Multiple Chronic Conditions Measurement Framework

Draft Report for Commenting

NATIONAL
QUALITY FORUM

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Multiple Chronic Conditions Measurement Framework

Summary

The National Quality Forum (NQF), under contract with the Department of Health and Human Services (HHS), was asked to convene a multi-stakeholder Steering Committee to develop a measurement framework for individuals with multiple chronic conditions (MCCs). Following endorsement through NQF's consensus development process,[1] the framework will serve as a foundation for the future endorsement of performance measures. This report presents the rationale, context, and core components of a measurement framework that addresses the complex circumstances of individuals with MCCs. The report also includes forward-looking considerations for applying the framework.

The Need for a Measurement Framework for Individuals with MCCs

Individuals with MCCs represent a growing segment of the population and currently comprise over one-quarter of the U.S. population.[2, 3] The presence of MCCs negatively affects quality of life, functional status, ability to get a job and work, and life expectancy. In addition to being at greater risk of adverse outcomes and complications of treatment than each of their individual conditions would confer,[4-26] individuals with MCCs receive care that often is fragmented, incomplete, inefficient, and ineffective.[19, 34-37] As a result, MCCs are associated with higher healthcare costs and utilization rates.[6-21, 23, 38] For example, individuals with MCCs are at increased risk for potentially avoidable inpatient admissions and preventable hospital complications.

Despite the growing prevalence of MCCs and associated complications, existing quality measures largely do not address individuals with MCCs. One explanation is that a dearth of evidence exists on which to build measures for complex patients. Most research on quality of care in individuals with MCCs has not considered clinical complexity in multiple areas of disease and treatment interactions. Accordingly, Clinical Practice Guidelines (CPGs), which inform performance standards and offer a structure for quality improvement efforts, rarely address multiple conditions.[42-45] CPGs typically focus on the management of a single disease, and strict adherence to disease-specific guidelines can potentially result in harm to patients with MCCs.[42, 45, 46] A formal review of adherence to disease-specific, guideline-recommended treatment in individuals with MCCs identified an impractically high level of complexity, cost, potential interactions, and burden.[42] Therefore, basing standards for performance on existing CPGs could lead to prioritizing low-value, burdensome measures. Additionally, existing measures based on CPGs can lead to overtreatment by encouraging more care; however, few measures assess inappropriate care. For example, strict glycemic or blood pressure control is not always appropriate for all individuals with MCCs based on their functional goals and preferences.[47] An in-depth consideration of these complex issues is important to address measurement for individuals with MCCs adequately.

Roadmap for Establishing a Measurement Framework for MCCs

Under the direction of the multi-stakeholder MCCs Steering Committee (see roster in Appendix A), NQF has developed a person-centric measurement framework for individuals with MCCs. Specifically, this framework provides a definition for MCCs, identifies high-leverage domains for performance measurement, and offers guiding principles as a foundation for supporting the quality of care provided to individuals with MCCs. Broadly, the primary intended uses of the framework are:

- Provide input to HHS to guide and help align programmatic initiatives targeting individuals with MCCs.
- Support standardization of measures by signaling to measure developers gaps in performance measurement for individuals with MCCs—specifically, signaling the need for cross-cutting measures that are highly important to individuals with MCCs, such as measures that assess the care provided across settings during a care transition.
- Guide the endorsement of measures that various public and private stakeholders can use to assess and improve the quality of care provided to individuals with MCCs. The framework will be used by NQF steering committees charged with evaluating measures to shape and inform their decision-making in conjunction with the endorsement criteria.
- Encourage the alignment of incentives by guiding the selection of measures for public reporting and performance-based payment programs. This framework will inform how the Measure Applications Partnership (MAP), particularly the MAP Dual Eligible Beneficiaries and Post-Acute Care/Long-Term Care Workgroups, gives guidance to public and private payers and purchasers on selecting measures for specific uses.
- Suggest a roadmap for new delivery models (e.g., accountable care organizations, patient-centered medical homes) that aim to provide patient-centered care across multiple settings.
- Inform and stimulate future research on the quality of care provided to individuals with MCCs.

Figure 1 presents the roadmap that guided the MCCs Steering Committee's work in establishing a measurement framework for MCCs. Because an explicit goal of this project was supporting alignment across public and private initiatives targeting MCCs, a deliberate effort was made to consider various public- and private-sector inputs as the framework's components were developed to serve the end users' needs articulated above.

Figure 1


Department of Health and Human Services (HHS) Frameworks
National Quality Strategy
Partnership for Patients
National Prevention Strategy
HHS Multiple Chronic Conditions Framework
INPUTS
Public Private-Sector Frameworks/Models
National Priorities Partnership
NQF-Endorsed Patient-Focused Episode of Care Framework
NQF measure endorsement ongoing projects
Coordinated Care Models for Targeted Populations
INPUTS
NQF-Endorsed Multiple Chronic Conditions Framework
Definitions
Domains
Key methodological issues
Guiding principles
USES
Intended Uses of the NQF-Endorsed Multiple Chronic Conditions Framework
Provide input to HHS
Identify measure gaps
Guide endorsement decisions for assessing & improving the quality of care
Guide selection of measures for public reporting and payment
Suggest roadmap for new delivery models (ACOs, PCMH)
Inform research

Alignment with Public- and Private-Sector Frameworks and Initiatives

The MCCs Steering Committee's work was informed and shaped by several important national initiatives spearheaded by HHS and others in the private sector. The committee recognized and valued that clear opportunities exist for aligning, sharing lessons learned, and maximizing resources.

First, the MCCs Committee looked to HHS's Multiple Chronic Conditions Strategic Framework[48] and was committed to ensuring that its work was supportive of HHS's four overarching goals:

1. foster healthcare and public health-system changes to improve the health of individuals with multiple chronic conditions;
2. maximize the use of proven self-care management and other services by individuals with MCCs;
3. provide better tools and information to healthcare, public health, and social services workers who deliver care to individuals with MCCs; and
4. facilitate research to fill knowledge gaps about, and interventions and systems to benefit individuals with MCCs.

Second, the MCCs Committee looked to the National Quality Strategy (NQS)[49] for concrete ways its work could advance the three NQS aims of better care, affordable care, and healthy people and communities. The six priority areas[a] of the NQS, and the associated goals, measures, and strategic opportunities within these priorities as recommended by the National Priorities Partnership[50] to HHS, served as a guidepost for the committee in identifying the MCC framework's measure concept areas, in particular those targeting care coordination and patient/family engagement. In addition, the committee examined other national initiatives, including the National Prevention Strategy (NPS)[51] and the Partnership for Patients[52] safety initiative. The goals of these programs, targeting health and wellness for disadvantaged populations and significantly reducing harm and hospital readmissions, respectively, are particularly salient to individuals with MCCs.

Third, the MCCs Committee explored private-sector initiatives, including measure endorsement projects under way at NQF, that are aligning to fill measure gaps addressing the NQS priorities and goals. The committee also built on the *NQF-Endorsed Patient-Focused Episodes of Care Measurement Framework,*[53] which provided a starting point for considering how to better measure and assess the quality of care provided to patients longitudinally over time and across settings. However, the committee acknowledged that this early prototype needed to progress from a disease-specific focus to one that is able to capture adequately the complexities of most individuals who live with MCCs. Therefore, the following sections delineate the components of the next evolution of a measurement framework that takes into account the intricacies and challenges around performance measurement for individuals with MCCs.

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[a] Health and well-being, prevention and treatment of leading causes of mortality, person- and family-centered care, patient safety, effective communication and care coordination, and affordable care.

Measurement Framework

The measurement framework for assessing the quality of care provided to individuals with MCCs is presented below. First, this framework establishes a definition of MCCs, capturing the various complexities and harmonizing the varying definitions in the field. Second, it determines the highest-leverage measure concept areas and demonstrates applications of those concepts in a conceptual model for measurement. Third, it establishes guiding principles, including key methodological challenges and potential solutions for applying existing performance measures to individuals with MCCs.

Definition of Multiple Chronic Conditions

MCCs are defined in a multitude of ways in literature and in practice. To establish a common understanding and a shared vision for effectively measuring the quality of care for individuals with MCCs, the committee's first priority in developing this framework was to define MCCs.

One method for defining MCCs is based on counts of concurrent conditions. For example, the HHS Multiple Chronic Conditions Strategic Framework[48] defines MCCs as the presence of two or more conditions;[54] this definition is intended to be interpreted and used inclusively. While prevalence of MCCs within a population can be determined readily under this definition, the broad definition could potentially target too large a portion of the population, as more than one-quarter of adults over age 18 have two or more chronic conditions.[55-59] Additionally, counting concurrent conditions does not consider the complexity or interaction among conditions. For example, an individual with two conditions with minimal interaction between them, such as allergic rhinitis and osteoarthritis of the knee, may be viewed differently within a MCCs measurement framework than an individual with congestive heart failure and dementia. Thus, considering complexity and interaction among MCCs is particularly important.

The Agency for Healthcare Research and Quality (AHRQ) defines a complex patient as having two or more chronic conditions that may influence the care of the other conditions through limitations of life expectancy, interactions between drug therapies, or direct contraindications to therapy for one condition by other conditions.[60] This definition moves toward capturing the ongoing interaction and complexity of concurrent chronic conditions and how these interactions impact care; however, it does not capture health status considerations such as function or quality of life.

The definition of MCCs may apply differently to children because of the types of chronic conditions they experience, and it may apply differently as children with MCCs mature. For adults, the most common chronic conditions are related to the aging process in conjunction with lifestyle choices (e.g., hypertension, high cholesterol, heart disease, diabetes, and arthritis).[61] The chronic conditions of childhood usually are the result either of genetic conditions, the consequences of low birth weight and prematurity, or environmental factors[62] (e.g., asthma, cystic fibrosis, cerebral palsy, developmental disabilities, mental illness, diabetes).[63] While chronic conditions can lead to many of the same consequences for children and adults, the impact of MCCs in children is more likely to vary with development stages and change across the lifespan as the child matures toward adolescence and adulthood.

Given these considerations, the MCCs Steering Committee established the definition of multiple chronic conditions to be:

> Persons with multiple chronic conditions are defined as having two or more concurrent chronic conditions that collectively have an adverse effect on health status, function, or quality of life and that require complex healthcare management, decision-making, or coordination.[b,c]
>
> Assessment of the quality of care[d] provided to the MCCs population should consider persons with two or more concurrent chronic conditions that require ongoing clinical, behavioral,[e] or developmental care from members of the healthcare team and act together to significantly increase the complexity of management and coordination of care—including but not limited to potential interactions between conditions and treatments.
>
> Importantly, from an individual's perspective the presence of MCCs would:
>
> - affect functional roles and health outcomes across the lifespan;
> - compromise life expectancy; or
> - hinder a patient's ability to self-manage or a family or caregiver's capacity to assist in that individual's care.

Widespread adoption of this definition would help to foster standardization of quality measurement across various public and private initiatives. Moving forward, challenges in putting this definition for measure development into operation highlight limitations in our current approaches to performance measurement, particularly the need to augment claims data with other clinical and patient-reported data to obtain information to identify this population. Data source considerations are discussed later in the guiding principles.

Key Measurement Priorities and Concepts

As previously noted, but worthy of further emphasis, strict adherence to disease-specific measures for patients with MCCs may lead to the unintended consequence of delivering inappropriate care that is not aligned with the patient's goals and preferences. Additionally, applying numerous measures targeting a variety of diseases could impose potential harm; lead to high measurement burden, often

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[b] In the context of this definition, chronic conditions encompass a spectrum of disease and other clinical (e.g., obesity), behavioral (e.g., problem drinking), and developmental (e.g., learning disabilities) conditions. Additionally, the social context in which a person lives (e.g., homelessness) also is considered an important influencing factor.

[c] A complication associated with a primary diagnosis also would meet the requirement of two or more concurrent conditions (e.g., cystic fibrosis in children with an associated complication such as pancreatic insufficiency).

[d] Quality of care is defined by the Institute of Medicine (IOM) six aims: safe, timely, effective, efficient, equitable, and patient-centered.

[e] Behavioral includes mental health and substance use illness.

without attaining better outcomes; and consume resources that might otherwise be used more judiciously and effectively to provide high-quality care. Therefore, the MCC Steering Committee sought to identify the highest-leverage measurement priorities for the MCC population in an effort to mitigate these two important concerns of unintended consequences and measurement burden. Building on the six national health and healthcare priorities identified in the National Quality Strategy[f] as an overarching framework, the committee identified measure concepts that map to the NQS priority areas and highlight issues most relevant for individuals with MCCs (see Appendix B for the MCC key measure concepts mapped to the NQS). In pinpointing these measure concept areas, the committee firmly acknowledged that collecting and reporting on these measures will vary over an individual's trajectory of illness, as goals and preferences can evolve and must be assessed regularly. There will need to be a balance achieved between the appropriate use of disease specific measures and crosscutting measures. Box 1 presents the committee's high-priority measure concepts. The committee's selection criteria were based on identifying cross-cutting areas that offer the greatest potential for reducing disease burden and cost and improving well-being, and are valued most by patients and their families.

Box 1

High-Priority MCC Measure Concepts

- Optimizing function, maintaining function, or preventing further decline in function
- Seamless transitions between multiple providers and sites of care
- Access to a usual source of care
- Shared accountability across patients, families, and providers
- Patient clinical outcomes (e.g., morbidity, mortality)
- Avoiding inappropriate, non-beneficial end-of-life care
- Transparency of cost (total cost)
- Shared decision-making

**Appendix C provides illustrative examples of available measures that address these measure concepts.*

Conceptual Model for Measuring Care Provided to Individuals with MCCs

The MCCs Steering Committee's measurement priorities set the stage for the development of a conceptual model to guide measurement for individuals with MCCs. This model is designed to illustrate the complexity of providing care for an individual with MCCs by showing the various ways that conditions, patient and family preferences, sites and providers of care, and types of care interact (see Figure 2). Also represented in the model are the social and environmental context in which the

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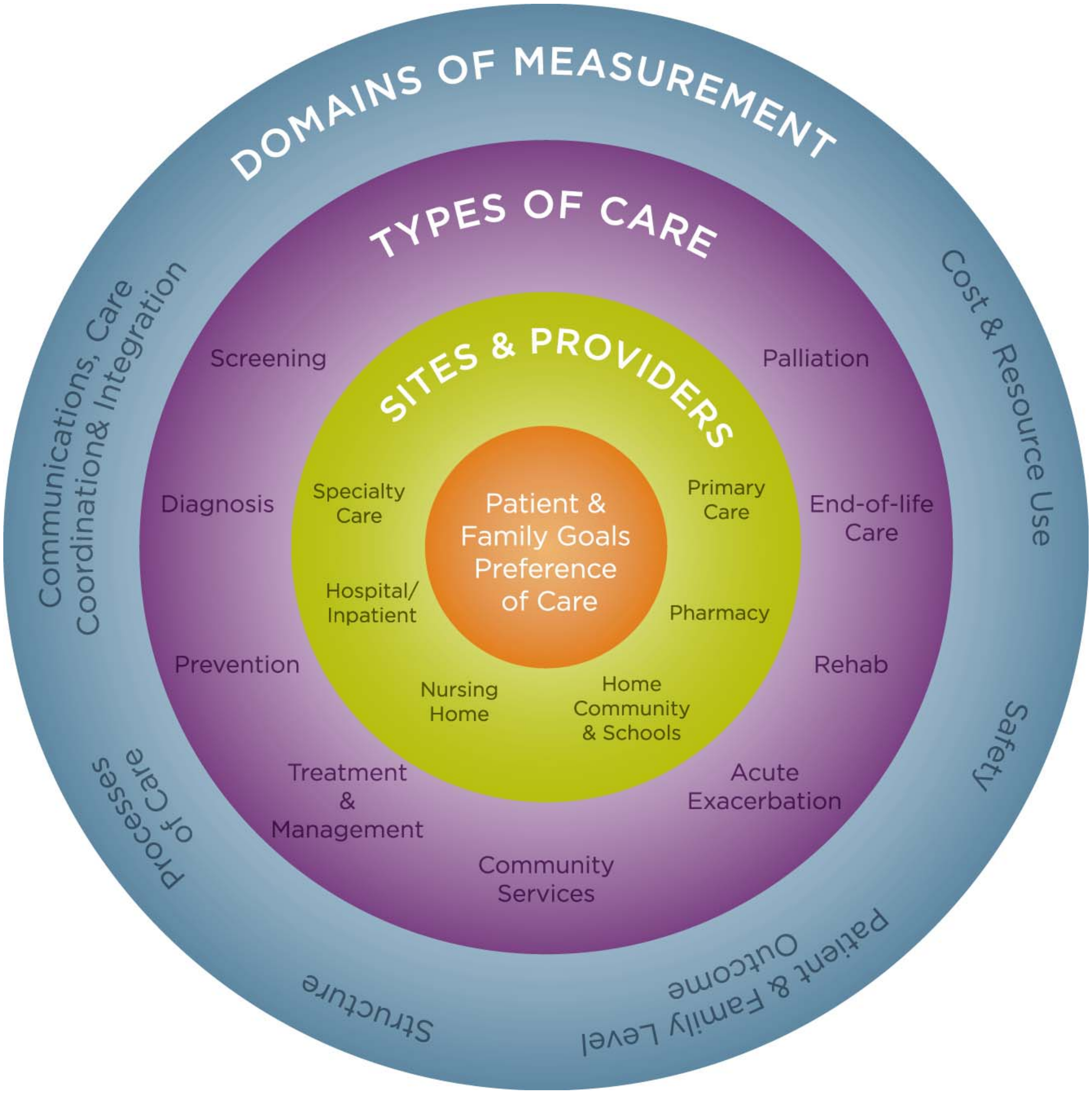
[f] Health and well-being, prevention and treatment of leading causes of mortality, person- and family-centered care, patient safety, effective communication and care coordination, and affordable care.

individual lives and receives care and the public and private health policy priorities that guide the delivery of care.

Figure 2



Within the center ring of the model is an individual with multiple different conditions that may have a greater or lesser effect on that individual. Circles of different sizes and different degrees of overlap represent these conditions. Also included in the inner ring are the family and friends who care for the individual, along with the individual’s goals and preferences for care.

Depending on their conditions and preferences, individuals can receive care in various sites from various providers. Examples of sites most relevant for individuals with MCCs included in the second ring of the model are: primary care, specialty care, hospital/post-acute, nursing home, community (including school and workplace), home (including both formal and informal care), and pharmacy. The types of providers offering care to the individual (e.g., internists, hospitalists, nurse practitioners, social workers) also shift depending on the needs of the individual.

The types of care individuals receive, included in the third ring of the model (i.e., screening, primary and secondary prevention, diagnosis, treatment and management, community services, management of an acute exacerbation, rehabilitation, palliation, and end-of-life care), are not necessarily linear or mutually exclusive. For example, an individual with congestive heart failure may be seen in the hospital for an acute exacerbation but also may need continuing treatment and management of diabetes and lung cancer at the same time. Additionally, palliative care can occur at many points during the course of a disease or condition and is not exclusive to end-of-life care. End-of-life care can include hospice care, which can occur at multiple sites of care. These real-life examples urge the use of a flexible model that can capture the complexity of often-changing healthcare needs over time.

The outer ring of the model highlights the domains of measurement (see Appendix D) that provide an overall guide for the variety of measures that can be appropriate to use with individuals with MCCs. These domains can be mapped to the key measurement priorities and measure concepts for individuals with MCCs as identified by the MCCs Steering Committee (see Box 1): communication, care coordination and integration, process of care, important structures, patient- and family-level outcomes, safety, and cost and resource use. These are system-level measures that can apply to every individual, regardless of disease or condition.

Performance Measurement with the MCC Conceptual Model

The conceptual model as a measurement framework can be used to evaluate and improve care for individuals with MCCs. As the model demonstrates, at any given point in time, the measurement strategy for an individual with MCCs can be focused on various conditions, sites of care, types of care, providers, and domains of measurement. The “wheels,” or measurement configurations, can turn to represent an individual’s changing needs. For example, disease-specific process or outcome measures may be used in concert with measures that cut across diseases (e.g., function, care transitions, shared decision making, patient experience). These measures may apply to various types, sites, and providers of care. Most importantly, this conceptual model highlights the need to design individualized measurement frameworks for individuals with MCCs based on their conditions and preferences.

Guiding Principles for Measuring Care Provided to Individuals with MCCs

In considering implementation challenges for the conceptual model and measure concepts, the MCCs Steering Committee adopted the following guiding principles:

To evaluate the full spectrum of care for individuals with MCCs, measurement should:

1. Promote collaborative care among providers and across settings at all levels of the system,[g] while aligning across various public- and private-sector applications (e.g., public reporting, payment).
2. Assess the quality of care[h] and incorporate measures that are cross-cutting,[i] condition-specific, structural,[j] behavioral,[k] and that address appropriateness of care.[l]
3. Be prioritized based on the best available evidence of links to optimum outcomes and consider patient preferences jointly established through care planning.
4. Assess if a shared decision-making process was undertaken as part of care planning and ultimately that the care provided was in concordance with patient preferences or, as appropriate, family or caregiver preferences on behalf of the patient.
5. Assess care longitudinally (i.e., provided over extended periods of time) and changes in care over time (i.e., delta measures of improvement rather than attainment).
6. Be as inclusive as possible, as opposed to excluding individuals with MCCs from measure denominators. Where exclusions are appropriate, either existing measures should be modified or new measures developed.
7. Include methodological approaches, such as stratification, to illuminate and track disparities in care for individuals with MCCs. In addition to stratifying the MCC population in measurement (which is particularly important to understanding application of disease-specific measures to the MCC population), bases for stratification include disability, cognitive impairments, life expectancy, illness burden, dominant conditions, socioeconomic status, and race/ethnicity.
8. Use risk adjustment for comparability with caution, as risk adjustment may result in the unintended consequence of obscuring serious gaps in care for the MCC population. Risk adjustment should be applied only to outcomes measures and not process measures.

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[g] The system includes, but is not limited to, individual patients, individual healthcare professionals, group practices, hospitals, health systems and other provider organizations, and health plans.

[h] Quality of care is defined by the IOM six aims: safe, timely, effective, efficient, equitable, and patient-centered.

[i] Cross-cutting measures apply to a variety of conditions at the same time or a single disease with multi-organ system ramifications (e.g., cystic fibrosis). Example measure concepts include: care coordination and integration, shared decision-making, medication reconciliation, functional status, health-related quality of life, and screening and assessment.

[j] Structural measures assess if essential infrastructure (e.g., team-based care, registries, EHRs) is in place to support integrated approaches to care management.

[k] Behavioral measures targeting major behavioral health risk factors such as obesity, smoking, alcohol and substance abuse, poor diet/nutrition, and physical inactivity.

[l] Appropriateness of care includes measures of overuse, underuse, and misuse, for example, measures that assess overuse of services such as imaging. Evidence-based guidelines for people with MCCs are not well developed in this area.

9. Capture inputs in a standardized fashion from multiple data sources,[m] particularly patient-reported data, to ensure key outcomes of care (e.g., functional status) are assessed and monitored over time.

These guiding principles build on the guiding principles outlined in the *NQF-Endorsed Patient-Focused Episode of Care Measurement Framework*,[64] which served as a springboard for this work. The guiding principles address methodological considerations including assessment of care across episodes, measure prioritization, and the infrastructure needed for data collection. These methodological considerations are briefly discussed below.

Assessing the Quality of Care Provided Across Episodes

The *Patient-Focused Episode of Care Framework*[65] highlights that an episode of care is a series of health services occurring over time and is not limited to one clinical interaction. While the start or end of an episode of care may be defined differently for individuals with MCCs, assessing care over time and promoting shared accountability are two essential principles of the patient-focused episode that are extremely important to individuals with MCCs.

People with MCCs receive care in multiple settings from multiple providers,[66] so measures should promote shared accountability across episodes of care. The *Patient-Focused Episode of Care Framework*[67] noted that when feasible, the smallest unit of accountability should be measured and reported. Designating a single accountable provider is difficult when multiple providers may be involved in a patient's care, so for individuals with MCCs, the smallest unit of accountability may well be a team of providers. Persons with MCCs require coordination of care and communication among providers to achieve an integrated care plan, requiring multiple providers to share accountability. While new payment models are progressing toward shared accountability, an interim approach to promote collaborative care could use harmonized measures across levels of the system to provide a comprehensive picture of care and identify targeted areas for improvement. Guiding principle #1 establishes that measures should promote collaborative care among providers and settings to promote shared accountability.

Additionally, it is imperative to recognize that over time the severity, prognosis, and symptom burden of any condition will change,[68] and those changes can impact other conditions; therefore, measures should assess how care is managed as conditions change over time. Assessing care across an episode requires a longitudinal approach to measurement, including delta measures that demonstrate improvement or maintenance over time rather than only attainment of an arbitrary target. Accordingly, guiding principle #5 denotes the need for measures to assess care longitudinally and monitor change over time.

Prioritizing Measures

The *Patient-Focused Episode of Care Framework*[69] highlights that measurement should be multi-dimensional, providing a comprehensive picture of quality across multiple domains. As established

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[m] Data sources include, but are not limited to: claims, EHRs, PHRs, HIEs, registries, and patient-reported data.

above, a comprehensive picture of the quality of care provided to individuals with MCCs would include measures that address patient- and family-level outcomes, communication, care coordination, safety, processes of care, essential structures, integration, and costs and resource use. Guiding principle #2 emphasizes that performance measurement for people with MCCs should include this mix of measure types. While each of these measurement domains contributes to a comprehensive picture of quality, measures must be prioritized to reduce measurement burden, while ensuring patient-centered care. As established in guiding principle #3, measure should be prioritized based on two key factors: evidence of links to outcomes and patient preferences.

The MCC population is heterogeneous, so some measures that are highly important for some individuals with MCCs may be less important for others. For example, while disease-specific measures may not address the complexity of individuals with MCCs, select disease-specific measures still may be appropriate based on the individual's goals of care. For many existing disease-specific measures, routine exclusion of individuals with MCCs prevents adequate assessment. Exclusions are commonly used as a method to identify populations to whom performance measures should not apply. For example, age frequently is used as a proxy for life expectancy or health status, identifying patients considered too frail for certain interventions. A more targeted approach should consider patient-specific factors (e.g., health status, severity of illness, life expectancy). In the absence of targeted exclusions, measures should aim to be more inclusive, as noted in guiding principle #6. If it is determined that the majority of people with MCCs are appropriately excluded, a measure tailored to individuals with MCCs likely is needed.

Ultimately, prioritizing measures for individuals with MCCs depends on the complex interaction among individual patient characteristics, such as disease severity, co-occurring conditions, treatment burden, and patient preferences. When appropriate, patient preferences extend beyond the patient to include family/caregiver preferences. A shared decision-making approach ensures patients/caregivers are provided with understandable information and engage in a dialogue with their providers about evidence-based options. Guiding principle #4 emphasizes that measures should assess if shared decision-making occurred.

Infrastructure Needed for Data Collection

This measurement framework for individuals with MCCs highlights the need for multiple types of data, particularly patient-reported data, to assess comprehensively the quality of care provided to individuals with MCCs. Claims, paper medical records, registries, and electronic medical records all provide important information; however, integration of multiple types of data is needed, as no one data source is adequate. Additionally, MCC measurement requires patient and family information, necessitating the development of tools and methods to collect patient-reported data. Guiding principle #9 establishes the need for standardized data collection to support measurement.

Another important data consideration is the availability of information for risk adjustment and stratification. These two methods, used to understand disparities, also can help illuminate the complexities of the heterogeneous MCC population. Potential adjustment factors include disability, cognitive impairment, life expectancy, illness burden, shadow or dominant conditions, socioeconomic status, and race/ethnicity. Risk adjustment should be approached with caution, as guiding principle #8 notes, to avoid over-adjustment, such that performance may appear better than it should, based on particular conditions, risk factors, and causal pathways relevant to outcomes.[70] Alternatively, stratifying measurement results by these same factors may better highlight how providers are or are not meeting the needs of a specific category of patients.[71] Guiding principle #7 outlines the advantages of stratifying measures for individuals with MCCs.

Path Forward

The vision for the measurement framework proposed within is that it will be a living document that will evolve as it is implemented and tested in the field under various applications. The MCCs Steering Committee has identified three strategic opportunities for moving forward and has highlighted how these opportunities align with the work of the National Priorities Partnership (NPP) and MAP.

Identifying and Filling Measure Gaps

This framework identifies key measure concepts for people with MCCs. Many of these concepts align with the measurement priorities and measure concepts identified in the MAP Post-Acute Care and Long-Term Care (PAC/LTC) Coordination Strategy[72] and the MAP *Dual Eligible Beneficiaries Interim Report*[73] (Appendix E highlights alignment of the measure priorities identified by all of these efforts). Notably, each of these reports has signaled a need for cross-cutting measures that incorporate patient-reported data and assess care across the entire system. Given the dearth of existing cross-cutting, longitudinal measures, there is a need for coordinated measure development. Additionally, measures for children with MCCs are virtually non-existent and represent a prominent gap.

A coordinated strategy for filling critical measure gaps, especially for developing cross-cutting measures, requires research to be conducted that includes individuals with MCCs. From this evidence base, clinical practice guidelines can be developed that are applicable to this population and can serve as the basis for measure development. In addition, a mechanism should be created to systematically capture implementation experiences in clinical practice and monitor for potential unintended consequences. Through this iterative process, the knowledge base will emerge to inform the most effective approaches to care for this population and to measure and assess effectively if high-quality care is being obtained.

Standardizing Data Collection, Measurement, and Reporting

This framework highlights the need for a common data platform to capture the multiple data sources necessary to assess care comprehensively, particularly patient reported outcomes such as functional status. The data platform should enable gathering patient-reported information and information about the social determinants of health for measuring the outcomes most important to patients and communities. Finally, a common data platform using standardized data elements could increase the utility of electronic data sources and decrease provider data collection burden.

Payment and Delivery System Reform

As new payment and delivery models emerge, the unique needs of individuals with MCCs should be considered. Quality measurement programs for these evolving delivery models should use this framework to incorporate patient-centric measurement. For example, approaches to measurement may include stratification of individuals who meet the definition of MCCs from the general population in disease-specific measures in conjunction with using available high-leverage, cross-cutting measures, as opposed to applying a one-size-fits-all approach, such as using composites that may not be appropriate for all patients.

Public reporting of performance measurement information should be used to ensure transparency and help inform the choices of patients, their caregivers, and those who purchase care for individuals with MCCs. Payment incentives should address the underlying cost drivers for the MCC population. Data collection and monitoring will be necessary, however, to ensure that public reporting and payment incentives do not result in adverse consequences for this vulnerable population. Accountable care organizations and medical homes should be explored as promising delivery systems for providing coordinated, integrated care to individuals with MCCs. Additionally, rewarding evidence-based benefit design to ensure coverage of essential services for this population is a strategic opportunity that could be leveraged.

Appendices:

Appendix A: Multiple Chronic Conditions Measurement Framework Steering Committee Roster
Appendix B: Multiple Chronic Conditions Key Measure Concepts Mapped to the National Quality Strategy Priorities
Appendix C: High-Priority MCC Measure Concepts and Illustrative Measures
Appendix D: MCC Conceptual Model Measurement Domains and Definitions
Appendix E: Priority Measure Concept Alignment—MCC, MAP PAC/LTC, and MAP Dual Eligible Beneficiaries

NOTES

1. National Quality Forum (NQF), *Consensus Development Process*, Washington, DC: NQF; 2011. Available at www.qualityforum.org/Measuring_Performance/Consensus_Development_Process.aspx. Last accessed November 2011.
2. Department of Health and Human Services (HHS), Office of the Assistant Secretary for Health (ASH), *Initiatives*, Washington, DC: HHS, ASH: 2011. Available at http://www.hhs.gov/ophs/initiatives/mcc/index.html. Last accessed December 2011.
3. Thorpe KE, Howard DH, The rise in spending among Medicare beneficiaries: the role of chronic disease prevalence and changes in treatment intensity, *Health Aff*, 2006;25(5):w378-w388.
4. Fortin M, Soubhi H, Hudon C, et al., Multimorbidity's many challenges, *BMJ*, 2007;334(7602):1016-1017.
5. Peters-Klimm F, Kunz CU, Laux G, et al., Patient- and provider-related determinants of generic and specific health-related quality of life of patients with chronic systolic heart failure in primary care: a cross-sectional study, *Health Qual Life Outcomes*, 2010;8:98.
6. Verbrugge LM, Lepkowski JM, Imanaka Y, Comorbidity and its impact on disability, *Milbank Q*, 1989;67(3-4):450-484.
7. Cornoni-Huntley JC, Foley DJ, Guralnik JM, Co-morbidity analysis: a strategy for understanding mortality, disability and use of health care facilities of older people, *Int J Epidemiol*,1991;20(Supp);1:S8-S17.
8. Concato J, Horwitz RI, Feinstein AR, et al., Problems of comorbidity in mortality after prostatectomy, *JAMA*,1992;267(8):1077-1082.
9. Guralnik JM, LaCroix AZ, Abbott RD, et al., Maintaining mobility in late life. I. Demographic characteristics and chronic conditions, *Am J Epidemiol*,1993;137(8):845-857.
10. Satariano WA. Aging, comorbidity, and breast cancer survival: an epidemiologic view, *Adv Exp Med Biol*, 1993;330:1-11.
11. Ettinger WH, Davis MA, Neuhaus JM, et al., Long-term physical functioning in persons with knee osteoarthritis from NHANES. I: Effects of comorbid medical conditions, *J Clin Epidemiol*, 1994;47(7):809-815.
12. Satariano WA, Ragland DR. The effect of comorbidity on 3-year survival of women with primary breast cancer, *Ann Intern Med*,1994;120(2):104-110.
13. McGee D, Cooper R, Liao Y, et al., Patterns of comorbidity and mortality risk in blacks and whites, *Ann Epidemiol*,1996;6(5):381-385.
14. Yancik R, Havlik RJ, Wesley MN, et al., Cancer and comorbidity in older patients: a descriptive profile, *Ann Epidemiol*, 1996;6(5):399-412.
15. Yancik R, Wesley MN, Ries LA, et al., Comorbidity and age as predictors of risk for early mortality of male and female colon carcinoma patients: a population-based study, *Cancer*,1998;82(11):2123-2134.
16. Fried LP, Bandeen-Roche K, Kasper JD, et al., Association of comorbidity with disability in older women: the Women's Health and Aging Study, *J Clin Epidemiol*,1999;52(1):27-37.
17. Fillenbaum GG, Pieper CF, Cohen HJ, et al., Comorbidity of five chronic health conditions in elderly community residents: determinants and impact on mortality, *J Gerontol A Biol Sci Med Sci*, 2000;55(2):M84-M89.

18. McGann PE, Comorbidity in heart failure in the elderly, *Clin Geriatr* Med, 2000;16(3):631-648.
19. Gijsen R, Hoeymans N, Schellevis FG, et al., Causes and consequences of comorbidity: a review, *J Clin Epidemiol*, 2001;54(7):661-674.
20. Patrick L, Knoefel F, Gaskowski P, et al., Medical comorbidity and rehabilitation efficiency in geriatric inpatients, *J Am Geriatr Soc*, 2001;49(11):1471-1477.
21. Yancik R, Wesley MN, Ries LA, et al., Effect of age and comorbidity in postmenopausal breast cancer patients aged 55 years and older, *JAMA*, 2001;285(7):885-892.
22. Fortin M, Lapointe L, Hudon C, et al., Multimorbidity and quality of life in primary care: a systematic review, *Health Qual Life Outcomes*, 2004;2:51.
23. Fortin M, Bravo G, Hudon C, et al., Relationship between multimorbidity and health-related quality of life of patients in primary care, *Qual Life Res*, 2006;15(1):83-91.
24. Fortin M, Dubois MF, Hudon C, et al., Multimorbidity and quality of life: a closer look, *Health Qual Life Outcomes*, 2007;5:52.
25. Newman AB, Boudreau RM, Naydeck BL, et al., A physiologic index of comorbidity: relationship to mortality and disability, *J Gerontol A Biol Sci Med Sci*, 2008;63(6):603-609.
26. Marengoni A, von Strauss E, Rizzuto D, et al., The impact of chronic multimorbidity and disability on functional decline and survival in elderly persons. A community-based, longitudinal study, *J Intern Med*, 2009;265(2):288-295.
27. Townsend A, Hunt K, Wyke S, Managing multiple morbidity in mid-life: a qualitative study of attitudes to drug use, *BMJ*, 2003;327(7419):837.
28. Bayliss EA, Ellis JL, Steiner JF, et al., Initial validation of an instrument to identify barriers to self-management for persons with co-morbidities, *Chronic Illn*, 2005;1(4):315-320.
29. Bayliss EA, Ellis JL, Steiner JF, Subjective assessments of comorbidity correlate with quality of life health outcomes: initial validation of a comorbidity assessment instrument, *Health Qual Life Outcomes*, 2005;3:51.
30. Bayliss EA, Ellis JL, Steiner JF. Barriers to self-management and quality-of-life outcomes in seniors with multimorbidities, *Ann Fam Med*, 2007;5(5):395-402.
31. Bayliss EA, Bosworth HB, Noel PH, et al., Supporting self-management for patients with complex medical needs: recommendations of a working group, *Chronic Illn*, 2007;3(2):167-175.
32. Bayliss EA, Edwards AE, Steiner JF, et al., Processes of care desired by elderly patients with multimorbidities, *Fam Pract*, 2008;25(4):287-293.
33. Bayliss EA, Ellis JL, Steiner JF, Seniors’ self-reported multimorbidity captured biopsychosocial factors not incorporated into two other data-based morbidity measures, *J Clin Epidemiol*, 2009;62(5):550-557,e1.
34. Boult C, Wieland GD, Comprehensive primary care for older patients with multiple chronic conditions: "nobody rushes you through", *JAMA*, 2010;304(17):1936-1943.
35. Parekh AK, Barton MB, The challenge of multiple comorbidity for the US health care system, *JAMA*, 2010;303(13):1303-1304.
36. Wolff JL, Starfield B, Anderson G, Prevalence, expenditures, and complications of multiple chronic conditions in the elderly, *Arch Intern Med*, 2002;162(20):2269-2276.
37. Boyd CM, Boult C, Shadmi E, et al., Guided care for multimorbid older adults, *Gerontologist*, 2007;47(5):697-704.

38. Boyd C, Leff B, Weiss C, et al., Faces of medicaid: clarifying multimorbidity patterns to improve targeting and delivery of clinical services for Medicaid populations. Center for Health Care Strategies, Inc.; 2010.
39. Creditor MC, Hazards of hospitalization of the elderly, *Ann Intern Med*,1993;118(3):219-223.
40. Librero J, Peiro S, Ordinana R, Chronic comorbidity and outcomes of hospital care: length of stay, mortality, and readmission at 30 and 365 days, *J Clin Epidemiol*, 1999;52(3):171-179.
41. Hohl CM, Dankoff J, Colacone A, et al., Polypharmacy, adverse drug-related events, and potential adverse drug interactions in elderly patients presenting to an emergency department, *Ann Emerg Med*, 2001;38(6):666-671.
42. Boyd CM, Darer J, Boult C, et al., Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: implications for pay for performance, *JAMA*, 2005;294(6):716-724.
43. Garber AM, Evidence-based guidelines as a foundation for performance incentives, *Health Aff* (Millwood),2005;24(1):174-179.
44. Greenfield S, Kravitz R, Duan N, et al., Heterogeneity of treatment effects: implications for guidelines, payment, and quality assessment, *Am J Med*, 2007;120:S3-S9.
45. Tinetti ME, Bogardus Jr. ST, Agostini JV, Potential pitfalls of disease-specific guidelines for patients with multiple conditions, *N Engl J Med*, 2004;351(27):2870-2874.
46. Brown AF, Mangione CM, Saliba D, et al., Guidelines for improving the care of the older person with diabetes mellitus, *J Am Geriatr Soc*, 2003;51(5):S265-S280.
47. Lee SJ, Walter LC. Quality indicators for older adults preventing unintended harms, *JAMA*, 2011;306(13):1481-1482.
48. HHS, *Multiple Chronic ConditionsA Strategic Framework: Optimum Health and Quality of Life for Individuals with Multiple Chronic Conditions*, Washington, DC: HHS; 2010. Available at www.hhs.gov/ash/initiatives/mcc/mcc_framework.pdf. Last accessed November 2011.
49. HHS, *Report to Congress: National Strategy for Quality Improvement in Health Care*, Washington, DC: HHS; 2011. Available at www.healthcare.gov/law/resources/reports/nationalqualitystrategy032011.pdf. Last accessed November 2011.
50. NQF, *National Priorities Partnership*, Washington, DC: NQF; 2011. Available at National Priorities Partnership. Last accessed November 2011.
51. HHS, *National Prevention Strategy*, Washington, DC: HHS; 2011. Available at www.healthcare.gov/center/councils/nphpphc/strategy/report.pdf. Last accessed November 2011.
52. HHS, *Partnership for Patients: Better Care, Lower Costs*, Washington, DC: HHS; 2011. Available at www.healthcare.gov/center/programs/partnership/index.html. Last accessed November 2011.
53. NQF, *Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care*. Washington, DC: NQF; 2009. Available at www.qualityforum.org/Publications/2010/01/Episodes_of_Care_Full_Report_v2.aspx.
54. HHS, *Multiple Chronic Conditions—A Strategic Framework: Optimum Health and Quality of Life for Individuals with Multiple Chronic Conditions*, p. 4.
55. Anderson G, Horvath J, *Chronic Conditions: Making the Case for Ongoing Care*. Baltimore, MD: Partnership for Solutions; 2002. Available

at www.partnershipforsolutions.org/DMS/files/chronicbook2004.pdf. Last accessed November 2011. Last accessed December 2011.

56. Fortin M, Bravo G, Hudon C, et al., Prevalence of multimorbidity among adults seen in family practice, *Ann Fam Med*, 2005 May-Jun;3(3):223-8.
57. Fortin M, Hudon C, Haggerty J, et al., Prevalence estimates of multimorbidity: a comparative study of two sources, *BMC Health Serv Res*, 2010;10:111
58. Fortin M, Soubhi H, Hudon C, et al., Multimorbidity's many challenges, *BMJ*, 2007;334(7602):1016-1017.
59. HHS, *Multiple Chronic Conditions—A Strategic Framework: Optimum Health and Quality of Life for Individuals with Multiple Chronic Conditions*, p. 6.
60. Agency for Healthcare Research and Quality (AHRQ), Rockville, MD; 2011. Available at www.ahrq.gov/. Last accessed November 2011.
61. Anderson G, Horvath J. *Chronic Care: Making the Case for Ongoing Care*. Princeton, NJ: Robert Wood Johnson Foundation; 2010. Available at www.rwjf.org/files/research/chronicbook2002.pdf. Last accessed November 2011.
62. Ibid.
63. Torpy JM, Campbell A, Glass RM, Chronic diseases of children, *JAMA*, 2010;303(7):682.
64. NQF, *Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care*, p. 14.
65. Ibid.
66. Pham HH, Schrag D, O'Malley AS, et al., Care patterns in Medicare and their implications for pay for performance, *N Engl J Med*, 2007;356(11):1130-1139.
67. NQF, *Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care*, p. 14.
68. Piette JD, Kerr EA, The impact of comorbid chronic conditions on diabetes care, *Diabetes Care*, 2006;29(3):725-731.
69. NQF, *Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care*, p. 14.
70. Mor V, Angelelli J, Gifford D, et al., Benchmarking and quality in residential and nursing homes: lessons from the US, *Int J Geriatr Psychiatry*, 2003;18(3):258-266.
71. Casalino LP, Elster A, Eisenberg A, et al., Will pay-for-performance and quality reporting affect health care disparities? *Health Aff (Millwood)*, 2007;26(6):w405-w414.
72. NQF, *Measure Applications Partnership Strategic Approach to Performance Measurement for Dual Eligible Beneficiaries Interim Report to HHS*, Washington, DC: NQF; 2011. Available at www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=68542. Last accessed November 2011.
73. NQF, *Measure Applications Partnership Performance Measurement Coordination Strategy for Post-Acute Care and Long-Term Care*, Washington, DC: NQF; 2011. Available at www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=69297. Last accessed November 2011.

Appendix A:
Multiple Chronic Conditions Measurement Framework Steering Committee Roster

Co-chairs	Organization
Caroline S. Blaum	University of Michigan Health System – Institute of Gerontology
Barbara McCann	Interim HealthCare
Committee Members	
Mary Barton	National Committee for Quality Assurance
Cynthia Boyd (Liaison)	Johns Hopkins University School of Medicine – Johns Hopkins Health System
Margaret L. Campbell	Detroit Medical Center
Amina Chaudhry	Substance Abuse and Mental Health Services Administration
Leona Cuttler	Rainbow Babies and Children's Hospital – Case Medical Center
Michael C. Farber	University of Vermont College of Medicine/Department of Vermont Health Access
Christina Farup	DePuy, Inc./Johnson & Johnson
Daniel Forman	Brigham and Women's Hospital, Partners Healthcare
Andrew Guccione	George Mason University
Seena Haines	Palm Beach Atlantic University
Emma Hoo	Pacific Business Group on Health
Gail Hunt	National Alliance for Caregiving
Thomas E. Kottke	HealthPartners
Joseph Laver	St. Jude Children's Research Hospital
Kyu Rhee	IBM Corporation
Robert J. Rosati	Visiting Nurse Service of New York
Dennis Saver	Primary Care of the Treasure Coast
Jeffrey Thompson	DSHS Washington State Medicaid
Barbara Turner	University of Texas Health Science Center

Appendix B:

Multiple Chronic Conditions Key Measure Concepts Mapped to the National Quality Strategy Priorities

National Quality Strategy Priorities	Measure Concepts
Enable healthy living; optimize function	• ***Optimize function, maintain function, or prevent decline in function*** • Patient/family perceived challenge in managing illness or pain • Social support/connectedness • Productivity, absenteeism/presenteeism • Community/social factors • Healthy lifestyle behaviors • Depression/substance abuse/mental health • Primary prevention
Effective communication and coordination of care	• ***Seamless transitions between multiple providers and sites of care*** • ***Access to usual source of care*** • ***Shared accountability that includes patients, families, and providers*** • Care plans in use • Advance care planning • Clear instructions/simplification of regimen • Integration between community and healthcare system • Health literacy
Prevention and treatment of leading causes of mortality	• ***Patient clinical outcomes (e.g. mortality, morbidity)*** • Patient reported outcomes (e.g., quality of life, functional status) • Missed prevention opportunities – secondary and tertiary
Make care safer	• ***Avoiding inappropriate, non- beneficial end of life care*** • Reduce harm from unnecessary services • Preventable admissions and readmissions • Inappropriate medications, proper medication protocol, and adherence
Making quality care more affordable	• ***Transparency of cost (total cost)*** • Reasonable patient out of pocket medical costs and premiums • Healthcare system costs as a result of inefficiently delivered services (e.g. ER visits, polypharmacy, hospital admissions • Efficiency of care
Person- and family-centered care	• ***Shared decision-making*** • Patient experience of care • Family/caregiver experience of care • Self-management of chronic conditions, especially multiple conditions

Appendix C:
High Priority MCC Measure Concepts and Illustrative Measures

High Priority MCC Measure Concepts	Corresponding High Priority Illustrative Measures
Optimize function, maintain function, or prevent decline in function	• Long-stay nursing home residents with moderate-severe pain[1]* • Long-stay nursing home residents with depressive symptoms[2]* • Change in basic mobility or function for post-acute care[3,4]* • Functional capacity and HRQL in COPD patients before and after pulmonary rehab[5]* • Lower back pain: pain and functional status assessment[6,7] † • SF-36 and SF-12 surveys[8,9]
Seamless transitions between multiple providers and sites of care	• Care Transition Measure—CTM-3[10]* • Transition record with specified elements received by discharged patients[11]*
Access to usual source of care	• People unable to get or delayed getting needed medical care, dental care or prescription medications[12] • Access problems due to cost[13] • Children with special healthcare needs with access to medical home[14]
Shared accountability that includes patients, families, and providers	• Children with effective care coordination and with a medical home[15]
Patient clinical outcomes (e.g. mortality, morbidity)	• Health outcomes—mortality and morbidity[16]
Avoid inappropriate, non-beneficial end-of-life care	• Hospice patients who didn't receive care consistent with end-of-life wishes[17]† • CARE mortality follow back survey of bereaved family members[18]† • Inappropriate non-palliative services at end of life[19,20] • Preventable ED visits[21]
Transparency of cost (total cost)	• Average annual expenditures per consumer unit for healthcare[22] • Consumer price indexes of medical care prices[23] • Personal health care expenditures, by source of funds [24]
Shared decision-making	• Persons whose healthcare providers always involved them in decisions about their healthcare as much as they wanted[25]

* NQF-endorsed measure

† Measure currently undergoing NQF review

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[1] Measure: Percent of long-stay nursing home residents who have moderate to severe pain. HHS, *Nursing Home Compare*, Washington, DC: HHS; 2010. Available at www.medicare.gov/NHCompare/Include/DataSection/Questions/SearchCriteriaNEW.asp?version=default&browser=IE%7C9%7CWindows+7&language=English&defaultstatus=0&pagelist=Home&CookiesEnabledStatus=True. Last accessed December 2011.NQF, *endorsed standard 0677*, Washington, DC: NQF; 2011. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: HHS, *Minimum Data Set (MDS)*, Washington, DC: HHS; 2010. Available at www.cms.gov/NursingHomeQualityInits/25_NHQIMDS30.asp. Last accessed December 2011.

[2] Measure: Percent of long-stay nursing home residents with depressive symptoms. HHS, *Nursing Home Compare*, Washington, DC: HHS; 2010. Available at www.medicare.gov/NHCompare/Include/DataSection/Questions/SearchCriteriaNEW.asp?version=default&browser=IE%7C9%7CWindows+7&language=English&defaultstatus=0&pagelist=Home&CookiesEnabledStatus=True. Last accessed December 2011.NQF, *endorsed standard 0690*, Washington, DC: NQF; 2011. Available at www.qualityforum.org/Measures_List.aspx. Last accessed

December 2011. Data source: HHS, *MDS*, Washington, DC: HHS; 2010. Available at www.cms.gov/NursingHomeQualityInits/25_NHQIMDS30.asp. Last accessed December 2011.

[3] Measure: Change in basic mobility as measured by the AM-PAC. NQF, *endorsed standard 0429*, Washington, DC: NQF; 2008. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: CREcare, *AM-PAC Outcome Instrument*, Boston, MA; 2009. Available at http://crecare.com/am-pac/ampac.html. Last accessed December 2011.

[4] Measure: Change in daily activity function as measured by the AM-PAC. NQF, *endorsed standard 0430*, Washington, DC: NQF; 2008. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: CREcare, *AM-PAC Outcome Instrument*, Boston, MA; 2009. Available at http://crecare.com/am-pac/ampac.html. Last accessed December 2011.

[5] Measure: Functional capacity in COPD patients before and after pulmonary rehabilitation. NQF, *endorsed standard 0701,* Washington, DC: NQF; 2011. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: American Association of Cardiovascular Pulmonary Rehabilitation, Chicago, IL; 2011. Available at http://www.aacvpr.org/Resources/OutpatientCardiacRehabilitationRegistry/tabid/422/Default.aspx.

[6] Measure: LBP initial assessment. NQF, *endorsed standard 0322*, Washington, DC: NQF; 2008. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: National Committee for Quality Assurance, *Back Pain Recognition Program,* Washington, DC; 2011. Available at http://www.ncqa.org/tabid/137/Default.aspx. Last accessed December 2011.

[7] Measure: LBP patient reassessment. NQF, *endorsed standard 0306*, Washington, DC: NQF; 2008. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: National Committee for Quality Assurance, *Back Pain Recognition Program,* Washington, DC; 2011. Available at http://www.ncqa.org/tabid/137/Default.aspx. Last accessed December 2011.

[8] Measure: 36-Item Short Form Survey. RAND Health, *Medical Outcomes Study,* Santa Monica, CA: RAND; 2011. Available at http://www.rand.org/health/surveys_tools/mos/mos_core_36item.html. Last accessed December 2011.

[9] Measure: 12-Item Short Form Survey. RAND Health, *Medical Outcomes Study,* Santa Monica, CA: RAND; 2011. Available at http://www.rand.org/health/surveys_tools/mos/mos_core_12item.html. Last accessed December 2011.

[10] Measure: 3-item care transition measure (CTM-3). NQF, *endorsed standard 0228*, Washington, DC: NQF; 2010. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: University of Colorado—Health Sciences Center, Denver, CO; 2011. Available at www.cu.edu/techtransfer/contact/healthscience.html. Last accessed December 2011.

[11] Measure: Transition record with specified elements received by discharged patients for inpatient discharges to home/self-care or any other site of care. NQF, *endorsed standard 0647*, Washington, DC: NQF; 2010. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: American Medical Association (AMA), *Physician Consortium for Performance Improvement,* Chicago, IL: AMA; 2011. Available at www.ama-assn.org/ama/pub/physician-resources/clinical-practice-improvement/clinical-quality/physician-consortium-performance-improvement.page. Last accessed December 2011.

[12] Measure: People who were unable to get or delayed in getting needed medical care, dental care, or prescription medicines in the last 12 months, by race, ethnicity, income, education, and language spoken at home. AHRQ, *National Healthcare Disparities and Quality Reports*, Rockville, MD: AHRQ; 2010. Available at www.ahrq.gov/qual/qrdr10.htm. Last accessed December 2011. Data source: AHRQ, *MEPS*, Rockville, MD: AHRQ; 2010. Available at www.meps.ahrq.gov/mepsweb/communication/whats_new.jsp?timeframe=150&sublastup=Go. Last accessed December 2011.

[13] Measure: Cost-related access problems, by race/ethnicity, income and insurance status. The Commonwealth Fund Commission on a High Performance Health System, *Why Not the Best? Results from the National Scorecard on U.S. Health System Performance*, New

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York, NY: The Commonwealth Fund Commission on a High Performance Health System; 2008. Available at www.commonwealthfund.org/Content/Publications/Fund-Reports/2008/Jul/Why-Not-the-Best--Results-from-the-National-Scorecard-on-U-S--Health-System-Performance--2008.aspx. Last accessed December 2011. Data source: The Commonwealth Fund, *2007 Commonwealth Fund Health Insurance Survey*, New York, NY: The Commonwealth Fund; 2008. Available at www.commonwealthfund.org/Surveys/2007/2007-Commonwealth-Fund-Biennial-Health-Insurance-Survey.aspx. Last accessed December 2011.

[14] Measure: Proportion of children who have access to a medical home. HHS, *HP2020*, *indicator MICH-30.1, MICH-30.2*; Washington, DC: HHS; 2010. Available at www.healthypeople.gov/2020/default.aspx. Last accessed December 2011.Data source: CDC, *NSCH*, Atlanta, GA: CDC; 2010. Available at www.cdc.gov/nchs/slaits/nsch.htm. Last accessed December 2011.

[15] Measure: Children with effective care coordination and with a medical home by age, residence location, and insurance. AHRQ, *National Healthcare Disparities and Quality Reports*, Rockville, MD: AHRQ; 2010. Available at www.ahrq.gov/qual/qrdr10.htm. Last accessed December 2011. Data source: CDC, *National Survey of Children's Health (NSCH)*, Atlanta, GA: CDC; 2010. Available at www.cdc.gov/nchs/slaits/nsch.htm. Last accessed December 2011.

[16] Measure: Years per life lost on all deaths occurring before the age of 75; Percent of adults reporting fair or poor health; and the average number of physically and mentally unhealthy days reported per month. University of Wisconsin Population Health Institute, *Mobilizing Action Toward County Health: The County Health Rankings (MATCH)*, Madison, WI: MATCH; 2009. Available at uwphi.pophealth.wisc.edu/pha/match/matchRankings.pdf. Last accessed December 2011.Data source: CDC, *National Hospital Ambulatory Medical Care Survey (NHAMCS)*, Atlanta, GA: CDC; 2010. Available at www.cdc.gov/nchs/ahcd.htm. Last accessed December 2011.CDC, *BRFSS*, Atlanta, GA: CDC; 2005-2009. Available at www.cdc.gov/BRFSS/. Last accessed December 2011.

[17] Measure: Family evaluation of hospice care. AHRQ, *National Healthcare Disparities and Quality Reports*, Rockville, MD: AHRQ; 2010. Available at www.ahrq.gov/qual/qrdr10.htm. Last accessed December 2011. NQF, *endorsed standard 0208*, Washington, DC: NQF; 2009. Available at www.qualityforum.org/Measures_List.aspx. Last accessed December 2011. Data source: National Hospice and Palliative Care Organization (NHPCO), *Family Evaluation of Hospice Care*, Alexandria, VA: NHPCO; 2010. Available at www.nhpco.org/i4a/pages/index.cfm?pageid=3264. Last accessed December 2011.

[18] Measure: Consumer Assessments and Reports of End-of-Life (CARE). Teno JM, Clarridge BR, Casey V, et al., Family perspectives on end-of-life care at the last place of care, *JAMA* 2004;291(1):88-93. Data source: Brown University Center for Gerontology and Healthcare Research, Providence, RI; 2011. Available at www.chcr.brown.edu/dying/MEASURES_JAMA_PAPER_LAST_PLACE_OF_CARE.PDF. Last accessed December 2011.

[19] Measure: Percent of patients seeing ten or more physicians during the last six months of life. The Dartmouth Atlas of Health Care, *Trends and Variation in End-of-Life Care for Medicare Beneficiaries with Severe Chronic Illness*, The Dartmouth Institute for Health Policy and Clinical Practice; 2011. Available at http://tdi.dartmouth.edu/documents/EOL_Trend_Report_0411%20(3).pdf. Last accessed December 2011. Data source: The Dartmouth Institute for Health Policy and Clinical Practice; 2011. Available at http://tdi.dartmouth.edu/documents/EOL_Trend_Report_0411%20(3).pdf. Last accessed December 2011.

[20] Measure: Number of hospice days per chronically ill patient in the last six months of life. The Dartmouth Atlas of Health Care, *Trends and Variation in End-of-Life Care for Medicare Beneficiaries with Severe Chronic Illness*, The Dartmouth Institute for Health Policy and Clinical Practice; 2011. Available at http://tdi.dartmouth.edu/documents/EOL_Trend_Report_0411%20(3).pdf. Last accessed December 2011.Data source: The Dartmouth Institute for Health Policy and Clinical Practice; 2011. Available at http://tdi.dartmouth.edu/documents/EOL_Trend_Report_0411%20(3).pdf. Last accessed December 2011.

[21] Measure: Went to emergency room for condition that could have been treated by regular doctor, by race/ethnicity, income and insurance status. The Commonwealth Fund Commission on a High Performance Health System, *Why Not the Best? Results from the National Scorecard on U.S. Health System Performance*, New York, NY: The Commonwealth Fund Commission on a High Performance Health System; 2008. Available at www.commonwealthfund.org/Content/Publications/Fund-Reports/2008/Jul/Why-Not-the-Best--Results-from-the-National-Scorecard-on-U-S--Health-System-Performance--2008.aspx. Last accessed December 2011.Data source: The Commonwealth Fund, *2007 Commonwealth Fund Health Insurance Survey*, New York, NY: The Commonwealth Fund; 2008.

Available at www.commonwealthfund.org/Surveys/2007/2007-Commonwealth-Fund-Biennial-Health-Insurance-Survey.aspx. Last accessed December 2011.

[22] Measure: Average annual expenditures per consumer unit for health care. *The 2012 Statistical Abstract: Health and Nutrition,* Washington, DC; 2007-2009. Available at http://www.census.gov/compendia/statab/2012edition.html. Last accessed December 2011. Data source: Consumer Expenditure survey**.** Bureau of Labor Statistics (BLS), *CPI Detailed Report, Data for January 2011*, Washington, DC. http://www.bls.gov/cpi/cpi_dr.htm. Last accessed December 2011.

[23] Measure: Consumer price indexes of medical care prices. U.S. Census Bureau, *The 2012 Statistical Abstract: Health and Nutrition,* Washington, DC; 1980-2010. Available at http://www.census.gov/compendia/statab/2012edition.html. Last accessed December 2011. Data source: Consumer Expenditure survey**.** Bureau of Labor Statistics (BLS), *Consumer Expenditure Survey*, Washington, DC. Available at www.bls.gov/cex. Last accessed December 2011.

[24] Measure: Personal health care expenditures, by source of funds. Centers for Disease Control and Prevention, *Health Expenditures,* Atlanta, GA; 1998-2008. Data Source: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Expenditure Accounts. *National health expenditures*, 2008. Available from: http://www.cms.hhs.gov/NationalHealthExpendData/ and unpublished data. Last accessed December 2011.

[25] Measure: Proportion of persons who report that their healthcare providers always involved them in decisions about their healthcare as much as they wanted. HHS, *HP2020*, indicator HC-HIT-3, Washington, DC: HHS; 2010. Available at www.healthypeople.gov/2020/default.aspx. Last accessed December 2011.Data source: National Institutes of Health (NIH), *Health Information National Trends Survey (NHINTS)*, Bethesda, MD: NIH; 2003-2007. Available at hints.cancer.gov. Last accessed December 2011.

Appendix D:

MCC Conceptual Model Measurement Domains and Definitions

1) **Communication, care coordination and integration:** measures that look at coordination and communication between physicians, specialties and sites of care and integration of an overall care plan. This domain includes process measures such as continuity of care, patient-centered communication, and effective transitions across care settings, and outcome measures such as patient experience of care. These measures may be less specific to a type and site of care, but look across multiple sites and types of care.
2) **Process of care:** measures that examine overuse, underuse and misuse of recommended treatments, but may also include non-disease-specific processes of care such as medication reconciliation. These measures may be specific to individual sites and types of care, however the same measure could apply to multiple different sites of care.
3) **Structure:** measures that examine the presence of structural elements aimed at improving patient care and coordination, such as electronic health records, self-management support groups, or a house call program. These measures may apply to a specific site of care or could be considered across multiple sites, such as across a health plan.
4) **Patient and family level outcomes: measures that** encompasses a wide range of outcome measures most important to patients and their families including (but not limited to) health outcomes, function, health-related quality of life, assessment of patient and family centeredness, goal attainment, shared decision-making, engagement, satisfaction, access to care, self-management, education, palliation, caregiver burden, and treatment burden. Similarly, there are process measures which overlap with some of these outcomes, such as providing patient education materials or documenting patient goals.
5) **Safety:** measures that include both outcome and process measures focused on reducing risk for harm from care. For individuals with multiple chronic conditions, this also includes adverse consequences of therapy interactions such as adverse drug reactions, development of delirium, and falls. Many safety measures are specific to a site or type of care; however some safety concerns, such as delirium, may result from transitions across sites of care.
6) **Cost and resource use:** measures that look at the both the quantity of resources used and the true cost of care and issues such as efficiency and value.

Appendix E: **Priority Measure Concept Alignment – Multiple Chronic Conditions (MCC), Measure Application Partnership (MAP) Post-Acute Care/Long Term Care and Dual Eligible Beneficiaries.***

National Priority: Work with communities to promote wide use of best practices to enable healthy living and well-being.

NQS Measure Concepts	MCC Measure Concepts	MAP Post-Acute Care/Long-Term Care Measure Concepts	MAP Dual Eligible Beneficiaries High-Leverage Opportunities
• Adequate social support • Emergency department visits for injuries • Healthy behavior index • Binge drinking • Obesity • Mental health • Dental caries and untreated dental decay • Use of the oral health system • Immunizations	• Optimize function, maintaining function, prevention of decline in function • Patient family perceived challenge in managing illness or pain • Social support/connectedness • Productivity, absenteeism/ presenteeism • Community/social factors • Healthy lifestyle behaviors • Depression/ substance abuse/mental health • Primary prevention	• Functional and cognitive status assessment.	• Quality of life • Mental health and substance use

National Priority: Promote the most effective prevention, treatment, and intervention practices for the leading causes of mortality, starting with cardiovascular disease.

NQS Measure Concepts	MCC Measure Concepts	MAP Post-Acute Care/Long-Term Care Measure Concepts	MAP Dual Eligible Beneficiaries High-Leverage Opportunities
• Access to healthy foods • Access to recreational facilities • Use of tobacco products by adults and adolescents • Consumption of calories from fats and sugars • Control of high blood pressure • Control of high cholesterol	• Patient clinical outcomes (e.g. mortality, morbidity) • Patient reported outcomes (e.g. quality of life, functional status) • Missed prevention opportunities—secondary and tertiary		• Quality of life • Mental health and substance use

National Priority: Ensure person- and family-centered care.

NQS Measure Concepts	MCC Measure Concepts	MAP Post-Acute Care/Long-Term Care Measure Concepts	MAP Dual Eligible Beneficiaries High-Leverage Opportunities
• Patient and family experience of quality, safety, and access • Patient and family involvement in decisions about healthcare • Joint development of treatment goals and longitudinal plans of care • Confidence in managing chronic conditions • Easy-to-understand instructions to manage conditions	• Shared decision-making • Patient, experience of care • Family, caregiver experience of care • Self-management of chronic conditions, especially multiple conditions	• Establishment and attainment of patient/ family/ caregiver goals • Advanced care planning and treatment • Experience of care • Shared decision-making	• Structural measures

Appendix E: **Priority Measure Concept Alignment – Multiple Chronic Conditions (MCC), Measure Application Partnership (MAP) Post-Acute Care/Long Term Care and Dual Eligible Beneficiaries.***

National Priority	NQS Measure Concepts	MCC Measure Concepts	MAP Post-Acute Care/Long-Term Care Measure Concepts	MAP Dual Eligible Beneficiaries High-Leverage Opportunities
National Priority: Make care safer.	• Hospital admissions for ambulatory-sensitive conditions • All-cause hospital readmission index • All-cause healthcare-associated conditions • Individual healthcare-associated conditions • Inappropriate medication use and polypharmacy • Inappropriate maternity care • Unnecessary imaging	• Avoiding inappropriate, non-beneficial end-of-life care • Reduce harm from unnecessary services • Preventable admissions and readmissions • Inappropriate medications, proper medication protocol and adherence	• Falls • Pressure ulcers • Adverse drug events • Inappropriate medication use	
National Priority: Promote effective communication and care coordination.	• Experience of care transitions • Complete transition records • Chronic disease control • Care consistent with end-of-life wishes • Experience of bereaved family members • Care for vulnerable populations • Community health outcomes • Shared information and accountability for effective care coordination	• Seamless transitions between multiple providers and sites of care • Access to usual source of care • Shared accountability that includes patients, families, and providers • Care plans in use • Advance care planning • Clear instructions/simplification of regimen • Integration between community and healthcare system • Health literacy	• Transition planning	• Care coordination
National Priority: Make quality care affordable for people, families, employers, and governments.	• Consumer affordability index • Consistent insurance coverage • Inability to obtain needed care • National/state/local per capita healthcare expenditures • Average annual percentage growth in healthcare expenditures • Menu of measures of unwanted variation of overuse, including: - Unwarranted diagnostic/medical/surgical procedures - Inappropriate/unwanted nonpalliative services at end of life - Cesarean section among low-risk women - Preventable emergency department visits and hospitalizations	• Transparency of cost (total cost) • Reasonable patient out of pocket medical costs and premiums • Healthcare system costs as a result of inefficiently delivered services, e.g. ER visits, polypharmacy, hospital admissions • Efficiency of care	• Infection rates • Avoidable admissions	• Infection rates Avoidable admissions