Value for the Money Spent? Exploring the Relationship Between Medicaid Costs and Quality

Final Report

August 2010

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EXECUTIVE SUMMARY

Spending on the Medicaid program, which is financed and administered by the federal and state governments, grew from about $206 billion in 2000 to more than $340 billion in 2008. Total Medicaid expenditures are projected to exceed $400 billion in 2010. Annual rates of Medicaid spending growth were often greater than general inflation during the past decade, and Medicaid payments now account for an average of 22 percent of states' expenditures. Both the magnitude of Medicaid spending and its sizable share of state budgets have led federal and state policymakers to ask if Medicaid dollars are spent as efficiently as possible. The recent economic recession, which has caused severe budget shortfalls in nearly every state and rapid increases in enrollment, makes it even more important to ensure that resources are used in the most effective manner.

This study examines the value of state Medicaid program spending by exploring the relationship between both sides of the efficiency coin—costs and outcomes. Using a framework and guiding principles we developed for defining and measuring state Medicaid spending efficiency, we created a set of measures that relate state spending per beneficiary to quality indicators and compared states' performance to each other. Due to a paucity of comparable state-level quality data for the Medicaid population, the measures offer a narrow window onto Medicaid spending value. But they build the foundation for a more comprehensive assessment of Medicaid efficiency when more data becomes available.

Study Framework and Approach

In the absence of an accepted definition of efficiency applicable to the Medicaid program as a whole, we developed for this study a framework and guiding principles based on previous research in health care efficiency and recommendations from a technical advisory group (TAG) of Medicaid program experts. The framework defines efficiency from the perspective of state Medicaid programs as large purchasers of health care that seek to produce better value, measured as cost relative to quality, access to care, or health care outcome indicators. This contrasts with a more traditional definition of efficiency that looks only at cost per unit of service.

While there are significant gaps in comparable state data on quality indicators for the Medicaid population, we used the data currently available to develop 28 "exploratory efficiency measures" relating to the four major populations covered by Medicaid—children, non-disabled adults, disabled individuals, and the elderly. The study assessed state performance by comparing measures of spending value across state Medicaid programs rather than to that achieved by other large health purchasers, such as Medicare or private health plans, because the populations they serve are very different. The study assessed the degree of variation across states in the cost and quality components of each measure, and the degree of correlation between the two components.

Comparing State Performance. As an initial effort to measure Medicaid efficiency, the study compared state performance using conservative benchmarks and scoring techniques. For each exploratory efficiency measure we assigned scores to states based on whether their per member per

month (PMPM) costs and average quality scores were above or below the median. [1] Only states with relevant cost *and* quality data for each measure were used to calculate the median. The use of medians rather than means, or averages, guards against the potential for outlier states (those well above or well below the mean) to skew the average. We did not rank state performance based on aggregate scores because data limitations leave out a sizable number of states for many measures, and the measures leave out large groups of Medicaid enrollees. Instead, states were assigned to one of three tiers based on the frequency of scores in each of the five measure domains, which are a family or group of measures for each enrollee subgroup. States with more 1s were assigned to Tier A, states with more 2s to Tier B, and states with more 3s to Tier C.

The study also conducted case studies of six states, three of which had more frequent scores in Tier A, and three in Tier C to examine whether particular Medicaid program features or policies, such as purchasing strategies and provider payment rates, contributed to their performance. It also analyzed the effect on state Medicaid spending of factors *not* subject to influence by state Medicaid policy, including general population demographics and local medical input prices.

Major Findings

This exploratory exercise in comparing state Medicaid cost and quality outcomes yielded several findings:

- **Little relationship between cost and quality on exploratory efficiency measures.** Despite substantial variation in state performance on PMPM costs and on some quality measures, there were few statistically significant relationships between them. Of the 28 measures, only three showed a significant correlation between cost and quality in 2006, two positive (higher costs associated with higher quality) and one negative (lower costs associated with higher quality but to a very small degree). In other words, for most of the measures, higher total Medicaid spending on a PMPM basis does not necessarily produce better outcomes, and lower PMPM spending does not necessarily result in worse quality outcomes.
- **Potential to reduce costs without harming quality or improve quality without increasing costs.** The lack of correlation between costs and quality by state suggests that state Medicaid agencies may be able to reduce costs, or at least slow cost growth, without negatively affecting quality. There may also be opportunities to increase quality without necessarily increasing costs, particularly in states whose absolute scores on quality measures are lower than the median.
- **Few states are high or low performers in all measures and domains**. While measure performance was strongly correlated within a measure domain, it was rare for a state to have the highest or lowest scores across all measures in each domain. In other words, no state had a score of 1 for all of the individual measures within a domain, and few states had a score of 3 for all measures in the domain. Varying performance across the five domains was common. Eleven states placed in the top quartile for at least one

[1] Scores on individual measures were assigned as follows: 1 for states with higher-than-median quality and lower-than-median costs; 2 for states with near-median quality or costs, *or* high quality-high costs *or* low quality-low costs; and 3 for states with lower-than-median quality and higher-than-median costs.

domain, while placing in the bottom quartile for at least one other domain. Fourteen states placed in the same quartile, or tier, across all domains with available cost and quality data. That Medicaid program performance was consistent within the five measure domains but varied across them may reflect differences in Medicaid program management by population.

- **No common features shared by states in the top and bottom tiers.** Among states at either end of the performance continuum—states that frequently placed in the top or bottom tier in each measure domain—there do not appear to be any obvious characteristics, such as program size, use of certain managed care arrangements, or underlying medical care costs that are uniformly shared by those states. Moreover, the case studies did not identify a set of policies or purchasing strategies that account for variation in performance between the high- and low-performing states. While state Medicaid agencies are beginning to tie payment to provider and managed care plan performance, states with more scores of 1 (meaning higher value) on many measures are pursuing many of the same policies designed to improve quality and control costs as states with more scores of 3 (meaning lower value).

- **Several factors play a role in state variation in PMPM costs and quality measures for exploratory efficiency measures.** Although the case studies did not identify the policies that are most effective in achieving better value, they helped shed light on a complex set of factors that contribute to each side of the cost-quality coin: (1) beneficiary characteristics, (2) provider and managed care organization payment rates, (3) targeted efforts to improve quality or access for certain enrollee groups, and (4) state-specific health market characteristics. In some cases, higher-than-median quality scores appear to reflect concerted action by the state to improve the outcomes. Differences in state scores may also reflect different starting points. Strategies adopted since the 2004-2006 study period that explicitly link payment to performance hold promise for improving value over time within each state, though their performance relative to other states will depend on the degree of improvement.

- **PMPM costs are influenced by, but not entirely due to beneficiary characteristics.** The proportion of capitated managed care organization (MCO) adult enrollees who are disabled affects relative performance of states. When PMPM costs for adult enrollees in capitated managed care plans were separated by those who qualify on the basis of disability and those who do not, state performance relative to others in the adult measure domain changes for about half the measures. Higher shares of disabled enrollees in capitated managed care plans contribute to higher PMPM costs relative to other states, but do not account for all variation in state costs and value relative to other states.

- **Wide variation in state spending per beneficiary for defined population groups**. When overall Medicaid spending is disaggregated by 10 Medicaid population subgroups, defined on the basis of age, disability status, use of long-term care, dual status (Medicare and Medicaid eligibility), and eligibility for limited benefits, PMPM spending per enrollee varies almost 20 fold. As in previous studies, we found that the lowest Medicaid PMPM costs were for children ($249 national average) and the highest for disabled individuals using long-term care and not dually eligible for Medicare ($4,372 national average). But state spending can also vary substantially across the 10 subgroups within a state; for example, Georgia had low PMPM spending relative to other states for 9 of the 10 subgroups, but one of the highest PMPM spending on adults. This underscores the

need to examine cost and quality for distinct groups of Medicaid enrollees when constructing efficiency measures. Many of the exploratory efficiency measures developed for this study go further by creating even more homogeneous subgroups divided by gender and age (for example, breast cancer screening among women ages 52 to 69).

- **Enrollee mix explains some state variation in overall per-beneficiary costs.** Variation in the relative mix of the enrollees can account for some of the differences across states in overall PMPM costs covering the four enrollee categories of children, adults, disabled individuals and the elderly. However, once beneficiaries are separated into the 10 enrollee subgroups, further controls for the age and sex distribution of states' low-income populations are not significant.

Policy Implications and Recommendations

Potential Avenues for Improving Value. Wide variation in state spending per beneficiary relative to quality, access to care, and health outcomes suggests there may be opportunities to lower costs without sacrificing quality. This does *not* mean that higher-than-median Medicaid spending per enrollee accompanied by better health outcomes is not worthwhile. Policymakers and state program officials can justify higher spending if it produces better quality outcomes.

Policymakers seeking to improve the value of Medicaid spending need to consider both sides of the value equation—lowering costs in ways that do not harm quality, and improving quality for little or no extra cost. For example, if a state Medicaid agency pays health care providers at significantly lower rates than private insurance or Medicare, reducing rates may harm quality, so the focus should be on restructuring payment to reward quality *improvement*. Alternatively, provider rates for preferred services could be increased while those for services of lesser value could be reduced, with no net change in overall reimbursement for particular provider types. Much wider variation in state spending per beneficiary—especially for those using long-term care, with little difference in most quality measures—also suggests there may be an opportunity to lower costs without harming quality.

Improving Quality Relative to Cost Through the Use of National Benchmarks. The measures developed by this study offer national benchmarks that could help to raise the performance bar, particularly in states where quality standards are well below or costs are well above the national median. For example, states can use the benchmarks to establish minimum quality standards for all health plans or providers with whom they contract. In some situations, this may be difficult to do if just a subset of managed care plans and providers participate in the state's Medicaid program. In most states, however, nearly all providers of certain services, such as nursing facilities, do participate in Medicaid, so the state could contract with only those that meet minimum quality standards.

In addition, it is increasingly common for Medicaid programs to reward managed care organizations and certain types of providers for higher quality through pay-for-performance (P4P) programs. Generally, states assess performance or progress in relation to past performance rather than to that of other states. If higher performance means better than it was before, it may be worth paying more. But if higher performance means improvement from a starting point that is low relative to other states or a national benchmark, the state may end up paying more for a low standard of quality, which makes the value of additional payment doubtful. The benchmarks in this study could be used by state Medicaid officials seeking to set the bar higher.

Study Limitations

Incomplete Medicaid Quality Data. Our attempt to measure the value produced by Medicaid spending was severely constrained by the lack of Medicaid-specific quality data. For example, because so many states did not have relevant quality data for many of the exploratory efficiency measures, correlations between cost and quality are based, for some measures, on data from as few as 18 states. If additional states were included in the analyses, the relationship between cost and quality might change in both direction and strength. In other words, a relationship may exist between Medicaid spending and quality, but measures that can be constructed from currently available data are inadequate to detect such a relationship.

Although the state scores and tiers utilize the best available data that can be compared across states, the lack of quality data for a substantial proportion of states in all years means this study presents a very incomplete picture of the value of state Medicaid spending. Consequently, the comparisons across states made in this study should be viewed as an initial attempt to use existing measures and current methodological tools to compare Medicaid program efficiency. A more comprehensive assessment would require greater availability of comparable data on quality, access to care, or health care outcomes for a greater portion of the Medicaid population in all states. Several initiatives designed to provide these data are now under way or recently authorized in national health reform legislation, which will help to remedy this limitation in the future.

Inadequate Data to Perform Risk Adjustment. Another study limitation is that the cost and quality measures used to create the exploratory efficiency measures are not risk-adjusted for the health or functional status of each state's Medicaid population. This study's analysis of PMPM spending for enrollees in capitated managed care plans for disabled versus non-disabled enrollees illustrates the importance of doing more sophisticated risk-adjustment, but for capitated managed care enrollees this requires diagnostic information or encounter data not available in most states. Studies of risk-adjusted state cost and quality data in a limited number of states with such data would improve the accuracy of state comparisons.

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I. INTRODUCTION

One of the major goals of reforming the nation's health care system is to spend health care resources more effectively and efficiently to produce better health outcomes. During the recent economic downturn, federal and state policymakers have been particularly concerned about making the best use of limited health care dollars.

Spending on the Medicaid program, jointly financed and administered by the federal government and state governments, grew from about $206 billion in 2000 to more than $340 billion in 2008 and accounts, on average, for about 22 percent of states' expenditures. The economic recession that began in 2008 caused severe budget shortfalls in most states, and put enormous pressure on the Medicaid program in particular. Total Medicaid spending grew by 8 percent in FY2009, the highest growth rate in six years, largely due to increasing enrollment among people who lost jobs and income. Because states must balance their budgets, most of them made program spending cuts.

As in previous recessions, most states turned to traditional cost-cutting measures, such as reductions in eligibility, benefits, and provider payments. These methods, however, can diminish access to necessary care, lower the quality of care, and may ultimately necessitate more costly treatment (Cunningham and Nichols 2006; Bindman et al. 2008; NASHP 2004). Are there ways to reduce costs while maintaining access and quality? Are some state Medicaid programs more efficient than others, thereby purchasing greater value for their dollars? If so, how do they achieve this?

Policymakers aiming to ensure public dollars are being spent as efficiently as possible must consider both sides of the efficiency coin—cost and outcomes. Just as international comparisons of health systems show that some countries have better outcomes but spend much less per capita (WHO 2000; Schoen et al. 2006), some state Medicaid programs appear to get more from their spending than others. For example, in calendar year 2004, Medicaid personal health care spending in New York ($10,173) was nearly twice that of Hawaii ($4,974), but on measures of healthcare access among adults enrolled in capitated Medicaid programs, both states had similar access scores (Martin et al. 2007; AHRQ 2006).[2] This example suggests the possibility that Hawaii gets more value—equal healthcare access at lower cost.

Wide variation across states in spending per beneficiary and in health care indicators prompted the questions that motivated this study: Do some states get more "bang" for their Medicaid bucks? What is the relationship between Medicaid cost and quality? To inform federal and state policymakers interested in improving the value of Medicaid spending, the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (ASPE)

[2] Consumer Assessment of Healthcare Providers and Systems (CAHPS) measures for adults in captitated Medicaid managed care were obtained from the 2006 AHRQ National Healthcare Quality Report. In 2004, among adults ages 18 and over who reported making an appointment for routine care within the past six months, 43.9 percent of Medicaid beneficiaries in Hawaii reported always getting an appointment as soon as they wanted, while 44.3 percent of beneficiaries in New York did so. Among adults ages 18 and over who reported making an appointment for care for illness or injury within the past six months, 53.9 percent of Medicaid beneficiaries in Hawaii reported always getting an appointment as soon as one was needed, while 53.4 percent of beneficiaries in New York did so (AHRQ 2006).

commissioned Mathematica Policy Research to develop an approach for measuring and comparing state Medicaid program efficiency.

A. Project Goal and Approach

The goal of this project was to define, measure, and compare the efficiency of Medicaid spending across the 50 states and the District of Columbia, and explore whether certain Medicaid policies are associated with higher value in program spending. The project involved four major components: (1) defining efficiency in the Medicaid program context; (2) developing exploratory efficiency measures using existing Medicaid data sources; (3) analyzing state Medicaid cost and quality data to compare state performance on the exploratory efficiency measures; and (4) investigating the factors that contribute to higher or lower performance on the measures in selected states.

To inform our approach, we conducted a literature search to determine how health care efficiency is defined and measured—in a general sense and for the Medicaid program in particular. Although some empirical studies have measured the efficiency of certain types of care paid by Medicaid programs, there has been no systematic effort to measure Medicaid spending efficiency across states. Consequently, we also sought the advice of a technical advisory group (TAG) made up of Medicaid policy experts.

B. Organization of This Report

This report has six chapters in addition to this introduction. In Chapter II, we present the study framework and the guiding principles for defining efficiency in Medicaid spending based on previous research and recommendations of the TAG. The overall approach, specific methods, and data sources used to create exploratory Medicaid efficiency measures are explained in detail in Chapter III. In the subsequent two chapters, we summarize the results of the quantitative and qualitative analyses. In Chapter IV, we present results of the analyses of the relationship between cost and quality on 28 exploratory efficiency measures and compare states' performance on these measures. To shed light on state variation in total Medicaid spending, in Chapter V we provide findings of analyses on spending per enrollee for 10 population subgroups, and the extent to which state cost variation relates to differences in the mix of Medicaid enrollees by subgroup and in geographic medical care costs. In Chapter VI, we present findings from the six case study states, including how state Medicaid programs measure and seek to improve value and how their approaches contribute to state scores on the exploratory efficiency measures. Chapter VII presents implications for policy and future research.

II. STUDY FRAMEWORK AND DESIGN PRINCIPLES

To develop a guiding framework for this study, we conducted a review of the literature on efficiency measurement and Medicaid cost analyses, and convened a TAG to provide guidance on the study design. Based on the literature review (Lipson et al. 2009) and TAG recommendations, we developed a definition of efficiency appropriate to the Medicaid program as that which produces higher value—better health quality, access or outcomes for a given level of spending. After assessing alternative measures and methods for comparing state Medicaid costs and outputs, we identified a set of guiding principles for choosing the most appropriate data sources and analytic methods for measuring efficiency. This chapter presents an overview of the study's framework and design principles.

A. Defining Efficiency from the Medicaid Purchaser Perspective

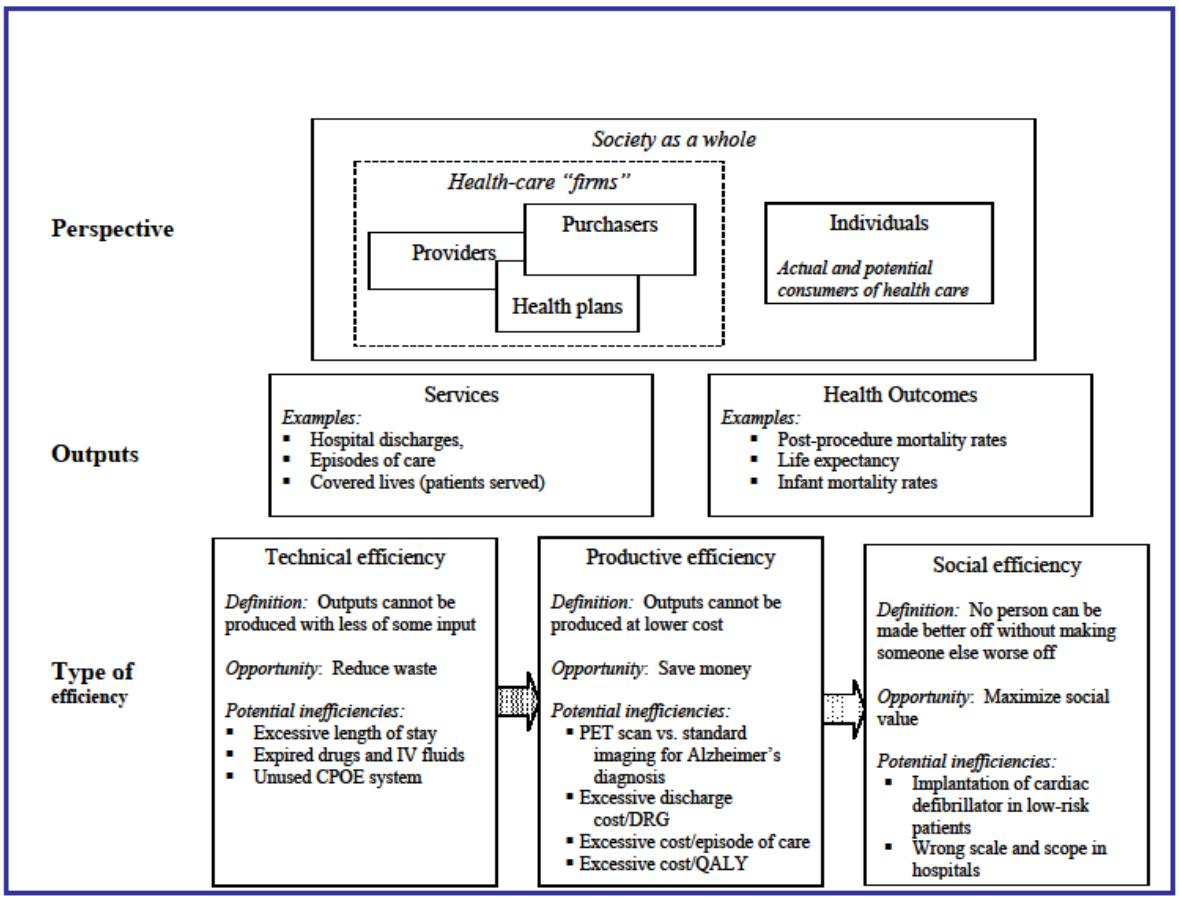
Many definitions of health care efficiency exist and there is little agreement about which is preferable. Most definitions tend to focus on cost per unit of output, such as a health care service or episode of care (McGlynn et al. 2008; Bentley et al. 2008; Leatherman et al. 2003; Chen et al. 2007). In their recent review of health care efficiency measures, McGlynn and colleagues (2008) developed a framework reflecting these different definitions (see Figure II.1). The components include (1) from whose perspective efficiency is evaluated, such as purchaser, a health plan, or a provider; (2) which outputs are used, such as a unit of service, an episode of care, or a unit of quality outcome; and (3) which inputs or resources, such as personnel, facilities, or technologies depending on the population, service, or setting examined are used to produce the outputs or outcomes. The review also identified three major types of efficiency: technical, productive, and social.

The literature does not provide much, if any, guidance for defining or measuring efficiency in the Medicaid context. State Medicaid programs are fundamentally health care purchasers that do not provide care directly. Instead, Medicaid programs try to obtain the mix of services and contracts with providers that can produce the best access and quality outcomes for a given level of spending. This corresponds to the definition of productive efficiency: a given set of outputs cannot be produced at lower cost. This concept is similar to one recommended by the National Quality Forum (NQF), which defined efficiency as the relationship of the cost of care associated with a specific level of performance measured with respect to the other five aims of quality identified by the Institute of Medicine (IOM): safety, timeliness, effectiveness, equity, and patient-centeredness (NQF, 2009).

Consequently, for this study, we defined efficiency from the purchaser perspective, focusing on total costs per quality outcome. Because there are no standards or benchmarks for determining an absolute or highest level of efficiency that can be achieved by a state Medicaid program, the concept must be assessed by comparing existing patterns of spending and outcomes across state Medicaid programs. Combining these two principles produced a definition of state Medicaid efficiency as *that which produces better outcomes for a given level of spending relative to other states or similar outcomes for lower costs.*

To select relevant costs and quality measures for the Medicaid population and to score states for their relative efficiency performance, we adopted the following seven principles. They are based on established practice in Medicaid cost analysis, currently available state-level quality data for Medicaid populations, and best practices in health care ranking exercises (CIHI 2008).

Figure II.1. A Typology of Efficiency in Health Care



Source: McGlynn et al. 2008

B. Guiding Principles

1. Develop Measures Addressing Important Dimensions of Quality

To measure efficiency—involving both quality and costs—we first sought to identify and select measures representing multiple dimensions of quality that are consistent with existing frameworks. In particular, we sought to identify measures of whether care delivered to Medicaid beneficiaries is safe, effective, patient-centered, timely, efficient, and equitable, as defined in the IOM's 2001 report "Crossing Quality Chasm: A New Health System for the 21st Century." We also sought measures that addressed three care components—structure, process, and outcome—consistent with Donabedian's (1966) classic quality measurement framework. And we tried to select a range of measures that reflect a variety of other aspects of care, such as access, patient satisfaction or experience, delivery of preventive services, delivery of other recommended processes of care, and clinical outcomes. However, there are several gaps in current quality measures and data collection activities for many of these dimensions (IOM 2006); and those pertaining to Medicaid quality measurement are even more limited. Thus, while the measures identified and selected for this analysis cover multiple dimensions, there remain large holes, as discussed in more detail in Chapter III.

2. Develop Measures Relevant to Each of the Major Medicaid Beneficiary Groups

The literature documents widely different service needs, cost patterns, and relevant quality measures for each of the major populations served by state Medicaid programs (for example, Wenzlow et al. 2007; Sommers et al. 2006; Sommers et al. 2005; Holahan and Cohen 2006; CMS 2008). There are significant differences in the mix of these populations across states, based on varying eligibility rules, underlying state population differences, and other factors. Therefore, based on common practice in Medicaid cost analysis and input from the TAG, a key goal of the study was to develop relevant cost and quality measures for each of these populations, and to stratify or adjust for population differences when comparing efficiency performance across states. The four major groups that the Medicaid studies use most commonly include:

- Adults (non-disabled)
- Children (non-disabled)
- Disabled children or adults
- Elderly

Thus, the data and methods developed in this study were designed to produce measures corresponding to the service delivery and cost patterns associated with these groups. Within these broad beneficiary categories, there are significant variations in service use and cost patterns of long-term care users, pregnant women, mentally retarded or developmentally disabled (MR/DD) individuals, and beneficiaries dually eligible for Medicare and Medicaid. Our selection of cost and quality measures attempts to account for these distinct population subgroups.

Most Medicaid cost analyses divide spending by major service categories, including acute versus long-term care services, and specific services such as those delivered by physicians, hospitals, and nursing homes, as well as prescription drugs. However, state Medicaid agencies increasingly purchase many of these services in packages or bundles from managed care plans for the majority of non-disabled children and adults. In addition, rates paid to nursing homes are for a combination of health and personal care services. Because the combination of services, rather than any individual service, contributes to key health quality outcomes, we decided to compute costs based on total spending for each of the Medicaid enrollee subgroups rather than on the cost of individual services.

3. Use Current Medicaid Quality Measures and Available Data Despite the Limitations

Studies of efficiency use several measures of quality of care, access to care, and other outcomes. Yet only a small subset of measures is routinely and consistently collected at this time by Medicaid programs in all or most states. Some state-specific studies and state Medicaid agency reports contain data on such outcomes, but their utility for this project is limited because of the lack of comparability to other states.

Consequently, based on the literature and input from the TAG, we selected quality measures for this study if they were well accepted—for example, widely used in assessing Medicaid performance—and currently available. Primary data collection and establishment of new measures was beyond the scope of this study. Consistent with this principle, we selected measures if they were: (1) available for the years of the study (2004-2006); (2) targeted to or highly specific to state Medicaid populations; and (3) collected from all, or a significant number of states. We also gave preference to measures that focused on patient experiences, processes of care, or clinical outcomes

considered to be direct indicators of quality. We did *not* select measures of policies or Medicaid program features that may contribute to quality outcomes, such as how care was financed or managed (capitation or fee-for-service), or the settings in which care was provided (institutional versus community-based care) because we regard them as independent variables that could contribute to average costs or quality of care patterns, as discussed below.

We identified several data sets routinely collected for a large portion of states during multiple years, covering a wide variety of performance domains and populations. These measure sets are either specifically designed for state Medicaid performance assessments or highly specific to state Medicaid populations (see Chapter III for a description of the data sets chosen).

4. Identify Relevant Medicaid Cost Components

We defined costs as per-enrollee—per member per month (PMPM) —Medicaid expenditures on health care services, in the form of fee-for-service payments and capitation payments covering bundles of services (including behavioral health care services), plus total state administrative costs apportioned equally across enrollees within a state. By aggregating spending on all services in the "bundles" reflected in the quality measures, the study does not take into account differences in benefits covered, or the utilization of specific services, because from an efficiency perspective variable inputs may lead to different outcomes.

Other studies analyze Medicaid costs using different units, such as aggregate expenditures, spending per *eligible* population (including those who are eligible but not enrolled in Medicaid), and spending per capita (all state residents) (Bindman et al. 2007; Verdier et al. 2009; Sommers and Cohen 2006; Wenzlow et al. 2007; Holahan and Cohen 2006; Kaye et al. 2009). But such approaches would not allow for fair comparison of the outcomes produced by Medicaid spending for the population covered and enrolled in each state. Those measures are likely to reflect cost differences among states that would be affected by factors other than efficiency, such as population size or eligibility and enrollment policies.

We included Medicaid administrative costs because some studies indicate that administrative functions can be an important feature of efficiency; however, we decided not to examine administrative costs separately for two reasons. First, there is significant variation in the way administrative costs are counted and reported across states. Second, even if measured in standardized ways, high administrative costs may not be an indicator of lower efficiency. For example, some administrative activities, such as investment in new care management programs or patient education efforts, may increase the efficiency of spending on all services.

We did not include Medicaid disproportionate share hospital (DSH) payments in calculations of total spending because of the complex ways in which these payments are distributed across states, often unrelated to efficiency, and because they cover hospital costs for low-income uninsured patients not covered by Medicaid. However, we did examine whether adding these costs would have any significant impact on the states' scores on the exploratory efficiency measures and found they did not materially alter the quartiles or tiers in which states performed (see Chapter IV).

5. Examine State-Level Variation in Cost and Quality for Each of the Exploratory Efficiency Measures

Because efficiency measures—combining cost and quality together—for state Medicaid programs have not been previously developed or widely used, we first examined the relationship

between PMPM costs and quality measures for each of the 28 exploratory efficiency measures before proceeding to comparisons of state scores. This was designed to see how each state's costs and quality measures vary and relate to one another within specific performance domains.

An alternative approach would have been to develop aggregate or composite efficiency measures and scores based on weighted, linear combinations of cost and quality measures across multiple domains. This would involve the use of more advanced measure development techniques, such as factor analysis or cluster analysis. However, we believe such an approach would have been premature. The conceptual development of efficiency measures for the Medicaid program is in an early stage, providing little guidance or theory on suitable weighting or statistical techniques.

6. Use Conservative National Benchmarks for Comparing States on Exploratory Efficiency Measures

The study originally sought to compare state performance based on overall scores and rankings. However, because quality data are unavailable for such a large portion of all Medicaid enrollees, and for so many states, we did not develop aggregate or composite scores or rankings. In addition, we took a conservative approach to establishing benchmarks for comparing state performance. For each exploratory efficiency measure and for each measure domain—a group of measures for the same enrollee subgroup—we sorted states into three groups, based on whether their PMPM costs and average quality scores were above or below the median. States with higher-than-median quality and lower-than-median costs formed a "high-performing group;" states with lower-than-median quality and higher-than-median costs formed a "low-performing group." All remaining states—with near-median performance in both dimensions, or high quality/high costs, or low quality/low costs—formed the third group. The median was based on the performance of states with relevant cost *and* quality data. The use of the national median rather than the mean (average) also guards against the possibility that outlier states (those that are well above or well below the mean) could skew the average.

This conservative approach to setting national benchmarks is appropriate for an initial effort to measure and score state Medicaid spending efficiency. Until more comparable state-level data on Medicaid-specific quality and access measures become available, and more studies conducted to determine the factors that influence performance, it is premature to set benchmarks based on the best attainable performance, the standard used in the Commonwealth Fund's state health performance ranking (Cantor 2007; McCarthy et al. 2009) and recommended by NQF as the most desirable benchmark for measuring efficiency (NQF 2009).

7. Explore a Variety of Factors That Might Contribute to Medicaid Efficiency

The final guiding principle for the study was to examine a wide array of factors that might contribute to each state's performance on the efficiency measures. Efficiency can be driven by many things, including Medicaid program and policy decisions, underlying state population characteristics, state provider composition and practice patterns, and such market factors as input costs (see, for example, Martin et al. 2007; CBO 2008, Gold 2004; Grabowski et al. 2004; Verdier et al. 2009). We examined these factors in two ways. First, we conducted multivariate analyses to examine how state cost variation changes when controlling for the mix of Medicaid enrollees and local medical care input costs. Second, we conducted qualitative case studies with a sample of high-performing and low-performing states to help assess the relationships between cost and quality scores and Medicaid policies and programs.

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III. STUDY METHODOLOGY AND DATA SOURCES

In this chapter, we summarize the analytic approach for two major study components. First, it describes how we developed exploratory efficiency measures using available cost and quality data specific to the Medicaid program and compared state performance. Second, it describes the analyses conducted to better understand the factors underlying Medicaid cost variation across states, which examined PMPM expenditures for a broader set of Medicaid subgroups than those represented in the exploratory efficiency measures, controlling for differences in states' demographics and medical input prices.

Details about the methodology for a third study component, which consists of six in-depth case studies that provide insight into contextual similarities and differences associated with state performance on the exploratory efficiency measures, are explained in Chapter VI.

A. Constructing and Analyzing Exploratory Efficiency Measures

Measuring efficiency involves examining outcomes in relation to costs. For this study, we sought to identify outcomes appropriate to Medicaid, represented by available quality, access-to-care, or outcome measures specific to subgroups of Medicaid enrollees, as well as costs associated with corresponding outputs, represented by Medicaid spending on specific subgroups plus the costs of program administration. We first describe the Medicaid-related quality and cost data used in our analyses, then explain our approach to combining them to assess and compare state performance.

1. Data Sources

Quality Data. From the literature review, we identified major data sources for measuring health care quality or access to care in general, then searched for quality data corresponding to four major Medicaid enrollee populations—children, adults, people with disabilities, and the elderly. A limited number of quality or other output measures relate specifically to the Medicaid program, however, and even fewer can be compared across all states and multiple time points (see Appendix Table A.1 for more details). To maximize the number of exploratory efficiency measures, we considered some quality measures that reflect care received primarily (though not exclusively) by Medicaid enrollees. We selected 28 quality measures for which there were comparable data for Medicaid enrollees (or predominantly Medicaid) from all or a substantial number of states, from the following six sources (more information on each one can be found in Appendix A): (1) Medicaid Consumer Assessment of Healthcare Providers and Systems (CAHPS), (2) Medicaid Healthcare Effectiveness Data and Information Set (HEDIS), (3) National Survey of Children's Health (NSCH), (4) National Immunization Survey (NIS), (5) National Core Indicators (NCI), and (6) Nursing Home Compare (NHC).

Cost Data. Medicaid costs were computed for two categories—services and administrative expenditures—using administrative data from the Centers for Medicare & Medicaid Services (CMS) that are available for all states. We relied primarily on Medicaid Analytic eXtract (MAX) data, which are research-quality data sets containing Medicaid enrollment and service use information from the Medical Statistical Information System (MSIS). They include a person-level summary file that covers data on eligibility, demographics, managed care enrollment, a summary of utilization and Medicaid payment by type of service, and four claims files for inpatient, long-term care, other services, and prescription drugs. We used the personal summary file from 2004-2006 MAX (the most recent years

available at the time this study was conducted) to develop the service cost measures, since it contains most of the information needed and is easier to work with than the detailed claims files.

While MAX files are built on detailed claims files contained in MSIS, MAX data sets are more appropriate for research and policy analysis because they have important advantages over MSIS (Wenzlow et al. 2007). For example, MAX files contain calendar year utilization analysis by date of service for each enrollee (as opposed to fiscal quarter claims payment in MSIS), which corresponds better to the quality measures used in this study. MAX files also reflect retroactive claims adjustments, retroactive eligibility and other coding corrections that are not easily traceable in MSIS. At the same time, MAX data have some limitations, which put some constraints on our ability to accurately count certain Medicaid costs:

- **No extra provider payments**. Because MAX consists of only enrollee-level information, it does not include payments to providers in addition to regular Medicaid reimbursement, such as DSH payments or supplemental payments made under UPL provisions. In fiscal year 2006, states spent $23 billion on DSH and UPL payments and they vary dramatically by state (GAO 2008). In this study, we decided not to count these extra payments in calculating PMPM costs because: (1) they are not attributable to individual enrollees and (2) they cover the cost of care for some individuals not enrolled in Medicaid (the uninsured) and so do not contribute to Medicaid-specific quality outcomes.[3]

- **No lump sum payments**. MAX does not include data on any lump sum payments, such as the amounts states pay the federal government for dual enrollees (individuals enrolled in both Medicaid and Medicare) for such costs as Medicare premiums and Part D "claw-back" payments that help finance the Medicare prescription drug benefit enacted in 2006. In addition, because Medicare is the first payer for services used by dual enrollees, MAX captures only additional Medicaid payments that are made on behalf of the enrollee, such as Medicare cost sharing. As a result, costs associated with dual enrollees are incomplete. However, since Medicare premiums and copayments are federally set and are therefore the same in all states, the omission of these payments should not significantly affect state variation in PMPM costs.

- **Limited data on managed care enrollees.** Information in MAX about managed care enrollees is restricted to enrollment months, monthly premium payments, and some service-specific *utilization* information (also called "encounter claims"), which is known to be incomplete. It does not include service-specific *expenditure* information for managed care enrollees. This was not a problem for most of our analyses, because for the most part they do not analyze costs for individual services.[4] But in the few cases in which we computed state spending on a set of services, MAX data could underestimate actual costs in states with high managed care enrollment rates. For example, to identify long-term care (LTC) service users, we had to use FFS payments for specific LTC services. In Arizona, where nearly all elderly and disabled individuals are enrolled in

[3] We conducted sensitivity analyses to determine how counting these extra payments would affect states' PMPM costs; even when such costs are included, very few states changed quartiles (see Chapter IV).

[4] We did not request HEDIS measures with a clinical condition or disease focus (that is, care quality for diabetics), precisely because we are not able to calculate costs for managed-care populations with such conditions using MAX data.

managed LTC plans, nursing home residents cannot be separately identified, so the state was excluded from the associated exploratory efficiency measure.[5]

- **Lack of data on home and community-based services (HCBS) waiver enrollment in 2004.** Before 2005, MAX data did not contain specific codes to indicate which individuals were enrolled in community-based waiver programs. To calculate 2004 spending on community-based waiver enrollees with developmental disabilities would have required extensive analysis of 2004 MSIS claims data, which was beyond the scope of this study. Hence, 2004 expenditures for this population subgroup reflect only those residing in intermediate care facilities for people with mental retardation (ICFs/MR), which accounts for 2004 PMPM costs that are almost double those in 2005 and 2006, when HCBS services that are less costly on a PMPM basis were also included.
- **Incomplete or anomalous data.** MAX contains some incomplete, anomalous or incorrect data elements. We consulted the MAX anomaly notes to determine if they could explain unusual patterns. In most cases, the anomalies do not significantly change PMPM costs or state scores on the exploratory efficiency measures. But the anomalies were so serious that we had to exclude one state (Maine) from this analysis because it was missing all claims except for prescription drugs in 2005 and 2006.

For administrative costs, which can affect efficiency, we used the Quarterly Medicaid Statement of Expenditures for the Medical Assistance Program, also known as the Form CMS-64, used by state Medicaid agencies to report to CMS actual program benefit costs and administrative expenses. We used CMS-64 data (aggregate federal fiscal year summary by state, available on the CMS website), to calculate Medicaid administrative expenditures for 2004-2006 and added them to total cost measures calculated from MAX data. This method results in a one-quarter difference between the MAX data (calendar year) and CMS-64 data (federal fiscal year) used in this analysis; however, Medicaid administrative costs do not vary significantly from one quarter to the next. Because administrative costs are not attributable to individual enrollees, we calculated PMPM administrative costs by equally distributing the full fiscal year value across all enrollees throughout the calendar year.

2. Quality Dimensions Covered by Available Data

The measures that could be constructed from existing quality and cost data sets cover several important dimensions of quality, as defined in well-established quality measurement frameworks. *Efficiency*, a key dimension identified by IOM, is the focus of all of the trial measures developed in this study. For most of the other IOM dimensions, there are many gaps.

We found that the emphasis on particular dimensions in available measures sets varies across the four population subgroups covered by Medicaid. As summarized in Table III.1, Medicaid quality measures for adults, children, and those with developmental disabilities tend to focus on IOM-defined quality dimensions of timely, patient-centered, and effective care, with an emphasis on measures of processes of care, preventive services, access to care, and patient satisfaction with care.

[5] Saucier and Fox-Grage (2005) estimated that in 2003-04 most Medicaid managed LTC plan enrollees were concentrated in seven states—Arizona, Florida, Massachusetts, Minnesota, New York, Texas, and Wisconsin—but they did not comprise more than 50 percent of all long-term-care users in any state except Arizona.

Measures for the elderly and disabled in long-term nursing facilities, on the other hand, focus on timely, effective care and clinical care outcomes. As a whole, the available measures do not address some important dimensions of quality that IOM identified, including, most notably, *patient safety* and *equity* of care. The available measures also do not address *structures* of care that can lead to quality. Table III.1 shows the dimensions of quality addressed by each measure, grouped by relevant subpopulation, as well as the primary data collection method used.

Table III.1. Dimensions of Quality Addressed by Exploratory Medicaid Efficiency Measures

	IOM Quality Dimensions*				Donabedian Quality Framework			Topical Focus		
Population Subgroup	Safe	Timely or Effective	Equitable	Patient-centered	Process	Structure	Outcomes	Access to Care	Preventive Service Delivery	Clinical Quality of Care
Adults		X		X	X			X	X	
Children		X			X			X	X	
People with developmental disabilities		X		X	X			X		
Elderly and disabled long-stay residents of nursing facilities		X					X			X

3. Assessing Relationships Between State Medicaid Costs and Quality

The major goal of the study was to understand and construct measures of the relationship between Medicaid costs and quality. Developing these measures involved three steps, described in detail below: construct exploratory efficiency measures, each composed of corresponding quality and cost data for a specific enrollee subgroup; analyze the correlation between quality and cost for each measure across states and establish national benchmarks based on medians for states with both quality and cost data; and compare the relative performance of states within and across the exploratory efficiency measures.

a. Development of Exploratory Efficiency Measures

Since Medicaid covers diverse population groups with widely varying needs and associated costs, it is important to divide enrollees into logical subgroups. As discussed, we drew on health care quality data currently available for Medicaid enrollees, or those that reflect primarily Medicaid enrollees, and constructed 28 exploratory efficiency measures for four subgroups (some available for all states, others for some states). Each measure combines the quality measure for the state as a whole, usually presented as a percentage of the relevant target population, with an associated cost measure for the same population in the corresponding (or closest) year.[6] After PMPM service costs

[6] We made one exception to the principle of calculating costs for the population defined by the quality measure. For the adult Medicaid population, Medicaid CAHPS and HEDIS quality measures are not reported separately for disabled and non-disabled enrollees of capitated managed care plans. As part of the cost analysis for this study, we found that the PMPM cost profiles for these two groups are quite different, with costs for disabled adults generally much higher than for non-disabled adults. In addition, because the share of disabled enrolled in such plans varies greatly across

were calculated, they were added with PMPM administrative expenditures to create one cost measure, to be matched with the corresponding quality measure. See Appendix Table A.1 for a description of each measure, and the definition of the target population.

In general, the Medicaid cost measures in this study are presented as PMPM costs, with administrative and service expenditures as the numerator, and total number of member months as the denominator. We chose to calculate PMPM costs instead of annual per-enrollee costs because the length of time that Medicaid beneficiaries remain continuously enrolled in the course of a year varies substantially by state (Fairbrother et al. 2007). States with more turnover among beneficiaries will appear to have lower costs by the per-enrollee measure because more of the ever-enrolled members are not eligible or are not using services throughout the year. Consequently, we concluded that total member months (rather than number of members) as the denominator was a fairer method for comparing state Medicaid spending.

For most of the exploratory efficiency measures, PMPM costs reflect total spending on the relevant beneficiary group's managed care payments and FFS costs, including acute and primary care, prescription drugs, and LTC. For example, CAHPS measures for adults ages 18 to 64 are collected for enrollees in "comprehensive" (capitated) MCOs. To compute the PMPM costs that correspond to these CAHPS quality measures, we identified enrollees in the targeted age group who had at least one month of enrollment in a capitated MCO. We then summed all reported costs for those enrollees—the MCO capitation payment and the cost of any other services delivered on a FFS basis—to compute total PMPM costs. Because we regarded the efficiency of Medicaid spending as reflective of the outcomes of the total mix of services rather than any single service, we did not, in general, analyze costs at the service unit level. The costs captured in each exploratory efficiency measure include:[7]

- Medicaid CAHPS and HEDIS measures for non-disabled adults: PMPM costs for individuals 19 to 64 years old enrolled in a capitated MCO for any part of the year.[8] Age is determined during the year of MAX data used. Some cost measures were calculated for females only, and appropriate age restrictions were applied to match the quality measures. The cost component of the prenatal care measures was computed for women with at least one hospital stay with a maternal delivery during the year, as reflected in encounter data.
- Medicaid HEDIS measures for children: PMPM costs for children or young adults enrolled in a comprehensive MCO for at least part of the year. Appropriate age restrictions were applied based on the quality measure.

(continued)

states, we chose to use non-disabled adult costs only to make cross-state comparisons more equitable. While CAHPS and HEDIS measures could vary among the two groups, we know of no evidence showing the measures, which are primarily access to care, or process of care measures, vary substantially by health or functional status. Cost data for non-disabled adults enrolled in capitated managed care plans were not computed for 2004 and 2005 as this required more resources than study funds allowed, so the state scores in this domain are computed for 2006 only.

[7] Due to coding changes over the three-year period (2004-2006) for some data, a few measures are defined differently each year and in some cases were not included in the comparison of efficiency measures over time.

[8] HEDIS and CAHPS measures are reported only for those enrolled in MCOs. Though MAX does not have service-specific costs for managed care enrollees, it does indicate which beneficiaries are enrolled in such plans.

- NSCH measures for children: PMPM costs for enrollees from birth to age 17 (ages 1 to 17 for the dental care measure).
- NIS vaccination measures for children: PMPM costs for enrollees ages 19 to 35 months.
- NCI measures for people with developmental disabilities: total PMPM costs for enrollees who are at least 18 years old, and had any FFS payments for care provided in intermediate care facilities for the mentally retarded (ICF/MR) or were enrolled in section 1915(c) waiver for MR/DD at any time during the year.[9]
- NHC measures for elderly: **t**otal PMPM for institutional long-term care services received in nursing homes paid on a FFS basis. Costs for any acute care or community care were excluded. To match the NHC quality measures, only costs for those enrolled in a nursing facility for three or more months were counted.

b. Analysis of Quality-Cost Correlation and Establishment of Benchmarks

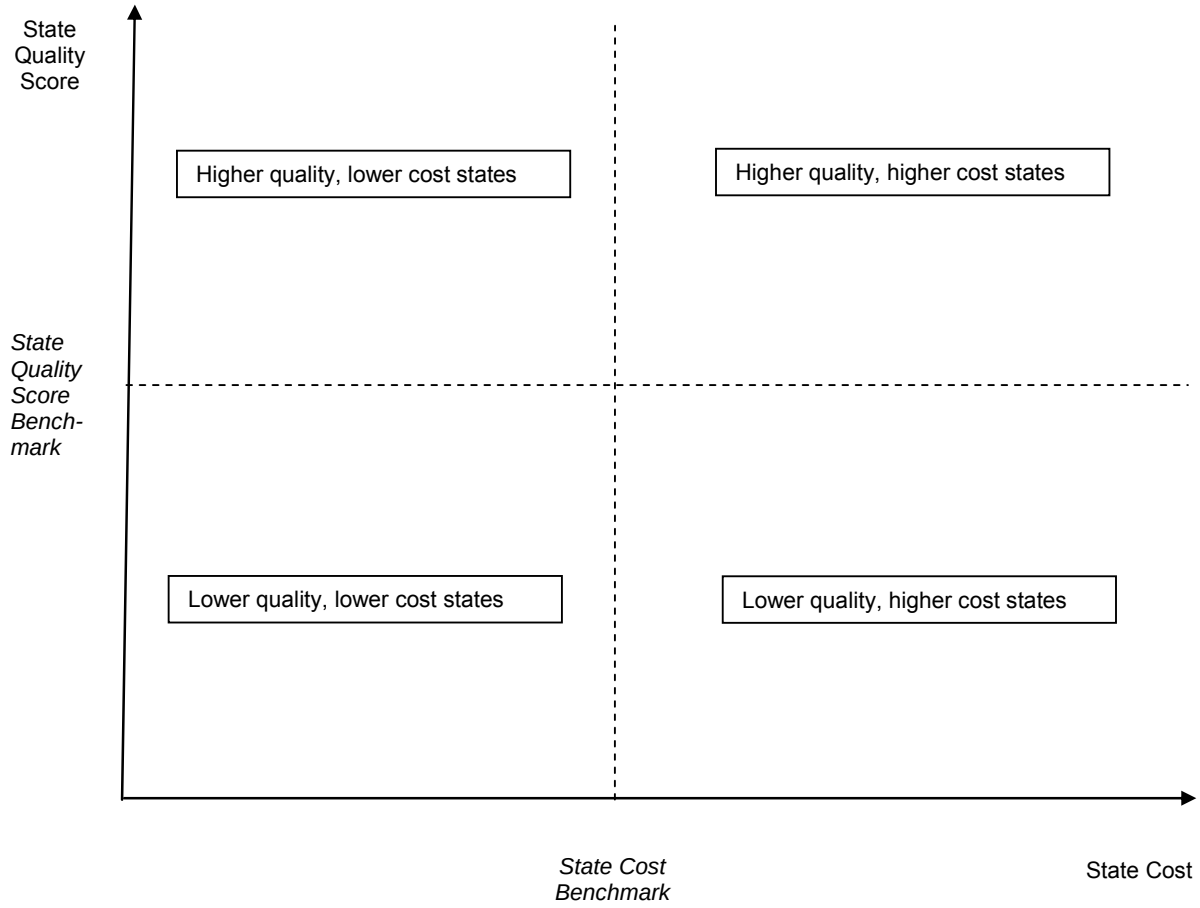
Conventional efficiency measures are often calculated as ratios between outputs and costs. However, some initial analyses found that higher spending is not strongly correlated with better quality outcomes, and we therefore decided it was not appropriate to compute a ratio of quality to cost, or the reverse. Ratios also obscure relative performance in each dimension since they do not distinguish between care that is of high quality for median costs, or median quality for low costs. To display the relationship between costs and outcomes, we generated a series of scatter plots for each quality and cost measure combination (see Figure III.1), as in a similar analysis of state variation in Medicare costs and quality (CBO 2008). Each point on the graph represents the intersection of a state's cost and quality score for that area of measurement—for example, the percentage of children who received all needed care compared to the PMPM costs of enrollees ranging in age from newborn to 17 years old.

The scatter plots simultaneously show state variation in costs and quality, and the correlation between the two at the state level. For example, a scattered "cloud" shape suggests large variation and little to no correlation between the two, whereas a dense line extending in either direction might suggest correlation (positive or negative). Because the unit and scale of the graphs can visually skew the results, we standardized the graphs based on the extent of variation around a median. We also examined whether one dimension varies while another is relatively invariant across states.

In addition to visually showing the relationship between quality and cost, we also measured the correlation coefficient directly. The correlation coefficient is a number between -1 and 1 that is often used to determine the extent to which changes in the value of one attribute (in this case, quality) are associated with changes in another (cost). High *positive* correlation, whereby higher cost is strongly associated with higher quality, may mean that states as a whole do not vary substantially in overall efficiency (cost per outcome), though they may vary on cost and quality. However, a *negative* correlation, whether high or low, suggests that some states are more efficient (lower cost-higher quality) and some are less efficient (lower quality-higher cost).

[9] Due to limitations in MAX data files, 2004 expenditures for this population subgroup reflect only those residing in ICFs/MR, which accounts for 2004 PMPM costs that are almost double those in 2005 and 2006.

Figure III.1. Sample Scatter Plot Diagram Indicating Distribution of State Medicaid Cost and Quality Measures



c. Comparing State Performance on the Exploratory Efficiency Measures

To compare state performance on the 28 exploratory efficiency measures, we grouped the measures into five domains corresponding to the major Medicaid enrollee groups (children, adults, disabled, and elderly). The children's group measures were divided into two subsets—those derived from HEDIS measures, and those based on the NSCH or the NIS—because all states had NSCH/NIS measures but no more than 25 states had HEDIS measures. The five domains, and the number of measures in each are: children-HEDIS (4 measures), children-NSCH/NIS (6 measures), adults (9 measures), disabled (4 measures), and elderly (5 measures).

To assign performance scores, we divided states by whether they are relatively efficient (upper left quadrant) or inefficient (lower right quadrant). The benchmarks, shown as dashed lines in Figure III.1, represent the median in each cost or quality measure among all states where data are available. Using the median divides states equally below and above the benchmark. For example, if median PMPM costs of enrollees in the birth to 17 years old age group are $200, half of the states have costs greater than $200 and the other half less than $200. The use of medians is preferable to the mean (that is, the average), which can be affected by outliers. For each individual measure, we assigned scores based on which quadrant the state appeared in, as follows:

- States scored 1 if the quality scores were in the top quartile and costs below median, OR costs in the bottom quartile and quality scores above median
- States scored 2 if the costs and quality were both in the middle quartiles of the distribution, or costs and quality were both above (or both below) median
- States scored 3 if the costs were in the top quartile, and quality scores below median, OR quality scores in the bottom quartile and costs were above median

Domain tiers were assigned by summing scores on individual measures within the domain and identifying the top quartile (Tier A) and bottom quartile (Tier C). Roughly half the states with data in each domain—those in the middle two quartiles—are grouped in Tier B. Generally, states with more 1s were assigned to Tier A, states with more 2s to Tier B, and states with more 3s to Tier C. States without data for any measures within the domain did not receive a domain tier, so as not to penalize nonreporting.

B. Cost Variation Analysis

While it is rare to find quality/outcome measures specific to Medicaid and available for all states, MAX data provide ample opportunities to explore the cost side of efficiency since Medicaid costs vary significantly by population and across states. Research to date indicates that variation in state Medicaid costs is due to differences in several factors including: (1) provider payment rates, (2) types and volume of care provided, (3) benefits covered, (4) the degree to which states use managed care delivery arrangements and which types, and (5) enrollee health status and socio-demographic characteristics related to state coverage of optional groups and income eligibility criteria. Though not well studied, there may also be state variation in program administration costs.

If efficiency measures are intended to reflect purchasers' ability to get more value for their spending, expenditures should reflect factors over which purchasers like state Medicaid programs have some control, such as those mentioned above, and should be adjusted for factors they cannot control. Little research has been done on the latter, such as state differences in the socio-demographic composition of low-income populations, and geographic variation in health care input prices.

The second component of this study begins to fill some of the gaps in understanding of the sources of state variation in Medicaid costs. We examined Medicaid program costs in all 50 states and the District of Columbia for a broader set of population subgroups than those reflected in the exploratory efficiency measures. Better understanding of the factors underlying Medicaid cost variation across states may inform future efforts to measure Medicaid efficiency as quality measures become more widely available.

1. Variation in PMPM Medicaid Spending

As with the exploratory efficiency measures, all comparisons were made using PMPM costs, including service and administrative costs in the numerator, and total number of member months as the denominator. To understand state variation in total Medicaid spending, we first calculated an overall PMPM cost measure, counting expenditures for all Medicaid enrollees without distinguishing by enrollee type. Given the diversity of the populations covered by Medicaid, we also disaggregated state costs by Medicaid subgroups to present more meaningful comparisons. Two criteria guided the selection of enrollee categories: (1) groups for which state Medicaid agencies make distinct program management and policy decisions, and (2) groups with different service needs and cost profiles. We

identified the following 10 subgroups of Medicaid enrollees based on age, disability status, long-term-care use, dual status, and eligibility for limited benefits:[10]

- Non-disabled children, ages birth to 18
- Non-disabled adults, ages 19 to 64
- Disabled adults and children, ages birth to 64, not dual eligible, no long-term care
- Disabled adults and children, ages birth to 64, not dual eligible, use long-term care
- Disabled adults and children, ages birth to 64, dual eligible, no long-term care
- Disabled adults and children, ages birth to 64, dual eligible, use long-term care
- Elderly, ages 65+, not dual eligible
- Elderly, ages 65+, dual eligible, no long-term care
- Elderly, ages 65+, dual-eligible, use long-term care
- Limited-benefit enrollees[11]

These 10 groups are mutually exclusive (each beneficiary appears in only one group) and together they include nearly all Medicaid beneficiaries.[12] Since the basis of eligibility (BOE) could change during the year, we used a hierarchy to assign enrollee categories.[13] Unlike many previous studies on Medicaid costs, we also divided beneficiaries by whether or not they were dual eligibles (with at least one month enrolled in both Medicare and Medicaid) and whether or not they used institutional or community-based LTC services, [14] because their service utilization and cost patterns

[10] Several constraints prevent us from dividing costs for some additional subgroups that might be of interest to state Medicaid officials. For example, it might be useful to distinguish costs within the disabled category, between individuals with physical disabilities and those with developmental disabilities, because Medicaid agencies often provide services to these groups through different service systems. Similarly, it would be illuminating to divide costs for Medicaid adults between pregnant and non-pregnant adults, since their cost profiles are quite different. While methods could be developed to identify these groups, using diagnosis codes and provider usage patterns, such analyses are very resource-intensive and were beyond the scope of this study. In addition, the accuracy of claims-based data may differ across enrollees served by FFS and MCOs.

[11] Limited-benefit enrollees include adults receiving family planning services, dual eligibles receiving only Medicare premium support, and unqualified immigrants eligible for only emergency hospital care. Collectively, these groups account for just over 1 percent of total Medicaid expenditures, though enrollment in this category and the exact benefits covered vary significantly across states. Hence, PMPM costs for this group are not comparable across states.

[12] A small number of individuals in every state's MAX data carry the eligibility code "Not Eligible" or "Unknown Eligibility." These individuals are excluded from our study.

[13] The hierarchy was as follows: if an enrollee had BOE of "disabled" for at least one month, he is considered "disabled;" a non-disabled enrollee is considered "elderly" if his BOE is "elderly" for at least one month; a non-disabled non-elderly enrollee is then assigned to "adult" or "child" based on the BOE category in a majority of months during the year ("adult" if months are equally divided).

[14] Individuals using any HCBS waivers were counted as LTC users. In addition, individuals were counted as LTC users if their spending on *nonwaiver* home health, personal care, adult day, private duty nursing, or residential care services was greater than the 10th percentile among all Medicaid beneficiaries who used such services (to exclude those who use these services for brief periods for post-acute care or respite). The percentile threshold was determined state by state for the aggregate of these community-based services.

differ markedly. Once enrollees are grouped into each of the 10 subgroups, all expenditures—regardless of service type or payment methods—are considered, and PMPM costs for each group calculated in the same way as the overall Medicaid costs, then compared across states.

2. Factors Contributing to Cost Variation

Total per-enrollee Medicaid expenditures vary from state to state partly because the proportion of enrollees in each major category varies. The PMPM cost measures for the 10 subgroups allow more accurate comparisons across states because each subgroup of enrollees is relatively homogeneous.

To further control for differences across states in the proportion of enrollees in each subgroup, we also computed weighted costs for a standard mix of enrollees. We first calculated the national proportion of member-months attributable to each subgroup of enrollees as an index weight. We then calculated standardized PMPM costs by multiplying a state's PMPM costs for each specific subgroup by the corresponding index weight and summing across all 10 subgroups. This standardized measure is compared to the unadjusted measure calculated previously to illustrate how variation in enrollment patterns across states affects overall PMPM costs. The remaining variation then can be attributed to differences in state Medicaid policies that could affect spending efficiency. As a sensitivity test, we also computed an alternative standardized measure by including just the 7 subgroups for which Medicaid pays most health care expenditures.[15] As noted, some variation in state Medicaid spending may be related to factors that are not specific to Medicaid but that can affect state variation in overall health care spending for all populations. The results of these regression analyses are detailed in Appendix E.

[15] The other subgroups—limited-benefit enrollees, dually-eligible elderly and disabled enrollees who do not use long-term care services—are excluded because a large portion of their medical costs are not paid by Medicaid so PMPM Medicaid costs for these groups present an very incomplete picture of their medical expenditures.

IV. STATE SCORES ON EXPLORATORY EFFICIENCY MEASURES

In this chapter, we present the results of analyzing the exploratory efficiency measures described in Chapter III. The analysis included data from 2004 through 2006 but the results show relatively little variation from year to year. Consequently, the results presented below are primarily drawn from 2006 since they are the most recent and include the most states, as the number of states that reported quality measures grew over time. Specifically, this chapter:

- Presents the relationship between cost and quality for the 28 exploratory efficiency measures developed for this study
- Focuses on state scores and tiers for 2006 and reviews state performance within each of the five measure domains (the domains organize quality-cost measures by Medicaid population subgroup and quality data source)
- Assesses the stability of state tiers over the period of 2004 to 2006 and compares the results to other state health performance ranking studies

A. Relationships Between Cost and Quality

To better understand the relationship between state Medicaid spending and quality, we first assessed the degree of variation across states in the cost and quality components of the exploratory efficiency measures, and the degree of correlation between the two components. If higher per-beneficiary spending is not consistently associated with higher quality of care outcomes, there may be room to reduce or control spending without harming outcomes.

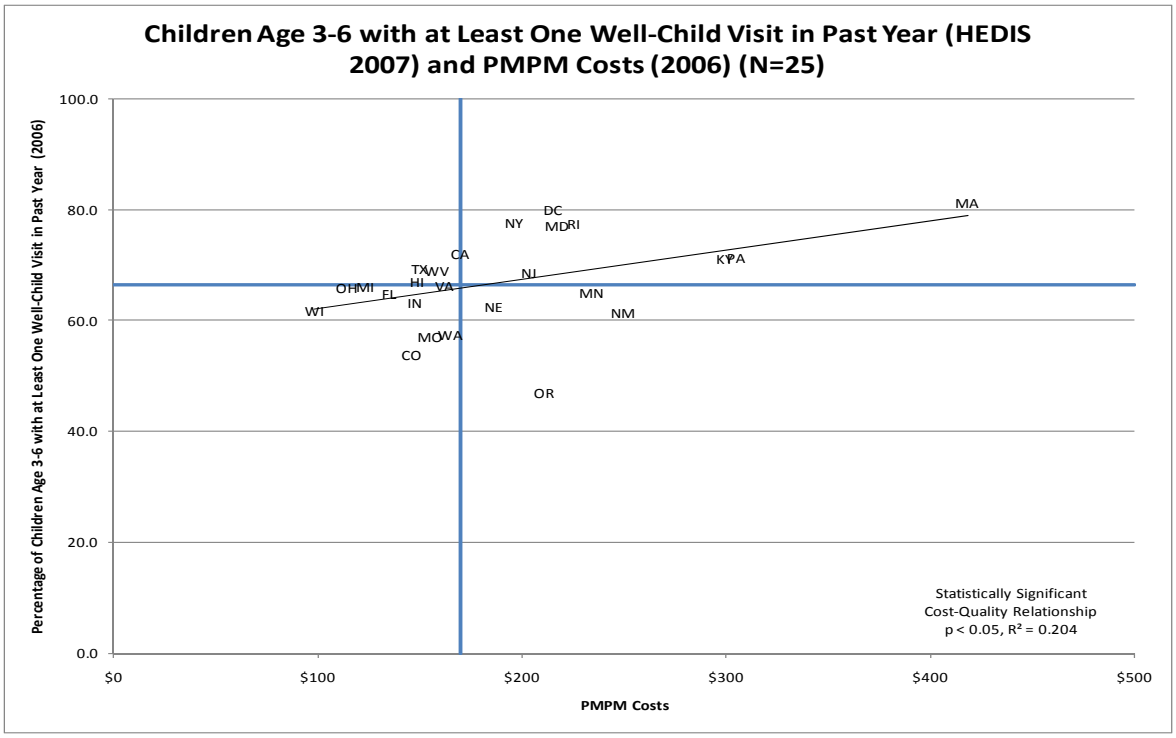
1. Cost and Quality Variation

For all 28 exploratory efficiency measures examined, there is substantial state variation in cost and quality. Figure IV.1 presents representative cost and quality scatter plots from 2006. The graphs include a horizontal bar to mark the median quality score and a vertical bar to mark the median PMPM cost, along with a regression line through the set of points.[16] In both cases, the median is derived from the subset of states with both quality and cost data for the applicable measure.

Overall, PMPM costs consistently varied by a factor of two to four between states with the lowest and highest values. For example, PMPM costs for children ages birth to 17 varied from a low of $141 (Louisiana) to a high of $556 (Alaska). Similarly, among states with quality measures for people with developmental disabilities, PMPM costs varied from a low of $2,495 (Pennsylvania) to a high of $9,113 (Delaware).

[16] The quality median sometimes appears as a dotted line when it would otherwise be difficult to distinguish from the best-fit regression line. Appendix B contains the source data for all 28 measures for 2004, 2005, and 2006 (Tables B.1, B.2, and B.3), and a complete set of scatter plots.

Figure IV.1. Representative Cost-Quality Scatter Plots by Domain, 2006



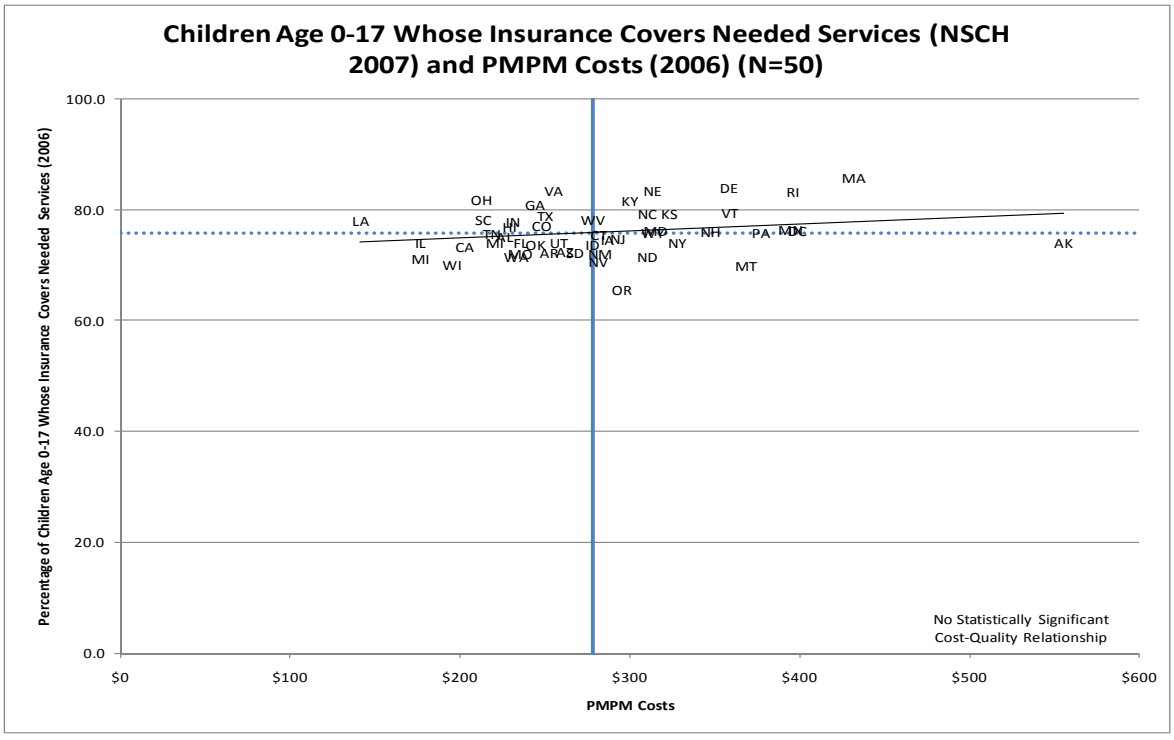
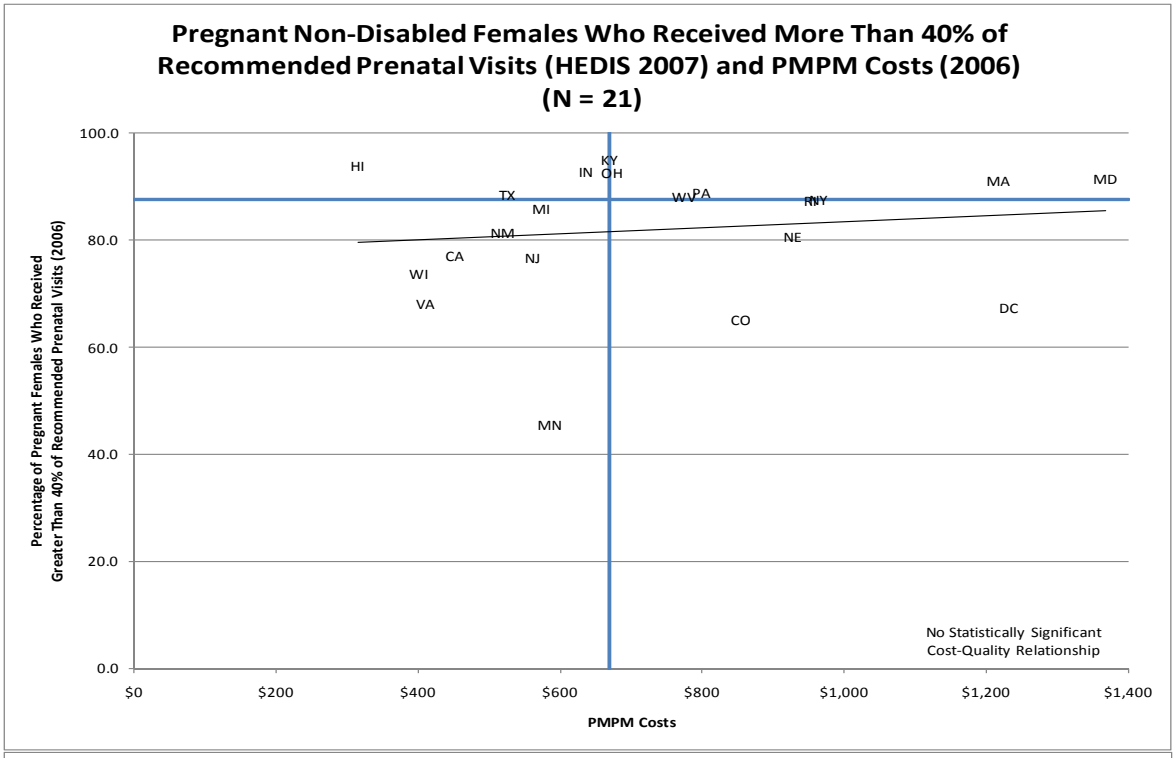


Figure IV.1 *(continued)*



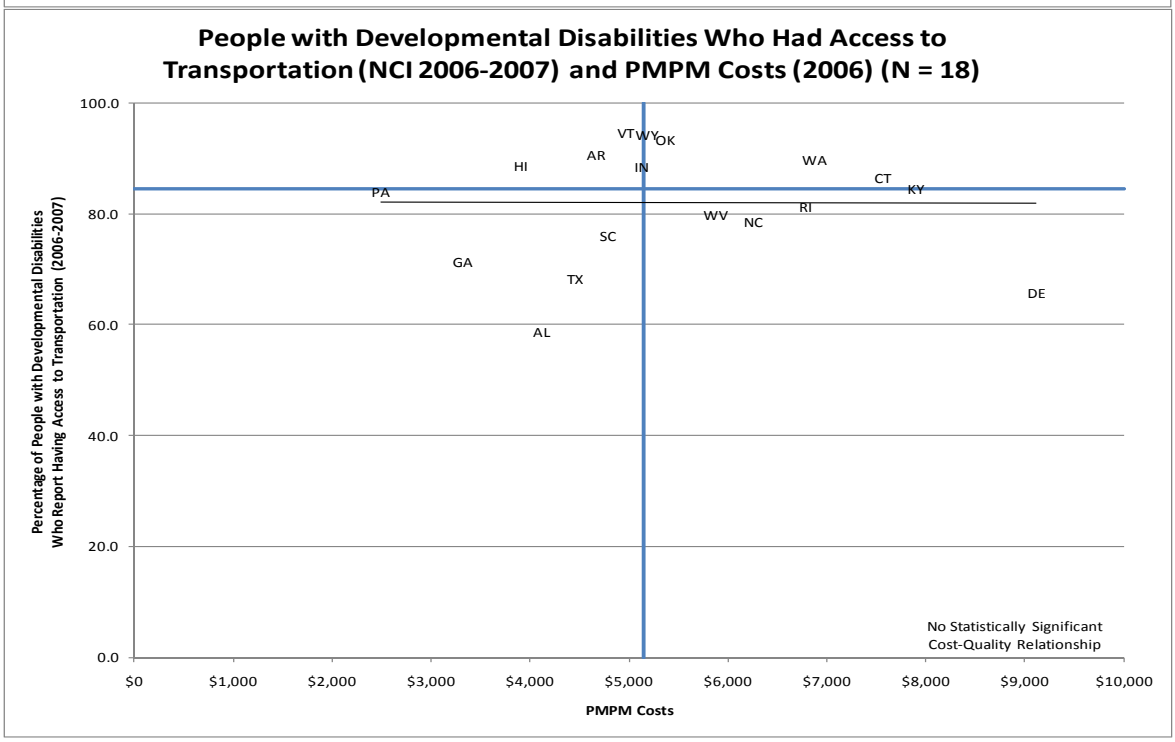
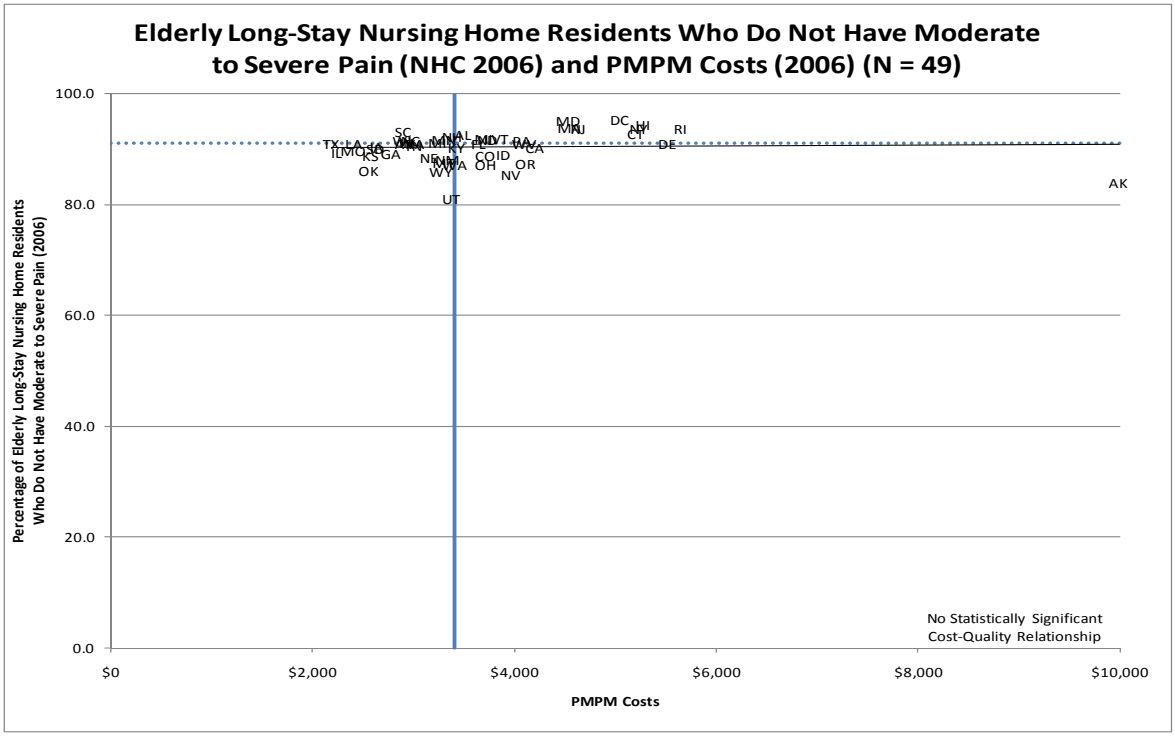


Figure IV.1 *(continued)*



On the quality side, some measure domains had tightly clustered quality scores, while others had relatively wide variation.[17] Quality measures for the institutionalized elderly varied the least. For example, Figure IV.1 shows the percentage of long-stay nursing home residents who did not report experiencing moderate or severe pain. Almost all states had quality scores within five percentage points of the median (91 percent) for this measure.

Measures for children, non-disabled adults, and the developmentally disabled were more variable. For example, the percent of pregnant women enrolled in capitated managed care plans who received at least 40 percent of recommended prenatal care visits varied more than 50 percentage points between the lowest (45.6 percent) and highest (95.8 percent) quality score. Generally NSCH and NIS measures for children were more tightly clustered than were HEDIS measures for children.

2. Cost and Quality Correlation

Despite substantial variation in state performance on PMPM costs and on some quality measures, we found few statistically significant relationships between cost and quality. Indeed, of the 28 exploratory efficiency measures, only three showed a significant relationship between cost and quality at the $p < 0.05$ level in 2006 (Table IV.1; see page 24). The measures with statistically significant cost-quality relationships were (1) well-child visits for children ages 3 to 6 enrolled in

[17] As presented in Chapter III, we organized the 28 exploratory efficiency measures into five measure domains, based on key population subgroups and data sources. The five measure domains are: (1) children-HEDIS, (2) children-NSCH/NIS, (3) non-disabled adults, (4) developmentally disabled, and (5) institutionalized elderly.

capitated arrangements, (2) adolescent care visits for children ages 12 to 21 enrolled in capitated arrangements, and (3) the frequency of pressure sores among low-risk nursing home residents.

However, these three measures did not tell a consistent story about the relationship between cost and quality. For both measures for children, the correlation was positive—that is, higher PMPM costs were associated with higher quality scores. The cost-quality correlation for pressure sores among nursing home residents indicated a negative relationship—that is, lower PMPM costs were associated with higher quality scores. However, the scatter plot for this measure (Appendix B) shows an extremely narrow range of quality scores—varying only from 95.2 to 98.2 percent across states. Thus, even though we find a statistically significant relationship, it does not appear to represent one of practical importance. In reviewing the results across time, these same three measures also show a statistically significant cost-quality correlation of comparable magnitude in 2004 and 2005 (Table IV.1).

3. Discussion of the Relationship Between State Medicaid Costs and Quality

The lack of a consistent, statistically significant relationship between cost and quality suggests that higher total Medicaid spending on a PMPM basis does not necessarily produce better outcomes. Conversely, lower PMPM spending does not necessarily result in worse quality outcomes among the set of exploratory efficiency measures examined. Because cost and quality vary widely, but do not appear correlated, there may be an opportunity to lower or control the growth in costs without sacrificing quality outcomes. These patterns reinforce the importance of looking for states that seem to be achieving higher-than-average quality outcomes at lower-than-average costs to determine whether particular Medicaid policies—such as purchasing strategies or provider payment methods—or other factors can account for their performance.

Nevertheless, several important caveats and limitations accompany these findings. First, as shown in Table IV.1, many states were excluded from the analyses because they lacked quality data. In 2006, correlations are based on data from as few as 18 states (NCI and CAHPS measures), and the observed relationship between cost and quality might continue to change in both direction and strength as additional states are added to the analysis. Still, when considering measures derived from the NIS, NSCH, and NHC, where data are available for nearly all states, there is only one statistically significant cost-quality relationship, and it does not appear to have practical significance.

Another limitation is that our cost and quality measures are not risk-adjusted for the health of each state's Medicaid population. If the underlying health status of beneficiaries differs substantially from state to state, PMPM costs might be higher in states with a high acuity population, and quality performance might be lower. But if this were true, one would expect to find a strong negative correlation between cost and quality, rather than no correlation, as found in this analysis. For this reason, we performed additional analyses to examine how the proportion of disabled individuals in capitated MCOs in each state affected PMPM costs, as will be addressed later in this chapter.

In addition, we found no consistent correlations between quality measures used in this analysis and state-level data on disease prevalence and unhealthy behaviors from the Behavioral Risk Factor Surveillance System (BRFSS), suggesting that states with low quality scores for the Medicaid

Table IV.1. Relationship Between Cost and Quality for Exploratory Efficiency Measures in 2004, 2005, and 2006

			Cost-Quality Association											
			2004				2005				2006			
Category	Measure	Source	N	R^2	B_{cost}	p (B_{cost})	N	R^2	B_{cost}	p (B_{cost})	N	R^2	B_{cost}	p (B_{cost})
Children	Well-child visits, 15 Months--6 or More Visits	HEDIS	22	0.002	0.006	0.844	24	0.028	-0.021	0.433	24	0.038	0.017	0.361
Children	Well-child visits, 15 Months--4 or More Visits	HEDIS	22	0.002	0.004	0.828	24	0.001	-0.003	0.885	24	0.016	0.005	0.551
Children	Well-child visits, Ages 3-6	HEDIS	23	0.205	0.072	<0.001	25	0.305	0.076	0.004	25	0.204	0.053	0.023
Children	Adolescent care visits, Ages 12-21	HEDIS	23	0.337	0.050	0.004	24	0.439	0.059	<0.001	25	0.434	0.056	<0.001
Children	Preventive Medical Visits, past 12 months	NCHS	---	---	---	---	---	---	---	---	50	0.018	0.006	0.350
Children	Preventive Dental Visits, past 12 months	NCHS	---	---	---	---	---	---	---	---	50	<0.001	-0.001	0.889
Children	Personal Health Care Provider	NCHS	---	---	---	---	---	---	---	---	50	0.007	0.003	0.576
Children	Insurance Covers Needed Services	NCHS	---	---	---	---	---	---	---	---	50	0.050	0.012	0.120
Children	Insurance Allows Access to Providers	NCHS	---	---	---	---	---	---	---	---	50	0.034	0.010	0.202
Children	Complete 4:3:1:3 Vaccination Series, 19-35 mo.	NIS	---	---	---	---	---	---	---	---	50	0.047	0.028	0.132
Adults	Access to Routine Care Appointments	CAHPS	---	---	---	---	---	---	---	---	18	0.048	0.013	0.384
Adults	Waiting Time For Care, Illness or Injury	CAHPS	---	---	---	---	---	---	---	---	18	0.009	0.006	0.716
Adults	Ambulatory/Preventive Visit, Ages 20-44	HEDIS	---	---	---	---	---	---	---	---	22	0.060	0.027	0.273
Adults	Ambulatory/Preventive Visit, Ages 45-64	HEDIS	---	---	---	---	---	---	---	---	22	0.021	0.009	0.524
Adults	Breast Cancer Screening, Ages 52-69	HEDIS	---	---	---	---	---	---	---	---	21	0.009	-0.004	0.686
Adults	Cervical Cancer Screening, Ages 24-64	HEDIS	---	---	---	---	---	---	---	---	24	0.001	-0.004	0.870
Adults	Chlamydia Screening, Ages 16-25	HEDIS	---	---	---	---	---	---	---	---	25	0.000	0.000	0.995
Adults	Prenatal Care, Greater than 80% of Rec. Visits	HEDIS	---	---	---	---	---	---	---	---	22	0.004	0.004	0.774
Adults	Prenatal Care, Greater than 40% of Rec. Visits	HEDIS	---	---	---	---	---	---	---	---	21	0.018	0.006	0.564
Disability	Service Coordinator Assistance	NCI	15	0.027	0.000	0.559	18	0.103	-0.002	0.195	18	0.084	-0.002	0.243
Disability	Transportation: Way to Get Places	NCI	15	0.012	-0.001	0.693	18	0.035	-0.002	0.455	18	<0.001	0.000	0.988
Disability	Get Services Needed	NCI	15	0.022	0.000	0.600	17	0.144	-0.003	0.134	18	0.174	-0.003	0.085
Disability	Physical Exam within Past Year	NCI	15	0.000	0.000	0.959	18	0.029	0.001	0.498	18	0.032	0.001	0.480
Elderly	Long Stay Residents who are Depressed or Anxious	NCH	50	0.000	0.000	0.914	49	0.008	0.000	0.534	49	0.030	0.001	0.233
Elderly	Confined to Bed or Chair	NCH	50	0.000	0.000	0.984	49	0.013	0.000	0.431	49	0.001	0.000	0.799
Elderly	Moderate to Severe Pain	NCH	---	---	---	---	49	0.000	0.000	0.921	49	0.001	0.000	0.810
Elderly	Pressure Sores--High Risk	NCH	50	0.000	0.000	0.927	49	0.016	0.000	0.387	49	0.005	0.000	0.624
Elderly	Pressure Sores--Low Risk	NCH	50	0.217	0.000	0.001	49	0.318	0.000	<0.001	49	0.216	0.000	<0.001

Note: Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006, so the costs attributable to nursing facility stays cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from the exploratory efficiency measures for the elderly. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006. Highlighted cells indicate that cost-quality relationship is significant.

program are not states with an atypically high disease burden.[18] Moreover, the majority of the quality indicators reflected in the measures are related to care processes or preventive care (that is, frequency of physician visits and preventive screenings) rather than health outcomes like mortality. There is no obvious reason why poorer population health status would be associated with poor quality care processes; indeed, one would expect, for example, those in worse health status or with chronic health conditions to make more physician visits.

A third limitation regarding these results is that the cost component of the measure reflects total Medicaid costs. Combining all spending may conceal the relationship between specific input prices or the quantity of services provided and the quality outcomes measured. For example, one could expect the physician payment rate to be more closely tied to the frequency of well-child visits, with higher payment rates resulting in better access to care. While an input-based approach is also instructive, we chose to use total spending for both theoretical and technical reasons. First, total spending captures the fact that to an increasing degree, state Medicaid agencies purchase a bundle of services, and that bundle—rather than any individual service—interacts to produce health care outcomes. Second, the MSIS/MAX data systems do not yet support service-level cost measurement in states with managed care programs. In 2006, all but three states used some form of Medicaid managed care, and 72 percent of Medicaid beneficiaries were enrolled in managed care on average.[19] To avoid limiting our analysis to FFS beneficiaries, who are no longer representative of Medicaid beneficiaries as a whole, we chose to use total spending, even with its limitations.

Despite these concerns, weak association between Medicaid cost and quality is consistent with several studies that have found little correlation between higher Medicare spending by state or hospital referral region and better outcomes for Medicare beneficiaries. Costs and quality performance vary widely across states, and after adjusting for input prices, beneficiary health status, and other factors, the Medicare Payment Advisory Commission has found that states with higher Medicare spending were more likely to show worse quality of care on a composite measure.[20] Others have found that for specific outcomes, ranging from patient satisfaction to mortality following cancer diagnoses, regions and states with Medicare higher spending often show poorer results (Fisher et al. 2003; Baicker and Chandra 2004).

Overall, the lack of correlation between cost and quality, and the wide variation found in both measure components suggest an opportunity to find high- and low-performing outliers—states that

[18] We conducted an analysis of the correlation between 18 quality measures (for adults, the developmentally disabled, and institutionalized elderly) used in this analysis and eight indicators of disease prevalence or unhealthy behaviors drawn from BRFSS 2006: percent of the population who smoke, percent overweight or obese, percent who report no physical activity in the past month, percent in fair or poor health, percent with diabetes, percent with a heart attack, percent with coronary heart disease, and percent with asthma. If states with an atypically high disease burden earned lower Medicaid quality scores, we would expect to find a significant negative correlation. As a whole, relationships between BRFSS measures and quality measures were not statistically significant (see Appendix B, Table B.4). For three measures there was a consistent negative relationship (adults: waiting time for care for illness/injury, elderly: confinement to bed/chair, and elderly: pressure sores among high-risk patients) and for two measures there was a consistent positive relationship (developmentally disabled: physical exam in past year, and elderly: depression/anxiety).

[19] Mathematica analysis of 2006 MAX validation tables. Use of managed care was not uniform across Medicaid population groups. More than three-quarters of adults and children were enrolled in some form of managed care in 2006, while only about half of disabled beneficiaries and one-third of the elderly were in managed care.

[20] Medicare Payment Advisory Commission. *Report to the Congress: Variation and Innovation in Medicare, Chapter 1.* 2003. Available at: www.medpac.gov/documents/June03_Entire_Report.pdf.

are achieving higher quality outcomes at lower PMPM costs, or lower quality outcomes at higher PMPM costs. The methodology described in Chapter III was designed to identify such outlier states, in order to investigate possible reasons for their performance on specific exploratory efficiency measures.

B. State Scores and Tiers on Exploratory Efficiency Measures

This section presents state scores and tiers for the 28 exploratory efficiency measures, focusing on results from 2006 since they are the most recent and include the most states. First, the section discusses performance within each of the five measure domains, which are organized around population subgroups and quality data sources: children-HEDIS, children-NSCH/NIS, non-disabled adults-HEDIS, developmentally disabled, and elderly who are long-term residents of nursing homes. Next, it compares states' tiers across domains. The section concludes by discussing the implications of both analyses.

1. State Scores and Tiers Within Measure Domains in 2006

Scores and tiers by measure domain are presented in Tables IV.2 through IV.6, and as maps in Figures IV.2 through IV.6. For each individual measure, states with *above* median quality measures and *below* median PMPM costs were assigned a score of 1, while states with *below* median quality scores and *above* median cost scores were assigned a score of 3. States with near-median cost and quality performance, or with higher-than-median cost and quality, or with lower-than-median cost and quality, were assigned a score of 2.

Domain tiers were assigned by summing scores on individual measures within the domain and identifying the top quartile (Tier A) and bottom quartile (Tier C). This means, for example, that states with consistently low scores (lots of 1s, indicating higher-than-median quality and lower-than-median costs) across measures within a domain, are grouped together in Tier A. Roughly half the states with data in each domain—those in the middle two quartiles—are grouped in Tier B. (Within each tier, states are organized alphabetically.) States without data for any measures within the domain did not receive a domain tier; states missing data for some individual measures were grouped into the tier with similar scores on measures in the same domain with available data.

The number of states with a domain tier ranges from a low of 18 for measures for disabled individuals to a high of 50 for NSCH/NIS measures for children. Variation in the number of states with a tier is primarily due to lack of available quality data, although in a few states, the cost data was unusable or unreliable, as explained in Chapter III and in table footnotes. For example, in 2005 and 2006, MAX data for Maine reflected only prescription drug costs, and therefore, we omitted the state from all exploratory efficiency measures.

a. Summary of State Performance Within Measure Domains

Children-HEDIS (Table IV.2 and Figure IV.2). In 2006, 25 states had usable cost data and HEDIS quality data to construct the four exploratory efficiency measures in this domain. The four HEDIS measures addressed the frequency of well-child visits for different age groups of children. The five states in Tier A in this domain were California, Kentucky, Michigan, Nebraska, and New York. In these states with lower-than-median PMPM costs, a higher-than-median percentage of children received well-child visits within the past year. Eleven states were in Tier B, while nine were in Tier C, indicating generally lower-than-median quality scores and higher-than-median PMPM costs. No clear regional pattern emerged for this domain.

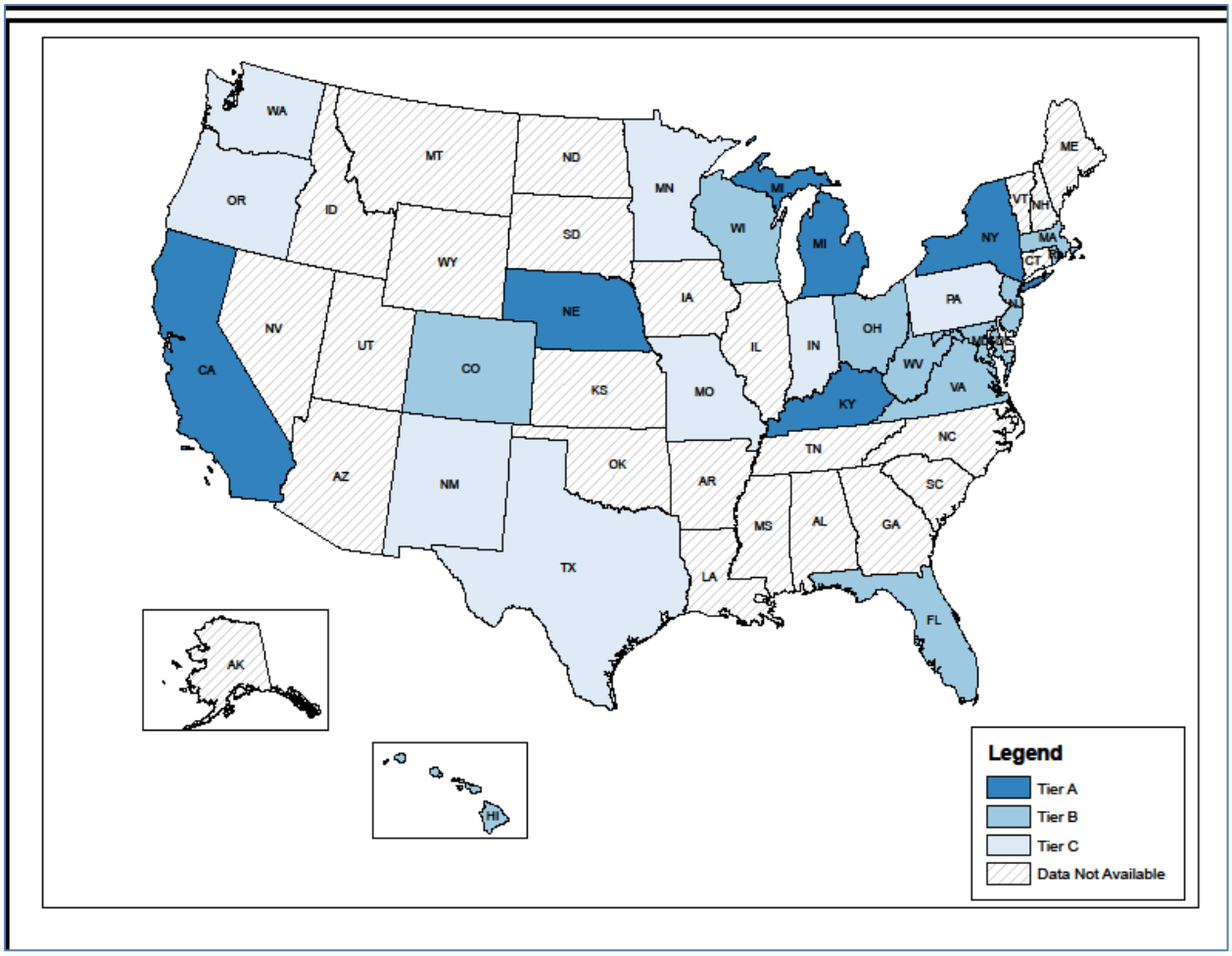
Table IV.2. State Spending and Quality Scores on HEDIS Measures for Children, by Tier, 2006

		HEDIS: Well-Child Visits			
		15M-6+V	15M-4+V	3-6Y-1V	12-21Y-1V
Tier A	California	1	1	2	2
	Kentucky	1	1	2	2
	Michigan	1	2	2	1
	Nebraska	1	1	3	2
	New York	1	1	2	2
Tier B	Colorado	2	2	2	2
	Florida	2	2	2	2
	Hawaii	3	3	1	1
	Maryland	2	2	2	2
	Massachusetts	2	2	2	2
	New Jersey	2	2	2	2
	Ohio	2	2	2	2
	Rhode Island	2	2	2	2
	Virginia	2	2	2	2
	West Virginia	2	2	2	2
	Wisconsin	2	2	2	2
Tier C	DC	2	3	2	2
	Indiana	2	3	2	2
	Minnesota	2	2	3	2
	Missouri	3	3	2	3
	New Mexico	2	2	3	2
	Oregon			3	3
	Pennsylvania	3	3	2	2
	Texas	3	3	2	1
	Washington	3	2	2	2
	Alabama				
	Alaska				
	Arizona				
	Arkansas				
	Connecticut				
	Delaware				
	Georgia				
	Idaho				
	Illinois				
	Iowa				
	Kansas				
	Louisiana				
	Maine				
	Mississippi				
	Montana				
	Nevada				
	New Hampshire				
	North Carolina				
	North Dakota				
	Oklahoma				
	South Carolina				
	South Dakota				
	Tennessee				
	Utah				
	Vermont				
	Wyoming				

1	Higher-than-median quality scores and lower-than-median PMPM costs.
2	Near-median quality and costs, or high quality/costs, or low quality/costs.
3	Lower-than median quality scores and higher-than-median PMPM costs.
HEDIS	Healthcare Effectiveness Data and Information Set
15M-6+V	Percent of children (15 mo. old) who received at least 6 well-child visits
15M-4+V	Percent of children (15 mo. old) who received at least 4 well-child visits
3-6Y-1V	Percent of children (ages 3-6 years) with a well-child visit in the past year
12-21Y-1V	Percent of children (ages 12-21 years) with a well-child visit in the past year

Source: Mathematica analysis of 2006 MAX data and 2007 HEDIS measures.

Figure IV.2. State Tiers for HEDIS Measures for Children, 2006



Source: Mathematica analysis of 2006 MAX data and 2007 HEDIS measures.

Children-NSCH/NIS (Table IV.3 and Figure IV.3). In 2006, 50 states had usable cost data and NSCH/NIS quality data to construct the six exploratory efficiency measures in this domain. The five NSCH measures addressed access to preventive medical and dental services, and how beneficiaries viewed the provider and service coverage of the Medicaid program. The NIS measure assessed the percentage of children who had up-to-date vaccinations. The 13 states in Tier A were Alabama, California, Georgia, Hawaii, Indiana, Louisiana, Michigan, Ohio, South Carolina, Tennessee, Texas, Utah, and Virginia. In general, Southern states and several in the Great Lakes region tended to emerge in Tier A in this measure domain. No clear regional pattern emerged for states in Tier C.

Table IV.3. State Spending and Quality Scores on NSCH/NIS Measures for Children, by Tier, 2006

		NSCH					NIS
		PMV	PDC	PHCP	ICNS	IAAP	4:3:1:3 V
Tier A	Alabama	1	2	1	2	1	1
	California	1	2	2	2	2	1
	Georgia	1	1	2	1	1	1
	Hawaii	2	1	1	1	2	2
	Indiana	2	2	1	1	2	2
	Louisiana	1	2	2	1	1	2
	Michigan	1	1	2	2	1	2
	Ohio	1	2	2	1	1	2
	South Carolina	1	1	2	1	1	1
	Tennessee	1	1	2	1	2	1
	Texas	2	1	2	1	2	2
	Utah	2	1	1	2	2	1
	Virginia	2	2	1	1	2	2
Tier B	Arizona	2	2	2	2	2	2
	Arkansas	2	2	2	2	2	3
	Colorado	2	2	2	2	2	2
	Connecticut	2	2	2	2	3	2
	Florida	2	2	2	2	2	2
	Idaho	2	2	2	2	2	2
	Illinois	2	2	2	2	2	2
	Iowa	2	2	2	2	2	3
	Kansas	2	2	3	2	2	2
	Kentucky	2	2	2	2	2	3
	Massachusetts	2	3	2	2	2	2
	Mississippi	2	2	2	2	2	1
	Missouri	2	2	2	2	2	2
	Nebraska	2	2	2	2	2	2
	New Hampshire	2	2	2	2	3	2
	New York	2	2	2	3	2	2
	North Carolina	2	2	2	2	2	1
	Oklahoma	2	1	2	2	2	2
	Pennsylvania	2	2	2	2	3	2
	Rhode Island	2	2	2	2	2	2
	South Dakota	2	1	2	2	2	2
	Vermont	2	2	2	2	2	2
	Washington	2	1	1	2	2	3
	West Virginia	2	2	2	2	2	3
	Wisconsin	2	2	2	2	2	2
	Wyoming	2	2	2	2	2	3
Tier C	Alaska	3	3	3	3	3	3
	D.C.	2	2	3	2	2	3
	Delaware	2	3	2	2	2	3
	Maryland	2	3	2	2	3	2
	Minnesota	3	3	3	2	3	2
	Montana	3	3	3	3	3	2
	Nevada	3	2	3	3	3	2
	New Jersey	2	3	2	2	2	3
	New Mexico	2	2	3	3	3	2
	North Dakota	3	3	2	3	2	2
	Oregon	3	2	2	3	3	3
	Maine						

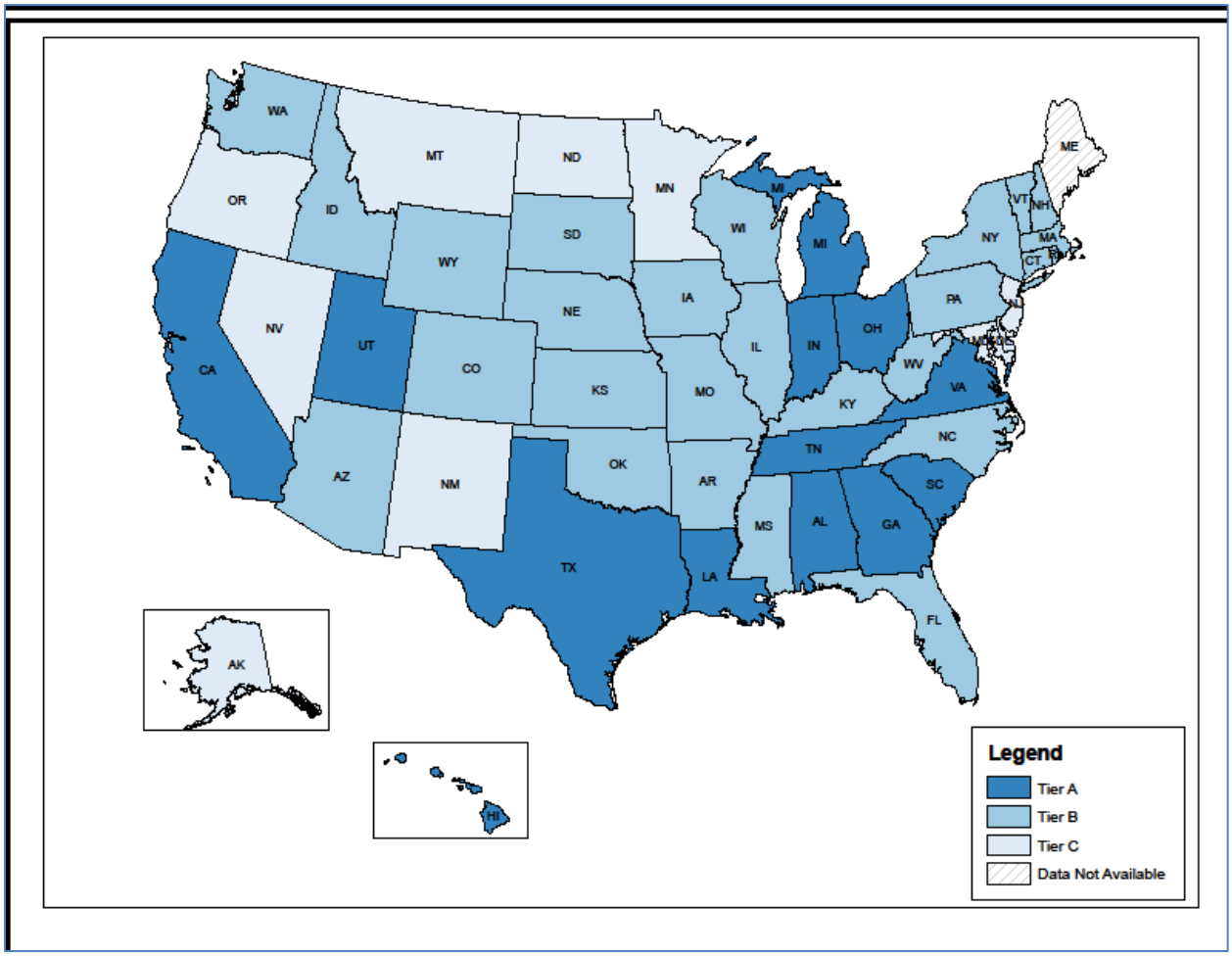
Source: Mathematica analysis of 2006 MAX data and 2007 NSCH/NIS measures.

Note: In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

Table IV.3, notes (*continued)*

1	Higher-than-median quality scores and lower-than-median PMPM costs.
2	Near-median quality and costs, or high quality/costs, or low quality/costs.
3	Lower-than median quality scores and higher-than-median PMPM costs.
NSCH	National Survey of Children's Health
NIS	National Immunization Survey
PMV	Percent of children (ages 0-17 years) with a preventive medical visit in past year
PDC	Percent of children (ages 1-17 years) with a preventive dentalvisit in past year
PHCP	Percent of children (ages 0-17 years) with a personal healthcare provider
ICNS	Percent of children (ages 0-17 years) whose insurance covers needed services
IAAP	Percent of children (ages 0-17 years) whose insurance allows access to providers
4:3:1:3 V	Percent of children (ages 19-35 mo.) with an up-to-date 4:3:1:3 vaccine series

Figure IV.3. State Tiers for NSCH/NIS Measures for Children, 2006



Source: Mathematica analysis of 2006 MAX data and 2007 NSCH/NIS measures.

Non-Disabled Adult-Managed Care (Table IV.4 and Figure IV.4). In 2006, 27 states had usable cost data and CAHPS or HEDIS quality data to construct the nine exploratory efficiency measures in this domain. Six of the measures addressed basic access to care, such as waiting times for an appointment, frequency of prenatal visits, and percentage of beneficiaries with a preventive visit in the past year. Three of the measures assessed the percentage of women who had completed preventive screening exams. The six states in Tier A were California, Hawaii, Michigan, New York, Rhode Island, and Wisconsin.

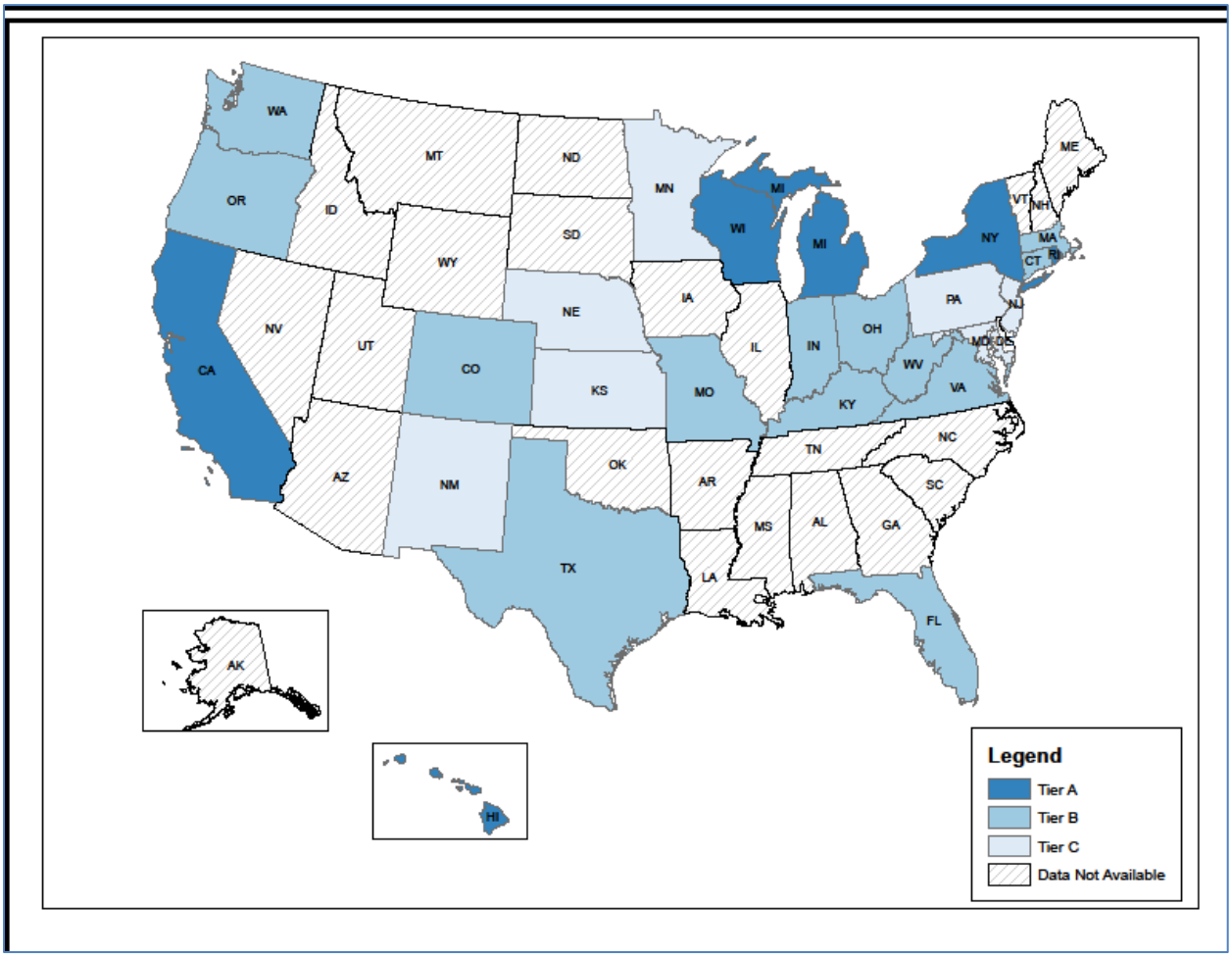
Table IV.4. State Spending and Quality Scores on Measures for Non-Disabled Adults, by Tier, 2006

		CAHPS		HEDIS						
		RCA	WTC-I/I	PV 20-44Y	PV 45-64Y	BCS	CCS	ChmS	PNC-80+	PNC-40+
Tier A	California	2	2	2	2	1	2	1	1	2
	Hawaii	2	2	2	3	1	2	1	1	1
	Michigan	1	2	2	1	1	1	1	2	2
	New York	2	2	2	2	1	1	2	2	2
	Rhode Island	2	2	1	2	1	1	3	2	2
	Wisconsin			1	2	3	1	1	2	2
Tier B	Colorado	1	1	2	2	3	2	2	3	3
	Connecticut	2	2							
	Florida	1	1	2	2	3	2	2	3	
	Indiana	2	2	2	1	2	3	3	2	1
	Kentucky			2	2	2	2	2	1	2
	Massachusetts	3	3	2	1	2	2	2	2	2
	Missouri						2	2		
	Ohio	2	2	2	2	2	2	1	2	2
	Oregon							2		
	Texas			2	2		2	2	2	1
	Virginia	1	1	2	2	3	3	2	2	2
	Washington					2	2	3		
	West Virginia			1	2		2	2	2	2
Tier C	DC			2	3	2	1	2	3	3
	Kansas	3	3							
	Maryland	2	3	3	2	1	3	2	2	2
	Minnesota	3	2	2	2	2	2	3	2	2
	Nebraska			2	2	3	3	2	3	3
	New Jersey	2	2	3	2	2	3	3	2	2
	New Mexico	2	2	2	2	3	3	2	2	2
	Pennsylvania	2	2	3	2	3	2	3	2	2
	Alabama									
	Alaska									
	Arizona									
	Arkansas									
	Delaware									
	Georgia									
	Idaho									
	Illinois									
	Iowa									
	Louisiana									
	Maine									
	Mississippi									
	Montana									
	Nevada									
	New Hampshire									
	North Carolina									
	North Dakota									
	Oklahoma									
	South Carolina									
	South Dakota									
	Tennessee									
	Utah									
	Vermont									
	Wyoming									

Table IV.4, notes (*continued)*

1	Higher-than-median quality scores and lower-than-median PMPM costs.
2	Near-median quality and costs, or high quality/costs, or low quality/costs.
3	Lower-than median quality scores and higher-than-median PMPM costs.
CAHPS	Consumer Assessment of Healthcare Provider and Systems
HEDIS	Healthcare Effectiveness Data and Information Set
RCA	Percent of adults (ages 18-64 years) who were always able to get routine appointments when desired
WTC-I/I	Percent of adults (ages 18-64 years) who were always able to get appointments to address illness/injury when desired
PV 20-44Y	Percent of adults (ages 20-44 years) with a preventive medical visit in past 12 months
PV 45-64Y	Percent of adults (ages 45-64 years) with a preventive medical visit in past 12 months
BCS	Percent of women (ages 52-69) screened for breast cancer
CCS	Percent of women (ages 24-64) screened for cervical cancer
ChmS	Percent of women (ages 16-25) screened for chlamydia
PNC-80+	Percent of expectant women receiving at least 80 percent of recommended prenatal visits
PNC-40+	Percent of expectant women receiving at least 40 percent of recommended prenatal visits

Figure IV.4. State Tiers for Measures for Adults, 2006



Source: Mathematica analysis of 2006 MAX data, 2007 HEDIS, and 2006 CAHPS measures.

As explained in Chapter III, the cost component of exploratory efficiency measures presented in this domain includes total PMPM costs for non-disabled adults meeting age and gender restrictions on each measure. We separated costs for non-disabled adults from those for disabled adult enrollees because a state with a high percentage of disabled enrollees would have higher PMPM costs for measures in the CAHPS and HEDIS domains, which would skew state comparisons of exploratory efficiency measures.[21]

However, we also explored the impact of considering costs only for non-disabled adults, versus considering costs for all adults, disabled and non-disabled combined. Across the 9 exploratory efficiency measures in the adult domain, for 6 measures restricting PMPM costs to non-disabled adults substantially reduced average PMPM costs relative to the measure for all adults. For example, PMPM costs for adults ages 45-64 in capitation arrangements decreased by an average of 41 percent across states with both cost and quality data, when comparing PMPM costs for non-disabled adults to that for all adults. Some changes were even larger; for example, Colorado's PMPM costs for this group decreased by 69 percent when counting only non-disabled enrollees.

Although the cost decreases are often significant when the disabled population is removed from PMPM costs for all capitated MCO adult enrollees, the declines do not always translate into changes in state scores on the exploratory efficiency measures because of the interrelationship between PMPM costs and quality scores. When restricting costs to non-disabled enrollees, there is substantial change in state scores for 5 of the 9 measures in the adult domain: the two CAHPS measures, preventive visits among 45-64 year olds, and breast and cervical cancer screenings. Restricting costs to non-disabled enrollees yielded little to no impact on state scores in the remaining measures. In addition, no state changes from a 1 to a 3, or vice versa. All changes were to or from the middle score of 2.

Developmentally Disabled (Table IV.5 and Figure IV.5). In 2006, 18 states had usable cost data and NCI quality data to construct the four exploratory efficiency measures in this domain. The measures addressed the helpfulness of service coordinators, as well as access to physician visits, transportation, and needed services. The five states in Tier A in this domain were Alabama, Arkansas, Georgia, South Carolina, and Vermont. Although several Southern states were in Tier A in this measure domain, limited data availability made it difficult to assess a regional pattern.

[21] In calculating the percent of disabled enrollees as a proportion of all capitated MCO enrollees, we found that there are few disabled children enrolled in capitated managed care plans in most states, so there is essentially no change in relative PMPM costs for children across states. But the percentage of disabled adults ages 18-64 among all capitated MCO enrollees ranges from 1 percent to 41 percent in the 24 states with both cost and quality data for enrollees in capitated MCOs. For some narrowly defined groups, limited by age and gender, disabled enrollees as a percent of all capitated MCO enrollees reach as high as 91 percent.

Table IV.5. State Spending and Quality Scores on Measures for the Developmentally Disabled, by Tier, 2006

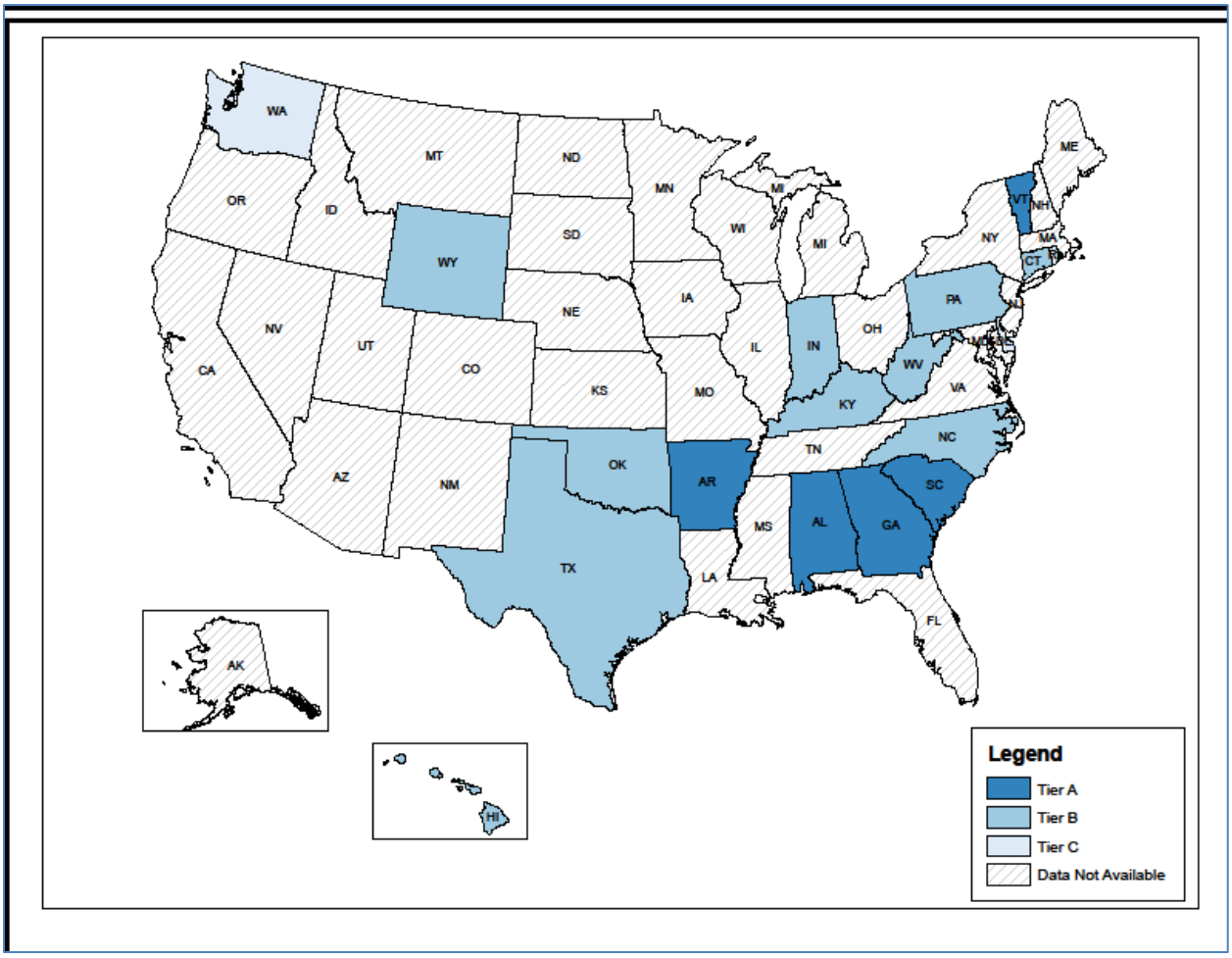
		NCI			
		SCA	Trans	ServNeed	PhyEx
Tier A	Alabama	2	2	1	1
	Arkansas	1	1	2	1
	Georgia	1	2	2	1
	South Carolina	1	2	1	2
	Vermont	1	1	1	2
Tier B	Connecticut	3	2	2	2
	Hawaii	2	1	2	2
	Indiana	2	2	2	1
	Kentucky	2	2	2	2
	North Carolina	2	2	3	2
	Oklahoma	2	2	2	2
	Pennsylvania	2	2	1	2
	Texas	1	2	2	2
	West Virginia	2	2	3	2
	Wyoming	2	2	2	2
Tier C	Delaware	3	3	3	3
	Rhode Island	2	3	3	3
	Washington	3	2	3	3
	Alaska				
	Arizona				
	California				
	Colorado				
	DC				
	Florida				
	Idaho				
	Illinois				
	Iowa				
	Kansas				
	Louisiana				
	Maine				
	Maryland				
	Massachusetts				
	Michigan				
	Minnesota				
	Mississippi				
	Missouri				
	Montana				
	Nebraska				
	Nevada				
	New Hampshire				
	New Jersey				
	New Mexico				
	New York				
	North Dakota				
	Ohio				
	Oregon				
	South Dakota				
	Tennessee				
	Utah				
	Virginia				
	Wisconsin				

Source: Mathematica analysis of 2006 MAX data and 2006-2007 NCI measures.

Table IV.5, notes (*continued)*

1	Higher-than-median quality scores and lower-than-median PMPM costs.
2	Near-median quality and costs, or high quality/costs, or low quality/costs.
3	Lower-than median quality scores and higher-than-median PMPM costs.
NCI	National Core Indicators (MR/DD waiver enrollees and ICF/MR residents)
SCA	Percent who report service coordinators were helpful in meeting needs
Trans	Percent with access to transportation when needed
ServNeed	Percent who report getting needed services
PhyEx	Percent with physical exam in the past year

Figure IV.5. State Tiers for Measures for the Developmentally Disabled, 2006



Source: Mathematica analysis of 2006 MAX data and 2006-2007 NCI measures.

Institutionalized Elderly (Table IV.6 and Figure IV.6). In 2006, 49 states had usable cost data and NHC quality data to construct the five exploratory efficiency measures in this domain. The measures addressed the prevalence of pressure sores, depression, moderate or severe pain, and confinement to a bed or chair. The 13 states in Tier A were Arkansas, Indiana, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, New Hampshire, South Carolina, South Dakota, Texas, and Wisconsin. States in the Midwest performed well in this measure domain, while West Coast and Mid-Atlantic states often placed in Tier C.

Table IV.6. State Spending and Quality Scores on Measures for the Institutionalized Elderly, by Tier, 2006

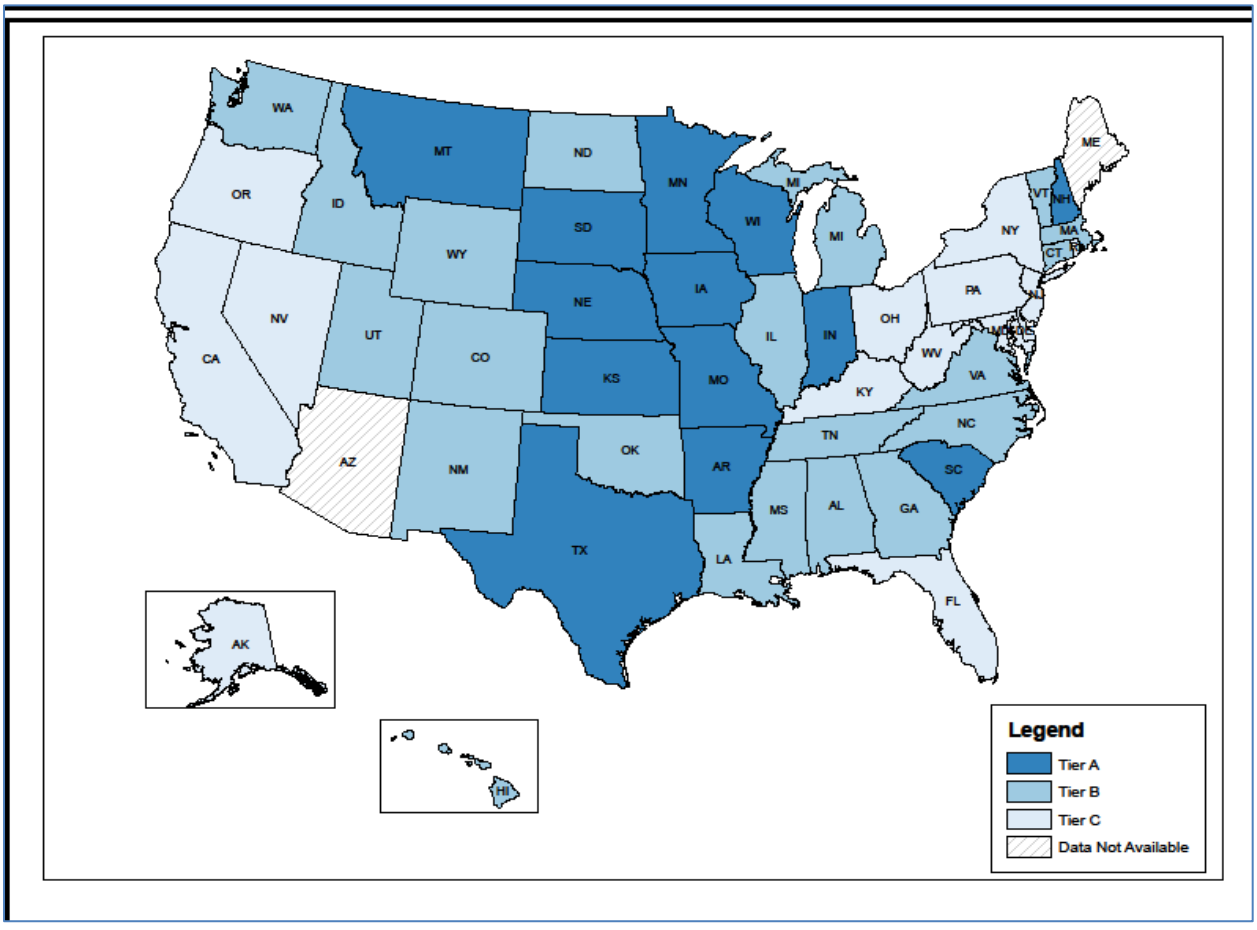
		NCH				
		DepAnx	ConfBed	MSPain	PSHR	PSLR
Tier A	Arkansas	1	2	1	2	1
	Indiana	2	1	1	2	2
	Iowa	2	1	2	1	1
	Kansas	2	1	2	1	1
	Minnesota	2	1	2	1	1
	Missouri	1	1	2	2	1
	Montana	2	2	2	1	1
	Nebraska	2	1	2	1	1
	New Hampshire	2	2	1	1	2
	South Carolina	1	2	1	2	2
	South Dakota	2	1	2	1	1
	Texas	1	2	1	1	1
	Wisconsin	1	1	1	1	2
Tier B	Alabama	2	3	2	2	2
	Colorado	2	2	3	2	2
	Connecticut	2	2	2	2	2
	Georgia	2	2	2	2	1
	Hawaii	2	3	2	2	2
	Idaho	2	2	2	2	2
	Illinois	2	1	2	2	2
	Louisiana	2	2	2	2	1
	Massachusetts	3	2	2	2	2
	Michigan	2	2	2	2	2
	Mississippi	2	3	2	2	2
	New Mexico	2	2	2	2	2
	North Carolina	2	2	2	2	2
	North Dakota	3	2	2	2	2
	Oklahoma	1	2	2	2	2
	Tennessee	1	2	2	2	2
	Utah	2	2	2	2	2
	Vermont	3	2	2	2	2
	Virginia	2	2	2	2	2
	Washington	2	2	2	2	2
	Wyoming	2	1	2	2	2
Tier C	Alaska	2	3	3	2	3
	California	2	3	3	3	3
	DC	2	2	2	3	3
	Delaware	2	3	2	3	3
	Florida	2	2	2	3	3
	Kentucky	3	3	2	2	2
	Maryland	2	3	2	3	3
	Nevada	2	3	3	2	2
	New Jersey	2	2	2	3	3
	New York	2	2	2	3	3
	Ohio	3	2	3	2	2
	Oregon	2	3	3	2	3
	Pennsylvania	3	2	2	2	3
	Rhode Island	2	2	2	3	3
	West Virginia	2	3	2	3	2
	Arizona					
	Maine					

Source: Mathematica analysis of 2006 MAX data and 2006 NHC measures.

Table IV.6 (*continued*)

Note:	Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006, so the costs attributable to nursing facility stays cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from the trial efficiency measures for nursing home residents. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.
1	Higher-than-median quality scores and lower-than-median PMPM costs.
2	Near-median quality and costs, or high quality/costs, or low quality/costs.
3	Lower-than median quality scores and higher-than-median PMPM costs.
NCH	Nursing Home Compare
DepAnx	Percent of residents who are not depressed or anxious
ConfBed	Percent of residents who are not confined to a bed or chair
MSPain	Percent of resident who do not have moderate or severe pain
PSHR	Percent of high-risk residents who do not have pressure sores
PSLR	Percent of low-risk residents who do not have pressure sores

Figure IV.6. State Tiers for Measures for Institutionalized Elderly, 2006



Source: Mathematica analysis of 2006 MAX data and 2006 NHC measures.

b. Patterns Within and Across Measure Domains

Within a Domain, State Scores on Exploratory Efficiency Measures Were Generally Correlated. Within each measure domain, both the cost and quality components were correlated across measures.[22] For example, in the non-disabled adults domain (Table IV.4), of the 52 individual measures attributed to the six Tier A states (9 measures for each of 5 states, plus 7 measures for Wisconsin), 20 (38 percent) were assigned a score of 1 (higher-than-median quality and lower-than-median PMPM costs), 29 (56 percent) had a score of 2 , and 3 had a score of 3 (lower-than-median quality and higher-than-median PMPM costs). Of the 61 measures attributed to the eight Tier C states, 22 (36 percent) had a score of 3, 37 had scores of 2, and 2 had a score of 1.

Within a Domain, It Was Rare for a State to Have the Highest or Lowest Scores Across All Measures. While state scores on the exploratory efficiency measures were correlated, no state had a score of 1 for all individual measures within a domain, and it was rare for a state have a score of 3 for all measures in the domain. Even the highest-performing states had measures for which they scored a 2, meaning that the state might have had high quality/high costs, low quality/low costs, or near-median performance on both quality and costs. For example, Georgia had a score of 1 for five of the six measures within the NSCH/NIS children's domain, but scored a 2 for one measure—the percent of Medicaid children with a personal health care provider. These patterns indicate that health care quality is multifaceted and that each state has room for improvement in some dimensions.

Many States Lacked Data for Multiple Measure Domains. State tiers across the five measure domains are summarized in Table IV.7. The most striking feature of that table is its patchwork appearance—substantial numbers of states do not have quality data available for many measures. Only eight states (Hawaii, Indiana, Kentucky, Pennsylvania, Rhode Island, Texas, Washington, and West Virginia,) had quality data, and therefore measures in all five domains for 2006. Fourteen states had measures only in the NSCH/NIS children and institutionalized elderly domains.

While Measure Performance Was Strongly Correlated Within a Domain, Varying Performance Across the Five Domains Was Common. Eleven states placed in Tier A for at least one measure domain, while placing in Tier C for at least one other domain. For example, Rhode Island was in Tier A for measures for non-disabled adults, Tier B for both measure domains for children, and tier C for measures for the developmentally disabled and institutionalized elderly. Only fourteen states placed in the same tier across all domains with available cost and quality data.

[22] In two domains (developmentally disabled and institutionalized elderly) the *cost* component of the exploratory efficiency measures was perfectly correlated by definition; the target population and therefore the PMPM costs were the same for each quality measure. Nevertheless, it is notable that *quality* measures were also strongly correlated in these domains.

Table IV.7. State Tiers Within Each Measurement Domain, 2006

	Children (HEDIS)	Children (NSCH & NIS)	Non-Disabled Adults	Disabled	Elderly
Alabama		A		A	B
Alaska		C			C
Arizona		B			
Arkansas		B		A	A
California	A	A	A		C
Colorado	B	B	B		B
Connecticut		B	B	B	B
DC	C	C	C		C
Delaware		C		C	C
Florida	B	B	B		C
Georgia		A		A	B
Hawaii	B	A	A	B	B
Idaho		B			B
Illinois		B			B
Indiana	C	A	B	B	A
Iowa		B			A
Kansas		B	C		A
Kentucky	A	B	B	B	C
Louisiana		A			B
Maine					
Maryland	B	C	C		C
Massachusetts	B	B	B		B
Michigan	A	A	A		B
Minnesota	C	C	C		A
Mississippi		B			B
Missouri	C	B	B		A
Montana		C			A
Nebraska	A	B	C		A
Nevada		C			C
New Hampshire		B			A
New Jersey	B	C	C		C
New Mexico	C	C	C		B
New York	A	B	A		C
North Carolina		B		B	B
North Dakota		C			B
Ohio	B	A	B		C
Oklahoma		B		B	B
Oregon	C	C	B		C
Pennsylvania	C	B	C	B	C
Rhode Island	B	B	A	C	C
South Carolina		A		A	A
South Dakota		B			A
Tennessee		A			B
Texas	C	A	B	B	A
Utah		A			B
Vermont		B		A	B
Virginia	B	A	B		B
Washington	C	B	B	C	B
West Virginia	B	B	B	B	C
Wisconsin	B	B	A		A
Wyoming		B		B	B

Source: Mathematica analysis of 2006 MAX data and quality data from the following sources: 2007 HEDIS, 2007 NSCH/NIS, 2006 CAHPS, 2006-2007 NCI, and 2006 NHC.

Note: Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006, so the costs attributable to nursing facility stays cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from the trial efficiency measures for the elderly. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

2. Comparison of State Scores and Tiers Over Time

When state scores and tiers are compared across all three years, state performance is relatively stable. State tiers for 2004 and 2005 are presented in Tables IV.8 and IV.9. Detailed tables and maps by domain are presented in Appendix C. The 2004 and 2005 rankings have only three measure domains (children-HEDIS, developmentally disabled, institutionalized elderly). Children's NSCH measures were not available for those years and the NIS vaccination measure could not be calculated specifically for the Medicaid population.[23]

Most states with available data in both 2004 and 2006 in a measure domain placed in the same tier in both years. For example, in the institutionalized elderly domain, 80 percent of states remained in the same tier across time, while 68 percent of states in the children's HEDIS domain remained in the same tier. The vast majority of movements over time were to adjacent tiers; there were just a few instances where a state placed in Tier A in one year, but Tier C in another.

As in 2006, within a domain, state scores on exploratory efficiency measures in 2004 and 2005 were generally correlated, though it was rare for a state to obtain a score of 1 or a score of 3 for all measures within a domain. Again, varying performance across the three measure domains was common. In 2005, six states placed in Tier A for at least one measure domain, while placing in Tier C for at least one other domain, and in 2004, five states exhibited the same pattern. However, state tiers are not entirely comparable over the three years because more states have measures in 2006 than in 2004. For example, for HEDIS measures for children, 23 states reported measures in 2004; by 2006, 25 states did so.

3. Discussion of State Scores and Tiers

Variable Performance on Higher-Than-Median Quality and Lower-Than-Median Costs. State scores and tiers on the exploratory efficiency measures suggest that states have different strengths and weaknesses across populations served by the Medicaid program. This analysis did not reveal a set of "model states" that produce high quality outcomes at low PMPM costs for all groups of Medicaid beneficiaries. Indeed, none of the eight states with data in all five measure domains in 2006 had consistently "Tier A" or "Tier C" performance across all domains.[24] To some degree, this should be expected, as Medicaid programs often have different administrative units, care delivery models (managed care versus fee-for-service), purchasing strategies, and provider payment rates across the different populations served. When responsibilities and management strategies vary across populations, outcomes would also be expected to vary.

[23] Adult HEDIS measures were available for those years but as explained earlier, we did not have the resources to compute costs for non-disabled adults enrolled in capitated managed care plans in 2004 and 2005.

[24] The eight states with data in all domains in 2006 were Hawaii, Indiana, Kentucky, Pennsylvania, Rhode Island, Texas, Washington, and West Virginia.

Table IV.8. State Tiers Within Each Measurement Domain, 2004

	Children (HEDIS Only)	Disabled	Elderly
Alabama		B	B
Alaska			C
Arizona			
Arkansas			B
California	A		C
Colorado	B		B
Connecticut		B	B
DC	B		C
Delaware		C	C
Florida	B		B
Georgia			B
Hawaii	B	B	C
Idaho			B
Illinois	B		B
Indiana		B	A
Iowa			A
Kansas			A
Kentucky	A	B	B
Louisiana			B
Maine		B	C
Maryland	B		C
Massachusetts	B		B
Michigan	C		B
Minnesota	C		A
Mississippi			B
Missouri	C		A
Montana			A
Nebraska	A		A
Nevada			C
New Hampshire			B
New Jersey	B		C
New Mexico	C		B
New York	A		B
North Carolina		B	B
North Dakota			B
Ohio	B		C
Oklahoma		A	B
Oregon	C		B
Pennsylvania	A	B	C
Rhode Island	A	C	C
South Carolina		A	B
South Dakota			A
Tennessee			B
Texas	B		A
Utah			B
Vermont		B	C
Virginia	C		B
Washington	B		B
West Virginia		B	C
Wisconsin			A
Wyoming		A	A

Source: Mathematica analysis of 2004 MAX data and quality data from the following sources: 2005 HEDIS, 2004-2005 NCI, and 2004 NHC.

Note: Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006, so the costs attributable to nursing facility stays cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from the trial efficiency measures for the elderly. For other measure domains, the quality component of the measure was not available for Arizona.

Table IV.9. State Tiers Within Each Measurement Domain, 2005

	Children (HEDIS Only)	Disabled	Elderly
Alabama		A	B
Alaska			C
Arizona			
Arkansas		B	A
California	A		C
Colorado	B		B
Connecticut		B	B
DC	C		C
Delaware	B	C	C
Florida	B		C
Georgia		B	B
Hawaii	A	B	C
Idaho			B
Illinois			A
Indiana			B
Iowa			A
Kansas	B		A
Kentucky	A	B	C
Louisiana			A
Maine			
Maryland	A		C
Massachusetts	B	B	B
Michigan	A		B
Minnesota	C		A
Mississippi			B
Missouri	C		A
Montana			B
Nebraska	A		A
Nevada			C
New Hampshire			A
New Jersey	B		C
New Mexico	C		B
New York	A		B
North Carolina		C	B
North Dakota			B
Ohio	B		C
Oklahoma		B	B
Oregon	C		C
Pennsylvania	B	B	C
Rhode Island	B	C	C
South Carolina		A	A
South Dakota		A	A
Tennessee			B
Texas	B	B	A
Utah			B
Vermont		A	B
Virginia	C		B
Washington	B		B
West Virginia	B	B	C
Wisconsin			A
Wyoming		A	B

Source: Mathematica analysis of 2005 MAX data and quality data from the following sources: 2006 HEDIS, 2005-2006 NCI, and 2005 NHC.

Note: Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006, so the costs attributable to nursing facility stays cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from the trial efficiency measures for the elderly. For other measure domains, the quality component of the measure was not available for Arizona

In addition, there do not appear to be any obvious characteristics—such as program size, reliance on managed care, or underlying medical care costs—that are uniformly shared by states that frequently placed in Tier A or Tier C across measure domains. We explored whether some characteristics were common to the 12 states that placed in Tier A in at least two domains (Alabama, Arkansas, California, Georgia, Hawaii, Indiana, Michigan, Nebraska, New York, South Carolina, Texas, Wisconsin), and among the 12 states that placed in Tier C in at least two domains (Alaska, District of Columbia, Delaware, Maryland, Minnesota Nevada, New Jersey, New Mexico, Oregon, Pennsylvania, Rhode Island, and Washington). While there are some features that distinguish the two groups of states on average, there are also striking exceptions:

- **Program size**. Top-tier Medicaid programs tend to have larger enrollment relative to bottom-tier states (2.4 million versus 640,000 enrollment in FY2006) and to cover a larger proportion of the state's population (20.4 percent versus 17.8 percent in FY2006). But there are exceptions to these trends that suggest size does not equate with efficiency. For example, Hawaii and Nebraska each have fewer than 250,000 enrollees, but frequently placed in Tier A, while Pennsylvania, with more than 2 million enrollees, frequently placed in Tier C.[25]

- **Use of managed care**. Considering all forms of managed care, including primary care case management programs, top-tier and bottom-tier Medicaid programs tended to enroll comparable proportions of the Medicaid population in managed care in 2006 (78 percent versus 77 percent). There was wide variation in managed care enrollment among both top and bottom tier states. For example, top-tier Wisconsin enrolled 63 percent of Medicaid beneficiaries in managed care in 2006, below the national median of 76 percent, while top-tier California enrolled 98 percent of beneficiaries. Similarly, the bottom tier included both Oregon, which enrolled 97 percent of beneficiaries in managed care, and Alaska, which enrolled no beneficiaries in managed care.

  A somewhat different picture emerges when considering only comprehensive managed care provided by health maintenance organizations (HMOs). By this measure, top-tier states enrolled a substantially smaller proportion of the Medicaid population in comprehensive managed care in 2006 (45 percent versus 65 percent). However, there was still wide variation across states in both the top and bottom tiers. For example, top-tier South Carolina enrolled just 15 percent of beneficiaries, while Michigan enrolled 70 percent of beneficiaries, including 52 percent of disabled beneficiaries, in comprehensive managed care. Among bottom-tier states, Nevada enrolled 58 percent of beneficiaries, while Maryland enrolled 85 percent of beneficiaries, including 63 percent of disabled beneficiaries, in comprehensive managed care.[26]

- **Local medical care costs**. Using the Medicare Geographic Adjustment Factor (GAF) to compare local medical care costs, as a group, top-tier states have costs 2 percent below the national average, while bottom-tier states have costs 2 percent above the national average. Still, Hawaii, with predicted costs 4 percent above the national average

[25] Kaiser Family Foundation. "Medicaid Enrollment as a Percent of Total Population, 2006." and "Total Medicaid Enrollment, FY2006." www.statehealthfacts.org.

[26] Mathematica calculation using 2006 MAX validation tables.

(see Chapter V for a discussion of the GAF), is in the top tier, while New Mexico, with predicted costs 7 percent below the national average, frequently places in the bottom tier.[27]

- **Physician reimbursement**. Across all services, top-tier states averaged physician reimbursement rates that were 77 percent of Medicare rates, while bottom-tier states averaged 84 percent of Medicare rates in 2008. When considering primary care physician fees alone the gap was wider, with top-tier states averaging 68 percent of Medicare rates and bottom-tier states averaging 77 percent. Still, there is no indication that low physician reimbursement rates are necessarily linked with top-tier performance. Bottom-tier Rhode Island averages physician reimbursement rates that are just 42 percent of Medicare, while three top-tier states—Georgia, Alabama, and Arkansas—have rates that are 90 percent of Medicare.[28] In addition, physician payments constitute only a small proportion (about 4 percent) of total Medicaid spending, so they are unlikely to explain overall spending patterns.

- **DSH dollars and other spending**. There was no substantive difference between top-tier and bottom-tier states in terms of DSH spending or other spending that cannot be disaggregated to individuals, such as UPL payments ($39 versus $33 PMPM). Top-tier states included both high (South Carolina) and low (Wisconsin) DSH states.[29]

Variation across measure domains and the lack of obvious common characteristics across Medicaid programs that frequently had top and bottom tier placements in 2006 underscore the importance of understanding the factors in each state that might contribute to the costs and quality outcomes reflected in each measure and domain. Chapter VI presents case studies of three states that frequently placed in Tier A (Hawaii, Indiana, and South Carolina), and three states that frequently placed in Tier C (Oregon, New Mexico, and Pennsylvania), to assess how specific state management approaches or initiatives, or other factors contribute to the observed performance on the exploratory efficiency measures presented in this report.

Key Caveats for Exploratory Efficiency Measures. Although the state scores and tiers utilize the best available data that can be compared across states, the lack of quality data for a substantial proportion of states in all years means this study presents a partial picture of the value of state Medicaid spending. Consequently, the state comparisons should be viewed as an initial attempt to use existing measures and current methodological tools to compare Medicaid program efficiency. A more comprehensive assessment of the value of state Medicaid spending depends on greater availability of comparable state-level data on quality, access to care, or health care outcomes for a greater portion of the Medicaid population in all states. While state tiers are complete in some domains, such as NHC measures for the elderly and NSCH/NIS measures for children, the relative position of states in other domains may change as additional states report quality data.

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[27] Mathematica calculation using data from O'Brien-Strain et al. 2008.

[28] Kaiser Family Foundation. "Medicaid-to-Medicare Fee Index, 2008." www.statehealthfacts.org

[29] Mathematica calculation using data from Government Accountability Office. "Medicaid: CMS Needs More Information on the Billions of Dollars Spent on Supplemental Payments." May 2008. GAO-08-614.

In addition, it was beyond the scope of this study to fully adjust for health status of Medicaid enrollees in each state. While we disaggregated costs by Medicaid groups that are alike in age, gender, and other demographic characteristics, we cannot rule out the possibility that state cost variation on the exploratory efficiency measures is due to differences in enrollee health and functional status across states. For example, Oregon's higher nursing home costs could be attributable to a greater proportion of "high care" individuals in nursing homes, due to LTC policies that keep all but the most functionally disabled in the community. A study that examined the proportion of low-care nursing home residents with stays of at least 90 days found that Oregon had fewer low-care residents than the national average, but not by a large margin. (Mor et al. 2007). Yet, according to the same study, South Carolina, with low PMPM costs for nursing home residents, had an even lower percentage of low-care residents in nursing homes, suggesting this cannot be the only reason for Oregon's higher costs.

Detailed studies on the differences in health status of enrollees reflected in the exploratory efficiency measures, using data on diagnosis, severity of condition, and functional ability, would help address this question. Variability in the populations covered by state Medicaid programs may be the greatest among non-disabled adults, which includes working parents and childless adults. By establishing national minimum income eligibility levels for Medicaid starting in 2014, federal health reform legislation will increase comparability of Medicaid-covered adults across states over time, but some variation will persist due to the flexibility afforded to states to provide coverage to individuals with income higher than the minimum threshold.

While this study did not have comparable quality data for many states for many of the measures, this does not mean that all of those states do not measure quality outcomes. In fact many states measure quality outcomes not included in this report (for example, some calculate HEDIS scores for primary care case management providers from claims data), but they are not necessarily comparable to those in other states. As interest in quality measurement leads to more uniform measures across states, additional domains and measures should be incorporated in exercises that seek to compare cost and quality. For example, there are currently no comparable measures of the quality of HCBS which serve a substantial proportion of the elderly and disabled who use long-term care.

Comparison to Other State Health System Performance Rankings. Although this report is unique in explicitly pairing quality and cost outcomes, two recent state health performance ranking exercises are relevant for comparison to the findings presented above. First, the Commonwealth Fund (CMWF) has published two well-researched rankings of overall state health system performance (not specific to Medicaid) in recent years—an initial report in 2007 (Cantor et al. 2007) and an update in 2009 (McCarthy et al. 2009). Second, the Public Citizen Health Research Group (PCHRG) released a ranking of state Medicaid programs in 2007(Ramírez de Arellano and Wolfe 2007). We compare our results to each of these reports.

- **Commonwealth Fund.** The first CMWF report scored state performance on 32 separate indicators, divided into five domains: access, prevention and treatment, avoidable hospital use and costs, equity, and healthy lives. The second report issued in 2009 had 38 indicators divided into the same five domains, added 2007 data for the six new indicators, and highlighted significant changes in state rankings between the two years. In both reports, the same group of 13 states appeared in the top quartile across the 38 indicators, and the same 10 states appeared in the bottom.

There is little correlation between the overall state rankings on the CMWF scorecard and the tiers presented in this report. For example, among the states that ranked in the top quartile in CMWF's scorecard in 2007 and 2009, only three—Hawaii, Nebraska, and Wisconsin—frequently placed in Tier A in 2006 in this analysis. In contrast, three top-tier states in this analysis ranked in the bottom quartile of the CMWF scorecard in 2009.

There are several explanations for these discrepancies. First, and most important, only two indicators, or measures, were common to both scoring exercises—long-stay nursing home residents who had moderate to severe pain and high-risk residents with pressure sores. State scores on the remaining 36 indicators in CMWF's scorecard and 28 measures in this study explain the different results. Second, the CMWF scorecard did not compare state spending relative to the quality or access indicators as this study did. Third, state CMWF indicators reflect scores for the entire state population, or for Medicare patients; with the exception of the two indicators for nursing home patients, none is specific to Medicaid or applies largely to Medicaid enrollees. Consequently, a state's performance overall is not necessarily indicative of its performance in its Medicaid program.

- **Public Citizen Health Research Group.** The 2007 PCHRG report scored state Medicaid performance on 55 indicators, divided into four domains: eligibility, scope of services, quality of care, and reimbursement. Again, there is little correlation between the overall state rankings on the PCHRG scorecard and the tiers presented in this report. For example, among the states that ranked in the top quartile in PCHRG's scorecard in 2007, four —again Hawaii, Nebraska, and Wisconsin, as well as New York —frequently place in Tier A for the exploratory efficiency measures, and five—Alaska, Minnesota, , Oregon, Rhode Island, and Washington—are frequently in Tier C for measures in this report. Four top-tier states in this report's analysis were ranked in the bottom quartile of the PCHRG scorecard.

  Again, there are several explanations for why these two scoring efforts arrived at different results. First, the PCHRG scorecard takes the perspective "if I were a poor, sick person, in which state would I have the best chance of being eligible for Medicaid and getting comprehensive, quality health care?" States that have more expansive eligibility criteria, and cover services more generously (in type and in scope) tend to perform well on the 36 indicators that address these issues (two-thirds of all indicators in the PCHRG study). This study did not address eligibility or benefit coverage. Second, and more importantly, the PCHRG study did not compare state spending relative to quality or access indicators. Indeed, the study takes the approach of awarding higher scores to states with high per-member spending, under the assumption that such states are better able to secure access to providers. Given our findings on the lack of a relationship between cost and quality, however, it is not evident that higher-spending Medicaid programs are necessarily "better."

C. Summary

This preliminary exercise in comparing cost and quality outcomes has yielded several key insights and many additional questions. The finding that cost and quality are poorly correlated within the Medicaid program echoes similar findings from studies of the Medicare population, and suggests there may be room to reduce costs, or at least slow cost growth, without negatively affecting quality. There may also be opportunities to increase quality without necessarily increasing costs, given that states' absolute scores on many quality measures indicate substantial room for improvement.

That Medicaid program performance was consistent within the five measure domains, but varied across them, likely reflects the fact that Medicaid programs are often managed differently by population, and indicates that each state has room to improve performance.

At the same time, the absence of any obvious shared characteristics across top-tier and bottom-tier states reinforces that the state-specific context is critical to understanding cost and quality outcomes. In Chapter VI we present the results of six case studies—three from states that frequently placed in Tier A and three from states that frequently placed in Tier C—that explore how Medicaid agencies approach the challenge of improving efficiency and assess how specific state policies, practices, or other factors contribute to the findings of this study.

Finally, a comparison of our results with two other high-profile state ranking approaches revealed very few commonalities. The purpose of this study was to pair cost and quality outcomes and use Medicaid-specific data to compare states, which yields substantially different results than statewide or Medicare data. Studies that draw heavily on non-Medicaid sources are not likely to be good proxies for finding high-performing Medicaid programs. Nevertheless, this effort is just a first step in comparing cost and quality outcomes. In the final chapter of this report (VII), we return to the theme of efficiency measurement and discuss how future efforts might build on this platform.

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V. MEDICAID COST VARIATION ANALYSIS

As shown in the scatter plots and states' scores on the exploratory efficiency measures, there is more state-to-state variation in Medicaid spending across enrollee groups than across most quality indicators. While the limited availability of Medicaid-specific quality and outcome data constrains our ability to assess and compare efficiency for all Medicaid enrollees, ample cost data are available to examine differences in state spending for the entire Medicaid population.

In this chapter, we present findings on the effect of variation in the mix of subgroups enrolled in each state Medicaid program on spending differences.[30] Because differences in age, sex, health and disability status, and geographic variation in local medical input prices have been shown to explain some of the differences in state *Medicare* spending per enrollee (CBO, 2008), we examined the effect of standardizing state Medicaid costs to adjust for some of these factors as well (see complete results in Appendix E). Although it was beyond the scope of this study to fully adjust for health status of all Medicaid enrollees in each state, we compared adjusted costs for 10 groups with similar age and disability profiles.

A. Variation in Overall PMPM Cost

Across state Medicaid programs, overall PMPM costs vary by a factor of three. In 2006, Medicaid PMPM costs ranged from a low of $272 to a high of $860, with an average of $537 (Table V.1). The states with the lowest overall PMPM costs were Arizona, California, Louisiana, South Carolina, and Michigan; the highest were Alaska, North Dakota, Minnesota, New York, and the District of Columbia.

Administrative PMPM costs represent a small proportion of overall PMPM costs, accounting for just 6 percent of PMPM costs, on average (Table V.1) and varying from $5 in Vermont to $75 in Alaska. Administrative costs may vary because of the ways states classify certain expenses. For example, some states classify case management as an administrative expense (using state-employed staff); others classify it as a service (purchased care that would appear in service claims).

The results, showing three-fold variation in state Medicaid spending per beneficiary overall, are generally consistent with other studies of Medicaid costs (Martin 2007). There are, however, some discrepancies between this and other studies' findings due to differences in which costs are included or excluded, such as DSH and other supplemental payments.

The three-fold variation in state Medicaid spending per beneficiary overall is also consistent with many studies of Medicare spending by state, which have found variation in per-capita Medicare spending across the states to fall in the same range (Gold 2004). Some states with low overall Medicaid per-enrollee costs relative to the U.S. average have low Medicare per-enrollee costs, and vice versa (high-than-average Medicaid and high Medicare costs per beneficiary). However, there is no relationship between the two groups of states: some states with high Medicare per-capita costs have low Medicaid per-beneficiary costs. This is likely due to the strong influence of state Medicaid

[30] The same analyses were conducted on 2004 and 2005 data as well, and generated similar results (see Appendix D). However, Medicaid spending on prescription drugs declined significantly in 2006 after Medicare Part D took effect; so state Medicaid PMPM spending was higher in 2004 and 2005 overall, and for dual enrollees in particular.

policies on Medicaid spending in ways that are quite different from the factors that affect state Medicare spending.

Table V.1. PMPM Medicaid Spending, Overall, 2006

	Overall	Administrative Costs Only	Administrative Costs as a Percentage of Overall Costs
Arizona	272	15	5%
California	322	36	11%
Louisiana	327	13	4%
South Carolina	338	14	4%
Michigan	339	24	7%
Alabama	341	12	3%
Arkansas	387	16	4%
Mississippi	390	13	3%
Tennessee	396	34	9%
Illinois	398	24	6%
Texas	405	20	5%
Georgia	407	29	7%
Washington	430	48	11%
Hawaii	431	28	7%
Oklahoma	442	26	6%
Florida	445	24	5%
Utah	450	38	9%
Wisconsin	451	21	5%
New Mexico	471	14	3%
Missouri	471	28	6%
Indiana	492	21	4%
Virginia	497	25	5%
Kentucky	503	20	4%
Nevada	509	31	6%
South Dakota	515	24	5%
Oregon	517	53	10%
Colorado	524	26	5%
West Virginia	525	23	4%
Idaho	533	31	6%
Vermont	536	5	1%
North Carolina	540	30	6%
Ohio	561	21	4%
Iowa	579	27	5%
Delaware	587	31	5%
Pennsylvania	600	39	6%
Nebraska	624	48	8%
Wyoming	625	45	7%
Kansas	640	37	6%
Maryland	644	36	6%
Montana	652	42	6%
Massachusetts	699	35	5%
New Hampshire	704	50	7%
New Jersey	710	52	7%
Rhode Island	747	36	5%
Connecticut	781	37	5%
DC	790	51	6%

Table V.1 *(continued)*

	Overall	Administrative Costs Only	Administrative Costs as a Percentage of Overall Costs
New York	803	25	3%
Minnesota	805	43	5%
North Dakota	829	37	4%
Alaska	860	75	9%
Maximum	860	75	11%
Minimum	272	5	1%
Range (Maximum - Minimum)	588	71	10%
Average	537	31	6%
Standard Deviation	151	13	2%

Note: In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

Source: Mathematica analysis of 2006 MAX data

B. Variation in PMPM Costs by Enrollee Subgroups

When overall Medicaid spending is disaggregated by enrollee subgroups, average spending per enrollee across the 10 Medicaid population subgroups varies almost 20-fold, ranging from hundreds to thousands of dollars (Table V.2). The lowest Medicaid PMPM costs occurred among children ($249 national average) and the highest occurred among disabled individuals who used long-term care and were not dually eligible for Medicare ($4,372 national average).

Although state-to-state PMPM costs for every subgroup varied by a factor of two to nine, the largest difference was usually observed for subgroups using long-term care. High variation within these subgroups may reflect several factors, including state differences in provider reimbursement rates, the amount of services provided, and the relative balance of institutional versus home and community-based long-term care.[31] The largest variation in PMPM costs occurs among enrollees with limited benefits, from just $40 PMPM to more than $1,500 PMPM, due to the heterogeneity of this group, whose benefits vary tremendously across states.

When the population groups are more homogeneous, variation is reduced somewhat, but three- to four-fold differences still exist in PMPM costs across states. Another study examined an even narrower Medicaid subgroup—cash assistance, non-dual, FFS beneficiaries with disabilities—to increase comparability across states, since most states use a uniform national eligibility standard for this population. Still, it found a two- to three-fold difference in state Medicaid costs (Kronick and Gilmer 2009).

[31] One of the exploratory efficiency measures looked at LTC institutional costs paid on an FFS basis for enrollees in a nursing facility for at least three months, a more focused cost measure than total costs for all subgroups using any LTC.

Table V.2. PMPM Medicaid Costs, by Enrollee Subpopulations, 2006

	Non-disabled Children	Non-disabled Adults	Disabled, Non-Dual, No LTC	Disabled, Non-Dual, with LTC	Disabled, Dual, No LTC	Disabled, Dual, with LTC	Elderly, Dual, No LTC	Elderly, Dual, with LTC	Elderly, Non-Dual	Limited Benefits
Arizona	256	215							659	239
California	187	226	624	2,848	269	1,920	199	1,723	684	100
Louisiana	121	326	464	3,513	154	3,887	112	2,267	1,342	232
South Carolina	187	322	642	3,456	169	2,440	114	2,046	635	40
Michigan	149	336	907	5,322	305	2,620	144	2,795	790	43
Alabama	207	332	451	2,057	158	1,699	153	2,671	1,202	91
Arkansas	199	315	637	3,873	535	3,198	319	2,244	459	88
Mississippi	186	359	546	4,059	239	2,667	151	2,696	1,060	138
Tennessee	199	356	543	5,419	178	4,914	124	2,955	946	85
Illinois	172	269	729	4,305	226	2,510	124	1,711	929	77
Texas	216	448	712	3,780	242	2,807	280	1,876	1,162	162
Georgia	214	483	728	4,117	228	2,587	203	2,356	1,177	121
Washington	211	436	734	3,217	237	2,397	151	2,094	1,202	137
Hawaii	199	359	697	4,449	327	3,743	148	3,587	952	60
Oklahoma	228	506	692	3,931	240	2,984	124	1,768	1,391	69
Florida	187	376	801	3,857	213	2,423	266	2,651	914	216
Utah	231	398	774	4,769	221	3,333	185	2,676	834	231
Wisconsin	158	305	737	4,365	351	3,401	983	2,570	1,620	105
New Mexico	252	413	1,053	3,942	203	3,156	259	2,410	1,755	186
Missouri	231	376	816	3,424	280	2,222	145	1,734	1,296	102
Indiana	221	413	845	4,739	423	4,015	173	2,779	1,424	149
Virginia	226	407	858	4,686	269	3,953	111	2,493	1,399	281
Kentucky	265	513	667	3,562	189	2,732	154	2,651	1,971	69
Nevada	247	318	992	5,407	328	3,299	196	2,436	2,196	212
South Dakota	245	428	865	3,923	263	2,806	146	2,198	2,081	214
Oregon	274	518	917	2,915	332	1,814	323	1,855	1,089	227
Colorado	225	364	754	3,689	256	2,652	347	2,511	884	264
West Virginia	235	366	658	3,571	176	3,057	107	3,148	1,870	42
Idaho	218	492	929	4,079	347	2,636	164	2,298	1,555	366
Vermont	294	382	817	4,201	277	3,720	226	3,193	1,525	124
North Carolina	251	469	881	3,717	289	2,191	126	1,699	1,101	602
Ohio	189	357	781	5,019	343	4,185	207	2,941	1,680	72
Iowa	223	345	770	3,737	334	3,016	156	1,965	1,300	88
Delaware	298	519	1,151	7,057	470	5,051	308	4,283	2,348	95
Pennsylvania	287	421	950	4,595	216	4,736	202	3,509	1,443	429
Nebraska	285	550	1,032	4,866	378	3,490	216	2,491	1,750	51
Wyoming	283	506	753	3,658	523	4,142	351	2,894	2,160	455
Kansas	279	453	795	3,435	377	2,857	318	2,030	1,121	142
Maryland	276	723	1,236	4,523	547	3,664	301	3,890	1,605	126
Montana	336	735	899	3,506	366	2,465	199	2,863	2,144	351
Massachusetts	390	392	891	4,846	368	4,177	307	3,430	1,338	130
New Hampshire	347	465	1,013	4,751	527	3,987	191	2,812	1,408	65

Table V.2 *(continued)*

	Non-disabled Children	Non-disabled Adults	Disabled, Non-Dual, No LTC	Disabled, Non-Dual, with LTC	Disabled, Dual, No LTC	Disabled, Dual, with LTC	Elderly, Dual, No LTC	Elderly, Dual, with LTC	Elderly, Non-Dual	Limited Benefits
New Jersey	254	383	1,021	5,072	446	4,288	232	3,498	1,384	1,534
Rhode Island	322	340	968	5,762	505	5,735	128	3,570	1,040	1,197
Connecticut	288	332	906	5,528	315	5,071	178	3,766	1,707	57
DC	333	495	1,400	8,274	735	4,415	361	4,521	2,296	840
New York	255	540	979	6,422	388	5,335	458	4,338	1,416	291
Minnesota	310	408	814	4,252	428	3,751	875	2,988	1,349	186
North Dakota	289	421	1,025	4,307	416	3,881	255	3,097	2,231	62
Alaska	510	763	1,375	5,403	428	4,275	253	3,872	1,941	407
Maximum	510	763	1,400	8,274	735	5,735	983	4,521	2,348	1,534
Minimum	121	215	451	2,057	154	1,699	107	1,699	459	40
Range (Maximum - Minimum)	389	547	949	6,217	581	4,035	877	2,823	1,889	1,494
Average	249	420	841	4,372	327	3,394	240	2,752	1,395	233
Standard Deviation	66	113	201	1,081	123	968	165	732	476	282

Source: Mathematica analysis of 2006 MAX data.

Note: Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006. Because the capitation rate covered all acute, behavioral and long-term care services, the costs attributable to long-term care cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from national tables, measures for the disabled and elderly that are defined on the basis of long-term care use, and standardization analyses. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

Within a state, PMPM costs across subgroups are often correlated. As Table V.3 shows, states with below-median PMPM costs for one subgroup also tended to have below-median PMPM costs for the other subgroups. For example, South Carolina and California had consistently low costs; Alaska and the District of Columbia had consistently high costs.

However, there were some exceptions to this pattern. For example, Georgia had low costs for 9 of the 10 subgroups, but had one of the highest PMPM costs for adults. Oregon had one of the lowest PMPM costs among all states for enrollee subgroups who used long-term care—reflecting its leading effort among states in making available less expensive HCBS care as an alternative to institutional care—but those low costs were offset by above-median high costs in almost every other subgroup, resulting an overall PMPM spending close to the national average.

C. Variation in PMPM Costs with a Standard Mix of Enrollee Subgroups

The relative mix of the subgroups as a proportion of total Medicaid enrollment can explain some of the variation in overall PMPM costs across the states but does not explain all of it. Some subgroups account for a disproportionate share of expenditures at the national level (Table V.4). For example, 49.3 percent of enrollees are children, but only 18.9 percent of expenditures are for children. In contrast, disabled beneficiaries represent 13.7 percent of enrollees (11 percent without long-term care, 2.7 percent with long-term care), but this group accounts for 42.9 percent of expenditures (17.6 percent without long-term care, 25.3 percent with long-term care). Similarly, elderly beneficiaries represent 6.9 percent of enrollees and 23.4 percent of expenditures, findings that are consistent with previous studies.

To determine how the mix of population subgroups in each state affects costs, we calculated a standardized overall PMPM cost for each state.[32] After such standardization, a few states appear to have significantly different overall PMPM costs (Table V.5). For example, Iowa has one of the highest unadjusted overall PMPM costs ($579, ranked at number 32), but one of the lowest standardized PMPM costs ($441, ranked at number 10) because many of its beneficiaries are elderly. Tennessee makes a transition in the opposite direction, moving from a rank of number 8 ($396) to a standardized rank of number 23 ($496).

We also examined whether state variation in Medicaid costs persists after controlling for the age-sex distribution of the general low-income population and the local medical input prices through some experimental regression analyses. [33] As discussed in Appendix E, once enrollees are divided into the 10 subgroups, age and sex are no longer significant predictors of states' PMPM costs (p-values were all greater than 0.10). This result is somewhat expected since the subgroups already control to some degree for age, and the analysis used state-level rather than person-level demographic controls.

[32] The standardization method assumed every state had the same member months across the 10 groups as the national distribution, but preserved differences in PMPM costs within each subgroup.

[33] We did not have sufficient data or resources to account for differences in enrollee characteristics due to varying income eligibility standards for similar subgroups. For example, it is possible that a state that enrolls more high-income adults than another could have a lower average adult PMPM if higher-income adults are healthier (and hence less costly) than lower-income adults.

Table V.3. Correlation of PMPM Costs Across Key Medicaid Subpopulations, by State, 2006

	Non-disabled Children	Non-disabled Adults	Disabled, Non-Dual, No LTC	Disabled, Non-Dual, with LTC	Disabled, Dual, No LTC	Disabled, Dual, with LTC	Elderly, Dual, No LTC	Elderly, Dual, with LTC	Elderly, Non-Dual	Limited Benefits
South Carolina	1	1	1	1	1	1	1	1	1	1
Illinois	1	1	2	3	1	1	1	1	1	1
Alabama	1	1	1	1	1	1	2	2	2	2
California	1	1	1	1	2	1	3	1	1	2
Louisiana	1	1	1	1	1	3	1	2	2	3
Missouri	2	2	2	1	2	1	1	1	2	2
Washington	2	3	2	1	1	1	2	1	2	2
Florida	1	2	2	2	1	1	3	2	1	3
Michigan	1	1	3	4	2	1	1	3	1	1
West Virginia	2	2	1	1	1	2	1	3	4	1
Arkansas	1	1	1	2	4	2	4	1	1	2
Georgia	2	3	1	2	1	1	3	2	2	2
Iowa	2	1	2	2	3	2	2	1	2	2
Mississippi	1	2	1	2	2	2	2	3	1	3
Oklahoma	2	4	1	2	2	2	1	1	3	1
Tennessee	1	2	1	4	1	4	1	3	1	1
Hawaii	1	2	1	3	3	3	1	4	1	1
Kentucky	3	4	1	1	1	2	2	2	4	1
Texas	2	3	1	2	2	2	3	1	2	3
Colorado	2	2	2	1	2	2	4	2	1	4
North Carolina	3	3	3	2	2	1	1	1	2	4
Utah	2	2	2	3	1	3	2	3	1	3
Kansas	3	3	2	1	3	2	4	1	2	3
South Dakota	3	3	3	2	2	2	1	1	4	3
Wisconsin	1	1	2	3	3	3	4	2	3	2
Oregon	3	4	3	1	3	1	4	1	2	3
Idaho	2	4	3	2	3	1	2	2	3	4
Ohio	1	2	2	4	3	4	3	3	3	1
Virginia	2	3	3	3	2	3	1	2	3	4
New Mexico	3	3	4	2	1	2	3	2	4	3
Connecticut	4	1	3	4	2	4	2	4	3	1
Nevada	3	1	4	4	3	2	2	2	4	3
Vermont	4	2	3	2	2	3	3	4	3	2
Indiana	2	3	3	3	4	3	2	3	3	3
Montana	4	4	3	1	3	1	2	3	4	4

Table V.3 *(continued)*

	Non-disabled Children	Non-disabled Adults	Disabled, Non-Dual, No LTC	Disabled, Non-Dual, with LTC	Disabled, Dual, No LTC	Disabled, Dual, with LTC	Elderly, Dual, No LTC	Elderly, Dual, with LTC	Elderly, Non-Dual	Limited Benefits
New Hampshire	4	3	4	3	4	3	2	3	3	1
Massachusetts	4	2	3	3	3	4	4	4	2	2
Minnesota	4	3	2	3	4	3	4	3	2	3
Nebraska	3	4	4	4	3	3	3	2	4	1
Rhode Island	4	1	4	4	4	4	1	4	1	4
North Dakota	4	3	4	3	4	3	3	3	4	1
Pennsylvania	4	3	3	3	1	4	3	4	3	4
Wyoming	3	4	2	1	4	4	4	3	4	4
Maryland	3	4	4	3	4	3	4	4	3	2
New Jersey	3	2	4	4	4	4	3	4	3	4
New York	3	4	4	4	3	4	4	4	3	4
Delaware	4	4	4	4	4	4	4	4	4	2
Alaska	4	4	4	4	4	4	3	4	4	4
DC	4	4	4	4	4	4	4	4	4	4
Arizona	3	1							1	3

Q1 (0-25th percentile) Q2 (25th-50th percentile) Q3 (50-75th percentile) Q4 (75th-100th percentile)

Source: Mathematica analysis of 2006 MAX data

Note: This table is sorted by the sum of each state's rankings on the ten PMPM cost measures. For example, South Carolina was in the 1st quartile for all 10 measures, and therefore has a sum of 10, the lowest score across all 50 Medicaid programs. DC was in the 4th quartile for all 10 measures, for a sum of 40, the highest score across all 50 Medicaid programs.

Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006. Because the capitation rate covered all acute, behavioral and long-term care services, the costs attributable to long-term care cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from national tables, measures for the disabled and elderly that are defined on the basis of long-term care use, and standardization analyses. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

Table V.4. Proportion Medicaid Enrollees, Member Months and Expenditures Attributable to Each Major Subgroup, National Level, 2006

Population	Number of Enrollees	Proportion of Total Medicaid Enrollees	Number of Enrolled Member Months	Proportion of Total Medicaid Enrolled Member Months	Expenditures	Proportion of Total Medicaid Expenditures
Non-disabled children (0-18)	28,721,485	49.5%	273,197,900	49.9%	$52,161,146,150	20.8%
Non-disabled adults (19-64)	9,373,576	16.2%	81,014,982	14.8%	$28,972,308,612	11.6%
Disabled adults and children (0-64), non-dual, no long-term care	4,055,205	7.0%	43,356,875	7.9%	$32,619,708,590	13.0%
Disabled adults and children (0-64), non-dual, long-term care use	772,100	1.3%	8,755,393	1.6%	$36,052,257,977	14.4%
Disabled adults and children (0-64), dual, no long-term care	2,272,238	3.9%	24,975,055	4.6%	$6,342,524,676	2.5%
Disabled adults and children (0-64), dual, long-term care use	860,075	1.5%	9,878,671	1.8%	$31,256,599,895	12.5%
Elderly (65+), dual, no long-term care	1,856,862	3.2%	19,783,679	3.6%	$4,245,416,636	1.7%
Elderly (65+), dual, long-term care use	1,757,944	3.0%	18,220,364	3.3%	$47,179,997,220	18.8%
Elderly (65+), non-dual	283,227	0.5%	2,705,185	0.5%	$2,874,058,304	1.1%
Limited benefit enrollees	8,021,076	13.8%	65,297,060	11.9%	$8,872,837,908	3.5%
Total Medicaid	57,973,788		547,185,164		$250,576,855,968	

Source: Mathematica analysis of 2006 MAX data

Note: Table excludes those with unknown or no eligibility. Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006. Because the capitation rate covered all acute, behavioral and long-term care services, the costs attributable to long-term care cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from national tables, measures for the disabled and elderly that are defined on the basis of long-term care use, and standardization analyses. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

Table V.5. Overall PMPM Medicaid Cost, Unadjusted vs. Standardized Measures, 2006

	Unadjusted		Standardized	
State	Overall PMPM Cost	Rank	Overall PMPM Cost	Rank
California	322	1	349	1
Alabama	341	5	370	2
South Carolina	338	3	379	3
Illinois	398	9	383	4
Louisiana	327	2	393	5
Missouri	471	19	425	6
Mississippi	390	7	430	7
Washington	430	12	431	8
Arkansas	387	6	440	9
Iowa	579	32	441	10
Michigan	339	4	450	11
Oklahoma	442	14	450	12
Texas	405	10	450	13
Florida	445	15	456	14
Georgia	407	11	465	15
West Virginia	525	27	467	16
Wisconsin	451	17	471	17
Colorado	524	26	476	18
Oregon	517	25	486	19
Kentucky	503	22	488	20
South Dakota	515	24	494	21
Kansas	640	37	495	22
Tennessee	396	8	496	23
Hawaii	431	13	498	24
Ohio	561	31	503	25
Utah	450	16	510	26
North Carolina	540	30	515	27
Idaho	533	28	518	28
New Mexico	471	18	520	29
Virginia	497	21	527	30
Indiana	492	20	530	31
Nevada	509	23	534	32
Vermont	536	29	552	33
Nebraska	624	35	569	34
North Dakota	829	48	577	35
Minnesota	805	47	595	36
Connecticut	781	44	606	37
Wyoming	625	36	607	38
New Hampshire	704	41	610	39
Montana	652	39	620	40
Pennsylvania	600	34	632	41
Massachusetts	699	40	640	42
Maryland	644	38	669	43
New York	803	46	704	44
Delaware	587	33	719	45
New Jersey	710	42	758	46
Rhode Island	747	43	778	47
Alaska	860	49	856	48
DC	790	45	871	49

Source: Mathematica analysis of 2006 MAX data

Note: Table is sorted by the standardized overall PMPM costs. Almost all long-term care in Arizona was provided through capitated arrangements during 2004-2006. Because the capitation rate covered all acute, behavioral and long-term care services, the costs attributable to long-term care cannot be accurately calculated using MAX data. For this reason, we exclude Arizona from national tables, measures for the disabled and elderly that are defined on the basis of long-term care use, and standardization analyses. In 2005 and 2006, MAX data for Maine contain prescription drug claims only. For this reason, we exclude Maine from all analyses in 2005 and 2006.

Local medical input prices do appear to affect state Medicaid PMPM costs. Depending on the subgroup, variation in local medical prices explained between 7 percent (children, $p = 0.06$) and 30 percent (disabled, non-dual, no long-term care, $p < 0.01$) of the variation in PMPM costs. [34] However, because the analysis used just one independent regression variable and did not control for other covariates, the finding indicates association but not causation. Nonetheless, the results suggest this may be an important factor to consider in future efforts to understand state variation in Medicaid cost and efficiency.

D. Summary

State costs vary considerably across the 10 subgroups defined by age, disability status, use of long-term care, dual status (Medicare and Medicaid eligibility), and eligibility for limited benefits. Variation in the relative mix of these enrollees can account for some of the differences across states in overall PMPM costs. However, once beneficiaries are separated into these more homogeneous subgroups, further controls for the age and sex distribution of states' low-income populations are not significant. Local input price, on the other hand, appears to be an important predictor of PMPM costs, though large variation persists after controlling for geographic differences in medical care prices.

These results underscore the need to examine cost and quality for distinct subpopulations of Medicaid enrollees, as we did when constructing the exploratory efficiency measures. Many of the exploratory efficiency measures go a step further by creating even more homogeneous subgroups divided by gender and age (for example, breast cancer screening among women ages 52 to 69). Beyond the usual explanation for differences in costs—state Medicaid reimbursement rates—this analysis also suggests important avenues for future research, including: (1) differences in health status of enrollees, using data on diagnosis, severity of condition, functional ability, and so on; and (2) the mix and quantity of specific types of services, such as emergency room visits, hospital admissions or lengths of stay, prescription drug use, specialist visits, and other services.

[34] As a proxy for local input prices, we used a state-level measure of the Geographic Adjustment Factor, which is a summary index of the three Geographic Practice Cost Indices that CMS uses to adjust Medicare physician payments (GAO 2005).

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VI. FINDINGS FROM CASE STUDIES OF SIX STATES

The aim of the case studies was to examine the policy and program features in states with different levels of performance on the exploratory efficiency measures. The case studies were specifically designed to explore the potential influence of Medicaid purchasing strategies, payment policies, use of managed care delivery systems, features of state health markets, and Medicaid beneficiary characteristics on the cost and quality measures used in this analysis.

In this chapter we first explain the methodology and selection criteria. The next section consists of a brief overview of the characteristics of the states studied, Medicaid program features, and states' performance on the exploratory efficiency measures. We then describe common themes and findings regarding each case-study state's approaches to measuring and improving Medicaid spending value and efficiency during the study period. We conclude by detailing the factors that may contribute to each state's performance on the exploratory efficiency measures.

In brief, the case studies showed there are not many marked differences in policies, when comparing high- and low-performing states. While state Medicaid agencies are beginning to tie payment to provider and managed care plan performance, differences in states' performance on the exploratory efficiency measures do not appear to be driven by purchasing-policy differences. States that get higher value scores on several measures are pursuing many of the same policies designed to improve quality and control costs as the states with lower scores. In a few cases, higher-than-median quality scores appear to reflect concerted action by the state to improve the outcomes. But most respondents could not identify specific initiatives that would have directly influenced the quality measures examined in this analysis.

A. Case Study Methodology

We used state scores on exploratory efficiency measures for 2004, 2005, and 2006 to identify three states that frequently placed in Tier A and three states that frequently placed in Tier C. Twelve states fell into each of these groups in 2006, so we used two additional criteria to narrow the list:

- **Availability of more exploratory efficiency measures.** Many states lacked data for one or more of the three years, reducing the number of measures. A state with fewer exploratory efficiency measures—sometimes from a single quality data source—offered less information to explore possible reasons for its performance in each measure domain. We gave higher priority to states with a greater number of efficiency measures over time.
- **Consistency in scores across three years.** After examining state scores for all three years, many of the highest- (or lowest-) performing states within individual measure domains were in the highest (or lowest) tier each year. We gave greater weight to those whose scores were mostly consistent over the three years to minimize the chance that a state's scores in one year were due to changes in the pool of reporting states.

After applying these additional criteria, we selected the following for our case studies: Hawaii, Indiana, and South Carolina from among the 12 with scores more frequently in Tier A; and New Mexico, Oregon, and Pennsylvania from among the 12 with scores more frequently in Tier C. It is important to note that these states are not the "best" or "worst" in terms of performance on the exploratory efficiency measures; we selected a geographically diverse set of states.

To conduct the case studies, we interviewed current and former senior Medicaid officials in each state who had a broad understanding of the Medicaid policies and programs that might contribute to its cost and quality performance during the 2004 to 2006 study period. The interviews covered three major topics:

- Approaches to measuring the value or efficiency of Medicaid spending, including how the Medicaid agency organized and developed these efforts and any benchmarks used to gauge performance;
- Special programs or initiatives to improve efficiency or value from 2002 to 2006, including their objectives, target population, key program features, and measures used to assess improvements in quality, efficiency, or value;
- Factors that might influence the state's performance on exploratory efficiency measures, including: state Medicaid purchasing programs or initiatives, overall cost of health care in the state, beneficiary characteristics, health care utilization and provider practice patterns, provider payment rates, and changes that could have affected administrative efficiency or the accuracy and completeness of Medicaid claims during the 2004 to 2006 timeframe.

Based on the interviews and reports or studies on the state Medicaid program obtained from secondary sources, we produced summaries of each state's approach to measuring and improving value or efficiency, and possible explanations for its performance on exploratory efficiency measures (see Appendix F for state case study summaries).

B. Overview of the Six Case Study States, Medicaid Programs, and Performance on Exploratory Efficiency Measures

1. State Characteristics

The six case study states are demographically and economically diverse (Table VI.1). The percent of the population older than age 65 is near the national average of 13 percent in four of the six states (Indiana, New Mexico, Oregon, and South Carolina). Hawaii and Pennsylvania have older populations: 16 percent and 15 percent of their populations are age 65 or older, respectively. Compared to the national median percentage of the population living in rural areas (25 percent), Oregon is at the median; Hawaii, Indiana, New Mexico, and South Carolina are above the median; and Pennsylvania is below the median.

The six states are also diverse with regard to racial composition and income levels. The proportion of South Carolina's population that is African American is more than twice the national average. Hispanics make up 43 percent of New Mexico's population, and that is nearly three times the national average. Almost three-quarters of Hawaii's population are of "other races," compared to just 7 percent for the nation as a whole. The proportion of the population that is white in Indiana, Oregon, and Pennsylvania is above the national average, while the proportion of other races is less than the national average. Two states—New Mexico and South Carolina—have higher poverty rates than the U.S. average; Hawaii, Indiana, Oregon, and Pennsylvania have lower poverty rates than the nation as a whole.

Table VI.1. Case Study State Demographic and Economic Profiles

	U.S. Average (A) or Median (M)	Scores More Frequently in Tier A			Scores More Frequently in Tier C		
		Hawaii	Indiana	South Carolina	New Mexico	Oregon	Pennsylvania
Demographics							
Percent of population over age 65, 2007-2008	13%	16%	13%	14%	12%	14%	15%
Percent living in non-urban areas, 2007-08	16% (A) 25 % (M)	29%	28%	33%	32%	25%	18%
Race: Percent White	65%	18%	89%	66%	43%	81%	82%
Race: Percent African-American	12%	NSD	9%	28%	2%	2%	10%
Race: Percent Hispanic	16%	7%	5%	3%	43%	10%	5%
Race: Percent Other	7%	73%	2%	3%	12%	7%	3%
Economics							
% living in poverty, 2007-2008	18.3%	16%	17%	19%	22%	16%	15%
Median Annual Income, 2006-2008	$51,233	$64,193	$48,095	$43,458	$43,636	$51,394	$51,156

Source: Kaiser State Health Facts (www.statehealthfacts.org) from various sources

2. State Medicaid Program Features

The six case study states' Medicaid programs are diverse in terms of their eligibility thresholds for different populations, coverage of the state's nonelderly population, distribution of Medicaid enrollees by category, managed care enrollment, and physician reimbursement rates (see Table VI.2). For example, the proportion of the nonelderly population covered by Medicaid ranges from 12.3 percent in Oregon to 17.1 percent in New Mexico. The proportion enrolled in comprehensive managed care arrangements, such as capitated HMOs, ranges from 27 percent in South Carolina to 79 percent in Hawaii. No characteristics are uniformly shared by the three states that frequently placed in Tier A or by those that frequently placed in Tier C.

3. State Performance on Exploratory Medicaid Efficiency Measures

As previously noted, the six states chosen for the case studies generally had more consistent performance across the three years of the study period and generally had more available quality data to inform a discussion about the cost and quality patterns that lie behind the exploratory efficiency measures. Three case study states—Hawaii, Indiana, and Pennsylvania—had data for all five measure domains in 2006; New Mexico and Oregon had data in four domains, and South Carolina had data for three domains (see Summary Performance in Table VI.3).

Table VI.2. Case Study State Medicaid Program Profiles

	U.S. Average	States with Scores More Frequently in Tier A			States with Scores More Frequently in Tier C		
		Hawaii	Indiana	South Carolina	New Mexico	Oregon	Pennsylvania
Scope of Medicaid Program							
Total Medicaid Enrollment, FY06	58,714,800	217,300	1,016,100	960,800	513,900	529,800	2,085,500
% Non-Elderly Covered by Medicaid, 2007-08	14.9%	13.1%	14.0%	13.9%	17.1%	12.3%	14.2%
Medicaid Births as % of State Births, 2003	41.0%	27.2%	41.2%	55.3%	NA	42.6%	31.0%
Distribution of Medicaid Population, FY06							
Children	49.7%	43.7%	58.2%	48.0%	58.2%	52.0%	46.9%
Adults	25.3%	34.2%	18.8%	23.5%	24.1%	23.4%	18.3%
Elderly	10.4%	10.6%	8.1%	13.8%	6.8%	9.6%	11.2%
Disablexd	14.5%	11.5%	14.9%	14.8%	10.9%	15.1%	23.6%
Provider Reimbursement Rates							
Medicaid Physician Fee Index (National Ave to State: All Services), 2008	1	1.04	0.	1.24	1.42	1.18	0.98
Medicare-to-Medicaid Physician Fee Index (All Services), 2008	0.72	0.73	0.	0.93	1.07	0.90	0.73
Percent Change in Medicaid Fees 2003 to 2008	15.1%	4.7%	9.8	28.4%	24.7%	13.7%	63.0%
Medicaid Eligibility Thresholds, FY09							
Children - Age 0-1	133% Min.	300%	200%	185%	235%	133%	185%
Children - Age 1-5	133% Min.	300%	150%	150%	235%	133%	133%
Children - Age 6-19	100% Min.	300%	150%	150%	235%	100%	100%
Adults							
Pregnant Women	133% Min.	185%	200%	185%	235%	185%	185%
Parents - Medicaid or Medicaid Look-Alike	NA	100%	25%	89%	67%	40%	34%
Parents - More Limited than Medicaid	NA	200%	200%	NA	250%	100%/185%	208%
Childless Adults - Medicaid or Medicaid Look-Alike	NA	100%	NA	NA	NA	NA	NA
Childless Adults - More Limited than Medicaid	NA	200%	200%	NA	250%	100%/185%	213%
Medically Need Program (none or enrollment #), FFY03	3,471,000	3,200	NA	NA	NA	1,900	115,100
Managed Care Enrollment - % enrolled in "comprehensive" managed care of total enrollees, 2008 (capitated HMOs and MCOs)	44%	79%	66%	27%	62%	73%	53%

Source: Kaiser State Health Facts (www.statehealthfacts.org) unless otherwise noted.

Table VI.3. Summary Performance for Case Study States, Tiers by Domain, 2004-2006

	Children (HEDIS)	Children (NSCH & NIS)	Non-Disabled Adults	Disabled	Elderly
Hawaii					
2006	B	A	A	B	B
2005	A			B	C
2004	B			B	C
Indiana					
2006	C	A	B	B	A
2005					B
2004				B	A
New Mexico					
2006	C	C	C		B
2005	C				B
2004	C				B
Oregon					
2006	C	C	B		C
2005	C				C
2004	C				B
Pennsylvania					
2006	C	B	C	B	C
2005	B			B	C
2004	A			B	C
South Carolina					
2006		A		A	A
2005				A	A
2004				A	B

Source: Mathematica analysis of 2004-2006 MAX data and quality data from the following sources: 2005-2007 HEDIS, 2007 NSCH, 2007 NIS, 2006 CAHPS, 2004-2007 NCI, and 2004-2006 NHC

C. State Perspectives on Measuring and Improving Medicaid Quality, Value, and Efficiency

Case study respondents in all states reported that they or others in the Medicaid agency continually seek new or better ways to improve the value and efficiency of Medicaid spending. In all case study states, Medicaid directors said they devoted substantial analytic and managerial time to identifying how to spend public dollars more efficiently (see case study summaries in Appendix F for details on each state's approach). In fact, in three states—Pennsylvania, New Mexico, and Indiana—provider payment systems were created that explicitly linked cost and quality outcomes (see discussion below). State Medicaid officials said that even during 2004 to 2006, a period of economic growth and increasing state budgets, they sought new ways to produce the best possible outcomes with available resources. Although some states appear to be less successful than others, officials leading Medicaid efforts in all of them reported having invested time and effort in finding ways to improve cost and quality.

In searching for ways to improve quality and manage costs, most respondents said they investigated approaches taken by other states. However, they did not compare their performance to that of other states, probably primarily because comparative data and national or regional benchmarks for Medicaid programs and populations are not readily available. In most cases, interviewees had not seen paired cost and quality data for state Medicaid programs and could more readily explain reasons for their state's relative performance on each component than on the two in relation to each other.

Some respondents believed the measures used in this study could not accurately compare state performance unless they were adjusted to account for differences in benefits covered and characteristics of the eligible populations. However, nearly all of them expressed strong support for a measurement system that would allow ongoing state comparisons of cost in relation to quality outcomes. Generally, respondents suggested developing a small set of performance measures from existing data because such an approach would minimize the reporting burden on states.

D. State Initiatives to Improve Medicaid Quality, Value, and Efficiency

During the interviews we asked respondents to identify specific initiatives conducted during the 2004 to 2006 period that they believed contributed most to improved quality, value, and efficiency. Their responses indicated that the three most common initiatives were: (1) performance-based payments to managed care organizations; (2) increased enrollment of Medicaid beneficiaries in managed care delivery systems, by adding enrollee categories subject to mandatory enrollment, or adding more counties in which MCOs or PCCMs operated; and (3) increased emphasis on HCBS for long-term care populations.

1. Performance-Based Payments to MCOs

Three of the case study states—Indiana, New Mexico, and Pennsylvania—instituted pay-for-performance incentives for capitated MCOs during the study period. But the timing of the initiatives was such that in most cases, substantial quality improvements would not occur until after 2006. For example, in 2006 Indiana began to review actuarial data to assess appropriate rates, quality metrics, and financial incentives that could be negotiated with MCOs "to make sure the state gets the best possible deal," in the words of one respondent. In New Mexico, where almost three-quarters of all Medicaid beneficiaries were enrolled in 2005 in capitated managed care for acute and primary care, the Medicaid agency began withholding part of the MCO capitation rate to be paid retroactively based on performance on HEDIS quality measures. The state also used HEDIS performance measures to determine which plans would receive auto-assigned members who did not select a plan on their own. According to an independent study of MCO plan performance from 2005 to 2007, quality outcomes improved for adults and children with chronic illness (Sommers et al. 2009).

Pennsylvania officials also began, in late 2004, setting aside part of the MCO capitation to be paid based on improvement in quality measures. The state started with 0.5 percent of the capitation fee at risk for 12 HEDIS and Pennsylvania-specific measures and gradually increased that to 2.5 percent. Starting in 2005, the state also began to evaluate MCO performance on avoiding unnecessary hospitalizations; Medicaid rates were reduced by a certain percentage for avoidable admissions. In the PCCM program, called Access Plus, the state began paying primary care providers regular FFS rates plus additional fees for achieving savings targets and designated HEDIS quality scores. It also based annual fee increases on improvement on the scores.

2. Increased MCO Enrollment

Four case study states—Indiana, Oregon, South Carolina, and Pennsylvania—significantly increased Medicaid managed care enrollment over the three-year study period, although in different ways and to varying degrees.[35] For example, Indiana increased the percent of enrollees in capitated MCOs from about 50 percent of enrollees in 2003 to 81 percent of non-disabled adults and 88 percent of children in 2005. In Oregon, the percentage of Medicaid beneficiaries enrolled in capitated MCOs increased from about 60 percent to nearly 80 percent between 2002 and 2006. All populations, including aged and disabled individuals, were required to enroll in capitated MCOs, which expanded to serve more counties. In 2005, Pennsylvania launched an enhanced primary care case management program to provide physical health services to Medicaid beneficiaries who do not enroll in an MCO voluntarily, in the 42 counties not subject to mandatory MCO enrollment. This includes almost everyone not dually eligible for Medicare in these counties. Starting in 2006, South Carolina took steps to raise the proportion of Medicaid enrollees in managed care, which went from 24 percent that year to 38 percent in 2008, with most of the increase attributable to expansion of a primary care "medical home network."

3. Policies to Reduce Long-Term-Care PMPM Costs

All case study states took steps to rebalance their long-term care systems toward home and community-based care. This can help to reduce PMPM spending for all beneficiaries using any form of long-term care, because HCBS costs less per person on average than institutional care. Oregon's PMPM costs for elderly residing in nursing homes for at least three months (the exploratory efficiency measure domain for the elderly) are much higher than the median. But its PMPM costs for all elderly using long-term care of any kind are much lower than the median, reflecting its long experience in expanding HCBS options for those needing long-term care. Conversely, Indiana's low PMPM costs for people with developmental disabilities in the exploratory efficiency measures reflect a long-term trend in deinstitutionalization for this group, but PMPM costs for the disabled and elderly population as a whole tend to be above the median.

Case study respondents did not cite parallel efforts to measure and reward HCBS providers based on quality performance, so it is unclear how lower costs relate to quality. Many advocates of LTC reform believe HCBS bestows better quality of life than institutional care. But data are not available to demonstrate that HCBS quality of care is in all cases better than institutional care or to develop measures like those used in this study to assess value and efficiency.

E. Factors Contributing to State Performance on Exploratory Efficiency Measures

The case studies helped to illuminate the factors that contribute to state variation in PMPM costs for the exploratory efficiency measures, and, in some instances, for quality measures, although interviewees could not always cite quality improvement initiatives that would have affected the particular measures in this study. Factors suggested by case study respondents include: (1)

[35] Managed care enrollment among children and adults was already high in Hawaii and New Mexico; in 2004-2006, both states began to develop new managed care models for people using long-term-care services, and dual enrollees in Medicare and Medicaid.

beneficiary characteristics, (2) MCO payment rates, (3) targeted efforts to improve quality or access for certain enrollee groups, and (4) state-specific health market characteristics.

1. Medicaid Beneficiary Characteristics

Some respondents believed that variation in costs per beneficiary is determined by the characteristics of the state's Medicaid population. For example, they speculated that states with medically needy (MN) programs would have higher costs than those without MN programs because those who qualify through MN rules have already incurred high medical care costs, which Medicaid agencies pay retroactively. In most of the 33 states with MN programs, the proportion of MN beneficiaries is relatively small. But their PMPM costs are $1,085 on average, more than double those for non-MN beneficiaries ($473). In some states, such as Hawaii, however, MN beneficiaries have average PMPM costs that are about 10 times greater than non-MN beneficiaries. Despite their large expenses, the MN beneficiaries (who total only 1 percent of all Medicaid beneficiaries in Hawaii) do not substantially change the state's performance in the exploratory efficiency measures. In other states with greater shares of all Medicaid beneficiaries who are MN enrollees, such as the District of Columbia, Illinois, Nebraska, New York, and North Dakota, this could have a greater impact.

Some respondents also believed that states with more disabled individuals enrolled in capitated MCOs would increase PMPM costs for the exploratory efficiency measures pertaining to the enrollees in those plans. For example, in three states with scores that placed them in Tier B or C of those measures (New Mexico, Oregon, and Pennsylvania), most disabled adults and children were required to enroll in MCOs during the study period. However, as noted in Chapter IV, state scores and tiers in the adult domain reflect costs for non-disabled adults only. When we removed disabled adults from all adult enrollees in capitated managed care plans, we found all changes in state scores on the exploratory efficiency measures were to or from the middle score of 2; no state score changes from a 1 to a 3 or vice versa. New Mexico's and Oregon's performance for non-disabled adults did not change in any of the measures from those for all adults.

2. Plan and Provider Payment Rates

In addition to the health or functional characteristics of enrollees, the case studies indicated that state PMPM spending for measures associated with enrollees in capitated MCOs (paired with HEDIS quality data) is influenced by rates or methods used to pay managed care plans. For example, Oregon bases MCO capitation payments on 100 percent of Medicare rates, which tend to be higher than Medicaid in most states. But high MCO rates may not translate into quality performance if the reimbursements do not flow through to providers. In Oregon, one respondent believed that MCOs pay primary care physicians about 70 percent of Medicare fees, a relatively low rate. If so, that could affect access to primary care and contribute to the state's lower-than-median quality scores for children in MCOs.

High payment rates may be necessary to attract and retain providers so the Medicaid program can build an adequate network. Yet, relatively high provider payment rates do not necessarily translate into high overall PMPM costs and associated declines in performance on the exploratory efficiency measures, because total costs are a function of both price (provider payment rates) and service volume. South Carolina, for example, increased provider payment rates from roughly 65 percent of Medicare in 2002 to about 95 percent of Medicare rates by 2007, but often placed in Tier A due to its high quality scores and low total PMPM costs.

3. Targeted Efforts to Improve Quality or Access

Respondents from two states discussed specific initiatives designed to improve quality and access for populations reflected in the exploratory efficiency measures. New Mexico launched a program in 2001 to increase participation of school-based health centers (SBHCs) in MCO provider networks to increase access to care for children enrolled in the plans and improve the quality of care provided by SBHCs. South Carolina also engaged in several initiatives to improve children's access to dental care. In both states, the time period in which these efforts occurred makes it plausible to suggest an effect on quality measures: (1) improvement in HEDIS well-child visits among 12- to 21-year-olds in New Mexico during the 2004 to 2006 period, and (2) South Carolina's higher-than-median dental visits among children.

The comments of some state officials also suggest the importance of measurement and adequate provider payment in improving quality. For example, Indiana officials were not surprised by their average performance on the quality measures for people with developmental disabilities. Data systems for monitoring quality for this population were relatively simple during the 2004 to 2006 study period. As a result, state managers lacked information to design a targeted quality improvement effort.

4. State-Specific Health Market Characteristics

The ways in which each state Medicaid program interacts with its health care market may explain some of the patterns in Medicaid cost and quality observed in this study. For example, Hawaii's generally high quality measures for children and adults enrolled in capitated MCOs may be attributable to the Medicaid agency's contracts with three well-established MCOs, all of which also serve commercial and Medicare populations and perform well on quality measures overall. In 2008, for instance, in Kaiser Permanente, 82 percent of all eligible female enrollees were screened for breast cancer and 91 percent of children had complete vaccinations; both measures are well above Medicaid and commercial averages nationwide (HSAG 2009). Substantial overlap between Medicaid and commercial providers might also improve continuity of care as beneficiaries move in and out of the Medicaid program.

F. Summary

The case study findings did not identify Medicaid program characteristics or particular approaches or policies that distinguish states in the top and bottom tiers of the exploratory efficiency measures. Differences in state performance on these measures do not seem to be driven by particular Medicaid purchasing policies. States with more scores in Tier A are pursuing many of the value-based purchasing policies—designed to improve quality while controlling costs—as states with more scores in Tier C. Even within measure domains, purchasing policies do not consistently explain differences in scores. For example, Indiana's performance on the measures drawn from HEDIS data cannot be attributed to its use of P4P for MCOs because: (1) the strategy was not completely implemented until after the study period and (2) New Mexico and Pennsylvania, which had lower-than-median quality and higher-than-median scores on those measures employed similar value-based purchasing strategies.

Differences in state scores also may reflect different "starting points." The performance of New Mexico, Oregon, and Pennsylvania during the study period reflects higher-than-median PMPM costs and lower-than-median quality scores. But each of these states has begun to link payment to quality and access improvements, so their performance may get better over time. P4P is likely to produce

better value overall when it covers more of the populations and services covered by Medicaid. For example, Pennsylvania was already using performance-based payment for capitated MCOs, and began P4P for PCCM providers, so expanded managed care enrollment puts that state in a good position to produce higher value for the overall Medicaid program. Conversely, South Carolina has the advantage of starting from lower-than-median costs and higher-than-median quality in many measures. But until it starts to enroll the most costly beneficiaries—elderly and disabled individuals—in managed care arrangements that are paid on the basis of performance, that state has less leverage to improve value for the Medicaid program overall.

Alternatively, relative state performance may remain stable over time because of long-standing, historical differences in provider practices that can affect the cost and quality of care for Medicaid beneficiaries. Medicaid programs have some leverage to change these care patterns and encourage better outcomes when they are a dominant purchaser, as they are in nursing home care. But they do not have as much purchasing power for the nonelderly population, where the share of the market is much smaller (Medicaid covered between 12 to 17 percent of nonelderly residents in the case study states). This could change, however, as national health reform is phased in and Medicaid covers a larger proportion of the population.

Finally, varying state performance across the five measure domains suggests that each state has opportunities to improve. Nearly all of the state officials interviewed for the case studies said national benchmarks like those developed in this study would help each state identify where it does well and where it does not, relative to other states, and to set realistic goals for improvement. But until more comparable quality data become available for more Medicaid beneficiary subgroups, and for more states, such benchmarks will be incomplete.

VII. POLICY IMPLICATIONS AND RECOMMENDATIONS

As the purchaser of health care for more than 50 million Americans, the Medicaid program must assess the value of the billions of dollars spent annually. Despite widespread agreement that better value and improved efficiency in health care are important goals, there is little agreement on how to define and measure the concepts. The more specific concept of efficiency as it relates to Medicaid funds is even more difficult to define. But if efficiency is to be improved, it needs to be measured.

Definitional difficulties notwithstanding, the interest in understanding the relationship between Medicaid spending and quality is intensifying. The new Medicaid and Children's Health Insurance Program (CHIP) Payment and Access Commission (MACPAC) authorized by the federal CHIPRA law of 2009 is charged with reviewing and assessing Medicaid and CHIP payment policies, the factors affecting program expenditures, and the relationship of such factors and payment methods to access and quality of care for Medicaid and CHIP beneficiaries.[36] This study produced several analyses that will help inform the commission's work.

This final chapter considers the policy implications of the study findings and makes recommendations to advance research and methods for measuring the value of state Medicaid spending. While the results suggest some states may get more "bang for the buck," the limited availability of Medicaid-specific quality data and inconclusive findings from our case studies indicate that much more work must be done before the measures developed by this study can be used to determine which policies lead to greater value in Medicaid spending.

A. Policy Implications

There are many models and techniques for measuring health care efficiency at the provider level but little research has been conducted and few measures have been developed to assess cost relative to quality outcomes for Medicaid programs at the state level. Although current data for measuring state Medicaid efficiency has many limitations, this study used existing data to begin investigating the value produced by Medicaid spending. The findings do not indicate precisely which policies lead to greater value in Medicaid spending, but they do have valuable policy implications.

Some States Appear to Get More from Each Dollar Spent, Suggesting There May Be Opportunities to Lower Costs Without Harming Quality. The results indicate that some states are consistently more efficient over time; that is, for the enrollee groups examined, they show better quality or access outcomes than the national median at a cost lower than the national median. Although some variation in state spending per beneficiary is to be expected, extreme variation in PMPM costs for certain enrollee groups with similar quality outcomes suggests it may be possible to lower costs without sacrificing quality. In addition, as in similar studies of Medicare, this study's findings show few measures for which there was a strong correlation between cost and quality, suggesting that higher spending does not necessarily produce higher quality of care for Medicaid beneficiaries.

[36] Public Law 111-3 of 2009, section 506, http://www.gao.gov/hcac/pl111-3section506.pdf

This finding does *not* mean that higher-than-median Medicaid spending per enrollee accompanied by better health outcomes is not worthwhile. Policymakers and state program officials can justify higher spending that produces better quality outcomes. Previous studies conducted on specific Medicaid services suggest that higher payment rates can contribute to higher quality outcomes. For example, one study showed that higher payments to nursing homes were associated with better outcomes, although the results were mixed: in states with higher payments rates, nursing home residents had a lower incidence of pressure ulcers and physical restraint, but not of daily pain (Grabowski et al 2004).

Because the Reasons for State Scores on the Exploratory Efficiency Measures Are Unclear, the Results Are Most Useful as a Starting Point for Each State to Understand Its Performance Relative to Other States. This study explored whether states that had scores more frequently in one tier or another used certain policies or had particular characteristics that might account for their performance. But the case studies did not find clear patterns in the Medicaid policies or practices that explain why some states were frequent high- or low-performers. No state had consistently better performance for all four Medicaid population groups, suggesting that every state could improve.

The case studies found that many factors contribute to each side of the cost-quality coin, and in many cases they are unrelated to each other. Clearly, costs reflect Medicaid payment levels (price) and in some states Medicaid purchasing policies. However, the finding that the geographic cost of medical care may affect Medicaid costs should also be considered. On the quality side, in some states, Medicaid enrollees may have higher quality or access indicators when they enter the program, while in some, Medicaid policies may play a role in producing better outcomes.

Policymakers seeking to improve the value of Medicaid spending should therefore consider how to lower costs in ways that do not harm quality, and, conversely, how to improve quality for little or no extra cost. If a state Medicaid agency pays health care providers at significantly lower rates than private insurance or Medicare, there may not be much leeway to reduce rates without harming quality. In that case, the focus should be on how to structure payment to reward quality *improvement.*

National Benchmarks Might Help Improve Quality Relative to Cost. The measures developed by this study offer national benchmarks that could help raise the performance bar, particularly in states where quality standards are well below the national median. For example, states can use these benchmarks to establish minimum quality standards for all health plans or providers with whom they contract. In some states, there may be little choice among managed care plans and providers if not all of them participate in the Medicaid program. In most states, however, nearly all providers of certain services (such as nursing facilities) do participate in Medicaid, so the state could contract with only those that meet minimum quality standards.

In addition, it is increasingly common for Medicaid programs to reward managed care organizations and certain types of providers for higher quality through P4P programs. Some states assess quality improvement relative to national benchmarks, such as those published by NCQA. Many other states assess improvement only in relation to past performance. If higher performance means better than it was before, it may be worth paying somewhat more for improvement. But if higher means improvement from a starting point that is low relative to other states or a national benchmark, the state may pay more for what remains a low standard of quality. The price at which providers are able to achieve certain standards or performance levels then becomes the issue, and the benchmarks in this study may be useful to Medicaid officials in this arena as well. Much wider

variation in state spending per beneficiary (especially for those using long-term care), with more limited distribution in most quality measures suggests there may be an opportunity to lower costs (after adjusting for local cost of medical care) without sacrificing quality.

B. Recommendations for Data Collection and Research on Medicaid Quality

This study took a step toward assessing the relationship between Medicaid spending and quality, but it was constrained by several shortcomings in the data, particularly for quality and other health care outcomes for Medicaid enrollees. Without better, more complete, and timelier data on Medicaid costs and quality, efforts by MACPAC and policymakers to understand the relationship between spending and quality will be hampered. Indeed, a relationship may exist between Medicaid spending and quality, but the measures that can be constructed from currently available data are inadequate to detect that relationship.

While this study lacked comparable quality data for several states in many of the measures, many of those states collect or produce quality measures like those included in this report. For example, some states calculate HEDIS scores for primary care case management providers from claims data. But they are not necessarily comparable to those of other states. As interest in quality measurement leads to more uniform measures across states, additional domains and measures should be incorporated in exercises that seek to compare cost and quality. In addition, while cost data from MAX is much more complete and comparable across states, 2006 was the most recent year available for this study.[37] Measuring Medicaid efficiency and quality would be significantly improved if the following were to occur:

1. **Fill gaps in Medicaid quality measurement.** Currently, state-level Medicaid quality measures do an inadequate job of assessing quality of care along many important dimensions of quality and access in well-established measurement frameworks for many Medicaid population subgroups. There are more measures and data to assess the quality of care provided to beneficiaries enrolled in capitated managed care plans than in the FFS setting. The measures for adults focus on health care use, but not on managing chronic conditions. Measures for the elderly are limited to nursing home care, even though an increasing number of people using long-term care are receiving services in home or community-based settings. In addition, important dimensions of care, such as patient safety, equity, and clinical outcomes of care, are lacking or are not well developed, and that limits how well or broadly the value of Medicaid program spending can be evaluated.
2. **Collect standardized data on health care quality measures (process and outcomes) for specific Medicaid population subgroups.** More data on state Medicaid enrollee quality and other health care outcomes, using standard and consistent definitions, are needed to make fair and accurate comparisons across states. In some cases, there are no valid quality measures for Medicaid populations who use certain types of services or have certain conditions.

[37] Mathematica Policy Research, which produces MAX data files from MSIS data submitted by states, recently received CMS approval to make changes that will allow timelier production of MAX files.

3. **Coordinate with Medicare to produce cost and quality data for dual eligibles.** Approximately 8.8 million people are enrolled in both Medicare and Medicaid, accounting for almost 46 percent of total Medicaid spending and about 25 percent of total Medicare spending in 2005, despite comprising about 18 percent of all Medicaid enrollees. Efforts to assess the value of Medicaid spending will be incomplete without including this group or accounting for services paid by either program.
4. **Improve tracking of managed care encounter data from state Medicaid data systems.** With growing enrollment in managed long-term-care plans, it has become harder to isolate costs for specific types of long-term services or users of such services across all states. For this reason, Arizona was excluded from the efficiency measures on nursing home quality and cost. Many more states, including Minnesota and Texas, are rapidly expanding enrollment of the elderly and disabled in capitated managed long-term-care plans. Studies to examine the effect on state spending or quality outcomes resulting from differences in the volume or intensity of care provided across states will be increasingly difficult to accomplish without such data. In many states, managed care organizations are supposed to submit encounter data on the services provided, but it is not reported consistently in national MSIS and MAX data and so cannot be used to compare performance on specific services. Some states do obtain accurate and timely encounter data and report it through the MSIS/MAX system, but many others do not. Changes are needed at both the federal and state levels to capture encounter data, and additional quality measures specific to managed LTC may be needed to assess the value of this type of spending.

Some recently launched government initiatives will help to fill these gaps in Medicaid quality and access measures and data. For example, Title IV of CHIPRA of 2009 requires the U.S. Department of Health and Human Services to identify an initial, recommended core set of children's health care quality measures for voluntary use by state Medicaid and CHIP programs, as well as providers, health plans, and managed care organizations that contract with them. A national advisory council developed a list of 24 measures for children's health care quality in December 2009.[38] Recently enacted federal health reform legislation also expanded the role of the MACPAC to include an assessment of adult services.[39] Efforts are also under way to identify a core set of quality measures for Medicaid beneficiaries who use long-term services and supports in home or community-based settings. The Deficit Reduction Act of 2005 directed AHRQ to develop quality measures for HCBS offered under State Medicaid programs. The agency identified and assessed measures and instruments that could be used or adapted for use, and is expected to develop final measure sets in 2010.

[38] Background Report for the Request for Public Comment on Initial, Recommended Core Set of Children's Healthcare Quality Measures for Voluntary Use by Medicaid and CHIP Programs. December 2009. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/chip/corebackgrnd.htm

[39] The Patient Protection and Affordable Care Act (P.L. 111-148), Sec. 2701, directs DHHS to: (1) identify and publish a recommended core set of adult health quality measures for Medicaid-eligible adults; and (2) establish a Medicaid Quality Measurement Program.

Some recent advances have made it possible to examine both Medicare and Medicaid costs for dual eligibles. CMS linked Medicare and Medicaid enrollment data at the person level to create a database with 2004 and 2005 summary data for about 5 million dual eligibles. Matching this data with appropriate quality measures is also possible under a new agreement, in which states can seek permission from CMS to use the data for quality improvement activities. Tennessee, for example, has used the data to evaluate provider performance for participants in a Medicaid managed long-term-care program. Using the data to determine how the federal and state governments can develop coordinated policies to lower costs and improve quality is the next frontier.

Based on the number of states that do not report Medicaid CAHPS and HEDIS data, however, if states are not mandated to report on any of these new measures, the data collected on any recommended measures are likely to be incomplete. The enormous sums spent on Medicaid by the federal and state governments, and the prospect of millions more people enrolling in Medicaid in the next several years, makes it more critical than ever to ensure all states report on the outcomes of the care financed by the program.

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APPENDIX A

EXPLORATORY MEDICAID EFFICIENCY MEASURES: DATA SOURCES AND MEASURE SPECIFICATIONS

Six data sources were consulted for the quality measures used in this study:

Medicaid Consumer Assessment of Health Plans and Provider Study (CAHPS). The Agency for Healthcare Research and Quality's (AHRQ) National CAHPS Benchmarking Database (https://www.cahps.ahrq.gov) collects and assembles state-level data from CAHPS surveys administered to Medicaid managed care enrollees. In the CAHPS survey, consumers rate their overall and specific experience in obtaining needed care, obtaining care quickly, communicating with doctors, and receiving customer service. For this analysis, we used two access measures that focus on adult Medicaid beneficiaries' ability to get timely medical appointments for (1) routine care and (2) illness and injury. Estimates for these measures are currently available for 2004, 2005, and 2006, and they cover 16 to 22 states, depending on the measure and year. Since we just analyzed 2006 cost data for non-disabled adult enrollees in managed care plans, we used 2006 CAHPS data only.

Medicaid Health Plan Employer Data and Information Set (HEDIS). HEDIS includes more than 70 quality-of-care measures across eight domains, including effectiveness of care, access/availability of care, satisfaction with the experience of care, health plan stability, use of services, cost of care, informed health care choices, and health plan descriptive information. The National Committee for Quality Assurance (NCQA) makes state-level estimates of Medicaid HEDIS measures available when a sufficient number of Medicaid-contracting health plans submit HEDIS data to NCQA. At least five health plans within a state must submit data for NCQA to create state-level estimates. Depending on the measure and year, state-level data are available for only subsets of states, but generally 20 to 25 states are included. We used 2007 HEDIS data (corresponding to services provided in 2006) for measures on preventive service use and access to care for adults (especially women), and 2005-2007 HEDIS data (corresponding to services provided in 2004-2006) for well-child visits and adolescent care visits (see Appendix Table A.1).

National Survey of Children's Health (NSCH). The Centers for Disease Control and Prevention (CDC) conducted the National Survey of Children's Health in 2003 and 2007, and makes available state-level data through its data resource center (http://www.nschdata.org). The survey supports state-level estimates for children ages newborn to 17 years old in all 50 states. Measures can be calculated specifically for the combined Medicaid/SCHIP population, although the data do not distinguish between enrollees in the two programs. We used data from the 2007 survey to examine key access and utilization measures, such as the proportion of children receiving a well-child visit during the past 12 months (see Appendix Table A.1). We paired these quality measures with cost data from 2006, the closest year of cost data available. Since this survey provides only one time point, we were unable to examine variations over time in the relationship between cost and quality for these measures.

National Immunization Survey (NIS). CDC also conducts an annual National Immunization Survey and publishes state-level data (http://www.cdc.gov/nis/) on the vaccination status of children ages 19 months to 35 months in all 50 states. Beginning in 2007, the survey included a question on insurance status that allows the measures to be calculated specifically for the combined Medicaid/SCHIP population. We used 2007 NIS data to examine the percentage of

children who have completed the standard 4:3:1:3 vaccination series (4 DTP: 3 polio: 1 MMR: 3 HiB), and paired this quality measure with cost data from 2006.

National Core Indicators (NCI). The National Association of the State Directors of Developmental Disability Services and the Human Services Research Institute (HSRI) collect data, based on a common set of data collection protocols, on states' delivery systems for people with intellectual and developmental disabilities (www.hsri.org/nci). As part of this data collection system, each state surveys a random sample of individuals over age 18 who are developmentally disabled and receiving at least one service besides case management. As of 2009, 27 states participate in the system. We selected four NCI measures, covering the performance of service coordinators, physical examination, access to doctors, and access to transportation services. These measures provide an important perspective on care provided to people with developmental disabilities who reside in the community (as most do). While these data are not Medicaid-specific, about 80 percent of respondents are Medicaid enrollees or likely Medicaid enrollees. In 2007, 58.5 percent of respondents in the overall sample received home and community-based waiver services, and 20.5 percent received services in Intermediate Care Facilities for the Mentally Retarded (ICFs/MR). We paired quality data from the 2004-2005 survey cycle with 2004 cost data, quality data from the 2005-2006 cycle with 2005 cost data, and quality data from the 2006-2007 cycle with 2006 cost data.

Nursing Home Compare (NHC). The U.S. Department of Health and Human Services (DHHS), Centers for Medicare and Medicaid Services (CMS) collects information on all nursing home residents and posts state-level quality of care indicators on the Nursing Home Compare (NHC) website (www.medicare.gov/NHCompare). These measures are derived from the Minimum Data Set (MDS) National Quality Indicator system (see Appendix Table A.1). Although the data are not Medicaid-specific, the majority of long-term-stay residents (those residing in facilities for 90 days or more) in most states are covered by Medicaid, so the facility- and state-level measurements will be driven in large part by outcomes for Medicaid residents. The data are available on a quarterly basis, which we used to calculate an annual average for each measure for each state from 2004-2006. The NHC data are currently available for 2000-2009, and were directly obtained from the website.

Table A.1. Exploratory Medicaid Efficiency Measures: Data Sources and Measure Specifications

	Quality Measure/Source/Year	Quality Measure Description	Cost Measure (MAX Data, CY 2004, 2005 and/or 2006)	Number of States
Non-Disabled Adults				
	Access to routine care appointments, Medicaid CAHPS, 2006	Among Medicaid enrollees, age 18 and older who reported making an appointment for routine health care in the last 12 months, percent who always got an appointment as soon as they wanted	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, ages 18-64	18 states
	Waiting time for care, illness or injury, Medicaid CAHPS, 2006	Among Medicaid enrollees age 18 and over who reported making an appointment for illness or injury in the last 12 months, percent who always got an appointment as soon as they wanted	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, ages 18-64	18 states
	Any ambulatory/preventive care, ages 20-44, Medicaid HEDIS, 2007 (for services provided in 2006)	Percentage of Medicaid enrollees, ages 20-44, who had at least one ambulatory or preventive care visit in the year	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, ages 20-44	22 states
	Any ambulatory/preventive care, ages 45-64, Medicaid HEDIS, 2007 (for services provided in 2006)	Percentage of Medicaid enrollees, ages 45-64, who had at least one ambulatory or preventive care visit in the year	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, ages 45-64	22 states
	Breast cancer screening, Medicaid HEDIS, 2007(for services provided in 2006)	Percentage of female Medicaid enrollees, ages 52-69, who had a mammogram to screen for cancer during the year	Per-member per-month costs for female Medicaid enrollees covered under capitation arrangements, ages 52-69	21 states
	Cervical cancer screening, Medicaid HEDIS, 2007 (for services provided in 2006)	Percentage of female Medicaid enrollees, ages 24-64, who had one or more Pap tests to screen for cervical cancer during the year	Per-member per-month costs for female Medicaid enrollees covered under capitation arrangements, ages 24-64	24 states
	Chlamydia screening, Medicaid HEDIS, 2007 (for services provided in 2006)	Percentage of female Medicaid enrollees, ages 16-25, who were identified as sexually active and who had at least one test for Chlamydia during the year	Per-member per-month costs for female Medicaid enrollees covered under capitation arrangements, ages 16-25	25 states
	Prenatal care, Medicaid HEDIS, 2007 (for services provided in 2006)	Percentage of deliveries that received the following number of prenatal visits as a percentage of expected visits: > 40%, > 80% (two measures).	Per-member per-month costs for female Medicaid enrollees covered under capitation arrangements with deliveries (live births) in the year	21-22 states

Table A.1 *(continued)*

	Quality Measure/Source/Year	Quality Measure Description	Cost Measure (MAX Data, CY 2004, 2005 and/or 2006)	Number of States
Children				
	Well-child visits, 15 months, Medicaid HEDIS, 2005, 2006, and 2007 **(2 measures)**	Percentage of Medicaid enrollees who turned 15 months old during the measurement year and who had the following number of well-child visits with a PCP during the first 15 months of life: (a) 4 or more visits, and (b) 6 or more visits	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, who turned 15 months during the year	Approx. 25 states
	Well-child visits, ages 3-6, Medicaid HEDIS, 2005, 2006, and 2007	Percentage of Medicaid enrollees who were ages 3-6 during the measurement year who had one or more well-child visits with a PCP during the year	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, who turned ages 3-6	Approx. 25 states
	Adolescent care visits, ages 12-21, Medicaid HEDIS, 2005, 2006, and 2007	Percentage of Medicaid enrollees who were ages 12-21 during the measurement year who had one or more well-child visits with a PCP during the year	Per-member per-month costs for Medicaid enrollees covered under capitation arrangements, who turned ages 12-21	Approx. 25 states
	Preventive medical visits in past 12 months, National Survey of Children's Health, 2007	Percentage of children ages birth to17 enrolled in Medicaid or SCHIP who report they received a preventive medical care visit in the past 12 months	Per-member per-month costs for Medicaid enrollees ages birth to 17	50 states
	Preventive dental care visits in past 12 months, National Survey of Children's Health, 2007	Percentage of children ages 1-17 enrolled in Medicaid or SCHIP who report they received a preventive dental care visit in the past 12 months	Per-member per-month costs for Medicaid enrollees ages 1-17	50 states
	Insurance covers needed services, National Survey of Children's Health, 2007	Percentage of children ages birth to 17 enrolled in Medicaid or SCHIP who report that their insurance always offers benefits or covers services that meet their needs	Per-member per-month costs for Medicaid enrollees ages birth to 17	50 states
	Insurance allows access to providers, National Survey of Children's Health, 2007	Percentage of children ages birth to 17 enrolled in Medicaid or SCHIP who report their insurance always allows them to see the health care providers they need	Per-member per-month costs for Medicaid enrollees ages birth to 17	50 states
	Personal health care provider, National Survey of Children's Health, 2007	Percentage of children ages birth to 17 enrolled in Medicaid or SCHIP who report having a personal health care provider	Per-member per-month costs for Medicaid enrollees ages birth to 17	50 states
	Receipt of basic immunizations, National Immunization Survey, 2007	Percentage of children ages 19-35 months, enrolled in Medicaid who have completed the 4:3:1:3 (or higher) vaccination series	Per-member per-month costs for Medicaid enrollees ages 19-35 months	50 states

Table A.1 *(continued)*

Quality Measure/Source/Year	Quality Measure Description	Cost Measure (MAX Data, CY 2004, 2005 and/or 2006)	Number of States
People with Developmental Disabilities			
Assistance from service coordinators in accessing services, National Core Indicators, 2004-2005, 2005-2006, and 2006-2007	The proportion of people reporting that their service coordinators help them get what they need	Per-member per-month costs for Medicaid enrollees ages 18 and older, who used ICF/MR facilities or were enrolled in an MR/DD waiver. (In 2004, this measure reflects only costs for individuals who resided in ICF/MRs, as MR/DD waiver enrollees could not be identified using MAX data.)	23-30 states
Receipt of physical exam within past year, National Core Indicators,2004-2005, 2005-2006, and 2006-2007	The proportion of people receiving physical examinations within the past year	Per-member per-month costs for Medicaid enrollees ages 18 and older, who used ICF/MR facilities or were enrolled in an MR/DD waiver. (In 2004, this measure reflects only costs for individuals who resided in ICF/MRs, as MR/DD waiver enrollees could not be identified using MAX data.)	23-30 states
Receipt of needed services, National Core Indicators, 2004-2005, 2005-2006, and 2006-2007	The proportion of people who report getting the services they need	Per-member per-month costs for Medicaid enrollees ages 18 and older, who used ICF/MR facilities or were enrolled in an MR/DD waiver. (In 2004, this measure reflects only costs for individuals who resided in ICF/MRs, as MR/DD waiver enrollees could not be identified using MAX data.)	23-30 states
Access to transportation, National Core Indicators,2004—2005, 2005—2006, and 2006—2007	The proportion of people who have adequate transportation when they need to go somewhere	Per-member per-month costs for Medicaid enrollees ages 18 and older, who used ICF/MR facilities or were enrolled in an MR/DD waiver. (In 2004, this measure reflects costs only for individuals who resided in ICF/MRs, as MR/DD waiver enrollees could not be identified using MAX data.)	23-30 states
Elderly and Disabled Long-Stay Residents of Nursing Facilities			
Moderate to severe pain, Nursing Home Compare, 2005 and 2006	Percent of long-stay residents who have moderate to severe pain	Per-member per-month long-term-care institutional costs paid on a fee-for-service basis for Medicaid enrollees enrolled in a nursing facility for at least 3 months during the year	50 states

Table A.1 *(continued)*

Quality Measure/Source/Year	Quality Measure Description	Cost Measure (MAX Data, CY 2004, 2005 and/or 2006)	Number of States
Pressure sores among low-risk residents, Nursing Home Compare, 2004, 2005, and 2006	Percent of low-risk long-stay residents who have pressure sores	Per-member per-month long-term-care institutional costs paid on a fee-for-service basis for Medicaid enrollees enrolled in a nursing facility for at least 3 months during the year	50 states
Pressure sores among high-risk residents, Nursing Home Compare, 2004, 2005, and 2006	Percent of high-risk long-stay residents who have pressure sores	Per-member per-month long-term-care institutional costs paid on a fee-for-service basis for Medicaid enrollees enrolled in a nursing facility for at least 3 months during the year	50 states
Depression or anxiety, Nursing Home Compare, 2004, 2005, and 2006	Percent of long-stay residents who are depressed or anxious	Per-member per-month long-term-care institutional costs paid on a fee-for-service basis for Medicaid enrollees enrolled in a nursing facility for at least 3 months during the year	50 states
Confined to bed or chair, Nursing Home Compare, 2004, 2005, and 2006	Percent of long-stay residents who spend most of the time in a bed or chair	Per-member per-month long-term-care institutional costs paid on a fee-for-service basis for Medicaid enrollees enrolled in a nursing facility for at least 3 months during the year	50 states

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