. The workshop began with an exploration of the vision for the use of core metrics, the current capabilities for the use of core metrics, and lessons learned from current measurement initiatives. The workshop attendees then divided into smaller groups to consider categories of measures, along with example measures within each category, that could help to achieve the vision of a core metric set. As measurement requires many support structures, the second day of the workshop explored the infrastructure, resources, and policies that are needed to support the use of core metrics. Throughout the discussions the workshop considered the differing measurement needs for different levels of the health system, from the local level to the national level, as well as the needs for the diverse set of stakeholders involved in measurement.

One of the challenges revealed by the workshop discussions was providing consistent terminology. For example, in some cases the term "better health" referred to population health, while in others it referred to clinical or disease outcomes for individuals. This diversity of meanings reflects the numerous perspectives in play when measuring the performance of the health system. For clarity, when different definitions are used for the same term, this publication includes the presenter's intended meaning.

BOX 1-1
Statement of Task

An expert planning committee will guide the development of a two-day workshop to examine the elements necessary for progress toward, and achievement of, a truly learning health system that achieves the three-part aim: better care for individuals, better health for a population, and lower costs. Fundamental to a learning health system is measurement of health outcomes and cost, delivered in a fashion that allows accurate, actionable, real-time, and continuous use of that information. The committee will steer development of the agenda for the workshop, including selection of speakers and discussants. The workshop will feature invited presentations and discussions that will provide participants an opportunity to engage representatives from federal, state, and local governments and the nonprofit and private sectors. The discussions will highlight lessons learned from existing data and measurement systems and the needs and opportunities for future measurement capacity across all sectors. The focus of the sessions will be on practical approaches to capacity building to ensure not only that options are considered for the critical analysis of progress toward the three-part aim but also that achievement of a learning health system is extended through seamless availability of health care data.

ROADMAP FOR THE SUMMARY

This publication summarizes the discussions that occurred throughout the workshop, highlighting the key lessons presented, practical strategies, and the needs and opportunities for improving future measurement capacity. Chapter 2 explores a vision for core metric sets, Chapter 3 considers current measurement capabilities, and Chapter 4 highlights example core measure sets that are currently in use. Chapter 5 covers the discussions from the breakout groups that surveyed potential metric categories and example metrics for population health, health care quality, and health care costs. Chapters 6 and 7 focus on implementation issues, including the implementation challenges faced by example initiatives and the data infrastructure needs for measurement. Chapter 8 concludes the report with a summary of common themes that emerged from the workshop discussions.

The workshop discussions are intended to be a first step in understanding the many factors affecting the development of a core measure set. The meeting revealed the many issues that must be considered in order to comprehensively assess the performance of the health system in improving overall health, care quality, cost and resource use, and patient and public engagement. Further work will be needed to resolve the issues raised and synthesize these discussions into a formal set of recommendations.

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2

Vision

KEY SPEAKER THEMES

Bisognano

- Realizing the Triple Aim—better care, better health, lower costs—requires involving organizations and individuals outside of the health care system.
- To move forward on the Triple Aim, an integrator plays a key role in bringing together the various improvement efforts along each dimension of quality, health, and cost.
- There is a critical need for measurements that enable learning as a means of improving health and health care.

Isham

- Health care is complex adaptive system, and the way to optimize such a system is to create a general vision that provides enough space for natural creativity to emerge.
- Setting specific targets could stimulate innovation and trigger efforts to identify what is and what is not working to optimize health and health care.
- Families of measures are useful for assessing the same concept at multiple levels of aggregation in the health system.

Before turning to the substantial task of developing a set of core metrics for assessing health outcomes, care quality, and costs, it is necessary to have a clear understanding of why the three-part aim is critical to transforming the nation's health care system. Maureen Bisognano, president and chief executive officer of the Institute for Healthcare Improvement (IHI), focused her presentation on some of the lessons that have been learned from several initial efforts at creating health care systems based around the three-part aim. George Isham, senior advisor at HealthPartners and senior fellow at the HealthPartners Research Foundation, discussed the need to consider the overall structure of the health system, and not just its sub-systems, when designing metrics for measuring improvements in the system.

VISION AND THE IMPORTANCE OF MEASURING PROGRESS ON CARE, POPULATION HEALTH, AND COSTS

To start her presentation, Maureen Bisognano reviewed the history of the Triple Aim, which was first formulated in 2006 when a group of people at IHI first began to think about whether the goal of the health care system should be health care or health. She explained that its genesis lay in a series of discussions her colleagues were having with leaders of a variety of health care systems around the country. These conversations highlighted the incredible diversity of thought about the importance of different goals and aims for health care improvement. Moreover, very few people within the health care system were, in fact, talking about health. After reviewing data from the Commonwealth Fund Scorecard, the Dartmouth Atlas, and other research studies, the IHI devised the Triple Aim to focus efforts to improve the health care system (see Figure 2-1). The Triple Aim takes a comprehensive view of improvement—improve the health of populations, improve the individual experience of care, and reduce the per capita costs of care for populations—in order to identify all of the factors that influence health and health care (Berwick et al., 2008). Soon after the Triple Aim's creation, 15 organizations joined with IHI to develop a learning community that would test the impact of these aims and whether their implementation could lead to a more efficient and effective health care system.

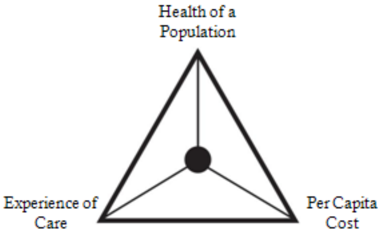

FIGURE 2-1 The IHI Triple Aim.
SOURCE: Institute for Healthcare Improvement.

Bisognano outlined three important lessons from this early effort. The first was how critical it is to have someone or some organization serve as an integrator that will keep activities focused on addressing all components of the Triple Aim. Second, it is important to identify a population on which to focus concrete efforts. The third lesson, the most complicated, is that no single intervention will provide sustainable progress toward all three aims. Because of this, initiatives must implement a portfolio of projects that consider the multiple drivers that can affect different aspects of the Triple Aim.

As an early example of the type of success that can come from focusing on the Triple Aim, Bisognano described QuadMed, a health care system developed by Wisconsin-based Quad/Graphics. Quad/Graphics, a large industrial printing company, was considering strategies for improving health care for its employees while reducing company costs. Quad/Graphics joined the Triple Aim effort and created a model based on the patient-centered medical home. The model the company created, QuadMed, employs its own internists, pediatricians, family practitioners, and some specialists; manages its own laboratories, pharmacies, and rehabilitation centers; and contracts with specialists and hospitals for other services. To focus attention on quality instead of volume, physician pay is based on satisfaction and clinical outcomes, and relevant metrics are enabled by a data system that tracks the system's entire patient population.

From its inception, QuadMed achieved improved clinical outcomes and rapid cost reductions—today, costs are 32 percent less than the Midwest average—and its focus on evidence-based medicine has led to gains in overall outcomes that outpace national benchmarks for conditions such as acute lower back pain, diabetes, hypertension, and hyperlipidemia. QuadMed has been so successful that other companies outside of the printing industry and beyond the borders of Wisconsin are now hiring it to provide health care for their employees. This example, Bisognano said, shows that building a model around the Triple Aim, one that uses measurement for comparison and learning and that has strong governance, can produce a system that both improves health and reduces per capita costs.

Bisognano noted the tension between using measurement to enable learning and improvement versus using measurement to drive incentives and payment. She noted that when measurement is heavily linked to incentives, organizations and individuals may limit their focus to local actions that affect specific measures as opposed to building coalitions and collaborations that address the broader Triple Aim. As a result, care systems are being designed that are quite different than that of Quad/Graphics, which has redesigned its care processes, benefits, and care availability to focus on comprehensive primary care, prevention and wellness, the patient experience, and the value of the entire care experience.

In the early models of the Triple Aim, the focus was on working within the confines of the current health care system. However, IHI and its partners soon concluded that the Triple Aim could not be realized if they confined their work to traditional health care organizations such as hospitals, primary care centers, and safety net centers. “We needed to go outside the walls of the hospital if we’re going to actually move the Triple Aim,” Bisognano said. She noted the need for a broader coalition to make progress across the Triple Aim, and the need for collaboration to influence the wide range of factors that influence the aims. As an example, she described how IHI’s partners started working in Memphis and neighboring Shelby County, Tennessee, where they engaged health care leaders, the chief executive officers of the local hospitals, the commissioner of public health, school nurses, and the like, but the metrics were not improving. After expanding their vision of who should be included in the effort, the team began involving the extensive network of churches and local community leaders in the area. Bisognano recounted the comment that one minister made at one of the project’s meetings in the context of addressing diabetes. He remarked that while a physician might see a patient twice per year for 15 minutes, he saw the same person twice a week for two hours. Making the connection with the local churches and community leaders, Bisognano said, changed the entire dynamic of the reform efforts.

Thinking about these success stories opens the door to entirely new way of defining health care. This new view highlights the importance of governance and its role in engaging different groups of people in a different set of activities and with a specific population and intervention in mind. In the case of Memphis and Shelby County, IHI and its partners started small by activating a virtual faith-based network and focused on two goals: reducing untreated and unmanaged hypertension among low-income African American men and reducing the risk and incidence of uncontrolled chronic disease for vulnerable women. The Memphis Congregational Health Network, formed by integrating three existing church networks, influenced entire congregations to adopt health and healing as part of their mission and provided reliable sources of information as well as training to trusted lay members on how to convey that information and advocate for health. For the initiative focused on female health, the effort began with 30 existing members of the Congregational Health Network in the first year, with plans to scale to 2,000 designated health volunteers from 300 churches over 3 years, with the goal of reaching more than 8,000 women across the community. For the male health initiative, onsite screening for hypertension and other health risks will be carried out at approximately 400 congregations over the first 2 years; this is expected to reach almost 2,700 individuals with previously undiagnosed or untreated hypertension who can be brought into community-based treatment.

Bisognano explained that value is achieved by optimizing all three aspects of the Triple Aim. There are two issues facing such an optimization: Different stakeholders may weigh the three dimensions differently, and it is necessary to understand the population of individuals being considered in this value measurement. She also noted that two important measures—efficiency and effectiveness—can be calculated by combining individual components of the Triple Aim. Efficiency, she said, is measured by combining the per capita costs and care experience aspects, as this would describe the level of resources required to achieve a given quality of care. Effectiveness can be derived from the combination of the population health and care experience dimensions, as this shows how health care delivery affected health outcomes for a local population. Combining all of these metrics together enables the measurement of cost-effectiveness and overall value (Stiefel and Nolan, 2012).

Bisognano ended her comments by stressing how important it is to not overemphasize the population at the expense of the individual. Doing so risks missing opportunities to understand the consequences of various health issues and policies for individuals. She also emphasized that designing metrics for a population using a variety of different perspectives is a complicated task. She noted that simplicity and comparability will be key for national learning about metrics and that it will be critical to develop actionable metrics as a means driving the momentum of transformation.

In response to a question about the role of the integrator, Bisognano explained that the integrator is often a group of individuals from various organizations who work together. To be effective, such a group requires strong governance and an individual to lead its efforts. It also needs to be independent so that it can address broad-based needs and coordinate work on all three aims.

SYSTEMS FOR BETTER HEALTH, BETTER CARE, AND LOWER COSTS

George Isham began his presentation by providing a conceptual framework for the nation's health system and proposing that the health system be considered as a complex adaptive system (IOM, 2001; Plsek and Greenhalgh, 2001). In a complex adaptive system, the system, along with the individuals and organizations within it, evolves over time, often in unpredictable ways. Furthermore, the system consists of interconnected organizations and individuals, and their actions affect the context for others. Because of the complexity and fragmentation of the system, it cannot be controlled with a single overarching approach. Rather, a better approach for managing a complex adaptive system such as the health system is to specify a small number of simple rules with minimum specifications, which will allow organizations and individuals to develop and adapt solutions suited for their specific circumstances and needs. In this spirit, Isham presented five simple rules that could provide a starting point for the discussion of core metrics (Kottke et al., 2012):

1. Stakeholders should agree on a set of mutually measurable goals for the system. In the case of health care, the three-part aim sets suitable goals and the National Quality Strategy provides sub-goals, but further work is needed (AHRQ, 2011).
2. The extent to which the goals are being achieved will be reported to the public. Concerning data reporting, Isham said that there is a wealth of data available, but better systems are needed to convey these data in an understandable and impactful manner to the public.
3. Resources will be available to achieve the goals.
4. Stakeholder incentives, imperatives, and penalties will be aligned with these goals.
5. Leaders of all stakeholders will endorse, promote, and honor the goals.

Turning to the opportunities to improve health, health care, and cost, Isham cited the case of France, where life expectancy is three years longer than in the United States, and yet the cost per capita is about $4,000 less, according to the latest data from the Organisation for Economic Co-operation and Development (OECD) (see Figure 2-2). After reviewing some specific data on imaging tests and chronic disease, he said that these data lead to two conclusions. First, the incentives for clinicians and health care organizations may not align with the goals of the overall health care system. For example, the primary incentive structure is the fee-for-service payment system, which encourages greater use of health care services and therefore higher costs, yet this is in conflict with the national interest in a sustainable spending level for health care. Second, the nation needs to set specific targets to meet in terms of improving health, health care, and costs. Isham cited the recommendation made in 2012 by an IOM committee that the Secretary of the Department of Health and Human Services (HHS) should set national goals on life expectancy and per capita health expenditures for 2030 that would bring the United States to average levels comparable to other wealthy nations (IOM, 2012). Setting specific targets for cost, Isham said, would stimulate innovation, particularly in the policy arena, that could improve the nation's competitiveness, something that he believes will not happen with incremental thinking. Creating a national challenge for improving life expectancy would trigger efforts to identify on a state-by-state and locality-by-locality basis what is not working in terms of optimizing health and health care.

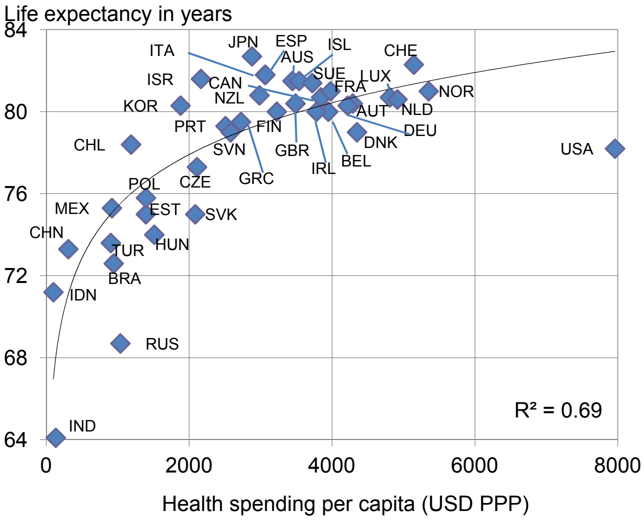

FIGURE 2-2 Life expectancy at birth and health spending per capita, 2009.

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SOURCE: OECD, 2011.

Isham then discussed an idea that David Kindig, emeritus vice chancellor for health sciences at the University of Wisconsin School of Medicine and Public Health, has put forward about how the components of the three-part aim measure the broader determinants of health. Kindig pointed out that population health is a function not only of health care, but also of health behaviors, social and economic factors, the physical environment, and other influences (Kindig, 2011). These factors outside of the health care system are often not specifically assessed in most assessment frameworks. Isham said that today, with the current emphasis on accountable care organizations (ACOs), most care delivery systems are starting to think about ways of working with populations of patients, but that concept does not go far enough to improve total population health. It is time, then, to begin thinking about how to integrate the health of all of the subpopulations in a way that improves the health of the total population. It is also timely to consider the appropriate metrics to use at different levels of the system and how they can be integrated into a national perspective. Isham described the conceptual framework that he and his collaborators at HealthPartners developed to identify those drivers that were within the realm of their capabilities and those that would benefit from partnerships with public health and community-based organizations (see Figure 2-3). The drivers could serve as focal points for developing metrics.

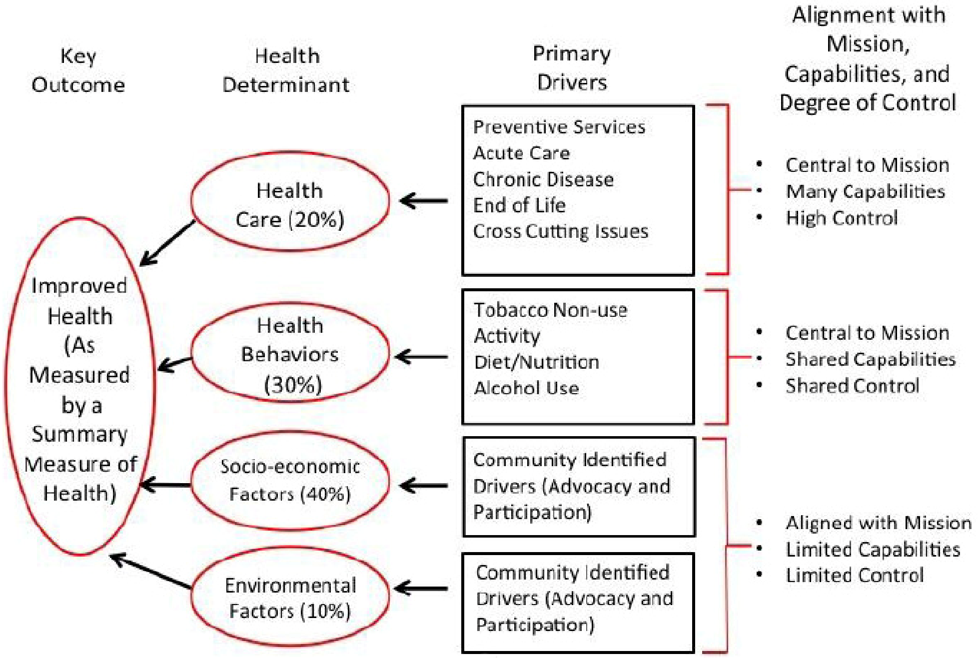

FIGURE 2-3 Conceptual framework depicting measurement domains of a "system within a system" approach and the drivers of health determinants.
SOURCE: Isham, 2012.

Turning this conceptual approach into action requires identifying all of the stakeholders that need to be involved and providing leadership and communication among efforts to improve each sub-domain (Jacobson and Teutsch, 2012). Then resources can be identified and allocated to address the primary drivers of each health determinant in a coordinated manner that meets the three-part aim. To identify and allocate new resources, Isham said that it will be necessary to get a better return on investment from policies and programs both inside and outside of health care and to capture funding by reducing ineffective health care spending. It will be necessary, too, to strengthen government funding for population health improvement at all levels with an increased focus on philanthropy that also engages corporate business leaders.

In his final remarks, Isham addressed the issue of metrics. It will be essential, he said, to identify the right kinds of measures that work in a multi-level approach that goes from the individual to the organizational level and then up to the regional, state, and federal levels. In this regard, a concept developed by the National Quality Forum could prove useful when it comes to developing families of measures and core measures. This concept defines families of measures as "related available measures and measure gaps that span programs, care settings, levels of analysis, and populations" (MAP, 2012, p. 28). Families of measures have been identified for concepts such as safety, care coordination, and prevention and treatment of cardiovascular conditions and diabetes (MAP, 2012). A core measure set could then identify families of measures for particular concepts, with measures tailored to specific programs, care settings, levels of analysis, and populations.

Isham also noted that his colleagues at HealthPartners have been developing a standard open-architecture measure of total cost of care that could provide a standard metric for the affordability component of the three-part aim. While plans and government programs have a general ability to assess costs, a standardized approach would help increase transparency for the public. This total-cost-of-care metric could be analyzed to understand the impact of different drivers of total resource use, such as price, at every level. HealthPartners has used this metric with its clinics to measure progress toward the three-part aim. In one example of assessing progress along each dimension, the organization found it was able to reduce the total cost of care relative to its market while improving the overall experience of care and boosting overall health, as measured by the percentage of patients with optimal control of diabetes. Isham said that the diabetes measure is a simply an initial surrogate measure for overall health and that HealthPartners is attempting to replace it with more advanced measures.

In summary, Isham said that the health system, as well as the clinical care and public health sub-systems, are complex adaptive systems. Understanding and redesigning simple rules for this system and its subsystems may offer the opportunity for enhancing population and individual three-part aim outcomes. Creating clear and commonly understood definitions of the three-part aim, and its related concepts, is important to facilitating progress. Further, explicit numerical goals should be set for each aspect of the three-part aim and at each level of the health system in order to both gauge progress and encourage innovation.

Engaging each state and community across the country, as well as key stakeholders at each level, needs to be part of a national strategy to meet the three-part aim, Isham said. He emphasized that this effort cannot be just about numbers and regulations. For the system and sub-systems, it is essential to describe the current status and explain why improving the current system is important to many different stakeholders and the nation as a whole. He said that families of measures for priorities and conditions and core measure sets for actors could help reduce the complexity of measurement and improve its applicability at multiple levels. Finally, he emphasized how critical transparency is for making progress and for raising awareness about current gaps throughout the system.

DISCUSSION

During the discussion period that followed the two presentations, Cathy Schoen, senior vice president for research and evaluation at the Commonwealth Fund, suggested that a suitable cost metric might be cost relative to growth of the economy, whether that be at the local, state, or federal level. Then, one goal could be to get the same or better health outcomes out of the health care system for the same or lesser share of the local, state, or national economy. Improvements in this relative cost metric would free up resources to deal with larger population issues that are outside the control of the health care system. Isham agreed that this would be an appropriate metric to help set national targets and enable the scale of re-engineering that is needed to improve the nation's competitiveness.

As an example of how this could work, Leslie Mikkelsen, managing director of the Prevention Institute, cited the Accountable Care Community of Akron, Ohio, which brings together seven health care partners and 70 community organizations with the Austen BioInnovation Institute playing the role of integrator. She said that this group's efforts have focused on reducing the cost of diabetes care and that the group uses some of the savings to fund activities that go beyond those that typically fall under the purview of the health care system. She said that she was looking forward to the development of metrics that encourage this kind of bridging and that can change community environments to support better health outcomes.

Eugene Nelson, professor at the Dartmouth Institute for Health Policy and Clinical Practice, remarked that one important unanswered question is how to have a governance structure and payment system align for health and health care so that they work in a given community. In other words, he said, there is a need to develop approaches to link payment systems to governance for health and health care in a given region. Bisognano commented that this requires a visionary and selfless leader to step in and coordinate the three-part aim, particularly since the incentives in use today place such a heavy emphasis on optimizing everything in terms of cost for a given organization, rather than for the nation as a whole. Randall Cebul, director of Center for Health Care Research and Policy at Case Western Reserve University, said that community leaders can often serve as selfless, proactive three-part aim-oriented leaders.

Addressing the issue of population heterogeneity, Bruce Ferguson, Jr., inaugural chairman of the Department of Cardiovascular Sciences at East Carolina University, asked if there was some theoretical level of heterogeneity in a population beyond which it becomes difficult to integrate data into one metric. In particular, he cited his own personal experience as a cardiac surgeon in which he observed that patients who are referred to his clinic from the southeastern United States have double the mortality of local patients whom he treats using the same level of care. Bisognano replied that she is increasingly optimistic that it is possible to design models to accommodate diverse populations such as this.

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3

Current Measurement Capabilities

KEY SPEAKER THEMES

Clancy
- The National Quality Strategy is dedicated to the delivery of better care, improvement of individual and community health, and provision of more affordable care.
- The National Quality Strategy was informed by a variety of stakeholders who developed six main priorities for the strategy: harm reduction, patient engagement, communication, prevention, community involvement, and cost containment.
- The National Quality Strategy has worked to align agency efforts around the three aims to promote coordination and provide comparable results where possible.
- The National Quality Strategy faces a variety of measurement, accessibility, and functionality challenges, all of which will continue to be addressed as the strategy evolves.

Burstin
- Measurement is not an end in itself, so measures should be developed and implemented around the goal of improving health and health care.
- Assessment, harmonization, and alignment of current measures are necessary to ensure a focus on only those measures that drive improvement.
- Measures will need to evolve to take advantage of new digital sources of health information.
- Measurement should involve a cyclical process of continuous improvement where the measure's impact is continually assessed and that information is used to improve.

Gage
- Moving towards an effective measurement approach requires data harmonization, consistency, timeliness, and parsimony to allow for broad, multi-level progress toward the three-part aim.
- To ensure that measures are useful and actionable, data availability, the effectiveness of metrics in driving change, and the value each measure adds should all be considered in measure development and selection.

- The multiple data sources in the health system, and the varying units of those data, present significant challenges to scaled metrics implementation.
- Metric concepts and specifications must be consistent to reduce and streamline the variability of those metrics.

Measurement capabilities currently vary across the numerous levels of the health and health care system. To delve deeper into the status of current metrics implementation, Carolyn Clancy, director of the Agency for Healthcare Research and Quality (AHRQ), led off her panel's discussions with an overview of the National Quality Strategy and its current initiatives, challenges, and future work. Helen Burstin, senior vice president for performance measures at the National Quality Forum (NQF), continued the conversation with a presentation on the key challenges and opportunities for current measurement capabilities. Barbara Gage, fellow and managing director of the Engelberg Center for Health Care Reform at the Brookings Institute, concluded the panel's discussion by focusing on measurement implementation.

THE ROLE OF MEASUREMENT IN THE NATIONAL QUALITY STRATEGY

In her discussion of the National Quality Strategy, Carolyn Clancy described the broad aims of the strategy. In summary, the strategy seeks to provide

- *better care*: improving overall care quality by making health care more patient-centered, reliable, accessible, and safe;
- *healthy people and healthy communities*: improving population health by supporting proven interventions to address behavioral, social, and environmental determinants of health; and
- *affordable care*: reducing the cost of quality health care for individuals, families, employers, and government.

Building on these broad aims, a range of stakeholders from the private and public sectors formulated specific priorities on which to focus. Those priorities, Clancy explained, are to

- make care safer by reducing harm caused in the delivery of care;
- ensure that each person and the members of his or her family are engaged as partners in that person's care;
- facilitate effective communication and coordination of care;
- promote the most effective prevention and treatment practices for leading causes of mortality, starting with cardiovascular disease;
- work with communities to promote wide use of best practices for healthy living; and
- make quality care more affordable for individuals, families, employers, and governments by developing and spreading new health care delivery models (HHS, 2011).

As required by the Patient Protection and Affordable Care Act (ACA), the U.S. Department of Health and Human Services (HHS) must submit a progress report on the National

Quality Strategy to Congress each year, Clancy noted. She gave an overview of the messages relayed in the 2012 update, which established key measures used to track each of the National Quality Strategy's priorities, described how the National Quality Strategy has helped align various measurement approaches used by programs to measure quality, and highlighted efforts in Colorado and Ohio to improve quality along the priorities identified by the National Quality Strategy. Clancy also outlined a variety of initiatives that are in line with the National Quality Strategy strategies for progress, including the Partnership for Patients, the Million Hearts Campaign, and the Multi-Payer Advanced Primary Care Practice Demonstration (HHS, 2012). Clancy noted, too, that given AHRQ's integral role in the National Quality Strategy Annual Progress Report, the agency has reoriented its National Healthcare Quality and National Healthcare Disparities reports to align with the National Quality Strategy priorities.

Future updates to the National Quality Strategy will use key measures to set aspirational targets and to track progress. These measures align with each of the priorities and are designed to evaluate long-term improvement in each priority area. Examples include monitoring hospital-acquired conditions to reduce preventable hospital admissions and tracking the proportion of adults who are obese in order to promote healthy living in the long term. Moreover, Clancy emphasized, the National Quality Strategy has provided a vital framework to ensure as much alignment with the three aims as possible, both across and within HHS and also with states and private sector initiatives.

In closing, Clancy elaborated on the ongoing uptake hurdles for the National Quality Strategy. Uniformity in data measurement poses critical challenges as national, state, and community-level initiatives may collect data differently. However, uniformity may be less critical in some instances, she said, and this may counter the utility of any broad requirements. Additionally, lags in the timeliness of data may make it more difficult to track progress or identify problems, and the reported data may not reflect the current conditions at a given site. There is also the question, she said, of whether all the data currently collected are useful for organizations' efforts to make real-time improvements. On this point, Clancy noted the example of one initiative, a nationwide program to reduce central line-associated bloodstream infections, which saw strong results with a low data collection burden and quarterly feedback (Dixon-Woods et al., 2011; Pronovost et al., 2006, 2010). Over the course of that project, it became clear that the ability to connect current improvement efforts to progress toward their goals, as assessed using a limited amount of data collected, provides a powerful incentive for continued work and engagement.

Looking to the future, Clancy emphasized that the strategy will continue to be refined based on lessons learned, new research findings, and changing health quality priorities. The next version of the National Quality Strategy will include aspirational targets for a greater number of key measures. It also will catalyze action by engaging federal, state, and private-sector stakeholders to identify next steps in the National Priorities Partnership's three strategic areas: a national strategy for data collection, measurement, and reporting; community-level organizational infrastructure for improvement efforts; and ongoing payment and delivery system reform.

KEY CHALLENGES AND OPPORTUNITIES FOR CURRENT MEASUREMENT CAPABILITIES

Helen Burstin started her presentation by emphasizing that measurement is not an end unto itself, but rather is valuable for how it can aid in improving the health and health care system overall. She stressed that the measures should be considered with that focus in mind. Burstin proceeded with an overview of how NQF evaluates and categorizes health care measures. Guided by how well they contribute to improving health and health care, NQF assesses measures for importance, usability, feasibility, reliability, and validity. Additionally, NQF considers how a particular measure contributes to the broader ecosystem of measurement in order to avoid directing resources toward redundant or unnecessary measurement activities.

Burstin explained that the stakeholders for measurement can be divided into two broad categories: clinicians and providers on one side, and consumers and purchasers on the other. These two groups bring competing perspectives and concerns about the role of measurement in the health care system. Clinicians and providers share concerns about how measurement might affect their clinical practices, whether measures focus on important clinical processes, as well as the potential administrative burden of additional reporting requirements. Consumers and purchasers, on the other hand, are typically concerned with the impact and value of measures, favoring composite measures that focus on outcomes for various groups and conditions, rather than measures of process and compliance.

Combining the perspectives of both groups, a hierarchy of measures was developed where the highest tier contains outcome measures linked to evidence-based processes, followed by outcome measures of substantial importance supported by plausible processes, then intermediate outcome measures, and finally, process measurements that have a proven impact on outcomes. The development of these preferred measures requires substantial evidence, and, at present, there is a dearth of high-quality, consistent data to guide the implementation and validation of these measures.

Furthermore, given what Burstin describes as the “tsunami of measurement” inundating the health care system today, it is essential to focus attention and resources on those measures that drive improvement. Providers face numerous and overlapping federal, state, and programmatic measurement requirements, creating a need for harmonization to reduce administrative burden and hone in on the most important measures. Burstin said that in order to move forward, inappropriate and duplicative metrics that increase burden without adding value must be avoided.

Burstin said that it will also be critical to develop *de novo* measures that take advantage of clinical data in new formats—such as electronic health records (EHRs), registries, and patient portals—rather than simply trying to force imperfect older measure toward new purposes. To make best use of these new technologies, the system needs better interfaces to other data, including patient demographics and costs, as well as interoperable systems to track quality and efficiency across time, sites, providers, and data platforms. At present, though, Burstin points out that EHR systems tend to be siloed and incompatible, with provider groups unable to share or compare information with each other or with the public. Furthermore, it is also critical that patients are at the center of data collection efforts, such that there is a comprehensive view of a patient’s health.

In her concluding remarks, Burstin outlined the key challenges that must be addressed to achieve high-quality, accurate core measurement in the health care system. Measurement today is divided, with one set of measures assessing selection and payment, and another set intended to drive improvement. Bridging this gap with comprehensive measures is an essential step toward better care. Second, measures should be continually evaluated and improved through the entire measurement cycle based on feedback about impact and accuracy. Third, outcome and composite measures should be prioritized, with a focus on disparities and longitudinal measures across episodes of care. Finally, measurement efforts should coalesce around the needs and values of the patient.

By developing systems for continuous improvement and aligning metrics with anticipated delivery and payment changes, Burstin said that the health system as a whole can ensure that core measurement supports positive change and reform toward better care for patients and populations.

CONSISTENT AND TIMELY IMPLEMENTATION OF MEASURES

To start her discussion of implementation issues, Barbara Gage gave a broad overview of the current measurement landscape. While there is growing use of performance measures for internal quality improvement, public and private reporting, and different payment methods, there are several challenges to the use of these measures, including variations in the data sources used to construct measures, inconsistent measures used across initiatives, different operational specifications for the same metric concept, and the large number of measures in play. All of these factors, she explained, contribute to the current challenges in applying metrics across different organizations and payer groups to move nationally towards the three-part aim.

Gage highlighted the changing measurement landscape and noted a few key points. First, measures will need to be aligned across similar concepts where possible, including the use of similar specifications to reduce administrative costs and enhance comparability of populations in different programs. Moreover, measures should be parsimonious to make large-scale, consistent implementation feasible. Further, consistency in measure use and timely feedback to clinicians will be key to establishing actionable data, which clinicians will need in order to change behaviors in real time.

Today’s environment for measure development, Gage said, involves a variety of actors. Measures are endorsed as scientifically valid by the National Quality Forum, and payers select among those measures for those best suited for monitoring provider performance and quality of care. Metrics are critical to multiple initiatives nationally, including accountable care organizations (ACOs), Aligning Forces for Quality (AF4Q), regional health collaboratives, and value-based purchasing initiatives. They are also being tested in new health information technology initiatives, such as the Beacon Communities, health information exchanges, and regional collaboratives.

Gage highlighted the work of the Quality Alliance Steering Committee (QASC), which is focused on challenges in performance measurement *implementation* as it relates to the three-part aim. In concert with others, the QASC has been working to identify and select measures that can determine value. This is critical because both clinical outcomes and the associated costs must be considered in striving to meet the goals of the three-part aim. Two major implementation challenges to consider are data transfer issues and the challenges in merging data across different systems throughout the entire patient episode. Data transfer requires protecting privacy, addressing security issues, and respecting proprietary information while using standardized provider performance measures to create comparable community metrics. Data governance structures need to be designed to ensure neutrality and respect the proprietary nature of the information being transferred. One approach to these challenges may be to use distributed data models, in which the individual-level, or patient-level, data stay with the data owner, but aggregated information and measures can be submitted to a convening organization.

In addition to data governance and data transfer, Gage highlighted three further implementation issues. The underlying information technology systems, regardless of the model, need to be affordable—they cannot be cost prohibitive to the providers. Furthermore, the measures need to be effective in helping organizations and individuals in efforts to meet the three-part aim. Gage emphasized that the measures must provide timely, interpretable feedback to clinicians in order to affect their performance, and they must be valued by clinicians in order to be actionable.

She continued her discussion by highlighting the variation in measures currently used under different insurance programs. The Medicare Shared Savings Program for ACOs requires 33 measures of patient experience, care coordination, safety, prevention, and at-risk populations from three separate sources. The Medicare Advantage Star programs use a different set of 36 measures of prevention, chronic care management, patient experience, and customer service from a variety of sources. Some of the concepts are similar, but the underlying data and specification of the measure may vary. The measures most common across private plans, as Gage found from discussions with America's Health Insurance Plans, are yet a third set of measures and specifications, and those used by the regional health collaborative are different as well. Each initiative can benefit from the lessons learned by others, especially to the extent that each is measuring quality and the value of services provided by the same type of provider or for similar populations.

Gage discussed the range of data sources used to populate measures. Patient experience data are commonly collected through surveys like the Consumer Assessment of Healthcare Providers and Systems (CAHPS) and may be collected more directly and in a more timely fashion from patients in the future. Claims data are typically used to measure service utilization, such as hospital readmissions, admissions for conditions that could be treated with ambulatory care, emergency room use, and cost measures, while clinically enhanced measures offer insights in health improvement through tracking high blood pressure control, screening for average blood glucose levels (HbA1c), eye exams, and other factors extracted from electronic records or medical charts.

In addition to the diversity of data sources, other factors can also make measure harmonization difficult. Harmonizing metrics can be challenging because of a lack of consensus about the best measures to use, and even when common concepts are measured, the specifications of the numerator, denominator, and inclusions and exclusions may vary. This makes it difficult to compare outcomes across providers, payers, initiatives, and communities. For example, initiatives may agree on the need to measure a concept like risk for falls but differ in the specific technical details, with one initiative measuring screening rates and other measuring patient education about falls.

Gage concluded with a discussion of these issues as they relate to the current landscape for cost and resource use measures, explaining the inherent challenges stemming from the significant variations in available cost measures. First, the unit of analysis can hinder comparisons; costs per person per year, per member per month, and per episode cannot be directly compared. Second, numerous types of cost measures exist. The metric may vary depending on whether it is reflecting costs per diagnosis, costs for certain types of clinical services, costs across certain time windows or episode periods, or costs based on numerous other possible factors. Third, risk-adjustment methods can vary across payers, making the measured costs difficult to compare. Fourth, these data are often considered proprietary and may contain individual identifiers that are protected under HIPAA regulations. Finally, there are multiple definitions of health care cost, ranging from negotiated prices per procedure to out of pocket cost, and it is important to ensure that the cost information made available to consumers is both actionable and understandable.

DISCUSSION

To lead off the ensuing discussion, one participant noted that while the idea of having global measures is good, global measures can fail to capture the level of detail that leads to accountability. Other participants also commented on the struggle to strike a balance between global and more detailed measures, such as those based on person-level data. Both Clancy and Gage agreed that there needs to be the right balance between global measures that put minimal strain on those responsible for collecting data and more detailed measures. Gage noted that there needs to be a better understanding of issues involving cost shifting and unintended consequences, particularly with regard to new payment models. That kind of understanding will come with experience and feedback from those on the ground who are actually collecting data.

A participant noted that the ability to use information at the service level, where physicians can begin looking at data from other physicians in the same plan, can run into privacy issues that are covered by state regulations. This complexity raises significant implementation issues for health care systems that operate in multiple states. In a similar vein, participants commented that even when two organizations use the same measure, the way they implement those measures may differ, and even within one organization implementation of a measure may change over time.

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4

Core Metrics Sets in Use

KEY SPEAKER THEMES

Nelson

- Accountable care presents a promising opportunity for meaningful health system reform and innovation.
- New delivery models, such as accountable care organizations, require a core set of metrics to gauge progress and value.
- The assessment of value should include measures of health outcomes and patient experience in relationship to per capita costs.

Stiefel

- There are myriad challenges in implementing measurement of the three-part aim.
- Each of the three three-part aim domains—population health, care experience, and cost—requires unique metrics adjustments to account for inherent measurement complications.

Jones

- Measures are critical to building out a high-quality data system because they make it possible to identify the specific data elements the system needs to capture.
- On a larger scale, core measure sets can drive data capture that promotes progress toward a learning health system as a whole.
- Implementation is crucial to realizing the benefits of health information technology and to producing consistent, accurate, and interoperable data.

Implementing core metrics presents broad opportunities for improvement, but it also involves numerous challenges. This chapter summarizes three presentations that were focused on core measure sets in use, with a particular emphasis on the diversity of current measure sets, the need for tailoring metrics to their use, and the multiple supports necessary for metrics implementation. Eugene Nelson, professor of community and family medicine and a professor at the Dartmouth Institute, both at Dartmouth University, discussed measuring aspects of the three-part aim in an accountable care environment. Matthew Stiefel, senior director for care and service quality at Kaiser Permanente, shared his perspective on the implementation of core metrics for measuring the three-part aim and the challenges inherent to that process. Craig Jones, executive director of the Vermont Blueprint for Health, concluded the panel's presentations with a case example of the Blueprint's experience with metrics and their integral role in building both a high-functioning digital infrastructure and a learning health system as a whole.

ACCOUNTABLE CARE AND MEASURING THE THREE-PART AIM

Eugene Nelson began his comments by adapting a quote from Wayne Gretsky: The secret to success is skating to where the puck is going to be. In other words, Nelson said, the focus should be in setting goals based not on the current status of health care in the United States but rather on where it will be in 2015 and what value will look like then to patients, consumers, and communities. Nelson explained that the focus by 2015 will be with accountable care, as 25 million to 31 million Americans already receive health care from organizations recognized as accountable care organizations (ACOs) (Gandhi and Weil, 2012). Accountable care offers a promising chance for meaningful reform and innovation if measures of system progress that are an inherent part of accountable care can promote rapid innovation and patient-centered, value-based approaches.

Citing the Dartmouth Spine Center as an example of accountable care, Nelson provided details concerning this delivery model. The accountable care process requires using patient-reported health outcomes, engaging patients in care decision making, and employing data to inform and improve care processes continuously. By incorporating all of the necessary resources for treating back pain, including specialists and physical therapists, into one central clinical microsystem, the Dartmouth Spine Center is able to provide better care in real time and to foster better research over time. Its information system allows for extensive use of patient-reported outcomes data in orienting new patients to the treatment process, after which an initial work-up is completed, and a plan of care is developed. That plan can direct patients to acute or chronic care management, functional restoration, or even palliative care. Through continuous tracking of patient status and progress, the information collected informs the plan of care moving forward and also is fed back to an improvement registry for public reporting and research. This information allows for monitoring of functional status, disease burden, pain levels, and actual patient experience, along with prior history and risk status. The data provided by this system, Nelson said, are actionable, valued by clinicians, and allow for predictive modeling for patients embarking on the care-decision process.

Nelson then described several examples of core measures in the accountable care setting. The CQO Roundtable, which includes such organizations as Intermountain Healthcare, Virginia Mason Medical Center, and Kaiser Permanente, has suggested parsimonious and balanced measures that emphasize the measurement of what matters. Another multi-stakeholder group, informally called the Gretsky Group, has put forth example core metrics for accountable care that are longitudinal and cross-cutting, that measure value, and that support the three-part aim. Nelson concluded by outlining the value equation for a core set, which would consider patient experience in organizations and health outcomes in relationship to per capita costs, and he highlighted several areas for progress along each dimension. (See Figure 4-1 for additional details on this calculation.)

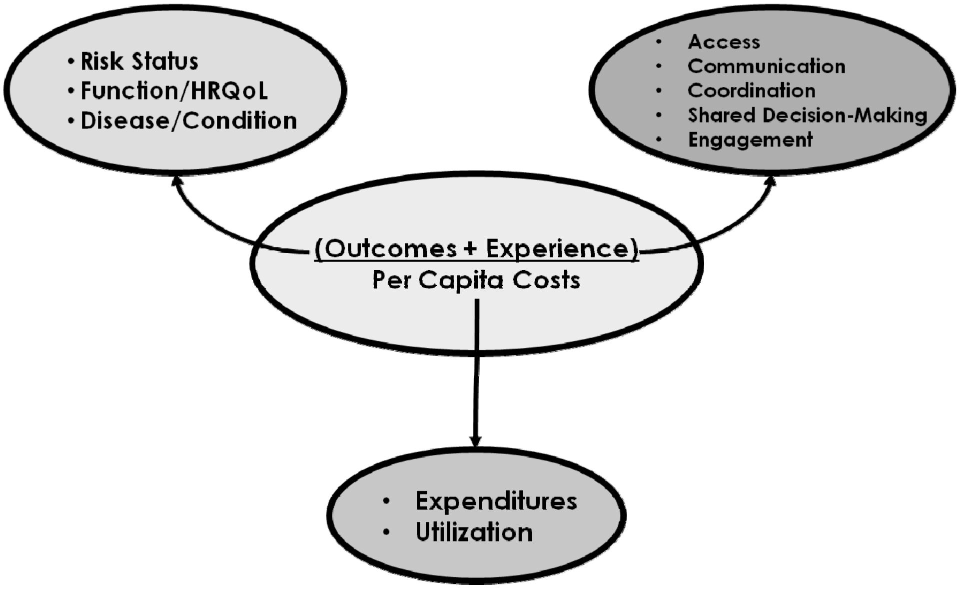

FIGURE 4-1 Value equation for the three-part aim, reflecting the multiple considerations for each aim.
SOURCE: Nelson, 2012.

GENERAL THEMES FOR IMPLEMENTATION

In his discussion of how metrics are implemented, Matthew Stiefel paid particular attention to the challenges confronted in measuring the three-part aim. In addition to overall measurement challenges, he highlighted specific challenges in assessing population health, care experience, and cost. Overall challenges include defining a population, embedding metrics into a learning system, and combining metrics into a single measure of overall value. Measurement of population health is complicated by the connection of health determinants to health outcomes, and care experience is difficult to measure because of the complexity of clinical care. The measurement of cost is also challenging because its definition depends on the varying perspectives on cost.

Further examining the challenges of population health measurement, Stiefel emphasized the merits of viewing total population from a geopolitical perspective. Each geopolitical area contains myriad subpopulations, but overall progress toward the three-part aim requires a broader, higher-level definition of the population. Moreover, he underscored the complex relationships between health determinants and health outcomes, highlighting the need to connect the upstream and individual factors that influence health with the downstream outcomes.

At Kaiser Permanente, Stiefel continued, care experience metrics have been streamlined in accordance with the six domains of care quality defined by the Institute of Medicine: safety, effectiveness, timeliness, patient-centeredness, equitability, and efficiency. Composite measures have greatly facilitated the ability to drill down from broad regional metrics to more localized outcomes. He also explained that cost metrics vary according to the perspective of the investigating party. Cost to a supplier is simply the cost of production, but cost to health plans and insurance companies is the cost of production plus a provider’s overhead margin. That cost plus the health insurer’s margin is the cost to purchasers and consumers. Each different frame on cost yields a different answer, complicating the overall measure of cost.

Stiefel's final comments focused on the measurement of value and its reliance on the relationships between population health, care experience, and per capita costs. Cost-effectiveness, efficiency, and overall effectiveness overlay those three domains of value, each influencing the ultimate measure of the three-part aim. Stiefel concluded by highlighting a compilation of potential three-part aim measures (see Table 4-1).

TABLE 4-1 Potential Three-Part Aim Measures

Dimension	***Measure***
Population Health	1. **Health Outcomes:** ▪ ***Mortality:*** *Years of potential life lost; life expectancy; standardized mortality rates* ▪ ***Health/Functional Status:*** *Single question (e.g., from CDC HRQOL-4) or multi-domain (e.g., VR-12, PROMIS Global-10)* ▪ ***Healthy Life Expectancy (HLE):*** *Combines life expectancy and health status into a single measure, reflecting remaining years of life in good health*
	2. Disease Burden: Incidence (yearly rate of onset, average age of onset) and/or prevalence of major chronic conditions
	3. Behavioral and Physiological Factors: Behavioral factors include smoking, alcohol, physical activity, and diet. Physiological factors include blood pressure, BMI, cholesterol, and blood glucose. (Possible measure: a composite Health Risk Appraisal score)
Experience of Care	**1.** Standard questions from patient surveys, for example: ▪ Global questions from Consumer Assessment of Healthcare Providers and Systems (CAHPS) or "How's Your Health" surveys ▪ Likelihood to recommend
	2. Set of measures based on key dimensions (e.g., IOM *Quality Chasm* aims: safe, effective, timely, efficient, equitable, and patient-centered)
Per Capita Cost	**1. Total cost** per member of the population per month
	2. Hospital and ED utilization rate and/or cost

SOURCE: Stiefel and Nolan, 2012.

VERMONT BLUEPRINT FOR HEALTH: CORE METRICS TO GUIDE THE DIGITAL INFRASTRUCTURE

In his presentation on the Vermont Blueprint for Health and the implementation challenges it has faced, Craig Jones first gave an overview of the Blueprint's projects and goals. Initiatives currently under way include advanced primary care practices, community health teams, payment reforms, digital infrastructure investments, community self-management programs, and learning health system activities. Specifically, Jones underscored the Blueprint's continuously learning, community-building directive: generating a foundation of medical homes and community health teams that can support coordinated care and linkages with a broad range of services; instituting multi-insurer payment reform that supports this foundation of delivery services; constructing a health information infrastructure that includes a variety of sources; and incorporating an evaluation system that uses routinely collected data to support services, guide quality improvement, and determine program impact.

Regarding the growing team-based network in Vermont, Jones emphasized the critical nature of shared goals, clear roles, mutual trust, effective communication, and measurable processes and outcomes as the core principles of team-based care. He noted that this has required a change in culture as a wider variety of health and social service professionals begin to work together in a team to improve health. The culture has continued to evolve as the teams work together over longer time periods.

However, even as these principles continue to take hold among the growing team networks in Vermont, questions persist concerning the promise of health information technology and why that promise has not been realized. In particular, he explained, clinicians see funding directed toward health information technology (health IT), but have yet to see it impact the provision of health services or provide them with the feedback they need. Jones emphasized the implementation challenges and practical considerations for realizing the benefits of health IT, especially with a fragmented delivery system with many independent providers, multiple electronic medical record systems, several practice management systems, and other differences. The Blueprint has spent considerable effort working throughout the state to address technical limitations and ensure that the data are accurate, trusted, reliable, and actionable for all data systems.

To advance the implementation of health IT, the Blueprint shifted its attention to clinical data capture guided by core metrics for measurement. It started with a core data dictionary which was compiled based on clinician input, national guidelines, and other organizations' models. The dictionary's elements were designed to build out the state's health information network to allow data to be aggregated, sorted, manipulated, and used to improve patient care. With core measures, it is possible to implement specific numerators and denominators, which allow for defined data elements to be captured, which in turn necessitates structured data capture systems to hold those common elements, ultimately resulting in high-quality, trusted, and reliable data.

However, without a core set of elements and an incentive for technical vendors to build their systems to capture those core elements, it is difficult to manipulate and transport the data between sources. As a result, the Blueprint is continuing its efforts to refine data-capture systems to increase transferability. Moreover, financial incentives should incent users, Jones said, to utilize those core measures to build out their datasets and ensure comparability between different sources.

In summary, Jones concluded, with reliable data it is possible to generate actionable knowledge for a learning health system and to measure progress. Core metrics can drive the core data dictionaries to ensure that captured data are useful for multiple purposes, such as clinical care, population health management, reporting, and payment programs. Those data are then available to guide ongoing policy and payment reforms that will influence the care process and generate new metrics data, helping to building a learning health system as a whole.

DISCUSSION

To start the discussion, one participant asked if health information technology vendors were receiving feedback from users in an appropriate time frame and, if not, how the field could move more quickly to refine systems for data collection. Jones said that there are few straightforward steps that the field could take to help address this issue. One suggestion he made was for meaningful use dollars or payment reforms to be linked to the tracking, exchange, and use of a core set of metrics, a change that he believes would have a major impact on the marketplace. As an example, he cited the 33 metrics that are now associated with ACOs and the fact that, because of the associated financial incentives, there is now a major effort under way to develop methods for measuring them and collecting and organizing the necessary data.

In response to a question about how to capture useful data on specialty and condition-specific measures, Nelson said there are now good measures of risk and functioning status—such as the Patient Reported Outcome Measurement Information System (PROMIS) measure sets—that the field could use. He equated the PROMIS measure sets for health outcomes to the Consumer Assessment of Healthcare Providers and Systems (CAHPS) measures for patient experience. He also noted that there are a number of excellent condition-specific measures available, though he added that more global measures would be more useful for patients with multiple chronic problems. Jones suggested that if a composite measure related to outcomes was linked to payment and was of shared interest to specialists and primary care physicians, there would be a rapid change in collaborative behavior. In his opinion, the same domains could apply to specialty and primary care, particularly for chronic conditions.

A participant asked if work is being done to do a better job capturing costs. Jones noted that the Vermont Blueprint is trying to capture total expenditures with an all-payer claims database. The development of this system can capture the complete expenditure picture, he said, and it is providing a look at total cost of care per person. Stiefel added that it is also necessary to look beyond health care costs and to include spending on public health and social services.

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5

Specifying the Shape of a Core Metrics Set

KEY BREAKOUT GROUP THEMES

Health Care

- Each core metric needs to be independent of the others, and collectively they should be comprehensive.
- Health care metrics need to be able to be properly adjusted for different populations.
- The six domains of quality from the *Quality Chasm* report provide an important starting point, with one new potential concept being overall modifiable risk.

Population Health

- Population health metrics can be divided into two categories: current health, such as length of life and quality of life, and future health, including factors that are both intrinsic and extrinsic to individuals.
- The three-part aim requires measures for population health that are outside of the traditional purview of the health care system. New responsibilities in communities will be needed to address those metrics.
- Metric development should consider the eventual use of a measure and its potential users and should aim for the measure to be actionable for the intended user.

Cost

- Cost metrics are needed to understand the drivers of cost and waste; to inform choices for plans, patients, and clinicians; to inform value-based payments; and to fuel transparency.
- Three high-level concepts are of primary importance: risk-adjusted per capita costs, utilization, and affordability.
- Operationalizing these metrics requires addressing issues involving antitrust concerns, distrust among different organizations collecting data, the privacy provisions of the Health Insurance Portability and Accountability Act, and data standardization.

An important component of this workshop was the 2-hour working group session, during which participants engaged in discussion to identify potential sets of core metrics for tracking progress toward better care, better health, and lower costs at national, state, community, organizational, and individual levels. Participants were assigned to one of three breakout groups, with each breakout group considering one dimension of the three-part aim. In addition to identifying the area's metrics that were most important to reliable assessment and monitoring of progress at these different levels, the participants were charged with identifying implementation challenges associated with this dimension and proposing approaches to address those challenges.

To assist each group in its deliberations, the workshop organizing committee, with the assistance of Institute of Medicine (IOM) staff, put together a packet of information on each specific aspect of measurement and included a table of potential metric categories with example metrics (see Table 5-1). The three groups took different approaches to assessing the suitability of those metric categories and to identifying making recommendations about additional categories and sub-categories. This chapter summarizes the discussions that took place during the breakout group discussions[1] and in the subsequent discussions that involved all of the workshop participants.

HEALTH CARE BREAKOUT GROUP

Key points from the breakout group discussion chaired by David Stevens, associate chief medical officer and director of the Quality Center at the National Association of Community Health Centers and research professor at the George Washington University School of Public Health and Health Services, are summarized here. Before starting this discussion, Mary Barton, vice president for performance measurement at the National Committee for Quality Assurance, gave a brief synopsis of the state of the field.

Defining a Core Metric and Understanding Current Limitations

The group began by considering the fundamental characteristics of a core metric set. An important characteristic of a set of core metrics is that each measure should be mutually exclusive but that collectively they should be exhaustive, that is, when put together they provide a unified picture of progress on the three-part aim. The denominator of a core metric should be adaptable for different populations and population sizes so that the metric makes it possible to drill down for more detailed analysis. The group also noted that it was important that metrics balance cost and quality of care in a way that does not overemphasize cost at the expense of the entire three-part aim. Finally, it was deemed important that any metrics of health outcomes be adjusted for risk.

The group also identified several current limitations of core measures. Many metrics today appear to be snapshots that reflect episodes of care at a specific moment in time rather than on a specific service or condition, and the breakout group expressed some concern that such metrics may not be that useful in a learning environment. A core metric should also be sensitive to change, a point that Stevens stressed, and should connect to a system that can learn over time, track results, and improve as a result of changes in the metric.

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[1] The summaries of the working group discussions are intended to demonstrate the diversity of perspectives and divergent opinions and should not be construed to reflect any group consensus.

TABLE 5-1 Matrix of Potential Metric Categories Across the Three-Part Aim

Metric Domain	Metric Categories	Example Metrics	National Priority from National Quality Strategy
Population Health	Length of life	Mortality, life expectancy, premature birth, preventable deaths	Promote wide use of best practices to enable healthy living and well-being. (National Priority 1)
	Quality of life	Physical health, functional status, disease burden, morbidity, pain, mental health, social functioning, injuries	
	Health behaviors and risk	Smoking, exercise, alcohol use, healthy diet, obesity	
	Utilization of preventive services	Immunizations, dental health, appropriate screening	
	Community health	Safety, healthy food, walkability/places to exercise, pollutants, healthy workplaces	
	Social and economic factors	Educational attainment, literacy, poverty, unemployment, health insurance status	
Health Care	Effective	Adherence to guidelines, disease-specific treatment targets (e.g., cardiovascular disease: control of high blood pressure, cholesterol, aspirin use)	Promote the most effective prevention, treatment, and intervention practices for the leading causes of mortality, starting with cardiovascular disease. (National Priority 2)
	Patient-centered	Experience of care; shared decision making, shared goal setting, or patient inclusion in health care team, patient knowledge and understanding of care plan, clinical communications, supports for self-care	Ensure person- and family-centered care (National Priority 3)
	Safe	Preventable hospital admissions/readmissions, health care–associated infections, medical errors (composite measure: serious reportable events), inappropriate medication use, inappropriate maternity/newborn care, unnecessary tests, occupational safety in health care	Make care safer (National Priority 4)

	Coordination and communication	Experience of care transitions; communication among health care team members, including patient, family, and caregivers; appropriate sharing of health records; care consistent with preferences, particularly for end of life care	Promote effective communication and care coordination (National Priority 5)
	Equitable	Support of vulnerable populations, communication appropriate to individual and community health literacy	Elements captured in National Priorities 1, 3 and 5
	Efficiency and timeliness (includes operations)	Access to needed care, consistent insurance, achievement of meaningful use of health IT, appropriate nurse staffing, effective management	Elements captured in National Priorities 5 and 6
Cost	Affordability	Costs for households/individuals, impact on wages/benefits, impact on other government services (local, state, national)	Make quality care affordable for people, families, employers, and governments (National Priority 6)
	Expenditures	Overall annual spending on health care (per member per month, per capita, per episode, per service), utilization of services	
	Indirect costs	Absenteeism, productivity	
	Waste	Unnecessary services (includes costs due to unwarranted variation/overuse), fraud, excessive administrative costs, inefficiently delivered services, prices that are too high, missed prevention	

Reviewing Potential Metric Categories

Several members of the breakout group indicated their comfort with the initial set of measurement categories contained in the background material, which were largely drawn from the *Quality Chasm* definition of quality (IOM, 2001). To improve this initial set by reducing the number of domains, some participants proposed that a timeliness metric belonged both in patient-centered care and coordinated care and that communication should be included as part of patient-centered care. Attendees had differing views on whether an equitable care metric should span all domains or if doing so would cause it to be lost. Stevens noted the latter concern could be addressed by emphasizing that all populations should be examined across those domains.

One proposed overarching concept was overall modifiable risk. Currently this metric is used only for cardiovascular disease, but the concept could be extended to many conditions and diseases. This metric would be actionable at multiple levels, from the patient to the system level.

A conceptual area that was raised in the discussion involved engaging providers. Although there has been significant attention paid to developing metrics that assess how engaged patients are in their own care, little work has been done to measure the changes and values that clinical professionals need to operate in a system designed around the three-part aim. These changes include working in teams, collaborating across organizations and regions, and being able to work with patients in self-management. Another area of need is for metrics that can assess the local capacity to assemble providers, public health structures, and community organizations to reach the three-part aim.

Examples of core metrics for the three-part aim include the composite Consumer Assessment of Healthcare Providers and Systems (CAHPS) score for patient experience, risk-adjusted mortality, functional status, a composite safety measure that is now under development, readmissions, and ambulatory care–sensitive readmissions. The calculation and use of many of these measures are constrained by the limited amount of consistent data collected across the wide range of health care delivery settings.

POPULATION HEALTH BREAKOUT GROUP

Participants in this group, chaired by Patrick Remington, associate dean for public health at the University of Wisconsin School of Medicine and Public Health, focused on three topics: defining populations, selecting metrics, and measuring community health. Before discussing these topics, Steven Teutsch, chief science officer of the Los Angeles County Health Department, gave a brief overview of the current state of population health measurement.

Defining Populations

Populations at risk serve as the denominator of any metric dealing with population health, making it essential to define specific populations. Geopolitical boundaries are an obvious defining feature, one with which public health is comfortable. However, health care usually thinks about populations of patients in a care system or populations of people with a particular condition, neither of which aligns with geopolitical boundaries. The definition of population, Remington said, depends on who is asking the question, whether it be policy makers, government entities, health systems, or patient groups.

Selecting Metrics

In talking about the categories for metrics of population health, participants set forth two general categories: current health, and factors that help predict health in the future. Health outcomes are essentially measures of death and disease or mortality and morbidity. The group noted that many metrics could be suitable for assessing these concepts, including health-adjusted life years, premature death rates, health-related quality of life, and disease incidence.

The group discussed briefly the notion of using rates of indicator diseases, such as heart attack rates, as sentinel indicators of health system performance. It also talked at length about whether determinants of health could be used to measure risk in populations, in terms of both factors that are intrinsic to individuals and factors that are extrinsic to individuals. Health risk appraisal was also mentioned as a potentially useful metric.

Quality of life, whether measured in terms of morbidity or judged by the individuals themselves, is an important metric, and both mental and physical health play a role. Group members noted that there may be specific measures that might be proxies of quality of life, such as the percent of 60-year-old adults who have had a knee replacement. The group also discussed the idea that the three-part aim requires measures for population health that are outside of the traditional purview of the health care system and that it would be the responsibility of those communities to address those metrics.

The group also explored the concept of community health. A healthy community is one with a robust combination of supporting elements, such as safety, quality of the educational system, the availability of jobs, and others. The breakout group noted that performance metrics for community health should be measured in context, that is, not just by the health or by the length or quality of life of individuals, but relative to the conditions in which people live.

Implementation

The group's participants conducted a substantial discussion about implementing metrics of population health. Remington captured five themes from this discussion. The first was that words matter: Measures such as health-related quality of life may be understood by policy makers, but the general public may not be familiar with this phrasing. Terms such as "healthy community" and "community well-being" are ambiguous and can have different meanings for different constituencies. Though the group did not solve the question of which words to use, it did recommend that experts in communication be brought into future discussions.

The group had a heated discussion about whether surveys or broad-based, all-inclusive individual questions are the best approach to collecting data on community health metrics. Both methods have costs associated with them that can be substantial, whether those costs are episodic in the case of surveys or ongoing for individual questionnaires given at the time an individual receives health care services. The group did agree that information needs to be collected on states of wellness and well-being and not be limited to people who are interacting with the health care system at any given moment. This is particularly important given that there are many people who are not in a structured health care system but who may constitute a substantial portion of the overall population.

While indices can serve as important metrics, it is important that they be transparent and not just a black box measurement. They can be helpful for summarizing information, but they must be amenable to drilling down. There was also a debate on when metrics should focus on everyone versus the leading innovators in promoting health. By looking at innovators, metrics can provide a glimpse of the future of where the health care system could go as opposed to where it has been.

Finally, all metrics should be actionable in the short term. Long-term metrics may be interesting to researchers, but they hold little sway over policy makers. Remington noted that this is not a theoretical exercise given that there are places that already measure the health of communities or populations and where public health and health care systems are working together.

COST BREAKOUT GROUP

The working group participants discussed several aspects of cost as viewed from different perspectives. Kate Goodrich, senior medical advisor in the Office of Clinical Standards and Quality at the Centers for Medicare & Medicaid Services, chaired the group, and Dennis Scanlon, professor of health policy and administration at Pennsylvania State University, summarized the current state of cost measurement before the group began its work.

Purpose of Measurement

In a short, straightforward discussion, the group first addressed the issue of identifying the purposes that cost metrics should serve. Core metrics need to be related to the aim of lowering cost in general—and to lowering per capita costs specifically—and they should help explain variations in trends. Cost metrics are also needed to understand the drivers of cost and waste; to inform choices for plans, patients, and administrators; to inform value-based payments; and to fuel transparency. After a more heated discussion, participants in the group leaned toward a definition of cost that refers to health care spending within the delivery system, that is, what is spent on payments to providers and out-of-pocket expenses for patients, including the cost of insurance. This definition of cost does not include the bigger issues of public health, such as education and crime reduction.

Core Metrics

The group spent much of its time discussing high-level core metrics and outlined three of primary importance. The first two measures were straightforward: per capita costs and a measure that assesses utilization. These would be risk-adjusted measures, and they could be analyzed by delivery systems, geographies, and populations. The third metric, which several attendees felt was novel and actionable, was an affordability measure, since a primary goal of the three-part aim is to make health care affordable.

While the working group participants agreed that there are many good subsets of metrics within these three core metric categories, there was not sufficient time to discuss these measures. However, the group recommended that settling on broad subsets of measures should be the next order of business.

The group also discussed how actionable these metrics would be—for example, what a provider can do once it knows its per capita costs. Several participants noted the need for core metrics and sub-metrics to be understandable at the local level and at greater levels of aggregation. The group debated whether there should be an underlying set of appropriate resource measures, but it did not reach agreement on this point and agreed that more discussion was needed to resolve this issue.

Implementation

The group identified a number of implementation issues that will need to be resolved, including antitrust issues, distrust among different organizations collecting data, the privacy provisions of the Health Insurance Portability and Accountability Act (HIPAA), and data standardization. The group noted that benefit design is a major issue when measuring per capita cost because of variations in attribution, legal provisions, and paying party. Fragmentation in the system across all levels is a major stumbling block to implementing meaningful cost metrics. During the general discussion, several participants remarked that data collection for cost metrics needs to be standardized at the national level in such a way that states and communities can then use this metric. It was also noted that issues over who controls cost data need to be resolved.

DISCUSSION

Following the reports from the three breakout groups, IOM staff prepared a summary of the specific metrics and categories that were discussed in the breakout sessions (see tables 5-2, 5-3, and 5-4). These summaries were then the subject of a discussion among all the workshop participants. That discussion is summarized here.

Population Health

Multiple attendees voiced support for creating two major metric categories for current and future health. One participant suggested that example metrics in the future health category could be intrinsic risk, as measured at the individual level in terms of health behaviors and perhaps genetic predisposition, and extrinsic or community risk, which would be measured using social and ecological models and include some measure of place-based risk. Another participant remarked that quality-of-life metrics in the current health category should include some measure of self-reported health. There was some discussion about how to phrase metrics in the future health category so that the general public will understand the concepts involved. It was noted that the term “health determinants” failed to resonate with consumers when it was tested in Wisconsin, and instead researchers there are using the term “health factors” and explaining it as things that will predict how healthy an individual will be in the future. The term “health influences” was also suggested.

There were several comments about how to conceptualize population health as it moves from the entire population to subpopulations. One participant remarked that population health at the level of a 5,000-person ACO serving Medicare patients is not going to look the same as a subpopulation of Medicaid patients or a subpopulation in the hundreds of thousands and wondered how those differences will be reflected in the implemented metrics. Participants also asked how measures of population health across subpopulations should reflect the concepts of equity, health disparities, insurance status, and access to care.

TABLE 5-2 Summary of Population Health Breakout Group Discussion

Metric Domain	Metric Categories	Example Metrics	Implementation
Population Health	Current Health	Length of life: Mortality, life expectancy Quality of life: Morbidity, functional status, indicator diseases	– Defining the population – Communication/education about measures – Data collection

		Composite: QALY, HALY	– Transparent methods for composites/indices – Tension in targeting innovators or all actors – Actionability of measures
	Future Health	Health Determinants: Health risks, health behaviors, healthy communities, and extrinsic determinants	

Health Care

When the breakout group reported its discussion to all workshop attendees, Marcus Thygeson, vice president for medical services at Blue Shield of California, remarked that it would be useful to have metrics that measure how patients do over time. Such metrics would assess the path to recovery and the speed of recovery, and they would differ from a timeliness metric or one that measured functional status. During this same discussion, Stevens noted that health care measures could be analyzed individually or be combined to support real-time improvement for individual patients, populations, providers, or health systems.

During the discussion, two participants from the health care breakout group raised suggestions for improving the summary list of measures by including several of the example measures from the background materials. Another participant suggested that the concept of appropriateness of care should be added under the effectiveness category and that a measure of composite medical harm should be included in the safety category. It was also recommended that ambulatory care admissions and readmissions be included in the efficiency category. One place to start in creating such a measure would be existing lists of conditions that should be treated on an outpatient basis.

Another participant, who had been part of the cost breakout group, asked if efficiency should be a subset of cost and if equitable care should be a metric itself rather than merely an example. A participant suggested that functional status should be broadened to that of overall health status, reflecting the changes in a patient's overall health after receiving health care services. It was noted that patient-reported outcomes could serve as a general measure of functional status.

There were also comments about implementation, particularly concerning the settings in which the data for these metrics would be collected. It will be important going forward, one participant noted, to identify the least disruptive setting or most accessible and least expensive setting in which to collect data if these metrics are to be truly useful on a large scale. A participant commented that a number of professional organizations are developing and implementing process metrics that are condition-specific and that these metrics are being well received by the medical community.

TABLE 5-3 Summary of Health Care Breakout Group Discussion

Metric Domain	Metric Categories	Example Metrics	Implementation
Health Care	Patient centered	Patient experience: HCAHPS metric Equitable Timeliness	– Risk adjustment critical – Appropriateness of care – Timeliness of care under all metrics (both in initial access and time to return to function)
	Effective	Mortality amenable to health care Functional status Equitable	
	Safe	Composite medical harm measure (including medical errors and health care-associated infections) Equitable	
	Efficient	Utilization: Admissions and readmissions for ambulatory care sensitive conditions Equitable	
	Coordination and communication	Timeliness	

Cost

The discussion highlighted the fact that total cost depends on two factors—the price of health care services and the utilization of those services. Unpacking overall costs in this way allows for a better understanding of which of these two factors is driving cost. However, one participant noted that this may lead to conceptual issues, as utilization can sometimes be considered in the health care quality domain of the three-part aim as opposed to the cost domain. For example, one participant noted that good health care services can directly reduce utilization, but their impact on cost may be unclear because of the multiple business layers between utilization and cost. Another participant remarked that utilization can be appropriate or inappropriate and that perhaps a metric for waste should be included in the cost domain, while another participant suggested further delineating waste into under-utilization and over-utilization.

Concerning the affordability metric, participants noted that the examples should also include measures of health care spending by states and communities as a percentage of state and local community economic output in addition to the comparison of health care spending with national GDP. Other participants noted that similar metrics could be included that illustrate the level of spending devoted to multiple programs and sources of payment, such as Medicare, Medicaid, employer-sponsored health programs, and health spending by the uninsured, with this spending normalized by the size of the economy, governmental budgets, organizational budgets, or individual budgets. One speaker suggested that premiums be included in the percentage of household spending on health and not listed separately, and another participant suggested there should be a metric involving value; while the members of this workshop all understand that value is included throughout these metrics, the participant noted, it would be useful to make this explicit for the general public.

TABLE 5-4 Summary of Cost Breakout Group Discussion

Metric Domain	Metric Categories	Example Metrics	Implementation
Cost	Total cost of care (actual costs)	Total cost of care metric, actual cost and risk-adjusted. Population-based per member per month (all conditions).	– Antitrust – HIPAA – Proprietary interests – Standardization – Governance – Attribution – Legal – Costs
	Total cost of care (standardized costs)	Total cost of care metric, standardized costs and risk-adjusted. Population-based per member per month (all conditions)	
	Affordability	Percent of household spending on health Percent of national GDP and/or federal government health care spending as percent of total federal government spending Percent of economy, governmental budgets, organizational budgets, or individual budgets devoted to specific programs or sources of payment, including employer-based health benefits, Medicaid, Medicare, and spending by the uninsured. Premiums	

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6

Implementation

KEY SPEAKER THEMES

Remington

- Rankings can be a useful tool for focusing the attention of community stakeholders and can motivate the larger public to become involved in efforts to improve health care.
- More work is needed to understand how to increase interest and engage people and create evidence-based programs and policies that can improve care delivery and other factors affecting health.

Gildemeister

- Metrics have played a key role in informing state health care reform efforts, with Minnesota serving as an example.
- It is important to establish clearly the purpose for creating metrics and to not have one measure that tries to accomplish everything.
- It is critical to align measures and to eliminate duplicate measures within states and across payers, including the federal government.

Romm

- Metrics cannot stand alone—it is necessary to have multiple levers operating in concert with the three-part aim in order to make progress in health care reform.
- A significant challenge is to align a state's efforts with those of other payers and purchasers to minimize redundant efforts.

Once the best measures have been selected, there are multiple challenges to implementing measures in routine practice, particularly considering the wide range of populations and the multiple levels of the health system at which measurement needs to be useful. In this session, Patrick Remington, associate dean for public health at the University of Wisconsin School of Medicine and Public Health, spoke about how to measure the health status of the U.S. population on a county-by-county basis. Stefan Gildemeister, director of the Health Economics Program and state health economist in the Minnesota Department of Health, addressed the measurement issue from a state health reform perspective. Carole Romm, who led, in a consulting capacity, the accountability and quality efforts for the Oregon Health Authority's

Medicaid program, described a measurement framework for coordinated care in another state effort.

ANALYZING HEALTH STATUS ACROSS ALL COUNTIES

To begin his presentation, Patrick Remington described the simple logic model that informs his work on measuring health status. This logic model assumes that programs and policies impact health factors—what used to be called health determinants—and that changes in health factors, over the long run, impact health outcomes. Health outcomes are measured using measures of morbidity and mortality, while health factors consist of health behaviors, clinical care, social and economic factors, and the physical environment. Remington then described the metrics that he and his colleague David Kindig chose to measure each of these inputs and the weighting that each metric is given in the final calculation (see Figure 6-1). He noted that one of the keys to developing this model was deciding on a set of measures and acknowledging that the final list is not perfect but could be sufficient. He also remarked that an important factor in selecting metrics is that the data are readily accessible and preferably available at no cost from every one of the more than 3,000 counties in the nation. Remington commented that together, these metrics provide a good assessment of the three-part aim.

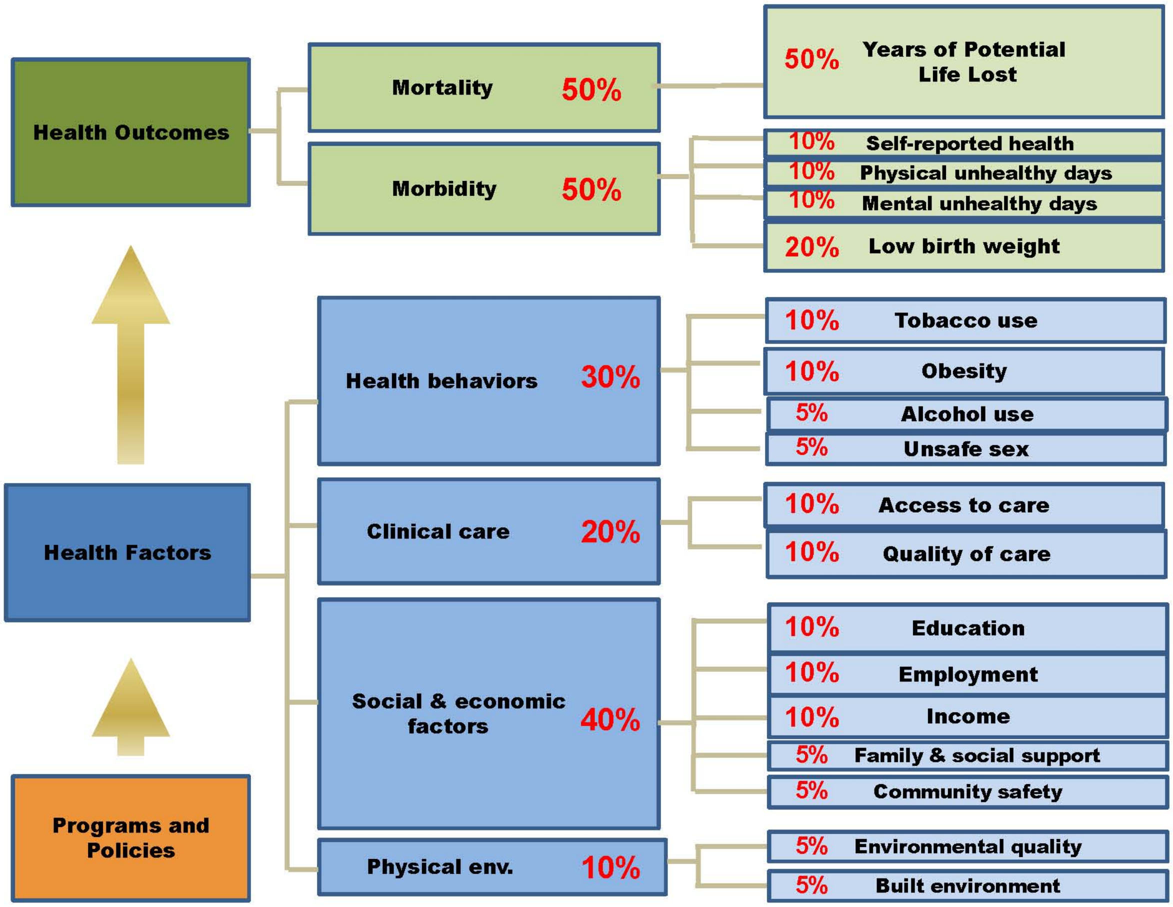

FIGURE 6-1 Metrics and weightings used to calculate health status on a county-by-county basis.

SOURCE: University of Wisconsin Population Health Institute and Robert Wood Johnson Foundation, 2013.

He showed some of the maps his group generated using the output from this model and explained how to use the maps to identify the healthiest and least healthy counties nationwide or within a state. He noted that counties are using these data, which are released annually in March, to take on the task of improving their ranking within their states. He remarked that the media are paying attention to the rankings, which appears to be forcing communities to form teams that can both talk about the rankings and move towards action based on the many measures in the model.

Remington concluded his talk with some of the lessons that he and his colleagues have learned from this project over the past decade. The first is that it is possible to collect the data needed for the model and to use the model to summarize health outcomes and health factors. Second, generating rankings gets the attention of the media, local health officers, the general public, and even physicians and others in the health care system within a community. In fact, he said, an integrator in a community could to use this model of broad population health determinants to create evidence-based programs and policies that would improve health. That realization leads to the third lesson, which is that more work is needed to understand how to move people from being interested and engaged to creating evidence-based programs and policies that can command the necessary resources to change the delivery system.

IMPLEMENTING STATEWIDE MEASUREMENTS ON ACCESS, COST, AND QUALITY

In Minnesota, Stefan Gildemeister said, measurement activities have taken place in the context of a state in which the legislature has been active in health care reform efforts since the early 1990s and has enabled efforts to inform that process with empirical evidence. To increase the quantity of evidence, the legislature has provided funding to conduct research and population-based monitoring of access, utilization, quality, and health care costs. In addition, Minnesota benefits from having a dynamic and innovative private sector that has put the state in the lead on concepts of managed care and utilization management, and that is moving the state into the new area of shared savings through collaboration on generating evidence and best practices. In particular, the largely nonprofit plan and hospital environment in the state has given rise to organizations, such as the Institute for Clinical Systems Improvement and Minnesota Community Measurement, that are identifying what works and pointing the way to improvement.

More recently, in 2008, the state passed groundbreaking bipartisan health care reform legislation that aimed to improve population health through efforts targeting obesity and tobacco use, to enhance the patient experience by investing in health care homes and stressing patient-centered care, and to improve cost trends through transparency in cost and quality and through payment reform. To further the momentum generated by this legislation, the state is finalizing a roadmap for implementing reform efforts over the next few years as part of the governor's health care reform task force. Gildemeister presented his office's projections of annual spending for the next 10 years and noted that, without action, the state's total health care spending will double (see Figure 6-2). He also discussed the data highlighting the current racial and ethnic disparities in health care that reform is also designed to address, noting that these data are indicative of how urgently reform is needed.

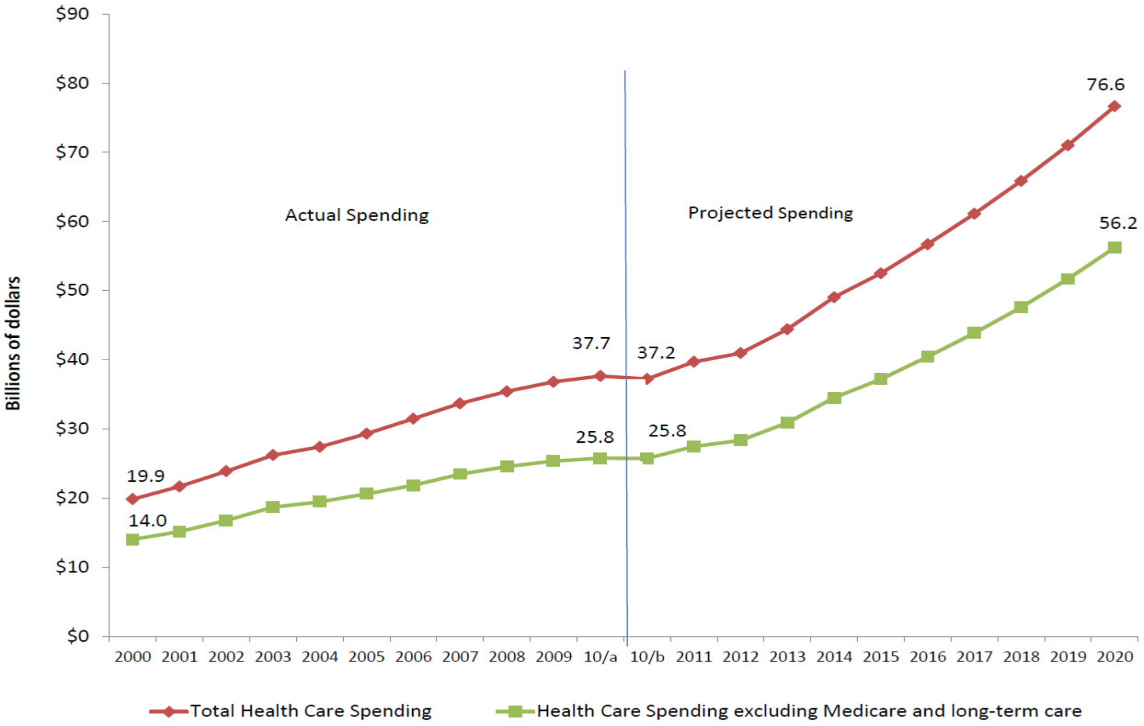

FIGURE 6-2 Estimates and projections of health care spending without the effects of Minnesota reforms.
SOURCE: MDH, 2012.

He then discussed some examples of the state's activities and the progress that Minnesota is making in meeting the three-part aim. Data from the state's measurement and reporting system on optimal diabetes care showed that the percentage of diabetics who received optimal care rose from 28.4 percent to 39.7 percent between 2009 and 2011 for patients regardless of the source of their health coverage. Medicare patients had the biggest increase, jumping from 33.8 percent to 46.2 percent, while Medicaid and uninsured patients realized the smallest benefit, an increase from 17.5 percent to 26.3 percent. He also showed data using a total care risk-adjusted quality score that his office developed as part of Minnesota's 2008 health reform law. This single measure, which looks at quality and cost as two dimensions and is based on confidentially reported data, is the result of early, high-level work that Gildemeister said could lead to a metric that could be drilled down to subpopulations. For example, the total care quality composite measure for hospitals summarizes care process measures and health outcomes using several currently reported data and adjusting for patient populations (MDH, 2013). This single risk-adjusted quality score plotted against risk-adjusted costs per discharge revealed a large disparity across the states hospitals in terms of quality versus cost.

Gildemeister noted that Minnesota's health insurance exchange, established under the provisions of the ACA, will provide a wealth of data on a dramatically larger scale than is available today, creating new areas for measurements of affordability, provider innovation, and population health. He highlighted the potential this will create for better understanding of health care system performance, which will allow for better tracking of progress and for fine-tuned, regular adjustments to policies and programs to ensure success. Based on Minnesota's experiences, there are several factors that Gildemeister believes will be important for maximizing the use of this upcoming influx of data. First, it will be important to establish clearly the purpose for creating a specific metric and to not force one measure to accomplish the measurement needs for all potential applications, which can include regulation, evaluation, and public reporting. It is critical as well to align measures and to eliminate duplicate measures within states and across payers, including the federal government, and he noted the promising work that the Office of the National Coordinator for Health Information Technology (ONC) is engaged in with the Centers for Medicare & Medicaid Services (CMS) and other federal agencies.

Another area of emphasis going forward will be to resolve the tension between the need to accelerate the measurement development cycle while maintaining quality and incorporating community input and priorities. Gildemeister believes that more work is needed to make the business case for improved measures to policy makers. This effort should develop better approaches to tracking and communicating measurement results in a more organized fashion and not necessarily by datasets. It should also develop composites or indices that help policy makers and the public assess progress more easily.

A MEASUREMENT FRAMEWORK FOR COORDINATED CARE IN MEDICAID

Carole Romm then spoke about Oregon's experience implementing the three-part aim and using metrics to assess progress in the state's Medicaid program. Currently, Medicaid accounts for 11 percent of the total state budget and covers 16 percent of all Oregonians and 50 percent of all babies born in the state. Some 85 percent of Oregon's health care providers participate in the state's Medicaid program. She noted that, as in Minnesota, Oregon's governor has been a strong proponent of health care reform efforts. She added that the state has set specific goals in achieving the three-part aim that include lowering cost increases by 2 percentage points over a 5-year demonstration period; ensuring that the quality of care is not degraded or improves; and ensuring that population health is not degraded or improves. Oregon, operating as a test bed, is working in close partnership with CMS to obtain a waiver that will enable it to move forward with its reform efforts.

Oregon realized that, to achieve the three-part aim, it would have to undertake a drastic revamping of its health care systems. This reinvention will start with what the state calls coordinated care organizations (CCOs) which will be responsible for a broad range of outcomes, including physical, mental, and oral health. These organizations will have a global budget, be responsible for the health and well-being of all of the Medicaid population within their catchment areas, and reflect the core concept that responsibility for health care should reside at the local level. These organizations are mandated to work with community partners outside of the health care system and are given the flexibility to deliver health care using approaches tailored to their specific populations. Furthermore, the state also developed a number of levers, such as alternative payment methodologies, to help advance the initiative.

To support the reform effort, Oregon is establishing a transformation center with innovator agents based on the model of the agricultural extension services suggested by Atul Gawande (Gawande, 2009). These innovator agents will be state employees embedded in individual coordinated care organizations and will serve as links between these organizations and the transformation center. In a sense, they will act as two-way conduits, informing the transformation center and the Oregon Health Authority of progress and challenges at the local level of the CCO, shaping the state's efforts to create learning collaboratives to meet the needs of the CCOs, and then conveying information back to the care organizations. Romm noted that Oregon's efforts will be focused on the patient-centered primary care home, reflecting the state's belief that care is best provided in a coordinated and integrated way at the local level. In addition, Oregon believes that non-traditional or community health care workers are an essential part of the health care team. The state is supporting the growth of these workers by setting out criteria for certification and by working with the state's community colleges to establish training programs.

In terms of metrics, Romm said the state used an open public process with stakeholder groups to create a list of principles for metrics selection. The coordinated care organizations will be required to collect these data as part of their contracts with the state. In conjunction with the development of these metrics, in 2012 the Oregon state legislature created a committee with nine members serving 2-year terms that used a public process to identify objective outcome and quality measures and associated benchmarks for disbursing funds from the state's quality incentive pool. These metrics, which were being reviewed by CMS at the time of this workshop, covered six areas that the committee deemed critical for transformation: behavioral health, maternal child health, chronic conditions, access, patient experience of care, and electronic health record adoption.

Romm finished her remarks by describing some of the challenges this effort has faced and some of the lessons the state has learned. Perhaps the biggest challenge has been to align the state's efforts with those of its purchasers and payers to minimize redundant efforts and to address the issue of parsimony. She acknowledged that the state is working hard to narrow the current list of measures to a reasonable set that covers critical aspects of the three-part aim. It has been challenging to collect data at a reasonable cost, to establish a baseline for new metrics, and to avoid unintended consequences in the selection of metrics. It has been important, she said, to set attainable and meaningful performance goals and to accept that metrics cannot stand alone—that there need to be multiple levers operating in concert with the three-part aim in order to make progress. Stakeholder involvement, though difficult to achieve, has been critical to gaining acceptance in Oregon and to catalyzing the emergence of champions for this process. Finally, it was critical to align efforts around a single model, which in Oregon's case was the coordinated care model.

DISCUSSION

A substantial portion of the discussion that followed the three presentations concerned the relationship of factors external to the health care system—smoking, diet, exercise, transportation policy, and the like—to internal factors that affect health. It was noted that establishing metrics for population health may be difficult given that these factors are sometimes beyond the direct control of the health care system. Diana Dooley, secretary of the California Health and Human Services Department, remarked that her state's Let's Get Healthy Task Force recognized that problem and decided to measure change across the state rather than by individual systems. In that way, the task force hoped to let local communities and health care organizations develop a wide range of initiatives and then see if the population health of the state changes. While this eliminates the ability to identify individual interventions, it does stimulate innovation that is not constrained by the need to measure. Gildemeister added that involving consumers in these community advisory councils can engage the broader community to take action beyond what a health care organization can do regarding the external factors that influence health.

During the discussion, Remington noted that his group's county health rankings capture disparities across a state or between neighboring regions in different states. He said that in Wisconsin, there is more of a gap between the healthiest and least healthy counties within the state than across the country. Romm said that Oregon has recognized this gap and requires the coordinated care organizations to have a community advisory council and to perform a community health needs assessment as a way of dealing with health disparities across the state.

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7

Building the Infrastructure

KEY SPEAKER THEMES

Larsen

- The Office of the National Coordinator for Health Information Technology, working with federal and non-federal partners, is developing a strategy focused on real-time measurement, as opposed to retrospective measurement, that is linked to decision support and patient dashboards.
- Achieving the full benefits of digitally enabled measurement requires additional actions beyond adopting new technologies, in order to achieve the goal of a culture of care that uses health information technology to enhance care.

Queram

- Sharing transparent clinical-level and provider-level data can lead to significant improvements in the quality of care.
- It is important to develop new approaches for putting data into a context that is useful for patients and support consumers as active participants in their health care.
- There are limited resources to support both national and local transparency efforts.

Ferguson

- There are important new local and regional opportunities in for collecting real-time data and using it to make inferences for use in real-time decision making.
- Health care delivery organizations create streams of clinical, quality, operational, and administrative data that could interface with electronic health records to enable just-in-time research and learning and could serve as a valuable resource for designing metrics.

Implementing metrics requires a robust data, technical, and social infrastructure. Three workshop speakers explored common themes around the infrastructure needs for advancing measurement (Hillestad et al., 2005). In particular, their presentations focused on the challenges and opportunities for making measurement a routine component of health and health care systems. Kevin Larsen, medical director of meaningful use in the Office of the National Coordinator for Health Information Technology (ONC), discussed the next generation of the digital infrastructure and the opportunities it can afford. Christopher Queram, president and chief executive officer of the Wisconsin Collaborative for Healthcare Quality, described one example of building and using a data collection infrastructure. T. Bruce Ferguson, Jr., inaugural chairman of the Department of Cardiovascular Sciences at East Carolina University, provided a practitioner's perspective on using metrics within the confines of a real-world health care organization.

INFORMATION TECHNOLOGY–ENABLED QUALITY MEASUREMENT

Kevin Larsen explained that the goal of ONC is to improve the performance of the overall health and health care system, not simply to expand the use of digital tools. Operationalizing this goal means providing tools that providers, organizations, and public health systems can use to drive improvement. At their best, such tools can identify gaps in a patient's care, allowing providers to make changes to address those specific gaps and to reform care processes in order to improve outcomes for future patients. To further this vision, ONC, the Centers for Medicare & Medicaid Services (CMS), and other federal partners have developed a strategy that focuses on real-time measurement, as opposed to retrospective measurement, and that emphasizes local ownership, benchmarking, links to decision support, and patient engagement tools. Larsen emphasized that ONC's initiatives are a collaborative effort relying on partnerships with CMS, other agencies of the Department of Health and Human Services (HHS), and many federal partners.

Larsen explained that meaningful use is not just about installing technology for the sake of technology but rather because the technology supports some goal or purpose. ONC's role in driving meaningful use is to make sure that an electronic health records system is working properly and providing the information needed to support defined goals. Toward that end, its certification process tests the basics of any new electronic health records system against a set of standards so that health care systems can purchase a system with confidence that it does work. He detailed the stages of the meaningful use program and the progression in functionality. Stage 1 involved ensuring that data capture and sharing capabilities met or exceeded a published standard and also ensuring the initial infrastructure was in place. Stage 2, the regulations for which were only recently published, is focused on advancing clinical process. In Stage 3, ONC will help support new models of care, such as accountable care organizations (ACOs) and patient-centered medical homes, that represent the next generation of health care delivery.

One challenge is take advantage of new digital sources of clinical data for measures. Many current metrics were developed for use with a given set of data sources, such as claims, chart abstraction, and others, yet electronic health records, registries, and other types of records can be used to supplement this information to provide a broader view of care quality and health. There are multiple challenges with today's measures: Some providers are expected to report on measures unrelated to practice scope, duplicate data are often submitted by multiple providers for the same patients, and data systems are often not interoperable. To address these and other issues, ONC and CMS are building modular measures that can be useful for the clinical care of common conditions and that can be integrated into an electronic health record. Explaining the concept of a modular measure, Larsen noted that it would rely on standardized components, such as the definition of a disease or a population. The advantage of using modular components is that it can allow individuals at the local level to innovate, reuse, and reconfigure their measurement framework, while being assured that they are aligning their work with definitions and technical specifications from other programs. As part of this work, ONC has been building common definitions, which are housed in the Value Set Authority Center at the National Library of Medicine and can be downloaded easily.

ONC, CMS, and the National Library of Medicine are also moving measures to new standards of representation, Larsen explained, using rich, standardized clinical languages such as SNOMED. This will require a transition for organizations used to claims-based measures, but the result will be a richer, most sophisticated representation of disease. Larsen noted that in developing automated measures, ONC has identified the need to develop a more rigorous testing and standardization process. ONC is also developing a set of standardized transmission formats that enable data to be moved electronically between systems regardless of the design of a specific electronic health record system.

Larsen said that ONC aims to support a range of improvement initiatives with the wider application of electronic health records. He presented an example of a tool, popHealth, that physicians can use for free that lets them see in real time how they are doing on various measures, such as asking their patients about tobacco use. ONC's aim is to link standardized measures to standardized tools for clinical decision support. For example, a measure about cardiovascular risk reduction linked to data standards that would instantly calculate a Framingham risk score for a patient or provider could lead to a conversation about risk right at the point of care. "The measurement is linked to a tool that helps make decisions, and it becomes part of the quality improvement ecosystem," Larsen explained.

In closing, Larsen said that the goal is to create for health information technology the equivalent of the Google home page screen. "It's a white screen with one little line, and you put a search in, and the whole world of information is at your fingertips," he said. "It all just works. You don't think about how it works. You don't know how it works, but it works, and you like it. That's what we're trying to achieve."

WISCONSIN COLLABORATIVE FOR HEALTHCARE QUALITY

Before discussing the experiences of the Wisconsin Collaborative for Healthcare Quality (WCHQ), Christopher Queram commented on the growing number of regional health improvement organizations, including WCHQ, that are working in the areas of accountability, public reporting of comparative performance measures, and performance improvement. He noted that as the work of these organizations has matured, they have been venturing into new areas such as supporting or catalyzing payment reform and engaging consumers in the use of the information that they have been generating. He credited initiatives such as the Robert Wood Johnson Foundation's Aligning Forces For Quality program, the high-value health care initiative promoted by former HHS Secretary Michael Leavitt, and ONC's current Beacon Community Programs for the key roles that they have played in catalyzing the development of these multi-stakeholder, largely not-for-profit, and largely private-sector regional health improvement organizations.

Given that context, Queram described WCHQ, which was founded in 2003, as a completely voluntary operation that worked to maintain a distinctive value proposition as its work matured and became more broadly accepted. Today WCHQ represents some 60 percent of Wisconsin's primary care physicians and includes most of the multi-specialty group practices and integrated health systems in the state as well as many of the state's small primary care clinics. Several years ago, WCHQ made the explicit decision to align its work around the three-part aim, anticipating the prominence that the three-part aim would take as the centerpiece of the National Quality Strategy. WCHQ's core competencies revolve around four activities: developing and prioritizing performance measures for assessing the quality and cost of ambulatory care in Wisconsin; collecting, validating, and analyzing both administrative and clinical data; publicly reporting comparative performance results for health care providers, purchasers, and consumers; and sharing the best practices of health care organizations that demonstrate high quality. In its early days, WCHQ worked on developing performance measures, particularly with regard to adapting the Healthcare Effectiveness Data and Information Set (HEDIS) measures to fit a non-enrolled population, but now it focuses on prioritizing measures.

Queram explained that WCHQ acquires data via two routes. Ten of WCHQ's 21 publicly reporting members calculate measures internally using detailed specifications and then submit aggregate denominator and numerator data for measures to WCHQ's Web-based reporting tool. These 10 also submit de-identified patient-level data for validation purposes. The other 11 publicly reporting members, as well as the nine new members scheduled to join in 2013, use repository-based data submission to submit global files of patient demographic, encounter, and clinical data. The repository's centrally programmed measure specification tool calculates performance results. This HIPAA-compliant data repository is approved as a CMS registry for payment purposes, for meaningful use submission, and for WCHQ public reporting. Queram noted that WCHQ shares basic functionality with the Minnesota Community Measurement system. He also remarked that WCHQ ensures the accuracy of its performance measures through the oversight of a multi-stakeholder audit committee that consists of representatives from WCHQ member organizations, health insurers, and purchasing partners. The audit committee guides the development and revision of WCHQ policies and procedures for data submission, validation, and reporting. The audit process, which includes some random checks, validates numerators and denominators and has a mechanism to resolve issues prior to data reporting.

Turning to how WCHQ's member organizations use these data, Queram used UW Health, the academic practice group for the University of Wisconsin medical school faculty, as an example. UW Health joined WCHQ in 2004 and began sharing enterprise-transparent clinical level reports in 2009, department-transparent provider level reports in 2010, and enterprise-transparent provider reports in 2012. Queram displayed examples of the organizational level (see Figure 7-1) and provider level (see Figure 7-2) reports that WCHQ generates and showed how UW Health uses the data to track colorectal cancer screening rates of its 23 clinics and then by provider at each clinic over time. UW Health has used these data to improve colorectal cancer screening rates across all of its clinics, from 61 percent in 2005 to 79 percent in 2011, which was better than the 61 percent to 73 percent improvement seen across the entire WCHQ population.

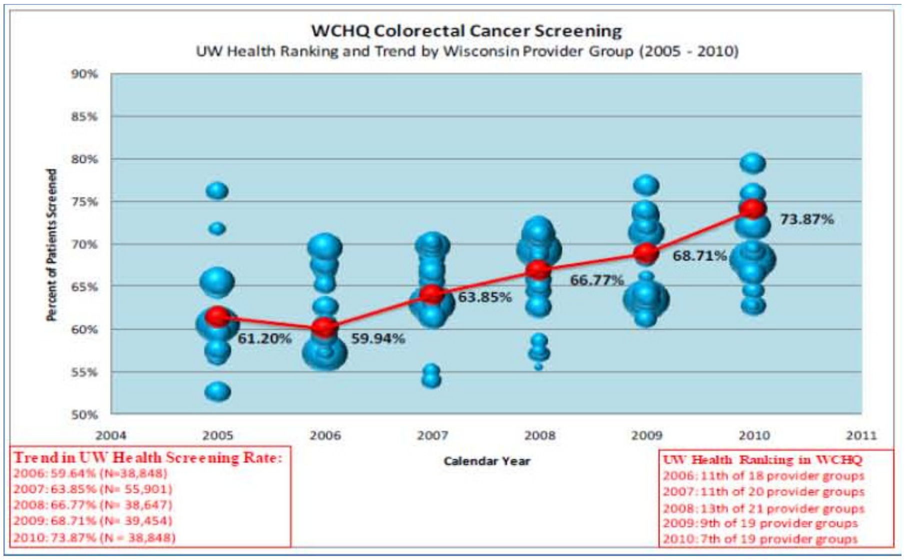
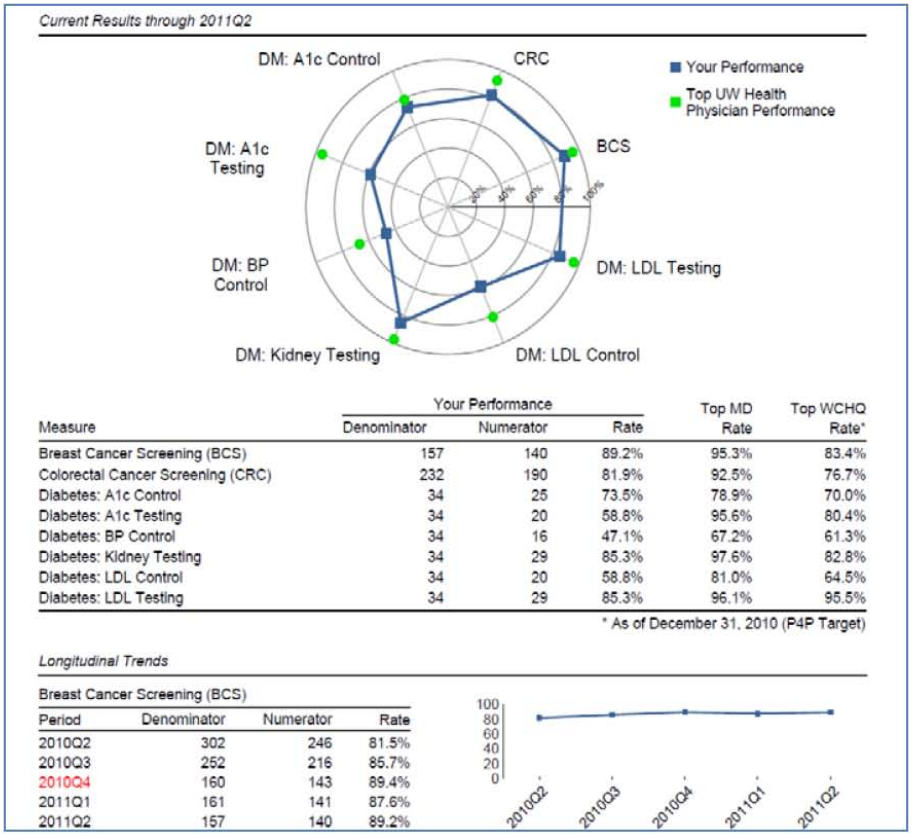


FIGURE 7-1 WCHQ organizational level report.
SOURCE: Queram, 2012.



Current Results through 2011Q2

Measure	Your Performance Denominator	Numerator	Rate	Top MD Rate	Top WCHQ Rate*
Breast Cancer Screening (BCS)	157	140	89.2%	95.3%	83.4%
Colorectal Cancer Screening (CRC)	232	190	81.9%	92.5%	76.7%
Diabetes: A1c Control	34	25	73.5%	78.9%	70.0%
Diabetes: A1c Testing	34	20	58.8%	95.6%	80.4%
Diabetes: BP Control	34	16	47.1%	67.2%	61.3%
Diabetes: Kidney Testing	34	29	85.3%	97.6%	82.8%
Diabetes: LDL Control	34	20	58.8%	81.0%	64.5%
Diabetes: LDL Testing	34	29	85.3%	96.1%	95.5%

* As of December 31, 2010 (P4P Target)

Longitudinal Trends

Breast Cancer Screening (BCS)

Period	Denominator	Numerator	Rate
2010Q2	302	246	81.5%
2010Q3	252	216	85.7%
2010Q4	160	143	89.4%
2011Q1	161	141	87.6%
2011Q2	157	140	89.2%

FIGURE 7-2 WCHQ provider level report.
SOURCE: Queram, 2012.

WCHQ makes its reports available through its webpage, and Queram noted that most of the visits to the website are by provider organizations that use the reports as benchmarks for their own organizations' performances. Few consumers have used the site, he added, because the data are available largely in raw form, and WCHQ is now experimenting with a number of different approaches for repurposing and repackaging the data for presentation on a consumer-oriented website, Wisconsinhealthreports.org. He described a narrative storytelling approach that uses two characters—one with diabetes, the other with hypertension—to put the data into a context that is useful for patient decision making.

As for the future direction of WCHQ, Queram said that the organization has started developing the mechanisms for reporting at the clinic or practice level and plans to begin public reporting of practice site–level data for all ambulatory care measures in May 2013. This will provide individual and provider organizations with a more granular depiction of performance. He added that one of the major lessons that WCHQ has learned is that there is no substitute for leadership from senior level executives and thought leaders, both for conceptualizing possibilities and managing expectations over time. It was also important to spend time with diverse groups to develop buy-in and to build the social capital needed to develop and grow. Furthermore, WCHQ has developed and published an evidence base, finding a correlation between public reporting and improvement (Smith et al., 2012).

In a final remark, he said that organizations such as WCHQ are learning that they are fragile in terms of their organization and market structure. “There has been a commoditization of performance measurement in the last decade,” he said. “For all of the good intentions and emphasis of these national level activities, it’s crowding out the human and financial capital that’s critical to support local activities.” He implored the workshop attendees to help redress this trend and create a balance that will enable important community-level work to continue.

BUILDING THE DATA INFRASTRUCTURE IN A HEALTH CARE ENVIRONMENT

Bruce Ferguson began the workshop’s final presentation with a brief comment about the concept of a global outcome score—the proportion of potentially preventable adverse events that are actually prevented with the current level of care—as an actionable metric that can be used to assess the potential effectiveness of different interventions in a real-world setting. This type of score can be used to set target goals, which is where the quality improvement process starts. The success of the global outcome score also highlights the value of local information, and Ferguson reiterated Queram’s final comment about the increasing difficulty in getting the resources needed to collect data at the local level (Eddy et al., 2012).

Local centers, Ferguson said, create a data stream, consisting of clinical data, quality data, operational data, and administrative data, that can be augmented by electronic health records. By integrating this data stream with existing electronic health record systems, the data stream becomes the resource for the populating the daily dashboard and for monthly and quarterly scorecard data, the tools that an ever-increasing number of academic medical institutions are using to assess their current status and design their futures. This structure also enables just-in-time research and learning, Ferguson said, and therefore can be a valuable resource for designing core metrics.

Ferguson showed an example of how this data stream can be used to catalyze improvements in care. Using an efficiency measure for coronary artery bypass, it was easy to identify one physician who fell into the high-cost, low-quality category and another physician who was in the low-cost, high-quality category. Putting these two physicians together produced improvements in quality quickly. In another example at a regional level, the data stream was used to analyze the cost of care for aortic valve prostheses and showed that the main driver of health care costs was surgical complications.

Ferguson also commented that mortality can be a misleading metric if it is not interpreted in the correct way. Two hospitals could have similar mortality rates overall, he said, but a closer look might find that patients who might be expected to have a low risk of mortality are in fact dying at a higher rate than expected. Using observed and predicted mortality rates, Ferguson and his colleagues calculate a patient-specific performance indicator, which evaluates a hospital's performance by incorporating the predicted risks of the patient with a specific event into a performance indicator module, where a positive score indicated better-than-expected performance and a negative score indicates a worse–than-expected performance. Comparing these two methods shows little correlation between the two measures (see Figure 7-3).

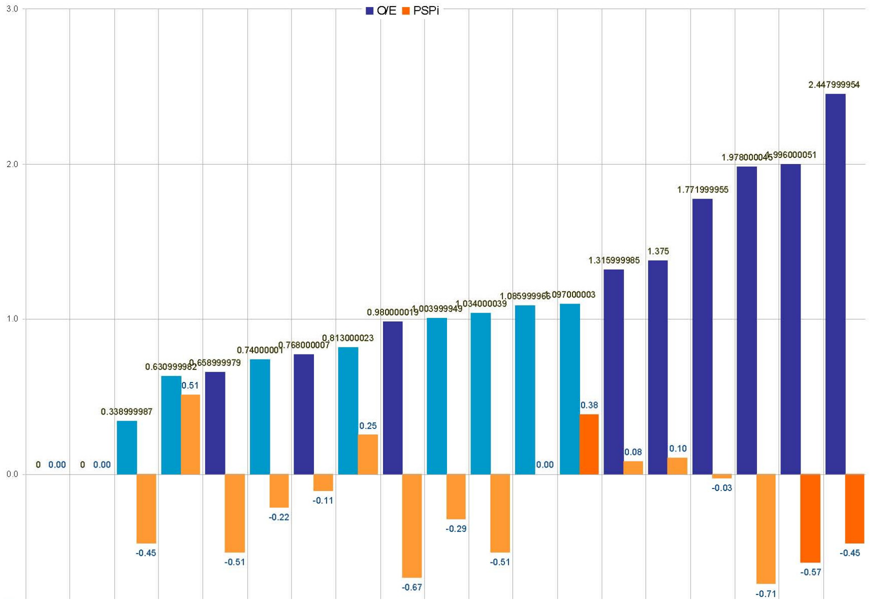


FIGURE 7-3 Comparison of two different mortality measures (the observed versus expected mortality measures [blue] and patient-specific performance indicator [orange]), which found little correlation between the two methods.
SOURCE: Ferguson, 2012.

Commenting on the universal patient identifier, Fergusson said that the cost to implement the universal patient identifier ranges from $1.5 billion to $11 billion but that the return on investment from having this identifier in combination with electronic health records would be $10 billion to $20 billion annually as a result of decreasing the inefficiency that now occurs in exchanging health information. He also remarked that technology can help overcome some of the obstacles that are impeding physician adoption of electronic health records. As an example, he cited a new tool he has been involved in developing that could incorporate clinical information directly into the health record with structured data elements instead of free-text notes.

Ferguson concluded by stating that he believes there are important new local and regional opportunities for taking real-time data and making inferences for use in real-time decision making. He added that these technology developments are quite robust as they come down the development pipeline. It will be important, though, to evaluate the realities of the clinical environment in which national core metrics will operate and to evaluate how well the core metrics can be effectively executed in these clinical environments.

DISCUSSION

During the ensuing discussion, a comment was made that it is important to start thinking now about how to pull clinical data out of registries and combine it with information-rich population data in a unified data stream. Another participant added that there is a real need for tools to turn these data into information that is useful to consumers, not just health care professionals. Larsen noted that he believes that the creative marketplace will develop those tools in a cost-effective manner. He added, though, that organizations will have to undergo a culture change in order to recognize the need to make their data transparent to consumers.

A participant described in detail a system that that the American College of Surgeons has rolled out across the country. This Rapid Quality Reporting System focuses initially on adherence to the National Quality Forum recommendations regarding post-surgical adjuvant therapy for breast and colorectal cancers. This system allows individual providers, physicians, and nurses to input a parsimonious dataset for each individual cancer patient via a Web-based portal. The data are processed at the college's Chicago headquarters and is then available for individual hospital sites to track their patients over time so that they are beginning therapy on schedule. Patient data are aggregated at the individual and hospital level. One key question about this system, the participant noted, is how to make this information available to the broader community. Another workshop attendee remarked that this effort shows that it does not need to take years and millions of dollars to create clinical database structures.

A participant who serves as a chief medical officer at a hospital said that standards need to be created to enable data transfer from electronic health records directly into registries such as the one that the American College of Surgeons developed. Such standards would have a significant impact on the burden of inputting data into these systems. Another participant, while recognizing the power of these disease-specific registries to improve care, wondered how it would be possible to connect these registries, given their increasing number. He noted an earlier comment that one hospital has 23 of these registries and has to populate data for each of them manually from the electronic health record.

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8

Common Themes

KEY QUESTIONS FOR CONSIDERATION

- What is the principal purpose of core measures?
- Who needs to be involved in the development of core metrics, and how?
- What related work is already completed or under way?
- What framework or model is best suited to the purpose?
- What criteria should guide the selection of priorities?
- How might overlaps be resolved among candidate measures?
- Which measures are most actionable for progress?
- What are the available data sources at each assessment level?
- What are the data infrastructure needs?
- How can the metrics and the process be most future-oriented?

The workshop summarized in this document had broad objectives, including examining a vision for core health metrics; drawing lessons from national, state, community, and organizational efforts; identifying the metrics that could reliably measure care outcomes, costs, and health improvement; and describing the implementation strategies for these measures. With a scope this broad, the discussions were similarly wide-ranging. However, certain points emerged multiple times in the presentations and audience discussions and became frequent reference points. In concluding remarks, Michael McGinnis summarized the common themes and potential opportunities for improvement in the measurement infrastructure.

COMMON THEMES

What Is the Principal Purpose of Core Measures?

The workshop participants highlighted several motivations for building a core set of measures. At the most fundamental level, basic measures should reflect and emphasize those issues most important to improving care, lowering costs, and improving health. The measures can then be used to improve program management and to develop incentives and payment systems targeted to the most important issues across the board. How, for example, might core measures be used to track progress in states receiving waivers to increase flexibility in managing Medicaid?

At the practice level, having a common core set of measures should help reduce the burden of measurement imposed by the increasing proliferation of metrics that clinicians and care delivery organizations must collect and report. Several participants noted that the number and scope of metrics has increased steadily over time. These expansive measurement requirements have impacts in cost and human effort, and they also spread attention so broadly that individuals cannot focus on the set of actions that are truly important for improving value and health.

A common set of measures will also allow for the identification of variations, whether among different health care delivery organizations, clinicians, treatments, or population health management techniques. One speaker noted that a common measurement framework in cardiac surgery allowed his organization to identify variations in clinical outcomes among different providers and then share the best practices from high performers throughout the organization. Another speaker emphasized that public reporting of performance measures allows organizations to identify areas that need improvement and to track improvement over time.

Several speakers noted that progress toward the three-part aim often requires diverse coalitions, as multiple factors influence health and health care. With such diverse coalitions, there is a need for integration of information from all partners, including county-based health departments, health care delivery organizations, community-based organizations, and employers. Core measure sets can help these diverse groups work together by defining a common target for improvement and identifying the areas where data need to be collected.

Finally, a common set of core measures can be used to guide the creation of a robust, rational digital infrastructure. One speaker highlighted how his organization in Vermont used core measure sets to identify the necessary data elements that its electronic health record systems should capture during routine care. In this example, the core set of measures served as the basis for a data dictionary around which the electronic health record system was designed. The resulting system was able to be used to export and ingest these key elements, populate the core measures in a dynamic fashion, and assure transmission and exchange of the key data elements. Similar principles can apply to other data systems, from multi-payer claims databases to health surveillance systems.

Who Needs to Be Involved in the Development of Core Metrics and How?

The health and health care system consists of a diverse set of organizations and individuals, each with a different perspective on the three-art aim. For example, the definition of cost varies depending on the stakeholder: Patients and consumers may consider out-of-pocket costs, a payer may consider total claims, and the federal government may view budgets and appropriations for health programs. The diversity of perspectives can be seen in the number of stakeholders, which include the following:

- Patients, consumers, caregivers, and the public
- Health care professionals (physicians, nurses, pharmacists, and others)
- Hospitals and health care delivery organizations
- Payers
- Public health agencies
- Regulators
- Communication professionals and the media
- Community-based organizations
- States (legislators, governors, executive agencies)
- Federal government (legislators, executive agencies)

Understanding these varied perspectives is critical for ensuring the usefulness of any core metric set; gathering these perspectives requires broad engagement across the health and health care system. This broad engagement also can uncover other factors that affect a metric's actionability for different stakeholders, such as the stakeholder's access to the underlying data for this metric, a stakeholder's ability to affect the metric, and whether the metric captures processes or health outcomes that are most in need of improvement. Furthermore, different groups will need different communication strategies based on their circumstances and needs, their numeracy and health literacy, and their perceptions of the metric. Communicating metrics to many stakeholder audiences requires multiple dissemination methods that may include rankings, media reports, academic publications, publicly reported data, and other techniques.

What Related Work is Already Completed or Under Way?

For decades, initiatives have been under way to identify the core measures in health and health care. More than 60 years ago, Congress founded the National Committee on Vital and Health Statistics to identify the needs for health statistics, data, and information. Over 30 years ago, the Healthy People initiative began with the publication of *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention.* The ongoing Healthy People initiative has produced four follow-on publications, the most recent being *Healthy People 2020.* A current effort to advance aligned measures is the Measure Applications Partnership convened by the National Quality Forum, which has identified families of measures that could be used in core measure sets and which provides feedback for federal measurement efforts. In addition, the Institute of Medicine has produced several reports examining various areas of measurement, including *Performance Measurement* (IOM, 2006) and *For the Public's Health: The Role of Measurement in Action and Accountability* (IOM, 2010).

Presently, many organizations are involved in measurement along one or more dimensions of the three-part aim (see Table 8-1 for an abbreviated list of example organizations). These initiatives vary in their scale, considering performance at a county, state, or national level; in their focus, from physicians to hospitals and health plans; and in their data sources, from surveys and registries to clinical records and health care payment records.

The breadth of initiatives highlights the interest in improving measurement, but it also underscores the challenge of harmonizing across the many different initiatives currently underway. As noted by several meeting participants, the number of initiatives contributes to the fact that many stakeholders feel overwhelmed by the quantity of data they are required to collect for measurement as well as by the quantity of measures they must routinely calculate and report. A basic challenge to the development of core metrics that can be reliably deployed at national, state, local, and institutional levels will be the design of a process that fairly, equitably, and responsibly ensures stakeholder input from the key perspectives.

TABLE 8-1 Example Organizations, with Several Example Initiatives, Involved in Each Dimension of the Three-Part Aim

Measurement Dimension	Example Organizations and Example Initiatives
Population Health	- HHS (e.g., Healthy People 2020—Leading Health Indicators) - CDC (e.g., Community Health Status Indicators; National Center for Health Statistics; Office of Surveillance, Epidemiology, and Laboratory Services) - NIH (e.g., Healthy Communities study [collaboration with CDC and RWJF]) - County Health Rankings (with the University of Wisconsin Population Health Institute and the Robert Wood Johnson Foundation) - NQF (e.g., convenes National Priorities Partnership, Measure Applications Partnership, population health measure endorsement) - Private insurers and health plans - State of the USA project (e.g., State of the USA Health Indicators) - State and local governments - UnitedHealth Foundation (e.g., America's Health Rankings)
Health Care	- AHA (e.g., Committee on Performance Improvement) - AHRQ (e.g., National Healthcare Quality Report, National Healthcare Disparities Report, National Quality Measures Clearinghouse, CAHPS) - AMA (e.g., convening the Physician Consortium for Performance Improvement) - AQA Alliance (e.g., multi-stakeholder collaborative with focus on using measurement to facilitate improvement and promoting best practices in reporting) - CDC (e.g., National Healthcare Safety Network) - CMS (e.g., Hospital Compare, Physician Compare, Physician Quality Reporting System, Shared Savings Program [ACO] measures, Medicaid/CHIP Pediatric Health Care Quality Measures) - HRSA (e.g., HRSA Clinical Quality Core Measure Set) - Institute for Clinical Systems Improvement (e.g., developing evidence-based guidelines and supporting collaborative initiatives for measure development) - Joint Commission (e.g., ORYX) - Leapfrog Group (e.g., Hospital Safety Score) - NCQA (e.g., HEDIS measures) - NIH (e.g., Patient Reported Outcomes Measurement Information System [PROMIS])

	- NQF (e.g., convenes National Priorities Partnership, Measure Applications Partnership, quality measure endorsement) - ONC (e.g., meaningful use measures) - OSHA (e.g., health worker safety, injuries) - Premier (e.g., QUEST collaborative measures) - Private insurers and health plans - Quality Alliance Steering Committee (e.g., High-Value Health Care Project) - Specialty societies and professional societies (e.g., National Surgical Quality Improvement Program, registries) - State and local governments - Utilization Review Accreditation Committee (e.g., measurement for accreditation programs) - Veterans Health Administration (e.g., ASPIRE, Surgical Care Improvement Project, Linking Information Knowledge and Systems, Medical Home Initiative)
Cost	- AHA (e.g., AHA Annual Survey of Hospitals and AHA Annual Survey of Hospitals—IT Supplement) - AHRQ (e.g., Healthcare Cost and Utilization Project, Medical Expenditure Panel Survey [in conjunction with Census Bureau and CDC]) - Census Bureau (e.g., National Health Interview Survey [collaboration with CDC], Medical Expenditure Panel Survey [collaboration with CDC and AHRQ]) - CDC (e.g., National Health Interview Survey [collaboration with Census Bureau], Medical Expenditure Panel Survey [collaboration with Census Bureau and AHRQ]) - CMS (e.g., National Health Expenditure Data) - NQF (e.g., endorsement of resource use and cost-of-care measures) - Private insurers and health plans - Quality Alliance Steering Committee (e.g., High-Value Health Care Project)

What Framework or Model is Best Suited to the Purpose?

To consider a measurement framework in more depth, the workshop participants divided into breakout groups for each dimension of the three-part aim: population health, health care, and cost. Each breakout group considered potential priority metric categories that reliably assess outcomes, cost, and overall health improvement, and Table 8-2 summarizes the potential metric categories that were discussed by each group. For population health measurement, the breakout group leader noted that the discussions differentiated between measures that reflect current health versus measures that capture factors and contributors to future health. For health care measurement, a number of the breakout group participants observed that prior categorizations of health care quality, such as those in the 2001 IOM report *Crossing the Quality Chasm*, remained useful frameworks. In the cost breakout group, multiple participants outlined three categories for assessing cost that included resource use and overall expenditures, utilization of particular services and treatments, and overall affordability of health care for different stakeholders. In addition to these specific categories, equity and variation were cross-cutting factors across all metric categories and dimensions; properly designed metrics could be analyzed for variation across geography, socioeconomic status, ethnicity and race, age, gender, and other characteristics. This emphasizes the importance of the population used for calculating metrics—unless the metric originally draws on data from a broad population, it will be difficult to calculate performance for specific smaller populations.

TABLE 8-2 Example Organizing Framework for Describing the Core Measurement Needs

Metric Domain	Potential Metric Categories	Cross-Cutting
Population Health	- Current health - Contributors and risks to future health	Equity and Variation
Health Care	- Patient-centered - Effective - Safe - Value and efficiency - Coordination and communication	
Cost	- Resource use and expenditures - Utilization - Affordability	

What Criteria Should Guide the Selection of Priorities?

Given the importance of accurately assessing progress toward the three-part aim of improved care quality, lower costs, and better population health, the metrics used for this purpose must have several key characteristics. One theme that several participants raised was the need to minimize the overall measurement burden in cost, time, and effort. One speaker described the efforts in his measurement work to derive measurement from data collected by routine care and health monitoring. Other attendees noted the value of standardization, such as using common technical specifications for calculating metrics, aligning metrics across different initiatives, and using existing measures whenever possible. Given the multiple levels at which measurement occurs, a number of participants underscored the value of metrics that are useful at multiple levels.

Multiple workshop participants emphasized the value of identifying metrics that are important, comprehensive, and meaningful. For example, an important metric is one that has an impact on health, health care, or cost and is tied to overarching goals for the health or health care system, such as reducing disparities. Some attendees noted that useful measures are as comprehensive as possible and bundle individual metrics to describe meaningful concepts in health, health care, or cost. This composite measure could include multiple process or intermediate outcome measures to assess progress on important health conditions. Composite measures assess broader impacts that narrow measures may miss. For example, a narrow prescription drug cost metric would show higher costs as adherence improves, while a broader cost measure would include potential savings from better compliance, such as reduced readmissions or lower hospital costs.

One additional set of criteria centered on the actionability of the measure. This concept was defined as how well the actions, policies, or incentives implemented by individuals or organizations could influence the metric. Several attendees noted that actionability depends on the availability of benchmark or comparison data which allow the measured individuals or organizations to make sense of the measurement results. Another factor ensuring actionability is the presence of an evidence base proving the reliability and validity of the metric. This can ensure that the measure is consistent across individuals and organizations and that it assesses the intended target.

How Might Overlaps Be Resolved Among Candidate Measures?

In addition to examining potential metric categories, the workshop breakout groups also considered example metrics for each category. Examples that were mentioned during the breakout groups and subsequent workshop discussions are presented below in Table 8-3. These example metrics vary in their specificity, comprehensiveness, and actionability. Some workshop participants noted that conceptual overlaps existed between the metric categories, such as between the example metrics for effectiveness in the health care domain and the metrics for current health in the population health domain. Resolving these overlaps will require a deeper examination of the concepts underlying each domain and the actions that could affect a given metric. While identifying some potential metrics, the workshop discussions underscored the need for further deliberations to develop a full core metric set.

TABLE 8-3 Example Metrics for Describing the Core Measurement Needs of the Three-Part Aim

Metric Domain	**Potential Metric Categories**	**Example Metrics**	**Cross-Cuttin g**
Population Health	Current health	- Length of life: Mortality, life expectancy - Quality of life: Morbidity, functional status, indicator diseases, self-reported health status - Composite measures: QALY, HALY, DALY	Equity and Variation
	Contributors and risks to future health	- Extrinsic risks: healthy communities, physical and social environment - Intrinsic risks: health risks, health behaviors	
Health Care	Patient-centered	- Patient engagement and experience, HCAHPS metrics - Shared decision making - Patient–clinician communication - Self-management - Timeliness and access to needed care	Equity and Variation
	Effective	- Overall mortality, mortality amenable to health care (risk adjusted), overall modifiable risk of death - Functional status improvements/changes from treatments and interventions, changes in modifiable risk factors, patient-reported outcomes, clinician-reported outcomes - Disease-specific outcome targets, time to recovery or time to return to function - Adherence to clinical guidelines, appropriateness of care	

	Safe	- Medical errors, health care–associated infections, overuse/underuse/misuse - Composite medical harm measure (including medical errors and health-associated infections)	
	Value and efficiency	- Utilization: Ambulatory care–sensitive admissions and readmissions, care performed in most appropriate setting - Effective management	
	Coordination and communication	- Timeliness - Care transitions - Information sharing and communication among care team (including patient and family) - Medication reconciliation	
Cost	Resource use and expenditures	- Actual per capita expenditures for health care (such as a risk-adjusted Total Cost of Care metric) across all conditions - Percent of national GDP and/or federal government health care spending as percent of total federal government spending	Equity and Variation
	Utilization	- Emergency room use, advanced imaging services, and other services, treatments, interventions, diagnostics	
	Affordability	- Percent of household spending on health, premiums	

Which Measures Are Most Actionable for Progress?

Metrics do not exist in a vacuum but depend on their ultimate use. For example, a metric that aids an organization in quality improvement efforts may not be appropriate when tied to payment for health care services. This fact adds additional complexities to metric development and selection, as there are many ways that metrics are used today, including

- Quality improvement (e.g., organizational, regional, state, national levels)
- Payment and purchasing decisions (e.g., pay for performance, tiered networks, state exchanges)
- Reporting and transparency (e.g. internal, clinical practice feedback, rankings, public, exchanges, surveillance)
- Regulation (e.g., professional certification, facility accreditation)
- Funding (e.g., organizational and governmental budgets, philanthropy)
- Scientific and clinical research (e.g., effectiveness research)

There are several challenges in the routine implementation of these core measure sets. One issue that several participants raised was defining the population, such as determining whether that population consists of the panel of patients seen by a clinical provider or health care delivery organization, all of the people in a given geographic region, or another grouping of individuals. The choice of populations affects what measures are possible to implement and the ultimate use of the measures. If the population definition is overly restrictive, it may not be possible to accurately understand how performance and health outcomes vary for different subpopulations. Furthermore, restrictive population definitions may cause disconnects between measures calculated for the clinical care system and the public health system (Gourevitch et al., 2012). Beyond defining the population, additional challenges occur when payment is linked to measurement, as this makes the measure high-stakes and increases attention on the measure's limitations in accuracy or comprehensiveness. Another implementation issue is how to account for the organizational and social factors necessary for successful measurement strategies. These factors include organizational leadership, culture, the business case or return on investment, knowledge management infrastructure, and workforce competencies. For example, one participant noted that some organizational cultures view measurement and data as a weapon, while other organizational cultures promote the view that regular feedback is a welcome opportunity to improve. Several participants noted that these organizational and social factors can determine whether a metric set actually leads to improvement and is used throughout the health and health care system.

Another implementation question that workshop attendees highlighted is how to roll up metrics from smaller to larger levels of aggregation, such as local to regional to national levels. One suggested method was to use a dashboard of key metrics that can track progress with a series of more specific measures attached to each dashboard measure. These more specific measures need to be associated with improvement of the dashboard metrics and could be operationalized at local levels. For example, some participants in the cost measures breakout group noted that overall health care spending measures need to be the goal, but progress at the local level will depend on specific utilization measures, such as emergency department use or the utilization of advanced imaging technologies. Other participants noted that families of measures can be useful for ensuring that metrics are useful at different levels of aggregation.

What Are the Available Data Sources at Each Assessment Level?

A key practical consideration that was underscored frequently is identifying the data used to populate the core metric set. Various data sources can be leveraged to support measurement, and choosing among them can be a challenge. These data sources vary based on the population of individuals included, the purpose for the data, and the process for collecting the data. These variations affect whether the data sources can be used for different purposes. The current primary data sources for metrics include

- Patient-level clinical care data (e.g., electronic health records, registries)
- Individual-level social data (e.g., social and economic status; demographics; access to social and economic services, children and family services, elderly services, and home health services)
- Population-level clinical data (e.g., cancer, chronic condition and screening registries)
- Population-level safety data (e.g., adverse event reporting registries)
- Vital statistics (e.g., local, state, and national vital statistics registries)
- Claims data (e.g., Medicare claims database, private payer claims database, multi-payer claims databases)
- Patient surveys (e.g., experience, health status)
- Population surveys (e.g., U.S. Census surveys)

What Are the Data Infrastructure Needs?

A prerequisite to assessment is the ability to routinely capture the key data elements that populate core measures and to exchange those data elements across data systems. Although progress is being made, there is a significant gap between current capabilities and the necessary data support. For example, despite an investment of significant resources, there is a patchwork of independent electronic health record systems that do not capture the necessary key data elements in consistent formats and do not readily exchange those elements across systems (Chan et al., 2010; Gold et al., 2012; Kern et al., 2013; Parsons et al., 2012). The country faces the possibility of a disjointed digital infrastructure that will not meet the needs of individuals or organizations, nor establish the capacity for regular assessment across the full landscape of organizations and individuals involved in the health and health care systems (IOM, 2011, 2012).

Beyond the technical infrastructure needs, these data systems need to be considered in light of their usability for all people, from patients and families to clinicians. For example, health information technologies and publicly reported information will only be successful if patients are engaged, if the tools are accessible for patients with a range of technological skills, and if patients understand how to apply the tools to their own health and care decisions. Similarly, health information technology will only be successful for clinicians if it accounts for their workflow and it assists them in care.

In addition, there are several policy issues that can limit progress. Several participants outlined the regulatory challenges that can prevent access and use of data for measurement, most notably the real and perceived barriers associated with the Health Insurance Portability and Accountability Act (HIPAA). Another policy challenge that was highlighted is risk adjustment. Risk adjustment is challenging because of the number of potential methods for adjusting measures and the role that risk adjustment plays in promoting buy-in among clinical providers.

How Can the Metrics and the Process Be Most Future-Oriented?

One basic issue that was raised several times at the workshop is the tension between starting with available metrics and improving over time versus ensuring a certain level of metric quality before widespread deployment. Those participants favoring the former approach highlighted the large number of measures currently available, the urgent need for progress, and the fact that the process of implementation can uncover logistical issues that may not have been envisioned in a planning process. Those preferring the latter approach noted that inaccurate measures can damage the credibility of the measurement enterprise, that a process for clinician buy-in is important to ensure that metrics are accepted and used, and that incorrect measures can be unfair when used for high-stakes uses such as payment and regulation. Resolving this tension is important to progress in implementing a core set.

Another issue affecting the ability of measures to improve over time is technological progress. For example, emerging devices can continually assess specific aspects of an individual's physical state, which can allow a more complete picture of health status and the impact of various interventions. The expected flood of new data from these personal devices will have implications for what is measurable and for the actionability of different measures. Yet, new challenges will also occur, such as the interoperability of different devices, the capabilities to analyze and use this new data, and the privacy and security of the generated data. As well, any measurement initiative must consider how measures will be updated and implemented based on the technological progress that is sure to occur.

One theme that arose during the discussion was how to ensure that core metric sets are forward looking and continuously learn and improve. Participants noted the need for a process to eliminate measures that are no longer helpful, such as ones that have achieved near-universal compliance. Without such a process to prune unneeded metrics, the measurement burden will only continue to increase. Several workshop attendees underscored the need to have measurement itself become a learning system so that it improves over time and takes advantage of improvements in science and technology. This will help ensure that measurement continually promotes progress in the health of the population, the quality of health care, and the overall value of the health and health care system.

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Appendix A

Biographical Sketches of Speakers and Planning Committee

David Atkins, M.D., M.P.H., is the director of the Quality Enhancement Research Initiative (QUERI) at the U.S. Department of Veterans Affairs. Dr. Atkins brings outstanding expertise in the field of implementation science to the QUERI program, having spent more than a decade at the Agency for Healthcare Research and Quality (AHRQ), where part of his duties included supervising 13 evidence-based practice centers (EPCs) as their chief medical officer. This has given him hands-on experience in negotiating the intersection between research, quality improvement, evidence-based practice, and public policy. Before serving as chief medical officer for the EPCs, Dr. Atkins was the coordinator for clinical preventive services at AHRQ's Center for Practice Technology Assessment. In that role, he directed an array of programs and research activities relating to clinical preventive services and health promotion, such as directing the work of the U.S. Preventive Services Task Force. Board certified in internal medicine, Dr. Atkins also has a masters of public health in epidemiology. Prior to joining AHRQ, he split his time between research and practice by conducting epidemiologic research on cardiovascular disease prevention and providing primary care in the ambulatory setting. In addition to several faculty appointments, Dr. Atkins has served on national committees that include the Armed Forces Epidemiology Board, the American College of Preventive Medicine's Practice Guidelines Committee, and the American Cancer Society's Detection and Treatment Advisory Group. Dr. Atkins is a member of the editorial board for the *American Journal of Preventive Medicine*, and he has authored nearly 40 articles and book chapters and given more than 50 presentations on topics such as improving cancer screening in the primary care setting, assessing outcomes of health promotion and disease prevention, and the science of practice guidelines. Dr. Atkins will lead QUERI as it continues to implement evidence-based innovations that help to improve the health and health care of veterans.

Mary Barton, M.D., M.P.P., is vice president for performance measurement at the National Committee for Quality Assurance (NCQA). In this role, she oversees the team supporting new quality measure development and the upkeep of existing measures in the HEDIS measure set. Prior to coming to NCQA, Dr. Barton was for more than 5 years scientific director of the U.S. Preventive Services Task Force (USPSTF) at the Agency for Healthcare Research and Quality (AHRQ). In that role, Dr. Barton's responsibilities included overseeing the evidence reviews prepared for the USPSTF by AHRQ-supported evidence-based practice centers as well as support and oversight of the methodological and recommendation-making work of USPSTF. Dr. Barton trained in primary care internal medicine at Brigham and Women's Hospital in Boston and completed a general medicine research fellowship at Harvard. Prior to joining AHRQ, she was an assistant professor at Harvard Medical School, where she performed clinical epidemiology and health services research related to cancer screening and prevention in terms of access, test performance, and outcomes. She is a member of the American College of Physicians and the Society of General Internal Medicine. Dr. Barton received her M.D. from Harvard University and a master's in public policy from the Kennedy School of Government at Harvard.

Maureen Bisognano is president and chief executive officer of the Institute for Healthcare Improvement (IHI), an independent not-for-profit organization helping lead the improvement of health care throughout the world. Previously, Maureen served as IHI's executive vice president and chief operating officer, leading IHI along with former president and chief executive officer Donald Berwick for 15 years. She is a prominent authority on improving health care systems whose expertise has been recognized by her elected membership to the Institute of Medicine of the National Academy of Sciences and by her appointment to the Commonwealth Fund's Commission on a High Performance Health System, among other distinctions. Ms. Bisognano advises health care leaders around the world, is a frequent speaker at major health care conferences on quality improvement, and is a tireless advocate for change. She is also an instructor of medicine at Harvard Medical School, a research associate in the Division of Social Medicine and Health Inequalities at the Brigham and Women's Hospital, and a board member of the Commonwealth Fund, the ThedaCare Center for Healthcare Value, and the Mayo Clinic Health System-Eau Claire. Prior to joining IHI, Ms. Bisognano was senior vice president of the Juran Institute, where she consulted with senior management on the implementation of total quality management in health care settings. Before that, she served as chief executive officer of the Massachusetts Respiratory Hospital in Braintree, Massachusetts, where she implemented a hospital-wide strategic plan that improved the quality of care while simultaneously reducing costs. Ms. Bisognano began her career in health care in 1973 as a nurse at Quincy Hospital in Quincy, Mass. She held positions of increasing responsibility there, eventually serving as chief operating officer from 1984 to 1987. She holds a bachelor of science degree from the University of the State of New York and a master of science degree from Boston University.

Helen Burstin, M.D., M.P.H., is the senior vice president for performance measures of the National Quality Forum (NQF), a private, not-for-profit membership organization established in 1999 to develop and implement a national strategy for health care quality measurement and reporting. Dr. Burstin joined NQF in January 2007 and is responsible for the NQF consensus development process and the endorsement of performance measures, preferred practices, and frameworks. Prior to joining NQF, Dr. Burstin was the director of the Center for Primary Care, Prevention, and Clinical Partnerships at the Agency for Healthcare Research and Quality (AHRQ). In her role, she oversaw the development of the health information technology (health IT) portfolio, which invested more than $166 million on research at the intersection of health IT and quality of care. Her center also supported the U.S. Preventive Services Task Force and an extensive body of research on primary care and prevention. Prior to joining AHRQ in 2000, Dr. Burstin was an assistant professor at Harvard Medical School and the director of quality measurement at Brigham and Women's Hospital. In her role, she developed a hospital-wide electronic quality measurement reporting system. She also served as the chair of the Medical Staff Executive Committee on Quality Assurance and Risk Management. Dr. Burstin is a graduate of the State University of New York at Upstate College of Medicine and the Harvard School of Public Health. She spent a year in Washington, DC, as national president of the American Medical Student Association. Dr. Burstin completed a residency in primary care internal medicine at Boston City Hospital. After residency, she completed fellowship training in general internal medicine and health services research at Brigham and Women's Hospital and Harvard Medical School. Dr. Burstin is the author of more than 75 articles and book chapters on patient safety, quality, and disparities. She previously served as a deputy editor of the *Journal of General Internal Medicine*. Dr. Burstin is a member of the board of directors of the American Medical Informatics Association (AMIA). She is a senior professorial lecturer in the Department of Health Policy at George Washington University School of Public Health and a clinical associate professor of medicine at George Washington University School of Medicine. A board certified general internist, Dr. Burstin precepts internal medicine residents at George Washington Medical Faculty Associates.

Michael E. Chernew, Ph.D., is a professor of health care policy at Harvard Medical School. Dr. Chernew's research examines several areas related to controlling health care spending growth while maintaining or improving the quality of care. His work on consumer incentives focuses on value-based insurance design, which aligns patient cost sharing with clinical value. Several large companies have adopted these approaches, and Dr. Chernew's ongoing work includes evaluations and design of such programs. His work on payment reform involves evaluation of bundled payment initiatives, including global payment models that include pay-for-performance components. Related research examines the effects of changes in Medicare Advantage payment rates. Additional research explores the causes and consequences of rising health care spending and geographic variation in spending, spending growth, and quality. Dr. Chernew received his B.A. from the University of Pennsylvania, and his Ph.D. in economics from Stanford University, where his training focused on areas of applied microeconomics and econometrics. He is the co-editor of the *American Journal of Managed Care* and senior associate editor of *Health Services Research*. Dr. Chernew has served on the editorial boards of *Health Affairs* and *Medical Care Research and Review*. Dr. Chernew is also a research associate of the National Bureau of Economic Research. Dr. Chernew is a member of the Medicare Payment Advisory Commission (MedPAC), which is an independent agency established to advise the U.S. Congress on issues affecting the Medicare program. He is also a member of the Congressional Budget Office's Panel of Health Advisors, the Institute of Medicine's Committee on Determination of Essential Health Benefits, and the Commonwealth Foundation's Commission on a High Performance Health System. In 2000, 2004, and 2010, he served on technical advisory panels for the Center for Medicare & Medicaid Services that reviewed the assumptions used by the Medicare actuaries to assess the financial status of the Medicare trust funds. On the panels, Dr. Chernew focused on the methodology used to project trends in long-term health care cost growth. In 1998, he was awarded the John D. Thompson Prize for Young Investigators by the Association of University Programs in Public Health. In 1999, he received the Alice S. Hersh Young Investigator Award from the Association of Health Services Research. Both of these awards recognize overall contribution to the field of health services research. His 2008 article in *Health Affairs*, "Impact of Decreasing Copayments on Medication Adherence within Disease Management Program," was awarded the Research Award from the National Institute for Health Care Management. In 2010, Dr. Chernew was elected to the Institute of Medicine (IOM) of the National Academy of Sciences.

Carolyn M. Clancy, M.D., was appointed director of the Agency for Healthcare Research and Quality (AHRQ) on February 5, 2003, and reappointed on October 9, 2009. Prior to her appointment, Dr. Clancy was director of AHRQ's Center for Outcomes and Effectiveness

Research. Dr. Clancy, a general internist and health services researcher, is a graduate of Boston College and the University of Massachusetts Medical School. Following clinical training in internal medicine, Dr. Clancy was a Henry J. Kaiser Family Foundation Fellow at the University of Pennsylvania. Before joining AHRQ in 1990, she was also an assistant professor in the Department of Internal Medicine at the Medical College of Virginia. Dr. Clancy holds an academic appointment at the George Washington University School of Medicine (clinical associate professor, Department of Medicine) and serves as senior associate editor for the journal *Health Services Research*. She serves on the editorial boards of multiple publications, including *Annals of Internal Medicine*, *Annals of Family Medicine*, *American Journal of Medical Quality*, and *Medical Care Research and Review*. Dr. Clancy is a member of the Institute of Medicine and was elected a Master of the American College of Physicians in 2004. In 2009, she was awarded the William B. Graham Prize for Health Services Research. Dr. Clancy's major research interests include improving health care quality and patient safety and reducing disparities in care associated with patients' race, ethnicity, gender, income, and education. As director of AHRQ, she launched the first annual report to Congress on health care disparities and health care quality.

Secretary Diana S. Dooley, J.D., was appointed to lead the California Health and Human Services Agency (CHHS) by Governor Jerry Brown. As CHHS secretary, Dooley will serve as a voting, ex officio member of the newly created California Health Benefit Exchange Board. She will also serve as a member or ex officio member of numerous other boards and commissions: the First 5 (California children and families) commission, Cal eConnect (health information exchange) board, Olmstead Advisory Committee, Alzheimer's Disease and Related Disorders Advisory Committee, Child Welfare Council, Managed Risk Medical Insurance Board, State Council on Developmental Disabilities, Technical Services Board, County Medical Services Program Governing Board, State Mental Health Planning Council, California Workforce Investment Board, San Joaquin Valley Partnership, and Strategic Growth Council. Prior to leading CHHS, Ms. Dooley was president and chief executive officer of the California Children's Hospital Association, which advocates for children's health on behalf of the eight nonprofit regional children's hospitals in California. These hospitals provide nearly 40 percent of all inpatient care for children in the state. Dooley began her professional career as an analyst at the State Personnel Board. In 1975, she was appointed to the staff of Governor Jerry Brown for whom she served as legislative director and special assistant until the end of his term in 1983. Before becoming an attorney in 1995, she owned a successful public relations and advertising agency. Dooley left her private law practice in December 2000 to accept the appointment as general counsel and vice president at Children's Hospital Central California near Fresno, where she established an in-house legal services program and directed the hospital's advocacy, communications, and governmental relations programs. Dooley is active in civic and community affairs, having served on the boards of directors of the University of California Merced Foundation, Blood Source of Northern California, and the Maddy Institute at California State University, Fresno. She is also a past president of Planned Parenthood, the Visalia Chamber of Commerce, and the Central California Futures Institute. Dooley is a native of Hanford, California, and graduated from Hanford High School in 1969. She received her bachelor's degree in social science from California State University, Fresno in 1972 and her law degree from San Joaquin College of Law in 1995.

T. Bruce Ferguson, Jr., M.D., was inaugural chairman of the Department of Cardiovascular Sciences at East Carolina Heart Institute at East Carolina University from 2007 to 2012. He is a board-certified cardiothoracic surgeon who specializes in adult cardiothoracic surgery with a particular emphasis in off-pump surgical revascularization. He came to North Carolina from Louisiana, where he was chief of cardiac surgery at the Louisiana State University Health Sciences Center in New Orleans prior to Hurricane Katrina. While in Louisiana, he received funding from the Transforming Healthcare Quality through Information Technology program of the Agency for Healthcare Research and Quality (AHRQ) to begin development of a longitudinal cardiovascular information system for the statewide charity hospital system population. He served for six years as the inaugural chair of the Society of Thoracic Surgeons Council on Quality, Research and Patient Safety, which oversees all aspects of the society's national database efforts, in collaboration with the Duke Clinical Research Institute. He was principal investigator on the society's two clinical trials in quality improvement from 1999 through 2007 funded by AHRQ. This effort also led to the creation of the National Consortium of Clinical Databases. He is currently co–principal investigator on the combined Duke-ECU Clinical Site for the Cardiac Surgical Network of the National Heart, Lung, and Blood Institute. He is a fellow of the American Heart Association and a member of the Quality Strategic Directions Committee, the Surgeon Council, and the Informatics Committee for the American College of Cardiology. He is also a member of the Committee on the Learning Health Care System in America of the Institute of Medicine. He received a degree in chemistry from Williams College and received his M.D. from Washington University in St. Louis. He completed his training in general and cardiothoracic surgery at Duke University Medical Center. He has been a consultant for Novadaq Technologies, Inc. since 2005 and for LifeCell, Inc. since 2011.

Barbara J. Gage, Ph.D., M.P.A., is a nationally recognized expert in Medicare post-acute and long-term care payment and quality monitoring policies. She leads the performance measurement work at the Brookings Engelberg Center for Health Reform, including efforts for the Quality Alliance Steering Committee, for the Long Term Quality Alliance, and for performance measurement in the work on accountable care organizations at Brookings. Dr. Gage has directed numerous national studies for the Centers for Medicare & Medicaid Services (CMS) and Congress, including the development of the Continuity Assessment and Record Evaluation (CARE), a standardized set of items for use in assessing the Medicare program, and numerous CMS efforts to develop quality measures for skilled nursing facilities, inpatient rehabilitation hospitals, and long-term care hospitals. Dr. Gage also directed the Post Acute Care Payment Reform Demonstration, which used the standardized CARE tool to examine patient outcomes and payment incentives associated with the range of acute and PAC services across an episode of care. Additionally, Dr. Gage has led numerous studies to develop quality-of-care measures and to examine payments and costs for these populations. Dr. Gage has also lead national studies of Medicare's hospice and durable medical equipment benefits, Administration for Community Living's (formerly the Administration on Aging) community-based long-term care systems, and numerous studies of episodes of care, including the identification of related services, quality of care and outcomes, and payment impacts. Her work includes both qualitative and quantitative methods, including interviews, surveys, primary data collection and secondary analysis of claims data, primary data from studies, and survey and certification data.

Julie Gerberding, M.D., M.P.H., joined Merck in January 2010 as the president of Merck Vaccines. She is responsible for the commercialization of the current portfolio of vaccines, planning for the introduction of vaccines from the company's robust vaccine pipeline, and accelerating Merck's ongoing efforts to broaden access to its vaccines in the developing world. Before joining Merck, Dr. Gerberding led the Centers for Disease Control and Prevention (CDC) as director from 2002 to 2009. In this position, she was responsible for coordinating more than 40 emergency response initiatives for public health crises, including anthrax bioterrorism, severe acute respiratory syndrome (SARS), avian influenza, and natural disasters. She also advised governments around the world on urgent public health issues such as AIDS, chronic diseases, and obesity. Dr. Gerberding joined the CDC in 1998 as director of the Division of Healthcare Quality Promotion at the National Center for Infectious Diseases at the CDC. There she developed CDC's patient safety initiatives and other programs to prevent infections, antimicrobial resistance, and medical errors in health care settings. Dr. Gerberding received her undergraduate degree and her M.D. from Case Western Reserve University in Cleveland, Ohio. She completed her internship and residency in internal medicine and a fellowship in clinical pharmacology and infectious diseases at the University of California, San Francisco (UCSF). As a tenured academician, she worked in a range of clinical, research, and teaching roles prior to joining the CDC in 1998. Dr. Gerberding also received her master's degree in public health at the University of California, Berkeley in 1990. She is a member of the Institute of Medicine and a fellow of the Infectious Diseases Society of America and the American College of Physicians and is board certified in internal medicine and infectious diseases. She is an adjunct associate professor of medicine in infectious diseases at UCSF. Dr. Gerberding has received more than 50 awards and honors, including the U.S. Department of Health and Human Services Distinguished Service Award for her leadership in responses to anthrax bioterrorism and the September 11, 2001 attacks. She was named by *Forbes* as one of its 100 most powerful women in the world in 2005, 2006, 2007, and 2008 and was named by Time as one of the 100 most influential people in the world in 2004.

Stefan Gildemeister, M.A., has 15 years of experience in conducting health services research and studying health care markets to generate applied policy analysis on health care cost, quality, and access to care. During this time, Mr. Gildemeister has directed research at the Minnesota Department of Health in health system finance, organization, and coverage using primary and secondary data to inform health policy making on a broad portfolio of health policy problems. Mr. Gildemeister has contributed to the state's work to design Minnesota's nation-leading 2008 health reform legislation. He currently directs the department's critical work to improve market transparency of cost and quality, which relies in important ways on Minnesota's all-payer claims database. As the state health economist and director of the Health Economics Program, Mr. Gildemeister provides policy advice and analytic guidance to Minnesota's implementation of the federal Affordable Care Act. Mr. Gildemeister holds degrees in economics and economics/business administration from the New School for Social Research, New York, and the University of Bremen, Germany. Over the years, Mr. Gildemeister has consulted on a variety of health policy issues for organizations and academic institutions in Germany and the United States.

Marge Ginsburg, R.N., M.P.H., is executive director of the Center for Healthcare Decisions (CHCD), a nonprofit, nonpartisan organization that seeks the public's perspective on complex health policy issues. Established in 1994 (originally as Sacramento Healthcare Decisions), the center's primary purpose is advancing health care that is fair and affordable and that reflects the values of an informed public. Recent work has focused on priorities in health care coverage and value-based benefits design. CHCD also assists other states in implementing community engagement activities related to health care. Ms. Ginsburg recently served on the Institute of Medicine's Committee for Determining Essential Health Care Benefits and is currently on the National Committee for Quality Assurance's Committee on Performance Measurement; on the boards of the Integrated Healthcare Association and the California Hospital Assessment and Reporting Task Force; on the California Technology Assessment Forum; and on the executive committees of the California Cooperative Healthcare Reporting Initiative and California's Physician Pay-for-Performance program. She received a nursing degree from the University of Maryland and a masters of public health from University of California, Berkeley. Prior to moving to Sacramento in 1990, she spent 15 years administering community-based geriatric services at the Institute on Aging in San Francisco.

Kate Goodrich, M.D., joined the Center for Medicare & Medicaid Services (CMS) in September 2011, where she serves as a senior technical advisor to the director of the Office of Clinical Standards and Quality and as chief medical officer of CMS. In this role, she provides leadership on quality measurement programs and oversees an effort at the Department of Health and Human Services (HHS) to align measures across programs and with the private sector. Prior to coming to CMS, Dr. Goodrich served as a medical officer in the office of the Assistant Secretary for Planning and Evaluation (ASPE). She managed the portfolio of ASPE comparative effectiveness research (CER) projects, including the creation of a multi-payer claims database for CER. She was also the project manager for the HHS contract with the National Quality Forum. Dr. Goodrich received her M.D. from Louisiana State University Medical Center in Shreveport, La., in 1995. She then moved to Washington, DC, and completed her residency in internal medicine at George Washington University Medical Center (GWUMC), whereupon she joined the faculty of GWUMC as a hospitalist in the Department of Medicine. A new Division of Hospital Medicine was created in 2005, and Dr. Goodrich was appointed division director. From 2005 to 2008 she expanded this division to nine full-time hospitalists and started a physician's assistant hospitalist program. She also served as chair of the institutional review board at GWUMC for 5 years. Dr. Goodrich is a graduate of the Robert Wood Johnson Clinical Scholars Program at Yale University, where she received training in health services research and health policy. She continues to practice clinical medicine as a hospitalist and assistant professor of medicine at George Washington University Hospital.

George J. Isham, M.D., M.S., is senior advisor at HealthPartners and senior fellow at HealthPartners Research Foundation. As senior advisor, Dr. Isham is responsible for working with the board of directors and the senior management team of HealthPartners on health and quality-of-care improvement for patients, members, and the community. As senior fellow at the HealthPartners Research Foundation, he is responsible for facilitating progress at the intersection of population health research and public policy. Dr. Isham was a founding board member of the Institute for Clinical Systems Improvement, a collaborative of Twin Cities medical groups and health plans that is improving three-part aim outcomes and implementing clinical practice guidelines in Minnesota. Dr. Isham provides leadership to other care delivery systems through service on the board of directors for Presbyterian Health Services in Albuquerque, New Mexico, and the external advisory board of the Marshfield Clinic in Marshfield,Wisconsin. Dr. Isham is also a board member for Presbyterian Health Plan, also in Albuquerque. Dr. Isham is active nationally and currently co-chairs the National Quality Forum–convened Measurement Application Partnership, chairs the clinical program committee of the National Committee for Quality Assurance (NCQA), and is a member of NCQA's committee on performance measurement. He is also chair of the Center for Medicare & Medicaid Services' Technical Expert Panel on the National Impact Assessment of CMS Quality Measures and a member of the Agency for Healthcare Quality's National Steering Committee for the Development of Measures of Appropriate Clinical Preventive Services for Older Adults. He is a former member of the Center for Disease Control and Prevention's Task Force on Community Preventive Services and the U.S. Preventive Services Task Force. He currently serves on the advisory committee to the director of Centers for Disease Control and Prevention. In 2011, Dr. Isham served on a five-member panel that provided a review of the public health portfolio of the Robert Wood Johnson Foundation, and he currently serves on the National Advisory Committee for the Robert Wood Johnson–funded Aligning Forces for Quality Grant. Dr. Isham is a former member of the board of directors of the American's Health Insurance Plans and a member of the boards of the Alliance of Community Health Plans and the Institute for Clinical and Economic Review at Harvard University.

Craig A. Jones, M.D., is the director of the Vermont Blueprint for Health, a program established by the State of Vermont under the leadership of its governor, legislature, and the bi-partisan Health Care Reform Commission. The Blueprint is intended to guide statewide transformation of the way that health care and health services are delivered in Vermont. The program is dedicated to a high-value, high-quality health care system for all Vermonters, with a focus on prevention. Currently, Dr. Jones serves on several committees and workgroups including the Institute of Medicine's Consensus Committee on the Learning Health Care System in America and its Roundtable on Value & Science-Driven Health Care. Prior to this he was an assistant professor in the Department of Pediatrics at the Keck School of Medicine at the University of Southern California and director of the Division of Allergy/Immunology and director of the Allergy/Immunology Residency Training Program in the Department of Pediatrics at the Los Angeles County + University of Southern California (LAC+USC) Medical Center. He was director, in charge of the design, implementation, and management, of the Breathmobile Program, a program in which mobile clinics deliver ongoing care to inner-city children at their schools and at county clinics. This program evolved from community outreach to a more fully integrated pediatric disease management program for the Los Angeles County Department of Health Services and has spread to several other communities across the country. Dr. Jones has published papers and abstracts in *Pediatric Research*, *Pediatrics*, *Journal of Pediatrics*, *Pediatrics in Review*, *Journal of Clinical Immunology*, *Journal of Allergy and Clinical Immunology*, *Annals of Allergy*, *Asthma and Immunology*, *CHEST*, and *Disease Management*. Dr. Jones was a member of the board and the executive committee of the California Chapter of the Asthma and Allergy Foundation of America as well the chapter president. He is a past president of the Los Angeles Society of Allergy, Asthma and Immunology and a past president and a member of the board of directors for the California Society of Allergy, Asthma and Immunology. Dr. Jones received his undergraduate degree at the University of California at San Diego and his M.D. at the University of Texas Health Science Center in San Antonio, Texas. He completed his internship and residency in pediatrics at LAC+USC Medical Center, where he also completed his fellowship in allergy and clinical immunology.

Kevin L. Larsen, M.D., is the medical director of meaningful use at the Office of the National Coordinator for Health IT. In that role he is responsible for coordinating the clinical quality measures for meaningful use certification and oversees the development of the Population Health Tool (http://projectpophealth.org). Prior to working for the federal government he was chief medical informatics officer and associate medical director at Hennepin County Medical Center in Minneapolis, Minnesota. He is also an associate professor of medicine at the University of Minnesota. Dr. Larsen graduated from the University of Minnesota Medical School and was a resident and chief medical resident at Hennepin County Medical Center. He is a general internist and teacher in the medical school and residency programs. His research includes health care financing for people living in poverty, computer systems to support clinical decision making, and health literacy. In Minneapolis he was also the medical director for the Center for Urban Health, a hospital–community collaboration to eliminate health disparities. He served on a number of state and national committees in informatics, data standards, and health information technology.

Peter V. Long, Ph.D., is president and chief executive officer of Blue Shield of California Foundation, a health foundation established in 2002 to ensure access to quality, affordable health care for all Californians and to end domestic violence. Dr. Long has extensive background in health policy working on issues affecting underserved communities at the state, national, and global levels. He has authored papers on a variety of health policy topics, including Medicaid coverage expansion, access to care, and health policy and legislation. Dr. Long's research also covers the social determinants of health, health impact assessments, and community health and development. He is an advisor for the Futures Without Violence task force on children and violence. Dr. Long served in leadership roles at the Henry J. Kaiser Family Foundation and the California Endowment. He also served as executive director of the Indian Health Center of Santa Clara Valley and as a legislative analyst for the National Progressive Primary Health Care Network in Cape Town, South Africa, during the country's transition to democracy. He received his bachelor of arts degree from Harvard University, a master's degree in health policy from the Johns Hopkins University School of Hygiene and Public Health, and his doctorate in health services from the University of California, Los Angeles (UCLA). In 2011, Dr. Long was inducted into the UCLA School of Public Health Alumni Hall of Fame. He was also honored by the Insure the Uninsured Project and Santa Clara County Board of Supervisors for his leadership on expanding access to health care for Californians.

Peter Margolis, M.D., Ph.D., is professor of pediatrics and director of research at the James M. Anderson Center for Health System Excellence at Cincinnati Children's Hospital Medical Center. His work encompasses the application and study of quality improvement methods in a broad range of areas including primary and subspecialty care and public health settings to improve the health outcomes of children, families, and communities. Dr. Margolis obtained his M.D. from New York University and his pediatric training at the University of Colorado, where he also served as chief resident in pediatrics. He subsequently spent 3 years in the National Health Service Corps in Rochester, New York, and Los Angeles, California, before pursuing a fellowship in clinical epidemiology. He was a Robert Wood Johnson Clinical Scholar at the University of North Carolina (UNC) at Chapel Hill, where he also earned his Ph.D. in epidemiology. In 1994 Dr. Margolis was named a Robert Wood Johnson Generalist Faculty Scholar at UNC, where he also served on the faculty between 1991 and 2005. In 2006, Dr. Margolis joined Cincinnati Children's Hospital Medical Center to create a new center focused on health care quality. Dr. Margolis has worked extensively with the certifying boards and specialty societies to assist them in designing programs that will enable physicians to meet new maintenance of certification requirements focused on systems thinking and performance in practice. He also devotes considerable time to teaching quality improvement methods. He is principal investigator of an National Institutes of Health Roadmap transformative research grant on redesigning systems for chronic illness care.

J. Michael McGinnis, M.D., M.P.P., is a physician, epidemiologist, and long-time contributor to national and international health programs and policy. An elected member of the Institute of Medicine (IOM) of the National Academies, he has since 2005 also served as IOM Senior Scholar and executive director of the IOM Roundtable on Value & Science-Driven Health Care. He also served as founding leader for the Robert Wood Johnson Foundation's (RWJF's) Health Group, the World Bank/European Commission's Task Force for Health Reconstruction in Bosnia, and, in the U.S. government, the Office of Research Integrity, the Nutrition Policy Board, and the Office of Disease Prevention and Health Promotion. In the latter appointment, he carried policy responsibilities for prevention through four administrations (presidents Carter, Reagan, Bush, and Clinton), during which he conceived and launched a number of initiatives of ongoing policy importance, such as the Healthy People national goals and objectives, the U.S. Preventive Services Task Force, the *Dietary Guidelines for Americans*, and development of the Ten Essential Services of Public Health. Earlier he served in India as epidemiologist and state director of the World Health Organization's smallpox eradication program. Widely published, he has made seminal contributions on the fundamental determinants of health (e.g., "Actual Causes of Death," *JAMA* 270:18 [1993] and "The Case for More Active Policy Attention to Health Promotion," *Health Affairs* 21:2 [2002]). He has held visiting or adjunct professorships at George Washington, the University of California, Los Angeles (UCLA), Princeton, and Duke. Dr. McGinnis is a graduate of the University of California, Berkeley, the UCLA School of Medicine, and the John F. Kennedy School of Government at Harvard University, and he was the graduation commencement speaker at each.

Leo S. Morales, M.D., Ph.D., is associate professor in the Department of Health Services and the Department of Medicine/Division of General Internal Medicine and Health Services Research at the University of California, Los Angeles (UCLA). He is also a faculty member of the UCLA Chicano Studies Research Center and a senior natural scientist at RAND in Santa Monica, California. Dr. Morales received his M.D. and M.P.H. in health services from the University of Washington and his Ph.D. in policy studies from the RAND Graduate School. Dr. Morales' research interests include Latino and immigrant health, disparities in health care, and cross-cultural survey research methods, including the application of advanced psychometrics. He is a past recipient of a Robert Wood Johnson Foundation Harold Amos Award and a current recipient of a Robert Wood Johnson Foundation Health Policy Investigator Award and a Russell Sage Foundation Award to study the effects of social assimilation on the health of Mexican immigrants. He is co-director of the UCLA Resource Center for Minority Aging Research and directs the research methods cores for two federally funded centers on minority health and health disparities. Dr. Morales is on the editorial board of *Health Services Research*. In addition to his research and academic activities, Dr. Morales is a practicing general internist at the UCLA Medical Center.

Judy Murphy, R.N., FACMI, FHIMSS, FAAN, is deputy national coordinator for programs and policy at the Office of the National Coordinator (ONC) for Health IT, Department of Health and Human Services, in Washington, DC. She is a nurse who came to the ONC in December 2011 with more than 25 years of health informatics experience at Aurora Health Care in Wisconsin, an integrated delivery network with 15 hospitals, 120 ambulatory centers, home health agencies, and more than 30,000 employees. She led their electronic health records (EHR) program since 1995, when Aurora was one of the early adopters of health information technology (health IT). Most recently she was vice president–EHR applications and managed the organization's successful achievement of Stage 1 EHR meaningful use, with incentive payments beginning in September 2011. Her informatics interests lie in system implementation methodologies, health IT project management, automated clinical documentation, and the use of technology to support evidence-based practice; she has published and lectured nationally and internationally on these topics. She has a longstanding reputation of patient advocacy and maintaining a "patient-centric" point of view. Judy has been on the Health IT Standards Committee since its inception in May 2009. On that committee, she co-chaired the Implementation Workgroup and was a member of the Meaningful Use Workgroup. She has also served on the American Medical Informatics Association (AMIA) board of directors and the Health Information and Management Systems Society (HIMSS) board of directors. She is a fellow in the American Academy of Nursing, the American College of Medical Informatics, and HIMSS. She received the 2006 HIMSS Nursing Informatics Leadership Award, was named one of the "20 People Who Make Healthcare Better" in 2007 by *HealthLeaders* magazine, and was selected as one of 33 nursing informatics pioneers to participate in the Nursing Informatics History Project sponsored by AMIA, the National Library of Medicine, the American Academy of Nursing, and the Robert Wood Johnson Foundation.

Eugene C. Nelson, D.Sc., M.P.H., is a professor of community and family medicine at the Geisel School of Medicine at Dartmouth and the Dartmouth Institute for Health Policy and Clinical Practice. He serves as the director of population health and measurement at the Dartmouth Institute and at Dartmouth-Hitchcock Health. Dr. Nelson is a national leader in health care improvement and the development and application of measures of quality, system performance, health outcomes, value, and patient and customer perceptions. In the early 1990s, Dr. Nelson and his colleagues at Dartmouth began developing clinical microsystem thinking. His work developing the "clinical value compass" and "whole system measures" to assess health care system performance has made him a well-recognized quality and value measurement expert. He is the recipient of the Joint Commission's Ernest A. Codman award for his work on outcomes measurement in health care. Dr. Nelson has been a pioneer in bringing modern quality improvement thinking into the mainstream of health care; he helped launch the Institute for Healthcare Improvement and served as a founding board member. He has authored over 150 publications and is an author of three recent books: *Quality by Design: A Clinical Microsystems Approach*, *Practice-Based Learning and Improvement: A Clinical Improvement Action Guide: Second Edition,* and *Value by Design: Developing Clinical Microsystems to Achieve Organizational Excellence*. He received an A.B. from Dartmouth College, an M.P.H. from Yale University, and a D.Sc. from Harvard University.

Samuel R. Nussbaum, M.D., is executive vice president, clinical health policy, and chief medical officer for WellPoint, Inc. He is the key spokesperson and policy advocate for WellPoint. He oversees corporate medical and pharmacy policy to ensure the provision of clinically proven effective care. Dr. Nussbaum collaborates with industry leaders, physicians, hospitals, and national policy and health care organizations to shape an agenda for quality, safety, and clinical outcomes and to improve patient care for WellPoint's 34 million medical members nationwide. In addition, Dr. Nussbaum works closely with WellPoint business units to advance international and innovative health care services strategy and development. In the decade that Dr. Nussbaum has served as chief medical officer at WellPoint, he has led business units focused on care and disease management and health improvement, clinical pharmacy programs, and provider networks and contracting with accountability for more than $100 billion in health care expenditures. He has been the architect of models that improve quality, safety, and affordability, and he was instrumental in developing an innovative contracting approach linking hospital reimbursement to quality, safety, and clinical performance. Under his leadership, WellPoint's HealthCore subsidiary has built partnerships with federal agencies, including the Centers for Disease Control and Prevention and the Food and Drug Administration, and with academic institutions to advance drug safety, comparative effectiveness, and outcomes research. Dr. Nussbaum currently serves on the boards of the National Quality Forum, the OASIS Institute, and BioCrossroads, an Indiana-based public–private collaboration that advances and invests in the life sciences. Dr. Nussbaum is a professor of clinical medicine at Washington University School of Medicine and serves as adjunct professor at the Olin School of Business, Washington University. Dr. Nussbaum has served as president of the Disease Management Association of America, chairman of the National Committee for Quality Health Care, chair of the Chief Medical Officer Leadership Council of America's Health Insurance Plan (AHIP), a member of the AHIP Board, and a member of the Secretary of Health and Human Services Advisory Committee on Genetics, Health, and Society. Dr. Nussbaum received the 2004 Physician Executive Award of Excellence from the American College of Physician Executives and *Modern Physician* magazine and has been recognized by *Modern Healthcare* as one of the "50 Most Influential Physician Executives in Healthcare" in 2010 and 2011. Prior to joining WellPoint, Dr. Nussbaum served as executive vice president, medical affairs and system integration, of BJC Health Care, where he led integrated clinical services across the health system and served as president of its medical group. He earned his medical degree from Mount Sinai School of Medicine. He trained in internal medicine at Stanford University Medical Center and Massachusetts General Hospital and in endocrinology and metabolism at Harvard Medical School and Massachusetts General Hospital, where he directed the Endocrine Clinical Group. As a professor at Harvard Medical School, Dr. Nussbaum's has carried out research leading to new therapies to treat skeletal disorders and new technologies to measure hormones in blood.

Christopher Queram has been the president and chief executive officer of the Wisconsin Collaborative for Healthcare Quality (WCHQ) since November 2005. WCHQ is a voluntary consortium of organizations working to improve the quality and affordability of health care and the health of the population in Wisconsin through public reporting of comparative performance information, collaborative learning, and sharing of best practices. In addition to his responsibilities with WCHQ, Mr. Queram serves on the boards of the Wisconsin Statewide Health Information Network, Wisconsin Health Information Organization, the Joint

Commission, its subsidiary Joint Commission Resources, and Delta Dental of Wisconsin. He is also a member of the Agency for Healthcare Research and Quality National Advisory Council, the Quality Alliance steering committee, the AQA steering committee, and the editorial advisory group of the Commonwealth Fund publication *Quality Matters.* Mr. Queram previously served as chair of the Purchaser Council, board member with the National Quality Forum (2000–2005), treasurer of the Leapfrog Group (2002–2005), principal of the Hospital Quality Alliance (2003–2011), and board chair of the National Business Coalition on Health (1998–2000). He was a member of three Institute of Medicine committees: the Committee on Redesigning the National Healthcare Quality and Disparities Reports; Committee on Redesigning Health Insurance Benefits, Payment and Performance Improvement Programs; and Committee on the Consequences of Un-insurance. He also served on President Clinton's Advisory Commission on Consumer Protection and Quality in the Health Care Industry. Prior to his current position, Mr. Queram was the chief executive officer of the Employer Health Care Alliance Cooperative in Madison, Wisconsin, and he also previously served as a hospital executive in both Madison and Milwaukee, Wisconsin. Mr. Queram holds a master's degree in health services administration from the University of Wisconsin at Madison.

Patrick Remington, M.D., M.P.H., is the associate dean for public health and a professor of population health sciences at the University of Wisconsin School of Medicine and Public Health. Dr. Remington received his undergraduate degree in molecular biology and his medical degree from the University of Wisconsin. After completing an internship at Virginia Mason Hospital in Seattle, he trained at the Centers for Disease Control and Prevention (CDC) as an epidemic intelligence service officer (assigned to the Michigan health department), as a preventive medicine resident in the Division of Nutrition at the CDC, and as part of the CDC Career Development Program, when he obtained his M.P.H. in epidemiology from the University of Minnesota. He was the chief medical officer for chronic disease and injury prevention in the Wisconsin Division of Health for almost a decade, and he joined the Department of Population Health Sciences in 1997. Dr. Remington's current research examines methods to measure the health outcomes and determinants in populations as well as health disparities by education, race, or region. In addition, he is examining ways to use this information in community health improvement, such as through the publication of county health rankings.

Carole Romm, M.P.A., R.N., is a health care consultant who helps organizations develop systems to advance care for Medicaid and other underserved populations. She is currently directing Oregon's accountability and quality efforts as it reforms health care for its Medicaid population through transformation of the delivery system. Prior to her role with the state of Oregon, Ms. Romm was public affairs director at Central City Concern, an agency serving homeless adults in Portland, Oregon. She also co-chaired Oregon's Medicaid advisory commission and served on a number of state committees developing the framework for Oregon's health reform initiative. Previously, Ms. Romm was the health services director at CareOregon, Oregon's largest Medicaid managed care plan. In 2000, Ms. Romm was awarded a three-year Robert Wood Johnson Foundation (RWJF) Nurse Executive Fellowship. In the past, she has held leadership roles with the RWJF Executive Nurse Fellowship Alumni Association board of directors, the Oregon Health Services Commission, and the Oregon Primary Care Association. She earned a baccalaureate in labor relations at Cornell University, a nursing degree from

Portland Community Commission College, and a master's degree in public administration from Portland State University.

Dennis P. Scanlon, Ph.D., is a professor of health policy and administration at Pennsylvania State University. Dr. Scanlon's research focuses on health systems improvement, including the role of information, incentives, and behavior change for improving health care outcomes. Research topics include quality measurement and transparency, competition in health insurance and health provider markets, public- and private-sector health care purchasing activities, and the impact of information and incentives in health care markets. He has led a federally funded research project examining the state of quality improvement activities at managed care plans as well as projects examining the impact and cost effectiveness of diabetes and disease management programs in federally qualified health centers and was principal investigator for the evaluation of the Commonwealth Fund's Evaluating the State Action to Avoid Rehospitalizations (STAAR) initiative. He is currently the principal investigator for the evaluation of the Robert Wood Johnson Foundation's Aligning Forces for Quality initiative and is participating in their Agency for Healthcare Research and Quality–funded investigation, "Assessing a Statewide Multi-Stakeholder Chronic Care Model Implementation." In addition to his research activities, he is also the professor in charge of the doctoral program in health policy and administration. Dr. Scanlon is frequently invited to speak and testify to a variety of policy and practice groups.

Edward J. Sondik, Ph.D., is director of the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS), the nation's principal health statistics agency responsible for monitoring America's health and health system. The center is one of the designated statistical agencies of the United States, which together conduct the major statistical programs of the federal government. In carrying out its mission, NCHS conducts a wide-ranging program of research and analysis in health and vital statistics, epidemiology, and the statistical sciences, all aimed at supporting government and private-sector policy development and research. Dr. Sondik also serves as senior advisor to the Secretary of Health and Human Services (HHS), providing technical and policy advice on statistical and health information issues. In this capacity he also serves on the HHS Data Council, the body that reviews HHS data policy and related issues. Dr. Sondik is a member of the Interagency Committee on Statistical Policy, along with the leaders of the other designated statistical agencies. Dr. Sondik received B.S. and M.S. degrees in electrical engineering from the University of Connecticut and a Ph.D. in electrical engineering from Stanford University. From 1976 to 1996, he was on the staff of the National Institutes of Health, including a period as acting director of the National Cancer Institute. Prior to joining the federal government, he served on the faculty of Stanford University.

David M. Stevens, M.D., is director of the Quality Center and associate medical director of the National Association of Community Health Centers, and research professor in the Department of Health Policy at the George Washington University School of Public Health and Health Services. Before assuming his current positions, Dr. Stevens was senior medical officer for quality improvement in the Agency for Healthcare Research and Quality (AHRQ) and its Center for Quality Improvement and Patient Safety. While at AHRQ he provided major leadership in AHRQ's mission to translate research into action. Major initiatives include a AHRQ/Robert Wood Johnson Foundation–sponsored learning collaborative to reduce health disparities with nine major national health plans, a care management improvement project with seventeen state

Medicaid agencies, a partnership with the Centers for Disease Control and Prevention (CDC) to develop interventions for the prevention of type II Diabetes Mellitus, an improvement collaborative with end-stage renal disease providers, and contributions to the National Health Quality Reports. Before coming to AHRQ, Dr Stevens was chief medical officer at the Health Resources and Services Administration (HRSA), where he was responsible for national clinical leadership of the Community and Migrant Health Center Program and for leadership of the HRSA/Bureau of Primary Health Care initiative on eliminating health disparities in underserved and minority populations. This landmark program, the Health Disparities Collaboratives, transformed preventive and chronic care and generated major positive clinical outcomes, as documented in peer reviewed scientific literature. With the CDC and the Institute of Healthcare Improvement, he initiated a landmark pilot demonstration on translating research from the Diabetes Prevention Program into practice. Dr Stevens also established national quality improvement policies for clinical programs in health centers, including the opportunity for accreditation by the Joint Commission on Accreditation of Healthcare Organizations. With the CDC he implemented a major immunization quality improvement initiative, increasing immunization rates by 50 percent in 10 states in more than 100 health centers, affecting 150,000 underserved infants and children each year. He was a practicing family physician and medical director for ten years at community health centers in the South Bronx and in Brooklyn, New York. Dr. Stevens was a member of a Department of Health and Human Services (HHS) workgroup that completed the HHS Strategic Plan for Asthma and a member of the HHS Work Group on reducing health disparities for diabetes. As a member of the commissioned corps of the U.S. Public Health Service, he received numerous awards, including the commissioned corps meritorious service medal, the HHS Award for Distinguished Service, and the Arthur S. Fleming Award, a private-sector award for outstanding federal employees who have made extraordinary contributions to government.

Matthew C. Stiefel directs the Center for Population Health in Kaiser Permanente's Care Management Institute. He was a 2008–2009 fellow with the Institute for Healthcare Improvement (IHI) and continues as a faculty member for the IHI three-part aim. Matt joined Kaiser Permanente (KP) in 1981 as a medical economist and later held management positions in KP Northwest, directing planning, marketing, and medical economics. He joined the Care Management Institute (CMI) as the director of measurement in 1998 and became the associate director of CMI in 2000. Prior to working at KP, he served as a policy analyst on the Carter Administration domestic policy staff and in the U.S. Department of Health, Education and Welfare, and he worked as a local health planner in the San Francisco bay area. He recently completed coursework toward an M.S. in epidemiology from the Harvard School of Public Health, holds an M.P.A. from the Wharton School, and a B.A. in psychology from Stanford.

Steven M. Teutsch, M.D., M.P.H., is the chief science officer of Los Angeles County Public Health, where he works on evidence-based public health and policy. From 1997 to 2009 he was with the Outcomes Research and Management program at Merck where he was responsible for scientific leadership in developing evidence-based clinical management programs, conducting outcomes research studies, and improving outcomes measurement to enhance quality of care. He worked at the Centers for Disease Control and Prevention (CDC) from 1977 to 2007. Most recently he was director of the Division of Prevention Research and Analytic Methods (DPRAM) where he was responsible for assessing the effectiveness, safety, and cost-effectiveness of disease- and injury-prevention strategies. DPRAM developed methodology for studies of the effectiveness and economic impact of prevention programs, provided training in these methods, developed CDC's capacity for conducting studies, and provided technical assistance for conducting economic and decision analysis. The division also evaluated the impact of interventions in urban areas, developed the *Guide to Community Preventive Services*, and provided support for CDC's analytic methods. He has served as a member of that task force and of the U.S. Preventive Services Task Force, which develops the *Guide to Clinical Preventive Services,* as well as on America's Health Information Community Personalized Health Care Workgroup and the Evaluation of Genomic Applications in Prevention and Practice (EGAPP) Workgroup. He chaired the Secretary's Advisory Committee on Genetics Health and Society and served on IOM panels, Medicare's Evidence Development and Coverage Advisory Committee, and several subcommittees of the Secretary's Advisory Committee on *Healthy People 2020*. At CDC, he was assigned as an Epidemic Intelligence Service officer to the Parasitic Diseases Division and worked extensively on toxoplasmosis. He then worked in the Kidney Donor Program and subsequently the Kidney Disease Program. He developed the framework for CDC's diabetes control program. He joined the Epidemiology Program Office and became the director of the Division of Surveillance and Epidemiology, where he was responsible for coordinating CDC's disease monitoring activities. He became chief of the Prevention Effectiveness Activity in 1992. Dr. Teutsch was born in Salt Lake City, Utah. He received his undergraduate degree in biochemical sciences at Harvard College in 1970, an M.P.H. in epidemiology from the University of North Carolina in 1973, and his M.D. from Duke University in 1974. He completed an internal medicine residency at Pennsylvania State University, Hershey. He was certified by the American Board of Internal Medicine in 1977 and by the American Board of Preventive Medicine in 1995, and he is a fellow of the American College of Physicians, the American College of Preventive Medicine, and the American College of Epidemiology. Dr. Teutsch is an adjunct professor at the Emory University School of Public Health and the University of North Carolina School of Public Health. Dr. Teutsch has published more than 190 articles and 8 books in a broad range of fields in epidemiology, including parasitic diseases, diabetes, technology assessment, health services research, and surveillance.

Thomas B. Valuck, M.D., J.D., is senior vice president, strategic partnerships, at the National Quality Forum (NQF). Dr. Valuck oversees NQF-convened partnerships—the Measure Applications Partnership and the National Priorities Partnership—as well as NQF's engagement with states and regional community alliances. These NQF initiatives aim to improve health and health care through the use of performance information for public reporting, payment incentives, accreditation and certification, and systems improvement. Dr. Valuck came to NQF from the Centers for Medicare & Medicaid Services (CMS), where he advised senior agency and Department of Health and Human Services leadership regarding Medicare payment and quality of care, particularly value-based purchasing. While at CMS, Dr. Valuck was recognized for his leadership in advancing Medicare's pay-for-performance initiatives, receiving both the 2009 Administrator's Citation and the 2007 Administrator's Achievement Awards. Before joining CMS, Dr. Valuck was the vice president of medical affairs at the University of Kansas Medical Center, where he managed quality improvement, utilization review, risk management, and physician relations. Before that he served on the Senate Health, Education, Labor, and Pensions Committee as a Robert Wood Johnson Health Policy Fellow; the White House Council of Economic Advisers, where he researched and analyzed public and private health care financing issues; and at the law firm of Latham & Watkins as an associate, where he practiced regulatory health law. Dr. Valuck has degrees in biological science and medicine from the University of Missouri–Kansas City, a master's degree in health services administration from the University of Kansas, and a law degree from the Georgetown University Law School.

Anne F. Weiss, M.P.P., is a senior program officer and director of the Robert Wood Johnson Foundation's Quality/Equality Health Care team. Weiss joined the foundation in 1999, after a distinguished career in health care policy at both the federal and state level. She served as senior assistant commissioner of the New Jersey Department of Health and Senior Services, where she directed the state's oversight of the quality of care delivered by health care providers and health plans, and was also responsible for the state's hospital indigent care programs. During her tenure, the Department of Health and Senior Services worked with physicians and hospitals throughout the state to issue New Jersey's first report card on health care quality. She also served as executive director of New Jersey's blue-ribbon health reform panel, the Essential Health Services Commission, for which she directed implementation of a subsidized health benefits program for the working uninsured. Previously, Weiss spent 10 years in Washington, DC, as professional staff to the Senate Committee on Finance and as a senior examiner with the Office of Management and Budget. She also has served as a program analyst in the Office of the Assistant Secretary for Planning and Evaluation, was a member of the steering committee of the National Academy for State Health Policy, and served on the board of the National Association of Health Data Organizations. Born in Detroit, Weiss received her M.P.P. from the Kennedy School of Government at Harvard University and a B.A. in history and political science from Wellesley College. Drawn to the foundation by its high standards for intellectual honesty and its willingness to take risks to improve health care, Weiss believes that the Quality/Equality Health Care team's strategy represents a dramatically new approach in which the foundation will seek to have a "focused impact in a few target communities in which we can bring to bear many of the different strategies the foundation has tried over the years to really demonstrate an impact on quality of care." She describes this approach as one that seeks to address the inequalities in health care for individuals from specific racial, ethnic, cultural, and socioeconomic backgrounds; increase sustained local collaboration to achieve high-quality health care; create greater transparency about what health care is and what it costs; and devote substantial resources to research, tracking, and evaluation.

Nancy J. Wilson, M.D., M.P.H., is senior advisor to the director of the Agency for Healthcare Research and Quality (AHRQ) and leads the agency's work to support and coordinate the ongoing development and implementation of the National Quality Strategy called for by the Affordable Care Act. This includes implementing the strategy across Department of Health and Human Services (HHS) agencies and facilitating implementation among public and private sector stakeholders. Dr. Wilson also leads the agency's efforts to establish a federal-wide Working Group on Health Care Quality charged with collaborating and consulting on the National Quality Strategy; avoiding inefficient duplication of quality-improvement efforts and resources; creating a streamlined process for quality reporting and compliance requirements, where practicable; and assessing public- and private-sector quality effort alignment. Dr. Wilson represents AHRQ on a number of national public–private alliances such as the National Quality Forum (NQF) board of directors, the Hospital Quality Alliance, the National Priorities Partnership, and, more recently, on the NQF Measures Application Partnership Coordinating

Council. She also provides strategic leadership and technical assistance on improvement implementation and data sharing among state Medicaid programs through the AHRQ-sponsored Medicaid Medical Director's Network. This network currently represents 45 states and the District of Columbia. In 2010 it successfully completed its first data-sharing project among 16 states on the use of antipsychotic medications in children and adolescents. The subsequent dissemination of the summary report and state-specific reports prompted the adoption of identified promising program and policy interventions across states throughout the network. Dr. Wilson is currently leading an AHRQ/CMS collaboration to identify, by January 2012, a core set of quality measures to monitor the health and health care of adults eligible for Medicaid. Her work to establish multi-stakeholder community collaboratives to improve health care services and population health resulted in Dr. Wilson and her teammates receiving the HHS Hubert H. Humphrey Service to America Award. Prior to joining the Department of Health and Human Services, Dr. Wilson was vice president and medical director for VHA, Inc., a nationwide network of 2,200 leading community-owned health care organizations and their affiliated physicians. Dr. Wilson designed and led nationwide improvement collaboratives that translated evidence-based practices into improved patient outcomes. For her work raising awareness and orchestrating company-wide efforts in patient safety, Dr. Wilson was awarded VHA's first President's Council Leadership Award. Before joining VHA, Dr. Wilson was director of the Office of Performance and Quality for the Veterans Health Administration. Among her accomplishments Dr. Wilson designed and implemented a new comprehensive performance management system that aligned VA's vision, mission, and goals with quantifiable strategic objectives; defined measures to track progress in meeting those goals and objectives; and held management accountable for results achieved. During her tenure, performance on process and outcome measures dramatically improved, including patient experience of care. For her work she received one of Vice President Gore's Hammer Awards for Reinventing Government. Dr. Wilson is a 1976 honors graduate of the University of Pittsburgh. She received her M.D. from Johns Hopkins School of Medicine in 1986 where she also completed her medical internship and residency in 1989. In 1994 she completed a General Medicine/Health Services Research Fellowship at Harvard Medical School while obtaining her M.P.H. in health care management at the Harvard School of Public Health. Dr. Wilson is currently an advisor to the Partnership for Patient Safety, the National Association for Healthcare Quality, and a founding designer and judge for the AHA Quest for Quality Award. She is also a member of several professional societies, including the Society of General Internal Medicine, the American College of Physicians, the American College of Physician Executives, and the American Public Health Association.

Appendix B

Workshop Agenda

CORE METRICS FOR BETTER CARE, BETTER HEALTH, AND LOWER COSTS

An Institute of Medicine Workshop
Sponsored by Blue Shield of California Foundation

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A LEARNING HEALTH SYSTEM ACTIVITY
IOM ROUNDTABLE ON VALUE & SCIENCE-DRIVEN HEALTH CARE

DECEMBER 5–6, 2012
THE BECKMAN CENTER OF THE NATIONAL ACADEMIES
100 ACADEMY WAY
IRVINE, CA 92617

Meeting goals

1. Discuss the vision for the nature, use, and impact of core health metrics.
2. Identify the important principles, targets, infrastructure, processes, strategies, and policies.
3. Describe lessons from efforts at national, state, community, and organization levels.
4. Specify core needs and requirements and propose priority metric categories that will most reliably measure care outcomes, care costs, and health improvement.
5. Consider specific examples of metric options within categories.
6. Describe the implementation strategies—national, state, community, organizational.

Wednesday, December 5

8:00 a.m.	Coffee and light breakfast available
8:30 a.m.	**Welcome, Introductions, and Overview**

Welcome from the IOM
Michael McGinnis, Institute of Medicine

Welcoming remarks
Peter Long, Blue Shield of California Foundation

Opening remarks and meeting overview
Craig Jones, Vermont Blueprint for Health (Planning Committee Chair)

9:00 a.m.	**Core metrics and health progress: Vision, principles, uses, requirements**

Discuss the purpose of core metrics, review examples of their usefulness, consider their development and use at national, state, community, organizational, and individual levels, and preview some of development and implementation challenges.

Vision and importance of measuring the three-part aim
Maureen Bisognano, Institute for Healthcare Improvement

Vision for a systems approach to achieve the three-part aim
George Isham, HealthPartners

Q&A and Open Discussion

Session Chair: *Craig Jones*, Vermont Blueprint for Health

10:15 a.m.	**Break**

10:30 a.m.	**Current state of measurement**

Discuss the inventory of current primary efforts, their relationships to each other, the categories of issues they cover, and the key discrepancies between the measurement vision and the current state of assessment on the three dimensions at the various levels. Illustrate issues with case studies.

The role of measurement in the National Quality Strategy
Carolyn Clancy, Agency for Healthcare Research and Quality

Key challenges and opportunities for current measurement capabilities
Helen Burstin, National Quality Forum

Consistent and timely measure implementation
Barbara Gage, The Brookings Institution

Q&A and Open Discussion

Session Chair: *Ed Sondik*, Centers for Disease Control and Prevention

12:00 p.m.	**Lunch**

12:30 p.m.	**Priority requirements and needs in measuring health, care, and cost**

Consider the principles for choosing the core metrics—priorities for improving care, lowering costs, improving health; regulatory and program requirements; available capacity.

Accountable care and measuring the three-part aim
Eugene Nelson, The Dartmouth Institute for Health Policy and Clinical Practice

General themes for implementation
Matt Stiefel, Kaiser Permanente

Case studies of current initiatives for measuring the three-part aim
Craig Jones, Vermont Blueprint for Health

Q&A and Open Discussion

Session Chair: *Anne Weiss*, Robert Wood Johnson Foundation

2:00 p.m.	**Breakout groups: Proposed options for measuring health, care, and cost**

Identify potential sets of core metrics to track progress toward better care, better health, and lower costs at national, state, community, organizational, and individual levels. Outline the primary challenges, opportunities, and measurement needs.

Health
Leader: *Patrick Remington*, University of Wisconsin
Opening Context: *Steven Teutsch*, Los Angeles County Department of Public Health

Health care
Leader: *David Stevens*, National Association of Community Health Centers
Opening Context: *Mary Barton,* National Committee for Quality Assurance

Cost
Leader: *Kate Goodrich*, Centers for Medicare and Medicaid Services
Opening Context: *Dennis Scanlon*, Pennsylvania State University

4:00 p.m.	**Report back from breakout groups**

5:00 p.m.	**Wrap up of the day's discussions**

Summarize common themes heard in Day 1.

5:30 p.m. Recess to Reception

Thursday, December 6

8:00 a.m. Coffee and light breakfast available

8:30 a.m.	**Summary of Day 1**

9:00 a.m.	**Getting there from here: Panel discussion on implementation**

Examine strategies for successfully advancing measurement of the three-part aim using case studies of individual initiatives.

Analyzing health status in all counties
Patrick Remington, University of Wisconsin

Implementing state-wide measures on access, cost, quality
Stefan Gildemeister, Minnesota Department of Health

Measurement framework for coordinated care in Medicaid
Carole Romm, Oregon Health Authority

Q&A and Open Discussion

Session Chair: *Diana Dooley*, California Health and Human Services

10:15 a.m.	**Break**

10:30 a.m.	**Requirements for building the infrastructure**

Explore the common themes around the data, technical, and social infrastructure necessary to advance measurement. This will especially consider the challenges and opportunities for making measurement a routine component of the health care and health systems.

Data infrastructure needs for measurement
Kevin Larsen, Office of the National Coordinator for Health Information Technology

Case examples of building the infrastructure
Chris Queram, Wisconsin Collaborative for Healthcare Quality

Building the data infrastructure in a health care environment
Bruce Ferguson, East Carolina University

Q&A and Open Discussion

Session Chair: *David Stevens*, National Association of Community Health Centers

12:00 p.m.	**Moving forward: Policy options and practical strategies**

The workshop will conclude with a session that summarizes the discussions and outlines the path for moving these metrics into practice.

Comments from the Chair
Craig Jones, Vermont Blueprint for Health

Comments and thanks from the IOM
Michael McGinnis, Institute of Medicine

1:00 p.m. **Adjourn**

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Planning Committee

Craig Jones (Chair)	Vermont Blueprint for Health
David Atkins	Veterans Health Administration
Maureen Bisognano	Institute for Healthcare Improvement
Michael E. Chernew	Harvard Medical School
Diana S. Dooley	California Health and Human Services
Julie Gerberding	Merck and Co, Inc.
Marjorie Ginsburg	Center for Healthcare Decisions
Kate Goodrich	Centers for Medicare & Medicaid Services
George J. Isham	HealthPartners, Inc
Peter Margolis	Cincinnati Children's Hospital Medical Center
Leo S. Morales	University of California, Los Angeles
Judy Murphy	Office of the National Coordinator for Health Information Technology
Samuel R. Nussbaum	WellPoint, Inc.
Patrick Remington	University of Wisconsin School of Medicine and Public Health

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David M. Stevens	National Association of Community Health Centers George Washington University School of Public Health and Health Services
Thomas B. Valuck	National Quality Forum
Anne F. Weiss	Robert Wood Johnson Foundation
Nancy Wilson	Agency for Healthcare Research and Quality

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Appendix C

Workshop Participants

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