

# Health Plan Resource Use—Bringing Us Closer to Value-Based Decisions

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**Objective:** To examine commercial health plan variation in resource use for members with diabetes and its relationship to the quality of care for these members.

**Study Design:** Cohort study using National Committee for Quality Assurance (NCQA) Healthcare Effectiveness Data and Information Set data submitted to the NCQA in 2007, reflecting 2006 health plan performance. Data are submitted to the NCQA by plans based on claim and administrative data; medical record data may be used to supplement missing claim data.

**Methods:** Composite measures for diabetes quality and resource use (total medical care observed-to-expected [O/E] and pharmacy O/E variables) were estimated. Descriptive statistics, Pearson correlations between quality and resource use, and 90% confidence intervals around each health plan's composite quality and resource use results were estimated.

**Results:** Vast variation was found for both quality and resource use. Medical care resource use has no relationship to quality for diabetes. Pharmacy resource use has a moderate positive relationship to quality.

**Conclusions:** Measures of resource use, along with measures of quality, can be produced and provide important information about the value of a health plan. Although this analysis did not determine causality, the lack of relationship between quality and resource use suggests that plans could improve quality of care without large increases in resource use or could achieve the same level of quality with less resource use.

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see end of text.

Those who want to improve healthcare affordability and healthcare quality in the United States often look to value-based purchasing principles for guidance. Because they involve specific consideration of the design and operation of health benefit exchanges, these principles will certainly be critical elements of many healthcare market reforms. Employers and other payers need comparative information on both cost and quality of care to select and manage health plans and health plan providers. For nearly 2 decades, purchasers have used the quality-of-care reports of the Healthcare Effectiveness Data and Information Set (HEDIS) to inform plan choice, to encourage quality improvement by plans, and more recently, to offer performance incentives. On the cost side of the health plan value equation, however, purchasers observe only the proffered premiums or, in the case of self-insured products, total claims paid plus the administrative fees for their employees. Although some purchasers access and analyze more detailed data (eg, at the practice level), they may be limited in their ability to compare and contrast their resource use in a manner that informs value-based decision making.

Premiums are clearly salient to employers and purchasers in short-run decision making, but they also mask different forces that drive benefit costs. It is our contention that some of these forces could be addressed by purchasers and policy makers if they had better information. In particular, premiums commingle differences in utilization of healthcare resources, as well as differences in benefit design, underwriting cycles, and provider fee schedules. These masked differences have substantial impact on how providers and patients access and use the healthcare system, thus increasing or decreasing utilization of health services.<sup>1,2</sup> Further, the offered premiums or actual costs preclude benchmarking and, given the wide variation in benefits offered, create additional barriers to value-based purchasing. To assess and compare the value added by a plan or self-insured product, we are in critical need of an approach that allows for resource use benchmarking and comparison among plans. This need is not limited to HMO plans precisely because differences in less transparent plan activities (including benefit structure) contribute to utilization; thus, their influence on utilization and quality should be examined and assessed, and plans should be compared with a relevant group of peers.

Health system efficiency is often defined as the level of *real-*

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ized attainment (eg, an actual attained level of quality) compared with the maximum that could be achieved by a given level of resource use.<sup>3</sup> Thus, effective purchasing and oversight of health benefits requires that purchasers be able to disentangle resource use from other factors to identify drivers of spending growth and make meaningful assessments of efficiency or value. Both private purchasers and public policy makers have an interest in understanding not only the overall price charged or paid for health benefits, but also how the price and volume of services interact.

The National Committee for Quality Assurance (NCQA) has worked with stakeholders to develop a set of HEDIS relative resource use (RRU) measures that complement existing HEDIS quality measures. These RRU measures capture resources (inpatient and outpatient services) used by a plan in the care of populations with certain chronic conditions (eg, diabetes) and estimate adjusted benchmarks to support comparative reporting. The measures are defined in a way that corresponds to existing related HEDIS quality measures, allowing simultaneous assessment. In this vein, it is important to note that 6 disease states, including diabetes, cardiovascular disease, asthma, chronic obstructive pulmonary disease, lower back pain, and hypertension, account for approximately 60% of all medical care expenditures by commercial plans.<sup>4</sup> The rise in chronic diseases has been directly linked to the increase in healthcare spending directed toward treating them.<sup>5</sup> The American Diabetes Association estimates that in 2007 the total estimated cost of diabetes was \$174 billion, including \$116 billion in excess medical expenditures and \$58 billion in reduced national productivity.<sup>6</sup>

The NCQA began collecting 3 of the 6 RRU measures in 2007 and all 6 measures in 2008. The NCQA began public reporting of plan-level results, along with related quality results, in late 2010. Coupled with premium or expenditure data, linked quality and resource use data allow payers (1) to gain a better understanding of cost-quality trade-offs, (2) to examine and compare types of resource use (eg, inpatient vs pharmacy), (3) to help plans identify areas where they may be able to improve quality while reducing total expenditures or holding them level, and (4) to select more efficient plans. We focused on the HEDIS RRU and quality results for patients with diabetes in advance of any public reporting at the plan level and explored implications for public reporting and policy decision making.

## DATA AND METHODS

This analysis used HEDIS data on diabetes care submitted by commercial HMO plans to the NCQA in 2007, reflecting

### Take-Away Points

Commercial health plan variation in resource use for members with diabetes was examined using National Committee for Quality Assurance Healthcare Effectiveness Data and Information Set (HEDIS) data.

- Medical resource use had no relationship to quality of care for diabetes; pharmacy resource use has a moderate positive relationship to quality of care.
- The lack of relationship between quality and resource use suggests that plans could improve quality of care without large increases in resource use or could achieve the same level of quality with less resource use.
- There is a critical need for comparative information about plan resource use to support value-based purchasing efforts.

health plan performance in 2006. (Prior to submitting performance data to the NCQA, health plans submit to an independent audit review, which assesses the validity of the data.) In 2007, 205 commercial HMO plans submitted performance data to the NCQA.

To estimate the overall quality of diabetes care for commercial HMO plans, we calculated the average performance across 7 HEDIS diabetes-process or intermediate-outcome measures and indexed each plan's quality composite rate against the mean HMO commercial plan performance. There are 7 diabetes quality composite components: glycosylated hemoglobin (A1C) testing; poor A1C control (>9.0%) (this rate is inverted such that a higher rate indicates better performance); retinal eye exam; low-density lipoprotein cholesterol screening; low-density lipoprotein cholesterol control (<100 mg/dL); medical attention for nephropathy; and blood pressure control (<130/80 mm Hg).

The HEDIS RRU measures include the application of standardized prices to account for observed variance in the intensity of resource use (achieved by weighing the services) and allows for plan-to-plan comparison. (This approach supports consistent comparisons across all data—including patients, health plans, and geographic areas—as if the data were derived from a single source using a single approach for classifying and pricing services. The pricing algorithms are designed to reflect service pricing levels for managed care organizations for the most recent time period.) The episode length for the Relative Resource Use for People with Diabetes measure is 12 months, and resource use is calculated for all services, whether or not they relate to the diabetes condition.

The HEDIS RRU measurement risk adjustment approach adjusts each plan's submitted resource use based on the distribution of its diabetes cohorts; the cohorts are based on a patient's major clinical condition, clinical category, presence of comorbidity, and age and sex (Table 1). (A detailed specification for each of the HEDIS quality and resource use component measures is available from the NCQA.) An example of a member cohort would be members with type 1 diabetes

■ **Table 1.** Clinical Reporting Categories by Hierarchies and Comorbid Groups

Major Clinical Condition	Clinical Category	Comorbidity	Sex	Age, y
Diabetes	Diabetes, type 1	With comorbidity	F or M	18-44, 45-54, 55-64, or 65+
Diabetes	Diabetes, type 1	Without comorbidity	F or M	18-44, 45-54, 55-64, or 65+
Diabetes	Diabetes, type 2	With comorbidity	F or M	18-44, 45-54, 55-64, or 65+
Diabetes	Diabetes, type 2	Without comorbidity	F or M	18-44, 45-54, 55-64, or 65+

with no comorbid conditions who are female and between the ages of 18 and 44 years.

For each diabetes cohort stratum, plans report to the NCQA the number of members and their respective monetized resource use during the measurement period. The NCQA estimates the average resource use amount for each cohort within a plan peer group (eg, commercial HMO plans). Peer groups can be national or regional, are always restricted to products (Medicare, commercial, and Medicaid), and compare HMOs with HMOs and preferred provider organizations (PPOs) with PPOs. An adjusted peer amount represents the resource use amounts *expected* from a plan based on the mix and size of their reported member cohorts using an indirect standardization technique.

In more detail, within the major clinical condition (diabetes), a member is assigned to 1 *clinical category* based on the specified hierarchies. For example, for diabetes, a member is assigned to 1 of 2 clinical categories using this hierarchy: diabetes type 1 or diabetes type 2. Members are then assigned to a hierarchy category based on the presence of a relevant and specified comorbid condition (eg, cardiovascular condition, chronic kidney disease). For the diabetes RRU measure, members are assigned into 1 of 4 hierarchical groupings based on their clinical and comorbid condition status and further stratified into 1 of 32 member cohort groups based on their sex and age. Across all the RRU measures, members with specified dominant medical conditions (active cancer, end-stage renal disease, HIV/AIDS, or organ transplant) are excluded. To avoid skewed results stemming from rare and costly events, the specifications include a member cap amount within each of the service categories (eg, inpatient facility), and members who exceed the monetized resource use are assigned the specified capped amount.

To examine the RRU among members with diabetes, we used a composite medical care observed-to-expected (O/E) variable and an ambulatory pharmacy O/E variable that include all services within specific categories for patients with a diagnosis of diabetes. The detailed characteristics of these measures were reported in a prior article and in a report released by the Centers for Medicare & Medicaid Services.<sup>4,7</sup>

The service categories of the RRU measure include the following total medical care composite: (1) inpatient facility services, (2) procedure and surgery services (inpatient and outpatient), (3) evaluation and management services (inpatient and outpatient), and (4) pharmacy (ambulatory). Research indicates that these 4 service categories account for approximately 75% of the total expenditures for patients with diabetes.<sup>4</sup>

The total medical care RRU index is the ratio of the plan's *observed* per member per month (PMPM) resource use, summarized across the service categories, compared with the *expected* PMPM resource use across the service categories for the specified condition. The pharmacy variable is each plan's *observed* pharmacy PMPM divided by its respective *expected* pharmacy PMPM resource use. The ratio of each plan's O/E result is indexed to the mean commercial HMO plan performance. (We use the term HMO to describe the insurance products for which the health plans [ie, the corporate entities] submitted the data we analyzed here. Some health plans separately submitted RRU data for their PPO products, but these data were not within the scope of this article.) Resource use by inpatient facilities includes services provided by the facility during a patient stay. Professional services, such as those provided by an internist or a surgeon, are included in the evaluation-and-management and procedure-and-surgery service categories. Pharmacy services include all prescriptions rendered in an ambulatory setting and are based on National Drug Codes, thus differentiating between name-brand and generic drugs and taking into account the days of supply and the amount of medication (ie, dosage and pill size).

The interpretation of the O/E ratio data is that plans with O/E results above 1.00 used more health services than expected (eg, a plan O/E of 1.10 indicates the plan used 10% more resources than expected), while those with an index below 1.00 used less than expected. Similarly, plans with quality index results above 1.00 had higher-than-average quality results and those below 1.00 had lower-than-average quality results.

We used SAS 9.0 software (SAS Institute Inc, Cary, NC) to calculate plan and US Census region descriptive statistics for the diabetes composite quality measure, total medi-

cal care (O/E and PMPM), and ambulatory pharmacy (O/E and PMPM) results. HMO plans that did not submit both diabetes quality and RRU data or that submitted RRU data for fewer than 400 members with diabetes were dropped from the analysis. HMO plans with O/E results of less than 0.33 or greater than 3.00 were also dropped. (The NCQA based these removal decisions on previous research, consideration of standard errors and sample size needs, and conversations with plans, all of which indicated that O/E results below 0.33 or above 3.00 were due to plan submission errors.) After these plans were removed, all composite and O/E results were re-estimated. For each plan, we calculated the 90% confidence interval (CI) around its composite quality result and its total medical care O/E and pharmacy O/E results.

Scatter plots were created to illustrate the individual health plan results. The health plan scatter plot differentiates plans whose 90% CIs do not intersect with 1.00 for either domain (quality or resource use).

## RESULTS

Of the 205 commercial HMO plans that submitted HEDIS RRU data for diabetes in 2007, 37 plans were dropped (because, as already mentioned, they did not submit both the diabetes quality and RRU measures, they had an eligible population of fewer than 400 members, or they had an O/E result of greater than 3.00 or less than 0.33). The remaining 168 commercial HMOs included in this study are from all 8 US Census regions (Table 2), with the most found in the mid-Atlantic region (19%, or 32 plans) and the fewest in the Pacific region (6%, or 10 plans). In all, 71% identified themselves as for-profit and all but 6 plans were accredited by the NCQA in 2006.

Among the 168 commercial plans, the RRU total medical care O/E result ranged from .43 to 2.45 (Table 3). This indicates that the plan with the highest RRU for diabetes used 145% more services than expected, and the plan with the lowest RRU used 57% fewer services than expected. Examining the risk-adjusted resource-use PMPM (or the expected

■ **Table 2. Commercial HMO Health Plans by US Census Region**

Region	No.	%
East North Central	30	18
Mid-Atlantic	32	19
Mountain	17	10
New England	17	10
Pacific	10	6
South Atlantic	31	19
South Central	17	10
West North Central	14	8
<b>Total plans</b>	<b>168</b>	<b>100</b>

amounts) for members with diabetes, the total cost for medical care ranged from \$2088 to \$4656 per member per year and the total cost for pharmacy ranged from \$2244 to \$3504 per member per year. The composite quality index ranged from 0.78 to 1.17, indicating that plans performed anywhere from 22% below to 17% above the average HMO plan. The composite quality rate among the HMO plans ranged from 50% to 76%, with an average rate of 66%.

No statistically significant correlation exists between the HMOs' total medical care RRU for diabetes patients and the composite quality results, as Figure 1 illustrates. Of the 168 plans, 81 (48%) could be classified as high, ambiguous, or low value because they were statistically different from both the mean quality and the mean resource use dimensions. Of these 81 plans, 39 were identified as having above-average quality and 26 as high value because they had simultaneously high quality and low total medical care resource use.

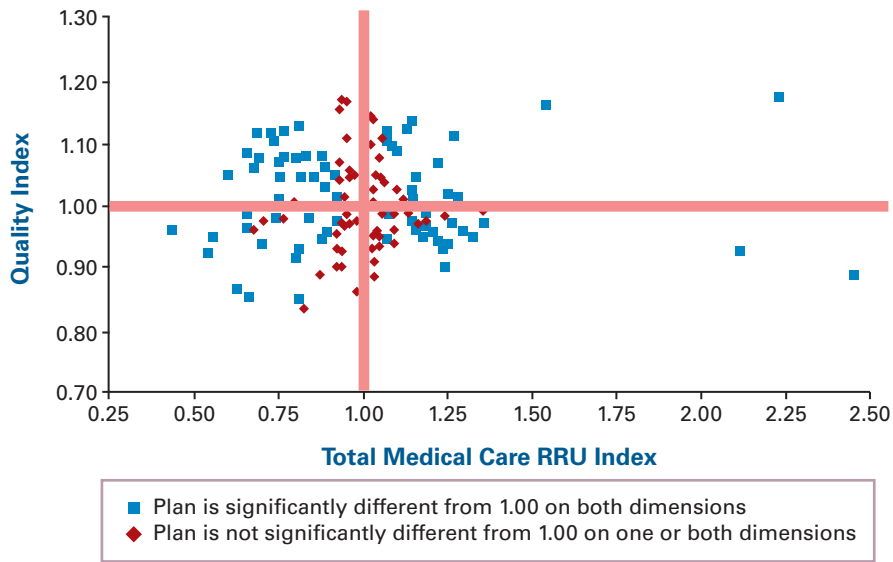
There was a statistically significant positive correlation between a plan's pharmacy RRU and quality ( $R^2 = 0.34, P < .05$ ) for members with diabetes, as the pharmacy scatter plot illustrates (Figure 2). Of the 168 plans, 104 (62%) were statistically different from the mean quality and pharmacy resource use dimensions. Of these 104 plans, 44 were identified as hav-

■ **Table 3. Descriptive Statistics**

Measure	Mean	SD	Minimum	Maximum
Medical care, index	1.00	0.25	0.43	2.45
Medical care, PMPM	259.65	28.36	174.20	387.85
Pharmacy, index	1.00	0.32	0.39	3.09
Pharmacy, PMPM	231.76	14.79	186.67	291.88
Composite quality, index	1.00	0.07	0.78	1.17
Composite quality, rate, %	65.65	4.56	50.24	75.60

PMPM indicates per member per month.

■ **Figure 1.** Diabetes Quality and Total Medical Care Relative Resource Use (RRU) Indices



ing above-average quality and 13 were identified as having both high quality and low pharmacy resource use.

## DISCUSSION

Not surprisingly, and in accordance with previous research, HEDIS diabetes data submitted by plans in 2007 demonstrated substantial variation in HMO resource use.<sup>7-9</sup> Although the analysis does not determine causality, the new finding, that pharmacy resource use was positively correlated with quality for members with diabetes, was not surprising given the important role of medication management in the treatment of diabetes (eg, A1C control). Moreover, a substantial number of HMOs could be identified as statistically significantly better or worse than average along the RRU and quality dimensions. The information provided in these RRU measures and other currently available information will allow purchasers and policy makers to make more informed decisions. Importantly, purchasers and policy makers can now compare plans along several variables, including (1) global quality (including accreditation status, clinical experience, and patient experiences); (2) clinical quality for a specific disease (eg, diabetes); (3) premium costs; and (4) for the first time, resource use in relation to all care provided to patients with serious chronic illnesses.

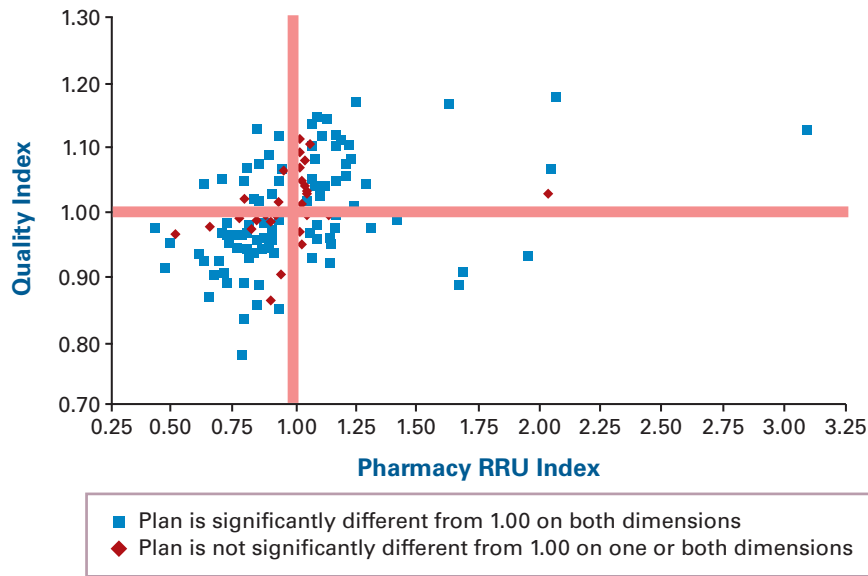
Premiums are a complex reflection of price paid for services, volume, and various market factors. Since RRUs are based on standard costs, their results separate the impact of volume (resource use) from negotiated prices using both RRU results and premiums. Even if plans begin to share price infor-

mation more readily, thus providing further transparency, the RRU measures—together with premium information—give stakeholders the ability to examine the relationship between a plan’s monetized resource use and its offered premiums. For example, 2 plans with similar quality results, one reporting low RRU and high premiums and the other high RRU and average premiums, may now be compared. Such comparisons will certainly provoke closer examination and stimulate important discussion.

The NCQA gives back to plans not only aggregate, but also cohort-level results (eg, the O/E PMPM resource use for men within an age band). In this way, plans can compare performance by disease state, within patient cohorts, and across disease states. Plans can also aggregate results within provider groups or other groupings to examine utilization patterns within their plan. They can also use these data to understand the influence of specific disease-management practices within the clinical areas and identify areas with higher resource use, including by cohort. In short, these data may provide plans with information about more or less effective disease-management practices.

The HEDIS RRU measures are based on population data and include the resources used for most aspects of care for patients with diabetes. The RRU approach complements episode-of-care cost measures—where one examines cost in relation to a specific diagnosis or event (episode based) and the other examines cost in relation to a patient with a particular condition (population based). In the context of the conceptual framework set out by Bentley et al,<sup>10</sup> the RRU measures will allow plans and purchasers to assess and com-

■ **Figure 2.** Diabetes Quality and Pharmacy Relative Resource Use (RRU) Indices



pare their operational and clinical resource use with that of their peers, while the episode-of-care approach allows them to examine specific clinical or operational resource use. Thus, RRU measures together with episode-of-care cost measures avoid the pitfalls of measuring in a fragmented manner—fragmentation that may result in missed opportunities to improve in highly inefficient areas. Further, because a system can appear to be efficient while delivering inappropriate care, more information is necessary beyond resource use (eg, measures of appropriateness).

Meanwhile, the RRU measures are a critical first step in understanding health plan efficiency and value. In the ongoing debate about the desirability and feasibility of expanded healthcare coverage in the United States, the need for more transparency and leverage over healthcare spending and waste is more urgent than ever. The continued development and deployment of resource use measures like the RRU measures will offer purchasers and accountable entities additional clarity about the levels and sources of variation in cost and value. Parallel developments are needed in payment-system and delivery-system reform to provide the incentives and the tools that will be needed to address inefficiencies that come to light through this process.

**Limitations**

This analysis is limited to commercial HMO plans that submitted data to the NCQA and may not apply to other types of plans or other settings. Data were limited to patients with diabetes. Although diabetes is highly prevalent and a costly disease, findings may not apply to other diseases. Simi-

lar analyses examining other conditions and delivery systems or plan types are needed.

HEDIS quality measures in this analysis are limited to clinical process and intermediate outcome measures related to diabetes. HEDIS RRU measures include all specified services rendered, regardless of whether they are directly related to diabetes. Although this inclusiveness of services avoids the issue of partitioning of cost, it leads to inclusion of costs not necessarily clinically related to diabetes.

Additionally, these data represent only a cross-sectional analysis of the relationship between quality and resource use. Thus, it is not clear whether improving quality would lead to changes in resource use or vice versa.

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**Authorship Information:** Concept and design (SET, MBR, LGP, SHS); acquisition of data (SET, LGP); analysis and interpretation of data (SET, MBR, LGP, SHS); drafting of the manuscript (SET, MBR, LGP, SHS); critical revision of the manuscript for important intellectual content (SET, MBR, LGP, SHS); statistical analysis (SET); administrative, technical, or logistic support (SET); and supervision (SET, LGP).

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