

**Relative Resource Use (RRU)  
Annual Report**

**National Committee for Quality Assurance (NCQA)**

**January 23, 2013**

**Prepared for the Committee on Performance Measurement**

## Table of Contents

Executive Summary .....	3
Background .....	5
Methodology .....	6
Data Sources.....	6
Data Dimensions .....	7
Analyses .....	7
Quality Index Calculations .....	8
Results for 2012 HEDIS Submissions .....	10
Plan Submissions (All-HEDIS, HEDIS-RRU and by Disease Condition) .....	10
Outlier Distribution, Eligible Population Size and Data Completeness .....	12
Plan Stability - Quartile Shifts .....	14
Cost Component Correlations .....	15
Cost Component-Performance Correlations .....	15
Cost Component-Component Correlations .....	17
Cost Component-Quality Measure Correlations .....	18
Comparing New Plans to Returning Plans .....	20
Additional Analyses .....	21
Eligible Population Size & Minimum Sample Size Requirement .....	22
Diagnostic Exclusions.....	27
Cohort-specific Utilization .....	32
Pharmacy Utilization .....	33
Conclusion .....	40
Appendix A-Additional Data.....	40

## Executive Summary

Debate on the drivers of cost in the US health care system has sparked interest in the concept of “value-based” purchasing, heightening the need to measure cost and quality simultaneously. Health plans and public and private purchasers alike have a growing interest in reliable efficiency measures that allow them to determine the impact of efforts to enhance value in the health care system.

### ***Establishing Efficiency Measures***

In 2007, NCQA introduced to HEDIS® measures of Relative Resource Use (RRU) using predetermined standardized costs to clearly and equitably define the cost portion of the value equation. RRU measures highlight the principle of value-based purchasing, relating the cost side of value to quality measures therefore enabling health plans to review benefits and costs of selected areas at the same time. These measures also assist health care purchasers in identifying plans that deliver high-quality care while managing associated costs. Ultimately a benefit expressed in terms of improved health outcomes is highly desirable; however at present HEDIS effectiveness of care (EOC) measures are used as a proxy for benefit alongside the resource use measure results.

These measures focus on the following:

- Diabetes
- Asthma
- Cardiovascular Conditions
- Hypertension
- Chronic Obstructive Pulmonary Disease (COPD)

In order to ensure that the measures continue to be effective in providing valuable information, NCQA staff annually conducts comprehensive analyses of RRU measure data collected through HEDIS submissions to ensure the reliability of the results, as well as identify any notable information that might further increase the understanding of the factors driving resource use in health plan members with chronic conditions. This report presents specific analyses on the data reported to NCQA in 2012 on HEDIS RRU measures for Asthma (RAS), Diabetes (RDI), Cardiovascular Conditions (RCA), COPD (RCO) and Hypertension (RHY). The Acute Low Back Pain (RLB) measure was retired from reporting in 2011. All RRU HEDIS measures are risk-adjusted to support valid comparisons across conditions and health plans.

### ***Updates to the Measures***

A number of refinements were made to the RRU measures between the 2011 and 2012 reporting years. These changes were intended to increase the specificity of the measurement approach, as well as expanding the services that are included in the reports generated by the RRU data.

Listed below are key updates to the RRU measurement set that are active as of the HEDIS 2012 data set.

- Addition of lab and imaging as priced service categories (aggregated under Total Medical)
- Replacement of the previous risk adjustment approach with the HCC-RRU risk adjustment method
  - New method accounts for disease severity, type and number of co-morbidities, age and gender
- Expansion of the inpatient service categories to include more detailed subcategories (acute inpatient, non-acute inpatient, days and average length of stay or ALOS)
- Expansion of the pharmacy reporting category to distinguish between name brand utilization, generic utilization and generic substitution
  - Results now include pharmacy utilization reported by generic and name-brand use
  - Results are stratified by the number of generic medications used, compared with the number of name-brand medications used

## ***Key Findings***

The analyses produced a number of key findings related to resource measurement at the health plan level. First, there continues to be a sufficient number of plans reporting across all RRU measures to support valid comparisons of health plan performance. Next, overall plan results generally remained stable across the 2011-2012 reporting period, although eligible population size continues to be a leading factor in preventing public reporting of several plans' RRU results. Additionally, the correlation analyses demonstrated the increased precision of the updated risk adjustment model, with new positive and negative correlations emerging in 2012 while others remained unchanged or subsided. The results also provided some initial insight into more specific patterns of utilization among the RRU population, with increases in utilization per health plan member noted alongside increasing age and HCC risk cohort in both the Total Medical and Total Pharmacy categories.

## Background

RRU measures report total standard costs and frequency for all included services for which the organization has paid or expects to pay for the eligible population during a pre-specified measurement year. The use of standardized pricing allows for comparison of plans on a national level. Health plans estimate resource use (in dollars) by following detailed HEDIS specifications, applying standardized prices for each unit of health service provided to members with the identified condition during the measurement period. In order to adjust for clinical differences in enrolled populations, a risk adjustment method is applied to the eligible population. The observed resource use (post application of standardized pricing and risk adjustment) is then compared to the expected value of resource use among a standardized population.

**Standardized Prices:** The standardized unit prices are calculated to represent data derived from a single source, using a single approach for classifying and pricing services. Pricing algorithms represent average service pricing levels for organizations for the most recent period. Standard prices support consistent comparisons of “weighted utilization” across all members, organizations and geographic areas and protect confidentiality of individual proprietary pricing and fee schedules.

**Risk Adjustment:** Health plans submit aggregated price and utilization data by risk cohort, enabling calculation of each plan’s risk-adjusted resource use and utilization. Adapted from the CMS Hierarchical Condition Category (HCC) case-mix adjustment approach, the risk adjustment method applied in HEDIS 2012 (HCC-RRU) accounts for disease severity, type and number of comorbidities, age and gender. Using HCC-CMS clinical logic markers and algorithms, NCQA estimates risk weights and calculates observed to expected (O/E) ratios for each health plan in order to define value. Conceptually speaking, the “case-mix peer group” represents what we might expect resource use to look like from the “average” plan if it had the same case-mix as the observed plan.

**Observed to Expected Ratio (O/E ratio):** An O/E ratio is a plan’s demonstrated resource use – referred to as the “observed” - divided by the estimate of a plan’s anticipated resource use. The estimate is derived with the assumption that the observed plan’s population demonstrates the same dimension-specific characteristics (see Data Dimensions under Methodology) as the hypothetical ‘average’ population of all other plans which submitted data (the “expected”). NCQA estimates the “expected” standardized utilization by calculating the average utilization within each clinical reporting category for each plan submitting data. Ratios are then calculated, comparing a plan’s resource use for the service categories listed in Table 1 below.

**Table 1: 2012 Relative Resource Use Service Categories**

Standardized Cost Categories	Service Frequency Categories
<ul style="list-style-type: none"> <li>• Combined Medical <ul style="list-style-type: none"> <li>○ Inpatient Facility</li> <li>○ Evaluation and Management <ul style="list-style-type: none"> <li>▪ Inpatient Services</li> <li>▪ Outpatient Services</li> </ul> </li> <li>○ Surgery and Procedure <ul style="list-style-type: none"> <li>▪ Inpatient Services</li> <li>▪ Outpatient Services</li> </ul> </li> <li>○ Laboratory Services</li> <li>○ Imaging Services</li> </ul> </li> <li>• Pharmacy, ambulatory</li> </ul>	<ul style="list-style-type: none"> <li>• ED Discharges</li> <li>• Total Inpatient Discharges</li> <li>• Pharmacy Utilization</li> <li>• Condition-specific procedures (RDI and RCA only) <ul style="list-style-type: none"> <li>○ Cardiac Catheterization</li> <li>○ PCI</li> <li>○ CABG</li> <li>○ Carotid Endarterectomy</li> <li>○ Carotid Diagnostic test</li> <li>○ Carotid CT</li> <li>○ Carotid EBCT</li> </ul> </li> </ul>

Data are displayed as standardized price-adjusted utilization per member per month (PMPM) for the standardized cost categories and per member per 1,000 member years (PMPY) for the service frequency categories. To enable comparisons between plans within geographic regions for given reporting types, NCQA indexes plans' O/E ratios to a mean of 1 by dividing each individual plan's ratio by the aggregated regional O/E ratio, and the reporting type-specific national average O/E ratio (national results are calculated in a similar fashion by defining "National" as an additional region). These indexed ratios are then reported by service category and displayed with the plan quality indexed O/E ratio in a chart, indicating a plan's relative value.

For this report, the focus is on the non-indexed O/E ratios at the national level to allow for evaluation at the population level. As mentioned above, the indexed ratio—a health-plan based performance measure—compares RRU results to the mean performance of all health plans. In comparison the non-indexed ratio, a population-based performance measure, compares RRU results to the performance of an average health plan for a particular measure in a product line. Analyses on both the national and regional O/E ratio results (indexed) are available via NCQA's public reporting module Quality Compass alongside an organization's quality index ratios.

#### Methodology

#### Data Sources

The primary sources of data for these analyses are the HEDIS 2012 submissions of RRU measure results by product line (Commercial, Medicare and Medicaid), which are compared with submissions from prior years. Reports for corresponding HEDIS Effectiveness of Care (EOC) quality measures from HEDIS 2012 and years prior were also used to examine co-variation in performance. Health plans estimate standardized (in dollars) resource use by following HEDIS specifications, including applying the NCQA standardized prices for each unit of health service included in each measure. NCQA estimates the "expected" standardized utilization by calculating the average utilization within each clinical reporting category for each health plan submitting data.

## Data Dimensions

NCQA collects resource measures at the plan level and summarizes across reporting cohorts along the following dimensions:

- **Product line** (3 levels): Commercial, Medicare and Medicaid
- **Reporting type** (2 levels): HMO<sup>1</sup> and PPO
- **Area level** (2 levels): national and region<sup>2</sup>
- **Resource use or utilization** (8 levels):
  - Inpatient facility
  - Surgery and Procedure (inpatient and outpatient)
  - Evaluation and management (inpatient and outpatient)
  - Laboratory services
  - Imaging services
  - Pharmacy, ambulatory
  - Inpatient discharges
  - Emergency department (ED) discharges
- **Condition** (5 levels):
  - Total annual RRU
    - Asthma
    - Cardiovascular conditions
    - COPD
    - Diabetes
    - Hypertension

Data are displayed as standardized price-adjusted utilization PMPM for the standardized cost categories and PMPY for the service frequency categories. Based on the observed and expected values, the O/E ratio is calculated. The O/E ratio is the health plan's submitted data (observed) divided by the NCQA risk-adjusted data (expected).

## Analyses

The analyses have been structured to provide comprehensive univariate (descriptive) information and selected correlation results. The analyses use cumulative plan observations across all data dimensions (e.g., product line, reporting type). NCQA utilized these analyses to examine the distribution of submitted plan data and the subsequent observed-to-expected ratios. We also examined the number of plans that were successfully able to report RRU data and compared to previous years' performance. Plans with estimated O/E results less than 1/3 or greater than 3.000, a frequency of reports with eligible populations (sample sizes) of less than 400 or incomplete data for corresponding HEDIS EOC measures were defined as unable to successfully report RRU data.

**High Level Descriptive Statistics** provide an overview of the number of plans able to satisfy additional criteria for public reporting of RRU results and have demonstrated stability in performance over a two-year period.

- Number of plans that were successfully able to report any HEDIS data
- Number of plans that were successfully able to report RRU-specific HEDIS data
- Outlier distribution of plans with estimated O/E results less than 1/3 or greater than 3.000
- The frequency of plans with eligible populations less than 400
- The frequency of plans with missing corresponding EOC measures' data
- Quartile shifts of plans' O/E ratios

---

<sup>1</sup> NCQA collapses all permutations of HMO plans, including POS [etc.] into the HMO reporting category; this is also done for this analysis.

<sup>2</sup> Plans are assigned to one of the ten Dept. of Health and Human Services regions.

**Correlation Analysis** provide further information about the stability of the measures, calculating correlations for health plan O/E results between the data reported for the RRU measures in 2011 and 2012. Correlation coefficients are used to assess the strength and consistency of association between cost components of the measures and various aspects of measure performance. These coefficients range between -1 and 1, with 1 indicating a perfectly consistent relationship where an increase in one variable is associated with an increase in the other; and vice-versa. Correlation coefficients were analyzed along the following dimensions:

- Cost components and plan performance (with O/E ratio as an indicator)
- Cost components and quality (raw and indexed)
- Component-to-component

Additionally, we took the opportunity to conduct additional analyses aimed at determining the relevance of previously proposed changes to the measurement approach. These analyses were conducted both on the RRU data submitted to NCQA through HEDIS reporting as well as in the RRU reference database currently maintained by OptumInsight. The additional analyses include:

- Change to the minimum eligible population size required for reporting (based on standard error/bootstrapping analysis)
- Prevalence of specific required diagnostic exclusions (e.g., end stage renal disease and specific transplant procedures (renal) among the RDI and RCA patient populations)
- Cohort-specific utilization patterns to gain a better understanding of the effects (if any) of the reference population on utilization
- Pharmacy utilization patterns to learn more about patterns of prescription drug use as a driver of health care costs

#### Quality Index Calculations

Quality composites are created using HEDIS EOC quality measures relevant to each condition, submitted in conjunction with the RRU measure data for any given reporting year. The quality composite is calculated as the average of the indicators specified for each disease condition. The averages used for the quality composite calculations are either weighted or un-weighted, depending on the structure of the corresponding EOC measures. Indicators within the quality composite are un-weighted (equally weighted) for the RRU measure composites, with the exception being COPD. For COPD there are two different measures, one of which (PCE) contains two indicators. In order for each measure to have a weight of 1.0, the two indicators within PCE are each given a weight of 0.5. HHS regions are used for classifying plans with respect to regions served. As with the O/E ratios, only non-indexed quality composites are used in the analyses presented in this report.



**Table 2: HEDIS EOC Quality Measures used for RRU Quality Index Calculations**

RRU Measure	HEDIS EOC Quality measure	Scoring
RDI – Diabetes	1. Comprehensive Diabetes Care (CDC) <ul style="list-style-type: none"> <li>• HbA1c testing</li> <li>• HbA1c poor control (&gt;9%)</li> <li>• HbA1c control (&lt;8%)</li> <li>• HbA1c control (&lt;7%)</li> <li>• Eye exam</li> <li>• LDL-C Screening</li> <li>• LDL-C Control (&gt;100mg/dL)</li> <li>• Medical attention for nephropathy</li> <li>• BP Control (&gt;140/90)</li> <li>• BP control (&gt;140/80)</li> </ul>	<ul style="list-style-type: none"> <li>• Equally weighted</li> <li>• Assignment allowed for missing variables</li> </ul>
RAS – Asthma	1. Use of Appropriate Medications for People with Asthma (ASM)	<ul style="list-style-type: none"> <li>• Single indicator score reported</li> </ul>
RCA – CV Conditions	1. Cholesterol Management (CMC) 2. Persistence of Beta-Blocker Treatment After a Heart Attack (PBH)	<ul style="list-style-type: none"> <li>• Equally weighted</li> <li>• Assignment allowed for missing variables</li> </ul>
RCO – COPD	1. Use of Spirometry Testing in the Assessment and Diagnosis of COPD (SPR) 2. Pharmacotherapy Management of COPD Exacerbations (PCE) <ul style="list-style-type: none"> <li>• Dispensed systemic corticosteroid within 14 days</li> <li>• Dispensed bronchodilator within 30 days</li> </ul>	<ul style="list-style-type: none"> <li>• Weighted Composite- each component of PCE is weighted as 0.5, so that the total weight is equal to 1.0; SPR is then given a weight of 1.0</li> <li>• Assignment allowed for missing variables</li> </ul>
RHY- Hypertension	1. Controlling Blood Pressure (CBP)	<ul style="list-style-type: none"> <li>• Single indicator score reported</li> </ul>

#### Assignment of Missing Variables

NCQA has developed a non-punitive methodology for allowing quality indices to be calculated when a few of the variables are missing from the health plan data set. During the data submission process, HEDIS certified auditors verify each health plans missing data and assign three designations during their review of the data submission:

- 1) Small Denominator (NA) - The organization followed the specifications but the denominator was too small (<30) to report a valid rate.
- 2) Benefit Not Offered (NB) – The organization did not offer the health benefit required to report the measure.
- 3) Not Reportable (NR) – The organization calculated the measure but the rate was materially biased, the organization chose not to report the measure, or the organization was not required to report the measure.

For all quality index calculations, when a quality measure component value is missing (NA, NB, or NR) and the number of missing components does not exceed the allowable threshold for the particular measure, the missing value is assigned either the *mean* or *minimum* value from the HHS region for which the health plan is reporting RRU. NCQA has made the decision to assign a value (or rate) in order to prevent plans from being unfairly

penalized in their quality index calculations because of missing data for a specific component of a quality measure composite. When components of a HEDIS quality measure contain either *NA* or *NB*, the missing value is assigned the mean value for the same HHS region as the plan in question. When components of a HEDIS quality measure contain *NR*, then the missing value is assigned the minimum value for the same HHS region as the plan in question.

Results for 2012 HEDIS Submissions

Plan Submissions (All-HEDIS, HEDIS-RRU and by Disease Condition)

As shown in Table 3a, in 2012 a total of 728 HMO and 328 PPO plans submitted HEDIS data to NCQA. With respect to RRU-specific HEDIS data (Table 3b), a total of 428 HMO and 244 PPO plans submitted data which is approximately 82 percent of commercial HMOs and 94 percent of commercial PPOs reporting any HEDIS data, 48 percent of Medicare HMOs and 48 percent of Medicare PPOs, and 49 percent of Medicaid HMOs. Since plans are not required to submit for all conditions, the counts include any plans that submit a subset of the five RRU measures in their submission; as such, these tables include unduplicated counts.

**Table 3a: Unduplicated total count of plans reporting HEDIS data**

Product Line	Reporting Type	Count of plans			
		2009	2010	2011	2012
Commercial	HMO	258	246	242	221
	PPO	184	183	172	189
Medicare	HMO	282	298	314	316
	PPO	93	110	128	139
Medicaid	HMO	163	171	184	191

**Table 3b: Unduplicated total count of plans reporting RRU HEDIS data**

Product Line	Reporting Type	Count of plans			
		2009	2010	2011	2012
Commercial	HMO	205	218	210	182
	PPO	138	132	163	177
Medicare	HMO	145	132	131	152
	PPO	20	31	32	67
Medicaid	HMO	87	95	102	94

In general, the trend in number of plans reporting RRU data is directly related to the number of plans reporting any HEDIS data. In particular, both the RRU and HEDIS saw declines in overall commercial HMO submissions and increases in both commercial and Medicare PPO submissions from 2011 to 2012. Additionally the increase in the number of Medicare plans reporting RRU data from 2011 to 2012 is consistent with the increase in the total number of plans seen reporting any HEDIS data.

Tables 4 and A-4 (see Appendix for Table A-4) builds upon Table 3b, evaluating the counts and corresponding percentages of plans reporting RRU HEDIS data, with results stratified by product line, reporting type and clinical condition. As mentioned for Tables 3a and 3b, since plans are not required to submit for all conditions the counts include any plans that include a subset of the five RRU measures in their submission; therefore Tables 4 and A-4 includes these unduplicated counts.

**Table 4: Number and Percentage of Plans Submitting RRU HEDIS data as a Percent of All HEDIS Submissions (by Product Line, Reporting Type and Clinical Condition) – 2011-2012**

Product Line	Condition	Reporting Type	Number and percentage of plans reporting RRU	
			2011	2012

			Count	%	Count	%
Commercial	Diabetes	HMO	210	86.8	182	82.4
		PPO	163	94.8	177	93.7
	Asthma	HMO	210	86.8	180	81.4
		PPO	163	94.8	177	93.7
	Cardiovascular	HMO	210	86.8	182	82.4
		PPO	163	94.8	177	93.7
	COPD	HMO	210	86.8	182	82.4
		PPO	163	94.8	177	93.7
	Hypertension	HMO	191	78.9	165	74.7
		PPO	91	52.9	136	72.0
Medicare	Diabetes	HMO	131	41.7	152	48.1
		PPO	32	25.0	67	48.2
	Cardiovascular	HMO	131	41.7	152	48.1
		PPO	31	24.2	67	48.2
	COPD	HMO	131	41.7	152	48.1
		PPO	31	24.2	67	48.2
	Hypertension	HMO	130	41.4	148	46.8
		PPO	31	24.2	65	46.8
Medicaid	Diabetes	HMO	99	53.8	90	47.1
		PPO	0	0.0	0	0.0
	Asthma	HMO	98	53.3	88	46.1
		PPO	0	0.0	0	0.0
	Cardiovascular	HMO	98	53.3	86	45.0
		PPO	0	0.0	0	0.0
	COPD	HMO	97	52.7	91	47.6
		PPO	0	0.0	0	0.0
	Hypertension	HMO	95	51.6	83	43.5
		PPO	0	0.0	0	0.0

As seen in Table 4, PPO reporting for RRU continues to lag slightly behind HMO reporting in their ability to report RRU measures that are linked to quality measures using hybrid data collection methods; however the recent gains in PPO plans reporting RRU in the last data collection period indicate that gap is closing. In particular, the percentage of Medicare PPOs reporting RRU (across clinical conditions) increased from 25 percent in 2011 to nearly 49 percent in 2012. This is most likely associated with growth seen in the number of submissions among both new and returning Medicare PPOs, which will be explored further in the latter portion of the report. Additionally, Commercial submissions (regardless of reporting type) for the Hypertension measure have been consistently lower in comparison to the other clinical conditions, despite increasing in terms of percentage reporting RRU during the 2011-2012 reporting period (from 52.9 percent in 2011 to 72 percent in 2012). The corresponding quality measure, *Controlling Blood Pressure*, requires use of medical record review for data collection, thusly adding a dimension of burden that is not evident for the other measures.

In terms of comparing product line-based submissions for RRU measures since 2009, the overall Medicare submission count has increased substantially from 2011 to 2012 while the Medicaid and Commercial counts generally increased or remained stable.

### Outlier Distribution, Eligible Population Size and Data Completeness

In addition to the number of plans submitting HEDIS and/or RRU-specific data, it is useful to examine how many plans meet public reporting status based on pre-defined criteria including: O/E ratio outlier distribution (for a specific service category or overall), data completeness for corresponding HEDIS EOC measure submissions and minimum eligible population size requirements. Plans are eliminated from public reporting in the *Total Medical* category if 1) any of the O/E ratios for components of *Total Medical* or *Total Pharmacy* is less than 1/3 or greater than 3.000; 2) if their eligible population size for a measure is less than 400, or 3) if the plan is missing required quality data in their HEDIS EOC measure submission file. Due to the increase in plans reporting RRU for the first time and the effect they might have on the reported results (assuming a steep learning curve for new plans), additional analyses are conducted based on their assigned reporting status (“New” submissions against “Returning” RRU plans). Status is assigned as “New” by determining whether the health plan has any RRU data associated with its Sub\_ID in the Interactive Data Submission System (IDSS) submission from the previous reporting period.

Table 5 illustrates results for each of these criteria, providing an overview of the percentage of plans submitting any data for a given RRU measure that failed to satisfy public reporting requirements (e.g. plans with an eligible population size of less than 400). The last column on the right indicates whether or not a plan elected to have its results publicly reported (provided all other public reporting requirements are met). Although some plans may choose not to publicly report their results in NCQA's public reporting module Quality Compass, their submitted data is still included in the calculation of means used for case-mix adjustment.

**Table 5: Public Reporting Status Based on Outlier Distribution, Eligible Population Size and Data Completeness**

Product Line	Condition	Reporting Type	Count of Plans Submitting Any RRU Data	Percent of Plans Submitting RRU Data						
				Eligible Population < 400	Total Medical		Total Pharmacy		Incomplete or missing EOC Data	Plan Chose to Publicly Report (Y/N)
					< 0.333	> 3.000	< 0.333	> 3.000		
Commercial	Diabetes	HMO	182	9.3	0.5	0.0	1.1	0.5	9.3	94.0
		PPO	177	1.7	0.0	0.0	0.0	1.1	27.7	96.0
	Asthma	HMO	180	51.1	0.6	0.0	1.7	0.6	2.2	93.9
		PPO	177	37.3	0.0	0.0	0.0	0.0	0.6	96.0
	Cardiovascular	HMO	182	39.6	0.0	0.0	1.1	1.1	8.8	94.0
		PPO	177	19.2	0.0	0.0	0.0	0.6	12.4	96.0
	COPD	HMO	182	38.5	0.5	0.0	1.1	0.5	51.1	94.0
		PPO	177	20.3	0.0	0.0	0.0	0.0	44.1	96.0
Medicare	Diabetes	HMO	152	11.2	0.0	0.0	0.0	1.3	0.0	86.2
		PPO	67	11.9	0.0	0.0	0.0	0.0	0.0	94.0
	Cardiovascular	HMO	152	42.1	2.0	0.0	0.7	1.3	2.6	86.2
		PPO	67	44.8	0.0	0.0	0.0	0.0	1.5	94.0
	COPD	HMO	152	21.7	0.7	0.0	0.0	2.0	17.8	86.2
		PPO	67	20.9	0.0	0.0	0.0	0.0	22.4	94.0
	Hypertension	HMO	148	2.0	0.7	0.0	0.0	1.4	0.0	86.5
		PPO	65	1.5	0.0	0.0	0.0	0.0	0.0	93.8
Medicaid	Diabetes	HMO	90	21.1	1.1	0.0	3.3	2.2	1.1	82.2
		PPO	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Asthma	HMO	88	19.3	1.1	0.0	3.4	2.3	4.5	80.7
		PPO	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Cardiovascular	HMO	86	65.1	2.3	0.0	3.5	2.3	20.9	82.6
		PPO	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	COPD	HMO	91	42.9	1.1	0.0	5.5	2.2	29.7	81.3
		PPO	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hypertension	HMO	83	16.9	0.0	0.0	3.6	2.4	1.2	83.1
		PPO	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

As seen in Table 5, eligible population size is the primary reason that plans do not qualify for public reporting status, regardless of product line, reporting type or clinical condition. However there have been instances of improvement in meeting this criterion, especially in terms of reporting for the CV Conditions and COPD measures. For the CV Conditions measure, the percentage of plans eliminated due to eligible population size decreased from 67.7 percent in 2011 to 44.8 percent in 2012 for Medicare PPO and from 43.5 percent in 2011 to 21.7 in 2012 for Medicare HMO; and from 70.4 percent in 2011 to 42.9 percent in 2012 for Medicaid HMO. For the COPD measure, the percentage of plans eliminated due to eligible population size decreased from 25.8 percent in 2011 to 1.5 percent in 2012 for Medicare PPO and from 24.4 percent in 2011 to 2.0 in 2012 for Medicare HMO; and from 39.2 percent in 2011 to 16.9 percent in 2012 for Medicaid HMO.

Data completeness (missing variables in the HEDIS EOC data) also plays a large role in plan qualification for public reporting. The percentage of plans with incomplete or missing EOC data continued to be high for the COPD measure in 2012, ranging from 17.8 to 51.1 percent across product lines. One hypothesis for this phenomenon is that many plans are unable to report the corresponding HEDIS quality measure due to small denominator size (NB). Since the quality index is required in order to report RRU, plans are not eligible for public reporting of the cost and frequency components of RCO.

In terms of O/E ratio outlier<sup>3</sup> distribution, less than six percent of plans were eliminated from *Total Medical* and *Total Pharmacy* O/E results falling outside the pre-defined outlier range. Overall the majority of plans chose to publicly report their RRU results if all other qualification criteria were met, which indicates a general confidence on the part of plans in their submitted data.

#### Plan Stability - Quartile Shifts

An indicator of plan stability over time is quartile movement of O/E ratios (for specific and overall service categories), with significant shifts having implications about plan performance in terms of resource use. For comparative purposes, plans that move less than one quartile are considered stable, with the magnitude of absolute change being more relevant as opposed to the direction of change (up or down). Since the benchmarks are calculated every year based on total RRU submissions, a single plan's O/E ratio can move about the mean without having any significant change in their observed data from one year to the next.

Table 6 displays the number of plans that experienced at most one quartile shift for the *Total Medical* and *Total Pharmacy* results between successive years (2011 and 2012). For each RRU measure NCQA calculated the percentile distribution for each cost component (by product line, reporting type and year) and then determined the quartile into which each plan's O/E ratio fell for a given cost component. NCQA then examined if the plan's 2012 O/E ratio remained within at least one quartile of the previous years. This analysis should reveal any erratic shifts in plan performance across years, which could indicate instances of data capture, data error or insufficient case-mix adjustment. Detailed information providing insight of quartile shifts from 2010 to 2012 can be seen in Tables A-6a and A-6b (see Appendix).

**Table 6: Proportion of Plans with O/E Ratios that Changed by At Most One Quartile between Successive Years – 2012 v. 2011**

Measure	Product Line	Percent of Plans with no more than 1 quartile shift			
		2012 vs. 2011			
		HMOs		PPOs	
		Total Medical	Total Pharmacy	Total Medical	Total Pharmacy

<sup>3</sup> Although the definitions of outliers as used for these analyses differs from that used for NCQA's public reporting module (Quality Compass), the impact of applying the QC rules had a minimal impact on the number of plans able to report Total Medical and Total Pharmacy results.

		Count of Plans	Percent of Plans	Count of Plans	Percent of Plans	Count of Plans	Percent of Plans	Count of Plans	Percent of Plans
Diabetes	Commercial	116	76.7	129	94.6	75	81.3	75	94.7
	Medicare	74	81.1	83	94.0	13	76.9	13	100.0
	Medicaid	44	70.5	55	94.5	0	0.0	0	0.0
Asthma	Commercial	58	81.0	65	87.7	51	94.1	58	98.3
	Medicaid	38	86.8	54	94.4	0	0.0	0	0.0
Cardiovascular	Commercial	82	78.0	88	89.8	82	75.6	82	87.8
	Medicare	50	82.0	56	94.6	6	33.3	6	100.0
	Medicaid	17	82.4	23	87.0	0	0.0	0	0.0
COPD	Commercial	56	85.7	63	90.5	52	67.3	53	88.7
	Medicare	60	83.3	67	92.5	8	100.0	8	100.0
	Medicaid	35	77.1	43	83.7	0	0.0	0	0.0
Hypertension	Commercial	116	81.0	127	90.6	62	82.3	62	93.5
	Medicare	69	73.9	77	87.0	14	78.6	15	93.3
	Medicaid	35	80.0	44	90.9	0	0.0	0	0.0

**\*Note:** Stability of health plan RRU reporting defined as moving less than one quartile between successive years

Overall the majority of plans' O/E ratios for *Total Pharmacy* and *Total Medical* stayed within or moved no more than one quartile between successive years, regardless of product line, reporting type or clinical condition. Results were not reported for Medicaid PPO plans as there were no submissions for this combination in 2012.

For the *Total Medical* category, in comparison to the previous reporting period (2010 to 2011) Medicare PPOs reporting the CV conditions measure experienced the largest shift as defined by the change in percentage from 2011 to 2012 (52.4 percent), followed by Commercial PPOs reporting the COPD measure (25.8 percent), Medicaid HMOs reporting the Diabetes measure (22.2 percent) and Medicare HMOs reporting the Hypertension measure (21.3 percent). This is consistent with results seen in years prior, with the exception of Medicaid HMOs reporting the Diabetes measure, which experienced a shift of 0.6 percent between successive reporting periods (2009 to 2010; and 2010 to 2011).

For the *Total Pharmacy* category, in comparison to the previous reporting period (2010 to 2011) Medicaid HMOs reporting the COPD measure experienced the largest shift (14 percent), followed by Medicaid HMOs reporting the CV conditions measure (13 percent) and Commercial HMOs reporting the Asthma measure (10.1 percent). This is consistent with results seen in years prior, with the exception of Commercial HMOs reporting the Asthma measure, which experienced a shift of 0.6 percent between successive reporting periods (2009 to 2010; and 2010 to 2011); and Medicaid HMOs reporting the CV conditions measure, which experienced a shift of 3.4 percent between the aforementioned successive reporting periods.

#### Cost Component Correlations

Cost component correlations provide an opportunity to evaluate the strength and consistency of the relationships between cost components (individual or aggregated); in comparison to various aspects of plan performance (with O/E ratio as the indicator); or in comparison to corresponding quality indicators. Complete data tables are provided in the Appendix detailing the results of all the correlation analyses.

#### Cost Component-Performance Correlations

Component-performance correlations generally provide a sense of how these components might affect changes (if any) in plan performance from year to year. Table 7 summarizes key findings of component-performance

correlations by clinical condition, with more information available in the Appendix (Tables A-7a to A-7e). The correlations highlighted for this analysis were defined as weak or not moderate to strong (*Spearman correlation coefficient*  $<0.30$  or a *p-value*  $\geq 0.01$ ), differing from how correlations were defined for both cost component-quality and component-to-component correlations.

As seen in the supporting data tables, new correlations considered 'weak' or not 'moderate to strong' (see aforementioned definition) did emerge across clinical conditions in 2012, mostly notably for Commercial PPOs and HMOs and Medicaid HMOs. The *Inpatient Facility* cost component is the most frequently reported component with 'weak' or not 'moderate to strong' correlations (regardless of product line, reporting type and clinical condition). Additionally, the *Evaluation and Management* (Outpatient) cost component is the most frequently reported component with 'weak' or not 'moderate to strong' correlations across Medicare PPOs for the Diabetes, CV Conditions and COPD measures. Medicare PPOs also had a notable amount of correlations subside from 2011 to 2012, particularly for the Diabetes, CV Conditions and COPD measures. Some of these changes could be due in part to the adoption of the HCC case-mix methodology in 2012, which affected both the occurrence and directionality of correlations in comparison to prior years' results.



**Table 7: Descriptive Summary of Cost Component to Performance Correlations (2011 v. 2012)**

Description	Diabetes	Asthma	CV Conditions	COPD	Hypertension
New correlations* seen in 2012	<u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> <li>P/S Inpatient</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M Outpatient</li> <li>P/S Outpatient</li> </ul>	<u><b>Commercial (PPO and HMO)</b></u> Across all categories	<u><b>Commercial (PPO and HMO)</b></u> Across all categories <u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>P/S (aggregated and Inpatient)</li> <li>Inpatient Facility</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M Outpatient</li> <li>P/S (aggregated and Outpatient)</li> </ul>	<u><b>Commercial (PPO and HMO)</b></u> Across all categories <u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>P/S Inpatient</li> <li>Inpatient Facility</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M (aggregated and Outpatient)</li> </ul>	<u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>P/S Inpatient</li> <li>Inpatient Facility</li> </ul>
Correlations * that subsided from 2011 to 2012	<u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> <li>P/S Outpatient</li> <li>Total Pharmacy</li> <li>Total ED Discharges</li> </ul>		<u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M Outpatient</li> </ul>	<u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> <li>P/S Inpatient</li> <li>Inpatient Facility</li> <li>Total Discharges</li> </ul>	

**\*Note:** Correlations for this analysis defined as weak or not moderate to strong (*Spearman correlation coefficient*  $<0.30$  or *p-value*  $\geq 0.01$ )

E/M = Evaluation/Management

P/S = Procedures/Surgery

#### Cost Component-Component Correlations

Component-component correlations generally provide a sense of the consistency of associations between RRU cost components (e.g., Total Discharges and Inpatient Facility) within each measure (by product line and reporting type) from year to year. Tables A-8a to A-12e (see Appendix) provide more detailed information on findings of component-component correlations. For these analyses, the relationships were defined as moderate to strong positive correlation (*Absolute value of Spearman correlation coefficient*  $>0.30$  with a *p-value*  $<0.01$ ) or moderate to strong negative correlation (*Spearman correlation coefficient*  $< -0.30$  with a *p-value*  $< 0.01$ ).

As seen in the supporting data tables, new correlations considered 'moderate to strong positive' emerged across all product line-reporting type combinations; and new correlations considered 'moderate to strong negative' emerged in particular among Medicare PPOs (for Diabetes, CV Conditions, COPD and Hypertension) and Commercial PPOs (for CV Conditions and Hypertension) in 2012. The majority of new correlations considered 'moderate to strong positive' included the *Laboratory* and *Imaging* components, which were introduced to the RRU measurement set as of HEDIS 2012. Other correlations, both moderate to strong positive and moderate to strong negative, remained unchanged in terms of occurrence and directionality or subsided altogether from 2011 to 2012 across all measures.

Additional information demonstrating the specific inter-item correlations for each individual component is available in Tables A-8a to A-12e.

#### Cost Component-Quality Measure Correlations

Correlations between components of the RRU measurement set and their corresponding HEDIS EOC quality indicators generally provide an indication of value in terms of the resource use-quality relationship. For these analyses, the relationships were defined as moderate to strong positive correlation (*Absolute value of Spearman correlation coefficient*  $>0.30$  with a *p-value*  $<0.01$ ) or moderate to strong negative correlation (*Spearman correlation coefficient*  $< -0.30$  with a *p-value*  $< 0.01$ ). NCQA assessed the association between the RRU O/E ratios and the quality composite, as well as the indexed RRU O/E ratios and the indexed quality composite. The relationships between cost and quality were determined to be the same regardless of whether indexed or non-indexed values were used; therefore the data presented in Tables A-13a to A-13e (Appendix) include only the non-indexed results. Table 8 summarizes key findings of component-quality correlations by clinical condition.

As seen in the supporting data tables, new correlations considered 'moderate to strong positive' emerged in 2012, particularly among Medicare PPOs (for Diabetes, CV Conditions and COPD) and Medicaid HMOs (for Diabetes and COPD) in 2012. Similarly, new correlations considered 'moderate to strong negative' emerged across various product line-reporting type combinations, in particular for Medicare PPOs (for Diabetes, CV Conditions and COPD) as seen in Table 8. The majority of new correlations considered 'moderate to strong positive' included the *Procedures and Surgery (aggregated)* component, and the majority of new correlations considered 'moderate to strong negative' included the *Total ED Discharges* component. Other correlations, both moderate to strong positive and moderate to strong negative, remained unchanged in terms of occurrence and directionality or subsided altogether from 2011 to 2012 across all measures.

**Table 8: Descriptive Summary of Cost Component to Quality Measure Correlations – 2011 v. 2012**

<b>Description</b>	<b>Diabetes</b>	<b>Asthma</b>	<b>CV Conditions</b>	<b>COPD</b>	<b>Hypertension</b>
New positive correlations* seen in 2012	<u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>P/S (aggregated and Inpatient)</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>P/S (aggregated and Outpatient)</li> </ul>	<u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>Total Pharmacy</li> </ul>	<u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>E/M outpatient</li> <li>P/S (aggregated and outpatient)</li> </ul>	<u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>E/M (aggregated)</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>P/S (aggregated and outpatient)</li> </ul>	
New negative correlations* seen in 2012	<u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges</li> </ul>		<u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges</li> </ul>	<u><b>Commercial PPO</b></u> <ul style="list-style-type: none"> <li>P/S (aggregated)</li> </ul> <u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges</li> </ul>	<u><b>Commercial HMO</b></u> <ul style="list-style-type: none"> <li>E/M (aggregated and Outpatient)</li> </ul>
Positive correlations* that subsided from 2011 to 2012			<u><b>Commercial PPO</b></u> <ul style="list-style-type: none"> <li>E/M (aggregated and outpatient)</li> </ul>		<u><b>Commercial PPO</b></u> <ul style="list-style-type: none"> <li>P/S (aggregated and Outpatient)</li> </ul>
Negative correlations* that subsided from 2011 to 2012	<u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> <li>Total Discharges</li> </ul>		<u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> <li>Inpatient Facility</li> <li>Total Discharges</li> </ul>		<u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>E/M Inpatient</li> </ul>
Correlations that remained unchanged from 2011 to 2012 (positive* unless otherwise indicated)	<u><b>Commercial HMO</b></u> <ul style="list-style-type: none"> <li>E/M IP (negative)</li> </ul> <u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges (negative)</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges (negative)</li> </ul>	<u><b>Commercial PPO</b></u> <ul style="list-style-type: none"> <li>E/M (aggregated and outpatient)</li> <li>Total Pharmacy</li> </ul>	<u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges (negative)</li> </ul>		<u><b>Medicaid HMO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges (negative)</li> </ul> <u><b>Medicare HMO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges (negative)</li> </ul> <u><b>Medicare PPO</b></u> <ul style="list-style-type: none"> <li>Total ED Discharges (negative)</li> </ul>

**\*Note:** Moderate to strong positive correlation: *Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*

Moderate to strong negative correlation: *Spearman correlation coefficient < -0.30 with a p-value < 0.01*

E/M = Evaluation/Management

P/S = Procedures/Surgery

## Comparing New Plans to Returning Plans

Plans can be considered in two categories – *New* and *Returning*. For all of these analyses, a plan is defined as *Returning* if it reported any RRU data more than once from 2009 to 2012. A plan is defined as *New* if there were no previous submissions associated with the plan's sub\_ID during this same time frame. A "Submission" is defined as any provision of data for any given RRU measure component (e.g. if a plan submits a valid value for at least one data point) during the HEDIS IDSS data submission period. These categories were pre-assigned prior to analysis for each individual RRU measure – i.e. a plan could be *New* for Diabetes but *Returning* for COPD in 2012.

For these analyses, it was not possible to account for submission ID changes; therefore if a plan changed IDs between 2011 and 2012, it would be categorized as *New* for 2012. Submission ID changes typically occur when the enrolled population changes (attributed to a variety of reasons); thus accommodating submission IDs may indicate a *New* plan with a significantly altered population and should be managed as such for these analyses.

The comparison of new plans and returning plans is critical in addressing the research questions listed below:

- Of plans with any component of RRU data, what percentage of plans is able to report both Total Medical and Total Pharmacy o/e ratios with minimal (if any) outliers or missing data?
- How does plan performance/resource use (using o/e ratio as an indicator) differ between new plans versus returning plans?

### Proportion of Plans Submitting Any RRU Data That Have Outlier or Missing Data

Tables A-14a to A-14c (see Appendix) address the first research question, evaluating the proportion of plans submitting RRU data and additionally evaluating the percentage of those with non-outlier or complete data (i.e. they are able to satisfy all the public reporting criteria). Plans are eliminated from public reporting in the *Total Medical* category if 1) any of the O/E ratios for components of *Total Medical* or *Total Pharmacy* is less than 1/3 or greater than 3.000; 2) if their eligible population size for a measure is less than 400, or 3) if the plan is missing required quality data in their HEDIS EOC measure submission file.

Results indicated that overall returning plans were more successful in terms of not being eliminated due to outlier distribution and data completeness for both the *Total Pharmacy* and *Total Medical* O/E ratios. This was demonstrated across both reporting types (HMO and PPO).

In terms of data submissions, the count of HMOs submitting RRU HEDIS data outnumbered that of PPOs from 2009 to 2012, regardless of product line or clinical condition. Additionally, Hypertension and Diabetes had the highest counts of plans submitting RRU data for both new and returning Commercial and Medicare plans in 2012. For the Commercial product line, new PPO plans experienced an increase in the percentage of plans meeting RRU HEDIS data submission criteria for the COPD (21.8 percent), Asthma (15.9 percent) and CV Conditions (15.2 percent) measures from 2011 to 2012. New HMO plans also experienced an increase in the percentage of plans meeting data submission criteria for the Asthma measure (18.1 percent). For the Medicaid product line (HMO only), new plans experienced an increase in the percentage of plans meeting data submission criteria for Asthma (25 percent), Hypertension (20.5 percent) and CV Conditions (16.7 percent).

For the Medicare product line, there was an increase in the number of PPO submissions for all measures from 2011 to 2012. Of note was the increase in number of submissions—and a corresponding increase in percentage of plans meeting data submission criteria—for new PPOs (from 13 or 61.5 percent in 2011 to 43 or 88.4 percent in 2012) for the Diabetes measure. Similar increases were seen for both the count of submissions and percentage of new plans meeting data submission criteria for the CV conditions (38.1 percent), COPD (32.8 percent) and Hypertension (22.2 percent) measures.

These increases seen across measures for new Medicare PPOs could be due in part to changes to the financial incentives offered to plans involved in the Medicare Advantage (MA) pay-for-performance program as part of the Patient Protection and Affordable Care Act of 2010 (ACA). Prior to the ACA, the Medicare Modernization Act of 2003 required plans – regardless of performance— to pay more in comparison to traditional fee-for-service programs. Per ACA regulations, in 2012 Medicare started distributing bonuses to plans that demonstrated strong performance on clinical quality, patient experience of care and service measures based on using the five-STAR quality rating system. The STAR rating system was implemented in 2007; however due to this recent link between bonus payments and quality ratings there is increased interest among MA plans to improve performance. Additionally, Medicare highlights plans deemed to be ‘poor performers’ on the Medicare.gov plan finder as another step toward accountability for performance. These policy changes are corroborated by performance on certain HEDIS measures for Medicare Advantage plans from 2010 to 2011. Although Medicare does not require use of the RRU measures, these recent changes could have led plans to pay closer attention to the impact of efficiency measurement on cost reduction/containment in their efforts to improve.<sup>4</sup>

#### Differences between Mean O/E Ratios - New and Returning Plans

Table A-15 (Appendix A) addresses the second research question, comparing plan performance/resource use (using o/e ratio as an indicator) between new and returning plans. For this analysis, new plans were defined relative to returning plans, with the mean o/e ratio either being significantly less than that of returning plans ( $p < 0.01$ ) or significantly higher than that of returning plans ( $p < 0.01$ ).

Overall returning plans had significantly higher mean o/e ratios in comparison to new plans (regardless of reporting type, product line or measure), which is consistent with prior years’ results. Although the specific cause cannot be determined, this could be an implication of returning plans having the opportunity to evaluate and modify their performance over time versus new plans. Exceptions to this trend were seen for new Medicare PPOs and the Total ED Discharges cost component (for the Diabetes and COPD measures).

#### Additional Analyses

Throughout the year NCQA staff received feedback on the RRU HEDIS measurement set and created analysis plans intended to respond to the questions posed about possible modifications to the specifications. 2011 and 2012 were particularly active given submission of the measures for NQF endorsement and public reporting of results. Both of these processes generated a number of suggestions about potential areas of improvement for the RRU measurement set. Specific questions were asked about the possibility of reducing the minimum eligible population size in order to allow more plans to qualify for public reporting. The NQF Steering Committee also questioned allowing renal transplantation and end stage renal disease (ESRD) as diagnostic exclusions given their roles in the treatment of cardiovascular conditions and diabetes in particular. In order to address these questions, NCQA designed an analysis plan using on the RRU Research database managed by OptumInsight to answer whether these modifications were feasible and valid to make to the RRU measures.

Other analyses include:

- Cohort-specific utilization patterns to gain a better understanding of the effects (if any) of the reference population on utilization
- Pharmacy utilization patterns to learn more about patterns of prescription drug use as a driver of health care costs

---

<sup>4</sup> Cotton P, Datu B and Thomas S. 2012. Early Evidence Suggests Medicare Advantage Pay For Performance May Be Getting Results. Health Affairs. Available from: <http://healthaffairs.org/blog/2012/10/29/early-evidence-suggests-medicare-advantage-pay-for-performance-may-be-getting-results/> (December 2012).

## Eligible Population Size & Minimum Sample Size Requirement

**Research Question:** Could the minimum eligible population (EP) size requirement be lowered while retaining an acceptable standard error that is seen in larger sample sizes?

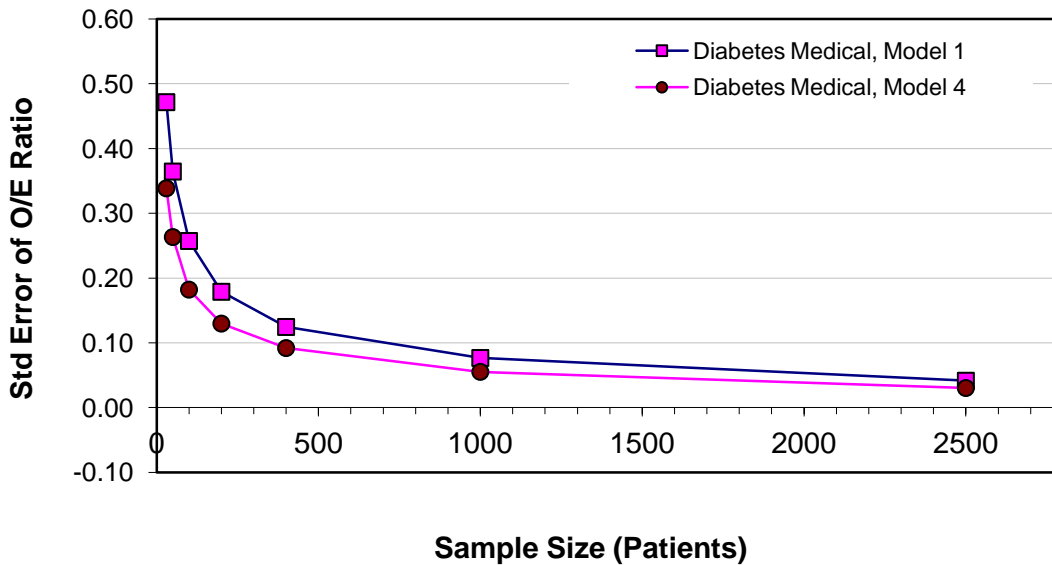
**Background:** Plan-specific confidence intervals can be calculated around the O/E ratios using standard errors that are estimated through a re-sampling technique known as bootstrapping, in which a large number of random samples of individuals (of a given size) are drawn and their total observed and expected per member per month (PMPMs) values are estimated. The standard error across the distribution of samples serves as an estimate of the true standard error. Bootstrap methods are typically used when a direct method of calculation does not exist or is prohibitively complex, which is the case with the RRU O/E ratios.

In order to determine a suitable denominator size criterion, NCQA previously conducted a bootstrap analysis for several possible risk adjustment approaches (Figure 1) in order to determine if improved precision could be achieved through a different method. These results demonstrated that a sample size of 400 was the lowest size that retained a standard error similar to that of larger sample sizes. Below 400, the estimated standard errors increase exponentially as seen in Figure 1. The difference in the two models is apparent with the curve of the RRU-HCC model slightly farther to the left opening the possibility that a smaller sample size might be specified that would allow us to decrease the requirements for the reporting program.

In 2006, under the guidance of the Efficiency Measurement Advisory Panel (EMAP) and the CPM, NCQA determined that an Age-Sex-Disease risk adjustment model was sufficiently robust for HEDIS implementation. This approach is the risk adjustment model applied to the HEDIS RRU measures (HEDIS 2007 – HEDIS 2011). The more precise HCC-RRU approach, adopted as of HEDIS 2012, allows for broader comparative analysis given the inclusion of plans with smaller EP sizes in public reporting, which is particularly relevant for conditions for which up to 40 percent of plans are eliminated from the reporting of results due to a sample size issue.

The adoption of HCC-based case-mix adjustment resulted in a more precise model for predicting utilization. It is therefore expected that the standard error of the case-mix adjusted estimates of resource use (O/E ratio) can be lowered and subsequently, the sample size required for public reporting can be smaller than the current requirement of 400.

**Figure 1: Sample Comparison of Standard Error and Sample Size (O/E Ratio) for 2008-2011 RRU Risk Adjustment Approach (Model 1) with new 2012 HCC-RRU Risk Assessment (Model 4)**



**Rationale:** NCQA is focused on providing a measurement strategy that allows for the most plans to report RRU results in a standardized and transparent fashion. Due to the larger sample size requirement, several plans are prevented from doing so; therefore this investigation is important to determine a threshold that is scientifically sound and inclusive of plans that can feasibly qualify for public reporting. As shown in Table 9, the EP size distribution among plans that submitted RRU-specific HEDIS data in 2012 varies substantially by measure. Per the highlighted columns, at least an additional 50 percent of plans (regardless of product line and reporting type) could meet a minimum EP size requirement of 200 and therefore be included in the RRU-specific HEDIS results that are publically reported by NCQA.

**Table 9: Eligible Population (EP) Size Distribution - HEDIS 2012**

Product Line	Reporting Type	Measure	Count of Plans That Submitted Any RRU Data	Count of Plans by Eligible Population Size								
				0 to 49	50 to 99	100 to 149	150 to 199	200 to 249	250 to 299	300 to 349	350 to 399	400 High
Commercial	HMO	Diabetes	182	0.5	1.1	0.0	1.6	1.6	1.1	1.6	1.6	90
		Asthma	180	6.7	10.0	7.8	5.0	5.0	5.0	6.1	5.6	48
		CV Conditions	182	4.4	7.1	5.5	5.5	4.9	4.4	4.4	3.3	60
		COPD	182	3.8	9.9	3.8	8.8	2.7	3.3	3.3	2.7	61
		Hypertension	165	0.0	0.0	0.0	0.6	0.0	0.0	0.6	1.2	97
	PPO	Diabetes	177	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.1	98
		Asthma	177	3.4	7.3	5.6	6.2	4.5	2.8	4.0	3.4	62
		CV Conditions	177	0.6	3.4	2.3	4.0	5.1	1.1	1.7	1.1	80
		COPD	177	0.6	1.7	2.8	4.0	2.8	3.4	3.4	1.7	79
		Hypertension	136	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	99
Medicare	HMO	Diabetes	152	0.0	0.7	0.0	0.7	5.3	0.7	2.6	1.3	88
		CV Conditions	152	4.6	9.2	6.6	5.3	5.9	3.3	3.3	3.9	57
		COPD	152	0.0	1.3	2.0	3.3	5.3	4.6	3.9	1.3	78
		Hypertension	148	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.7	98
	PPO	Diabetes	67	0.0	1.5	3.0	3.0	0.0	0.0	3.0	1.5	88
		CV Conditions	67	6.0	10.4	4.5	3.0	6.0	7.5	1.5	6.0	55
		COPD	67	0.0	3.0	4.5	0.0	1.5	3.0	6.0	3.0	79
		Hypertension	65	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	98
Medicaid	HMO	Diabetes	90	2.2	1.1	2.2	3.3	6.7	1.1	4.4	0.0	78
		Asthma	88	4.5	1.1	4.5	5.7	2.3	0.0	1.1	0.0	80
		CV Conditions	86	25.6	15.1	5.8	1.2	3.5	5.8	1.2	7.0	34
		COPD	91	9.9	9.9	5.5	7.7	4.4	2.2	2.2	1.1	57
		Hypertension	83	0.0	1.2	1.2	0.0	3.6	4.8	3.6	2.4	83

**Methods:** OptumInsight evaluated the minimum sample size requirement with respect to the standard error of the indexed o/e ratio for Medical and Pharmacy services for each condition using the bootstrapping sampling technique. The investigation involved the following steps:

- 1) Creation of the RRU Research Database including indications of age, gender, HCC-RRU risk and risk category, and cost and utilization measures
- 2) Segmentation of the database by data source (plan)
- 3) Creation and application of sampling strategy
  - Random selection of qualified patients to create samples of varying sizes (30, 50, 100, 200, 400, 1000, 2500)
- 4) Creation of indexed O/E ratio for Medical and Pharmacy services (for each sample)
  - Approach follows RRU measurement specifications, with the expected results being calculated using the results for all patients for a condition from database
- 5) Calculation of standard deviation across indexed O/E ratios for samples drawn (for each plan and condition and sample size)
  - Can be considered standard error of mean (for that combination of plan, condition, measure and sample size)
- 6) Summation of standard deviations across plans (for each condition and sample size)



- Estimation of true standard error

Actual and expected resource use is calculated for each member who are then randomly selected (with replacement) into hypothetical plans of specified sizes (e.g. 100, 200, 300, 400, etc.). For each hypothetical plan, observed and expected PMPMs are calculated in order to derive O/E ratios. This process is repeated upwards of 1,000 times and for each simulated sample the standard error of the estimated O/E ratio is calculated. Therefore, each sample size is given an estimated standard error for the O/E ratio.

**Results:** As seen in Table 10, based on 2012 data for each condition and sample size combination the standard error of the mean for the O/E ratio was lower for Pharmacy services in comparison to Medical services. Additionally, the size of the standard error had an indirect relationship with sample size, increasing as the sample size decreased.

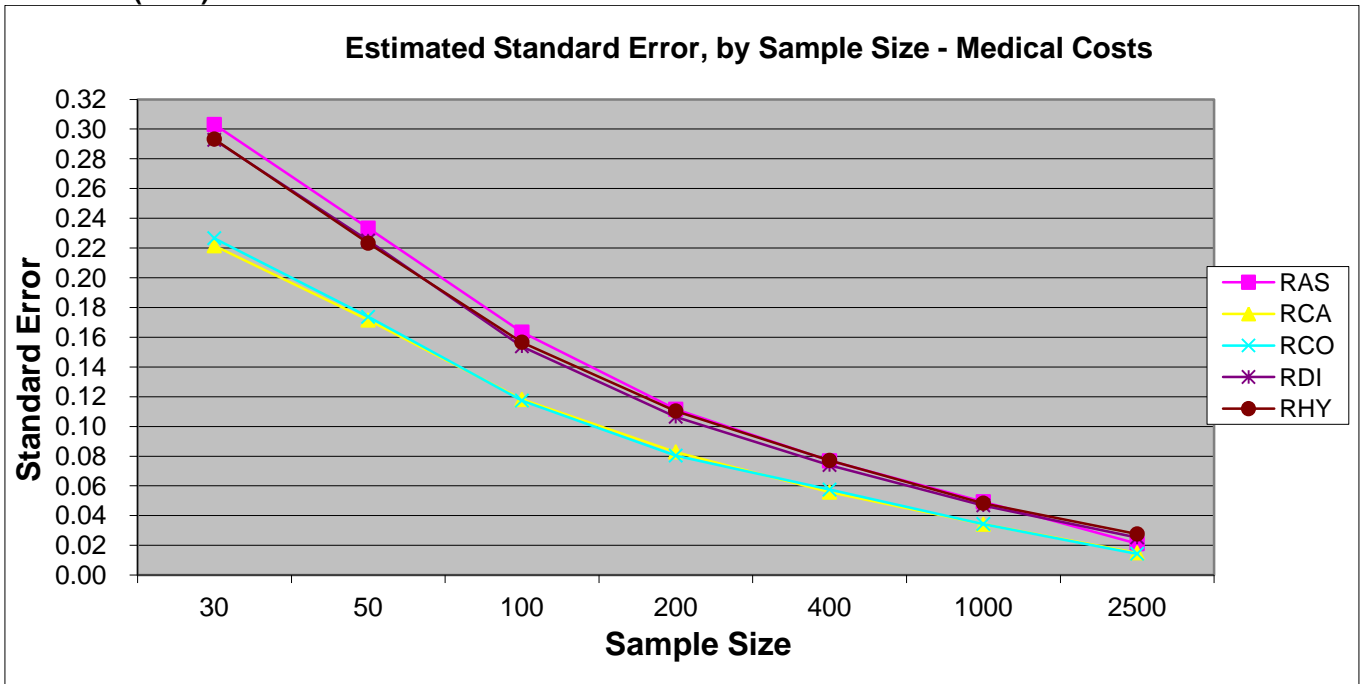
**Table 10: Mean Standard Error across Markets, by Condition and Sample Size**

Sample Size	RAS		RCA		RCO		RDI		RHY	
	MED	MED-RX	MED	MED-RX	MED	MED-RX	MED	MED-RX	MED	MED-RX
30	0.30	0.17	0.22	0.18	0.23	0.20	0.29	0.22	0.29	0.24
50	0.23	0.13	0.17	0.14	0.17	0.15	0.23	0.17	0.22	0.19
100	0.16	0.09	0.12	0.10	0.12	0.10	0.15	0.12	0.16	0.13
200	0.11	0.06	0.08	0.07	0.08	0.07	0.11	0.08	0.11	0.09
400	0.08	0.04	0.06	0.05	0.06	0.05	0.07	0.06	0.08	0.06
1000	0.05	0.03	0.03	0.03	0.03	0.03	0.05	0.04	0.05	0.04
2500	0.02	0.01	0.01	0.01	0.01	0.01	0.03	0.02	0.03	0.02

\*RAS = Asthma; RCA = Cardiovascular Conditions; RCO = COPD; RDI = Diabetes; RHY = Hypertension

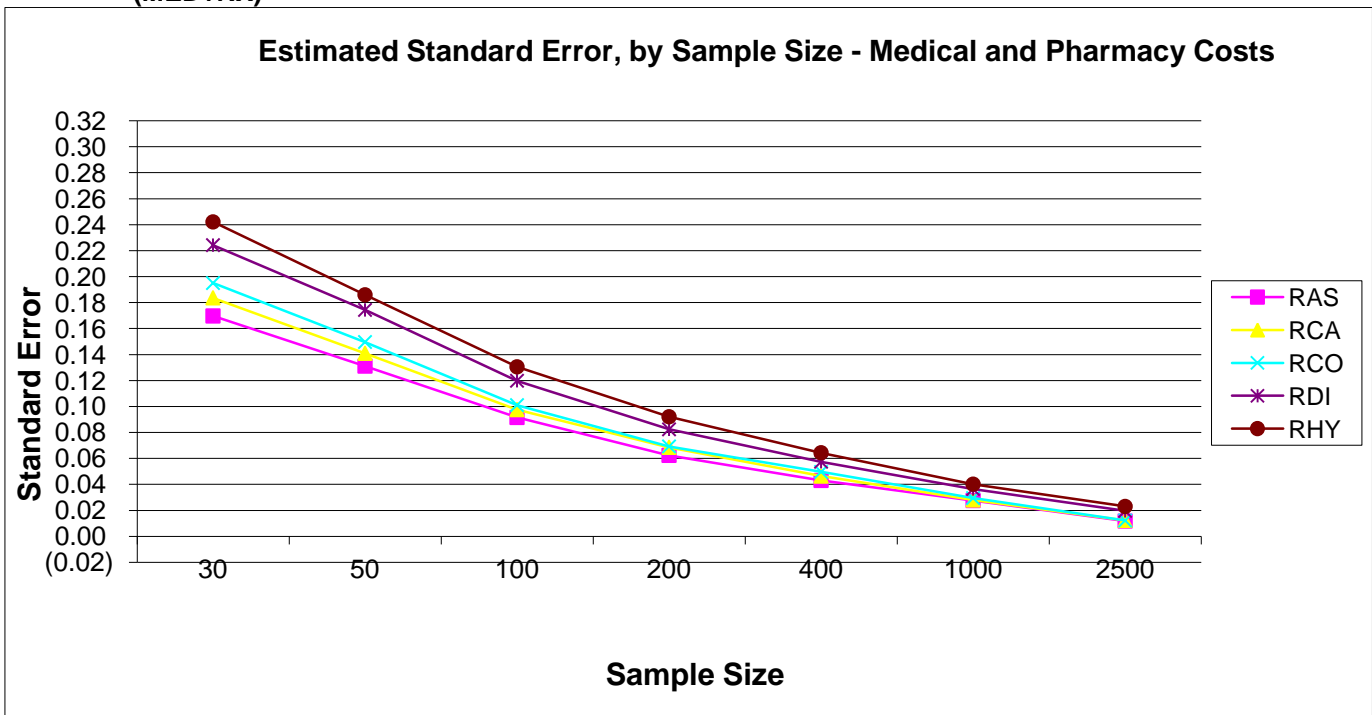
Figure 2 demonstrates that for Medical Costs, the estimated standard errors increase exponentially as the sample size decreases, with the error ranging from approximately 0.08 to 0.11 at a sample size of 200; and 0.06 to 0.08 at a sample size of 400. Additionally, there is a distinct gap between RCO and RCA and RAS, RDI and RHY; however the size of this gap decreases as the sample size increases, with the gap being approximately 0.03 for a sample size of 200; and 0.02 for a sample size of 400.

**Figure 2: Graphical Representation of Mean Standard Error across Markets, by Condition and Sample Size (MED)**



Similarly, Figure 3 demonstrates that for Pharmacy (Medical+Rx) Costs, the estimated standard errors increase exponentially as the sample size decreases, with the error ranging from approximately 0.06 to 0.09 at a sample size of 200; and 0.04 to 0.062 at a sample size of 400.

**Figure 3: Graphical Representation of Mean Standard Error across Markets, by Condition and Sample Size (MED+RX)**



**Discussion:** Results illustrate that while it is possible to lower the minimum EP size requirement from 400 to 200, there are trade-offs in terms of the standard error size and the subsequent precision of measurement, particularly given the differences seen between and within the Medical and Pharmacy categories. This demonstrates that there are two potential approaches for refining the minimum required sample size: 1) reducing the minimum across all RRU measures to a standard error size to be determined; or 2) setting a measure-specific minimum sample size that allows for a customized standard error size.

Based on the 2012 results and the additional simulations run through the RRU research database, we are proposing to modify the minimum sample size for HEDIS 2014 and post for Public Comment in spring 2013, after which NCQA staff will then review the feedback and assess the implication of this change alongside the EMAP and CPM.

### Diagnostic Exclusions

**Research Question:** Can end-stage renal disease (ESRD) and specific transplant procedures (renal) be applied only to the COPD (RCO), Asthma (RAS) and Hypertension (RHY) measures?

**Background:** The RRU measurement set requires that any patients with evidence of one or more dominant medical conditions, including active cancer, organ transplants, end stage renal disease (ESRD) or HIV/AIDS, be excluded from the cost calculations.

ESRD and renal transplants are particularly relevant to management of patients affected by diabetes and cardiovascular (CV) conditions. For diabetes, although the incidence rate of ESRD among patients diagnosed with diabetes has declined over time - from 304.5 per 100,000 individuals in 1996 to 191.9 in 2008 - diabetes continues to be a leading cause of kidney failure and related complications.<sup>5</sup> In 2008 over 48,000 people with diabetes initiated treatment for ESRD; and a total of 202,290 individuals with ESRD due to diabetes underwent chronic dialysis or had a renal transplant.<sup>6</sup> And in terms of cardiovascular (CV) conditions, chronic kidney disease (CKD) is considered a risk factor for coronary events and a subsequent increased mortality risk.<sup>7</sup> Conversely, cardiovascular disease disproportionately affects patients with CKD, with 26.0 percent of patients with CKD having a co-morbidity of cerebrovascular accidents and transient ischemic attacks; 12.5 percent with acute myocardial infarction; and 43.6 percent with congestive heart failure in 2010.<sup>8</sup>

**Methodology:** OptumInsight evaluated the prevalence and costs associated with ESRD and renal transplants for the RRU eligible population and specific cohorts of patients. The investigation involved the following steps:

1. Segmentation of the RRU research database by disease and risk cohorts
  - a. **Cohort 1:** All members for condition, including members who will be excluded
  - b. **Cohort 2:** All members after all exclusions applied
    - i. Patients with dominant conditions of active cancer, transplant status (renal), ESRD and HIV/AIDS **not included**
  - c. **Cohort 3:** All members after exclusions for ESRD and transplant status applied
    - i. Patients with dominant conditions of active cancer and HIV/AIDS **not included**
  - d. **Cohort 4:** Members with ESRD and transplant status (renal)
    - i. Patients with dominant conditions of ESRD and transplant status (renal) **included**

---

<sup>5</sup> Centers for Disease Control and Prevention. 2010. Incidence of End-Stage Renal Disease Attributed to Diabetes Among Persons With Diagnosed Diabetes --- United States and Puerto Rico, 1996—2007. MMWR. 59(42): 1361-6.

<sup>6</sup> Centers for Disease Control and Prevention. 2012. Diabetes Data and Trends: Crude and Age-Adjusted Incidence of End-Stage Renal Disease Related to Diabetes Mellitus (ESRD-DM) per 100,000 Diabetic Population, United States, 1980–2008. Available from: <http://www.cdc.gov/diabetes/statistics/esrd/fig7.htm> (December 2012).

<sup>7</sup> U.S. Renal Data System. 2012. USRDS 2012 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2012.

<sup>8</sup> Ibid 7.

2. Summary of costs (per member per month) for cohorts based on exclusions (including for ESRD and renal transplant where applicable)

**Results:** Overall ESRD and transplant status (renal) comprised small percentages of the CV conditions and Diabetes patient populations (1.5 and 1.0 respectively). However both were major contributors to costs incurred regardless of the primary condition or service category in consideration, as seen in Tables 11a to 11d below. Additionally, the largest proportion of Total Medical costs was associated with the Inpatient Facility service sub-category, most notably for the Asthma measure. Inpatient service costs were also significantly higher for Evaluation/Management services and Procedure/Surgery services for the Asthma measure. Thus collectively for the measures and with respect to Asthma, such a difference is reflective of the longer-term financial and clinical implications encountered in management of these conditions. Results for the Hypertension measure were inconclusive.

**Table 11a: Relative Cost (PMPM) Ratio of Cohort 4 to Cohort 3, Diabetes**

			Member Months		Evaluation & Management		Procedure & Surgery							
Age	Gender	# Members	Medical	Pharmacy	Inpatient	Outpatient	Inpatient	Outpatient	Total Pharmacy	Inpatient Facility	Imaging	Lab	Total Medical	Total
18-44	F	547	6,544	4,123	8.9	1.7	8.8	4.3	3.8	7.5	1.8	3.5	5.3	4.8
18-44	M	694	8,303	5,389	10.9	2.1	12.8	6.9	3.3	12.2	3.9	5.9	8.5	6.3
45-54	F	1,060	12,703	7,461	9.6	1.6	6.5	3.7	2.7	9.1	1.9	3.7	5.6	4.6
45-54	M	1,548	18,533	12,060	9.5	2.0	7.1	5.2	2.7	9.3	3.1	4.5	6.5	4.9
55-64	F	1,947	23,338	13,273	9.4	1.6	5.3	3.7	2.2	8.4	1.9	3.4	5.4	4.2
55-64	M	2,958	35,435	21,095	8.0	1.8	5.4	3.8	2.2	7.4	2.5	3.4	5.3	4.1
Total		8,754	104,856	63,401	9.1	1.8	6.4	4.2	2.6	8.5	2.3	3.8	5.8	4.6

**Cohort 3:** All members after exclusions for ESRD and transplant status applied (Patients with dominant conditions of active cancer and HIV/AIDS not included)

**Cohort 4:** Members with ESRD and transplant status (renal) (Patients with dominant conditions of ESRD and transplant status (renal) included)

**Table 11b: Relative Cost (PMPM) Ratio of Cohort 4 to Cohort 3, Asthma**

			Member Months		Evaluation & Management		Procedure & Surgery							
Age	Gender	# Members	Medical	Pharmacy	Inpatient	Outpatient	Inpatient	Outpatient	Total Pharmacy	Inpatient Facility	Imaging	Lab	Total Medical	Total
18-44	F	11	132	132	10.7	1.7	10.9	2.7	3.0	7.4	2.2	2.6	4.2	3.7
18-44	M	10	120	120	37.7	3.6	30.3	5.4	3.1	15.6	8.5	9.2	9.8	6.0
45-54	F	21	252	252	11.7	2.1	5.2	4.1	2.2	11.1	2.4	3.0	5.3	3.7
45-54	M	19	228	228	28.1	2.1	9.1	5.2	2.6	23.9	2.9	3.0	10.2	5.9
55-64	F	24	288	288	18.0	1.6	2.5	1.6	2.4	10.3	1.6	2.9	4.5	3.4
55-64	M	20	240	240	16.9	2.3	16.9	4.4	2.3	17.2	3.9	5.0	8.4	5.0
Total		105	1,260	1,260	19.00	2.13	10.03	3.95	2.67	14.16	2.76	3.77	6.80	4.66

**Cohort 3:** All members after exclusions for ESRD and transplant status applied (Patients with dominant conditions of active cancer and HIV/AIDS not included)

**Cohort 4:** Members with ESRD and transplant status (renal) (Patients with dominant conditions of ESRD and transplant status (renal) included)



**Table 11c: Relative Cost (PMPM) Ratio of Cohort 4 to Cohort 3, CV Conditions**

			Member Months		Evaluation & Management		Procedure & Surgery							
Age	Gender	# Members	Medical	Pharmacy	Inpatient	Outpatient	Inpatient	Outpatient	Total Pharmacy	Inpatient Facility	Imaging	Lab	Total Medical	Total
18-44	F	56	672	396	4.5	1.3	4.5	3.1	2.1	4.9	1.3	2.9	3.9	3.6
18-44	M	81	971	540	4.8	1.8	4.0	5.9	2.8	4.7	2.3	4.4	4.3	4.0
45-54	F	241	2,892	1,680	4.5	1.5	3.8	2.9	2.6	4.4	1.6	3.5	3.6	3.3
45-54	M	400	4,797	2,914	5.7	1.9	3.8	4.4	2.2	5.0	2.5	4.4	4.4	3.7
55-64	F	566	6,791	3,851	5.3	1.5	3.8	3.2	2.0	4.9	1.6	3.0	3.8	3.3
55-64	M	1,234	14,805	8,901	6.3	1.8	3.8	3.5	2.1	5.7	2.0	3.5	4.5	3.7
Total		2,578	30,928	18,282	5.79	1.73	3.83	3.57	2.17	5.27	1.97	3.56	4.27	3.65

**Cohort 3:** All members after exclusions for ESRD and transplant status applied (Patients with dominant conditions of active cancer and HIV/AIDS not included)

**Cohort 4:** Members with ESRD and transplant status (renal) (Patients with dominant conditions of ESRD and transplant status (renal) included)

**Table 11d: Relative Cost (PMPM) Ratio of Cohort 4 to Cohort 3, COPD**

			Member Months		Evaluation & Management		Procedure & Surgery							
Age	Gender	# Members	Medical	Pharmacy	Inpatient	Outpatient	Inpatient	Outpatient	Total Pharmacy	Inpatient Facility	Imaging	Lab	Total Medical	Total
18-44	F	19	227	167	6.5	1.4	6.4	3.9	3.8	7.1	1.7	3.8	5.1	4.8
18-44	M	17	204	84	10.6	2.1	8.2	6.2	4.5	12.0	2.6	4.9	8.6	7.7
45-54	F	176	2,112	1,248	7.1	1.5	4.9	2.9	2.3	7.4	1.9	3.3	5.2	4.5
45-54	M	212	2,541	1,641	6.8	1.7	5.3	4.0	2.6	7.1	2.5	4.0	5.6	4.9
55-64	F	456	5,470	3,082	6.3	1.4	4.8	3.1	1.8	6.5	1.7	3.1	4.8	4.0
55-64	M	617	7,399	4,473	5.7	1.7	4.2	3.0	2.3	5.5	2.0	3.0	4.4	3.9
Total		1,497	17,953	10,695	6.38	1.58	4.83	3.23	2.25	6.46	1.88	3.24	4.90	4.25

**Cohort 3:** All members after exclusions for ESRD and transplant status applied (Patients with dominant conditions of active cancer and HIV/AIDS not included)

**Cohort 4:** Members with ESRD and transplant status (renal) (Patients with dominant conditions of ESRD and transplant status (renal) included)

**Discussion:** Results illustrate that although the prevalence of the Diabetes and CV conditions with a co-morbid condition of ESRD and transplant status (renal) is small, these services contribute significantly to costs associated with medical care. Including them as separate service sub-categories within the Total Medical category provides an opportunity to evaluate their effects on medical care costs and resource use further. This inclusion could result in a significant shift in performance/resource use (as indicated by two or more quartile shifts in o/e ratio results) as these categories have high potential for increased utilization.

Based on the additional analyses run through the RRU research database, we are proposing to remove end-stage renal disease and specific transplant procedures (renal) from the mandatory exclusions list and apply them only to the COPD (RCO), Asthma (RAS) and Hypertension (RHY) measures for HEDIS 2014.

#### Cohort-specific Utilization

**Research Question:** What is the distribution and apparent impact of health plan member characteristics on resource use?

**Rationale:** This analysis helped with understanding the size of the reference population used for case-mix adjustment as well as the impact that the member characteristics (age, gender, and HCC risk category) have on resource use.

**Results:** For the *Total Medical* service category, the weighted average PMPM utilization increases with increasing HCC risk category, with the exception of HCC categories 1 and 2 which tend to either zero out or fluctuate in comparison to the observed pattern. Utilization also increased with increasing age strata, with the exception of the Diabetes and Hypertension measures which both illustrated decreases in the 45-54 age cohort for the Medicare product line; and COPD which demonstrated a decrease in the 75+ age cohort for the Medicaid and Medicare product lines. And with respect to gender, the weighted average PMPM utilization was generally higher among females than males for Asthma and Diabetes; and lower for CV conditions, hypertension and COPD with the exception of the Medicare product line.

For the *Total Pharmacy* service category, the weighted average PMPM utilization increases with increasing HCC risk category, with the exception of categories 1 and 2 which tend to either zero out or fluctuate in comparison to the observed pattern. Utilization also increased with increasing age strata, with the exception of Diabetes, COPD, Hypertension and CV conditions which illustrated decreases in the 45-54 age cohort for the Medicare product line. And with respect to gender, the weighted average PMPM utilization was generally higher among females than males for Asthma and Diabetes; and lower for CV conditions with the exception of the Medicare product line.

**Discussion:** Results indicated that age and HCC risk category both have a direct relationship with the weighted average PMPM utilization, with utilization increasing with an increase in category and age. Gender-specific trends tend to vary depending on the condition. Moving forward, the national weighted PMPMs can be compared with previous years which will provide an indication of how stable the effects of member characteristics on resource use.



## Pharmacy Utilization

**Research Question:** What are some of the patterns (if any) seen in pharmacy utilization?

**Rationale:** Prescription drugs are vital, playing a role in disease prevention and management as well as management of health care costs for patients. Given the rising drug costs over time, along with expansion of health insurance coverage to a larger population, it is critical to evaluate patterns in prescription drug use in order to gain a better understanding of the pharmaceutical market.

Prescription drug use accounts for a rapidly increasing percentage of total medical expenditures, contributing to 13 percent of the total growth in national health care expenditures in 2008.<sup>9</sup> The total expenditure for prescription drugs at \$234.1 billion for 2008, approximately six times the amount spent in 1990. In 2004, generic drugs constituted about half of the nation's 3.6 billion prescriptions. It has been estimated that the United States could save approximately \$8.8 billion dollars a year or 11 percent of total drug expenditures if adults substituted generic medications for name-brand drugs.<sup>10</sup> As cross sectional study examining generic substitution rates determined that fifty-six percent of all outpatient drugs were multisource products; of these, 61 percent were dispensed as a generic.<sup>11</sup>

While controversy persists about the bioequivalence (release of a drug's active ingredient into the bloodstream at virtually the same speed and in virtually the same amounts as the original drug) of a small number of medications, most generic drugs have the same active ingredient and provide identical therapeutic benefit when compared with their name-brand counterparts.<sup>12</sup> Because they have the same active ingredients, generic drugs are equivalent to name-brand drugs in dosage, safety, strength, quality, bodily effect, and exhibit the same risk and benefits. Some drugs are only available in their name-brand form due to their patent protection status. In particular, when new drugs are first made they have drug patent that are usually intact for 17 years. The patent protects the company that made the drug first and does not allow anyone else to produce and distribute the drug. When the patent expires, other drug companies are legally allowed to start selling the generic version of the drug, pending testing and FDA approval.<sup>13</sup>

**Background:** For the HEDIS 2012 RRU measurement set, NCQA updated the pharmacy reporting category to reflect both generic and name-brand prescription utilization, collecting data separately for all measures. Health plans were required to categorize the pharmacy utilization of health plans members by the NDC classification flags that were appended to the Pharmacy Standard pricing Tables (SPT). Health plans typically refer to large national pharmacy databases to determine the costs and/or reimbursement rates for medications. These pharmacy databases contain a field that indicates in which of the three categories (name brand - patent protection intact, name brand - patent protection lost, or generic) a particular National Drug Code (NDC) belongs. In some cases, different national pharmacy databases have differing information in this field, as evidenced by the fact that health plans will override the point-of-service drug categorization to determine payment. To provide consistency and accuracy for pharmacy utilization, NCQA categorizes each drug's NDC code into the following categories:

- Name brand only (N1)
- Name brand—Generic exists (N2)

---

<sup>9</sup> Kaiser Family Foundation. 2010. Prescription Drug Trends Fact Sheet. Available from: <http://www.kff.org/rxdrugs/upload/3057-08.pdf> (December 2012).

<sup>10</sup> Steinman MA, Chren MC and Landefeld S. 2007. What's in a Name? Use of Brand versus Generic Drug Names in United States Outpatient Practice. *J Gen Intern Med.* 22(5): 645–8.

<sup>11</sup> Haas JS, Phillips KA, Gerstenberger EP and Seger AC. 2005. Potential Savings with Substitution of Generic Drugs for Brand-Name Drugs. *Ann Intern Med.* 142:1-30

<sup>12</sup> Fischer MA and Avorn J. 2003. Economic Consequences of Underuse of Generic Drugs: Evidence from Medicaid and Implications for Prescription Drug Benefit Plans. *Health Serv Res.* 38(4): 1051–64.

<sup>13</sup> U.S. Department of Health and Human Services. Food and Drug Administration. 2009. Facts About Generic Drugs., Available from: <http://www.fda.gov/Drugs/EmergencyPreparedness/BioterrorismAndDrugPreparedness/ucm134010.htm> (July 2009).

- Generic only (G1)
- Generic name—Name brand exists (G2)

Where G1 is the count of prescriptions that are only offered as generics; G2 is the count of generic prescriptions written when a name-brand exists; N1 is the number of prescriptions that are only offered as name brand; and N2 is the number of name brand prescriptions written when a generic option exists.

**Methodology:** NCQA uses this information to compute the following four prescription utilization rates for each HCC risk cohort:

1. Total Prescriptions = N1 + N2 + G1 + G2
2. Generic Utilization Rate - Percentage of generics prescribed out of all prescriptions where a generic option was available.

$$\text{Generic Utilization Rate}^{14} = \frac{G1+G2}{N2+G1+G2}$$

*The numerator for this rate includes (1) multisource drugs that are dispensed as generics and (2) drugs only available as generics. The denominator includes both multisource and generic-only drugs. Name-brand-only drugs are not included in the numerator or denominator.*

3. Generic Substitution Rate - Percentage of drugs that were dispensed as generics among multisource drugs.

$$\text{Generic Substitution Rate} = \frac{G1}{N2+G1}$$

*This rate indicates the proportion of generic use when substitutes between name-brand and generics exist.*

4. Overall Generic Utilization Rate - Percentage of generic prescriptions out of all health plan prescriptions

$$\text{Overall Generic Utilization Rate} = \frac{G1+G2}{N1+N2+G1+G2}$$

*This rate does not take into account that some drugs have no generic available but does describe the overall utilization of generics. When subtracted from 100, this rate will indicate the name-brand utilization rate.*

**Results:** Tables 12a to 12e below present the percentile distribution of the HEDIS 2012 pharmacy data by clinical condition. Additional information on the correlation coefficients for the generic use rates with quality metrics, RRU, and the other generic rates included in this analysis (Tables A-16a to A-16e) can be found in the Appendix. For those analyses, correlations were defined as moderate to strong positive correlation (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.05*) or moderate to strong negative correlation (*Spearman correlation coefficient < -0.30 with a p-value < 0.05*).

The analyses in Tables A-16a to A-16e include the following metrics:

- 1) Total Medical and Total Pharmacy O/E
- 2) Total Inpatient Discharges (O/E)
- 3) Total ED Discharges (O/E)
- 4) Total Prescription Rate Per Member Per Month (PMPM)
- 5) Generic Utilization Provided Generic Option Exists (GU)
- 6) Generic Substitution Rate (GSR)
- 7) Overall Generic Utilization (OGU)
- 8) RRU Measure-Specific Quality Composite (RRU-Q)
- 9) All-Cause 30-Day Readmission Rate – Commercial – 18-64 (PCR18) *Commercial, only*
- 10) All-Cause 30-Day Readmission Rate – Medicare – 65 and Older (PCR65) *Medicare, only*
- 11) Medication Management for People With Asthma – 50% (MMA50) *Commercial and Medicaid, only*
- 12) Medication Management for People With Asthma – 75% (MMA75) *Commercial and Medicaid, only*

---

<sup>14</sup> Given existence of generic option

**Table 12a: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Diabetes**

Product Line	Reporting Type	Metric	Mean	Percentile Distribution				
				10th	25th	50th	75th	90th
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	3.6	2.4	2.7	3.7	4.1	4.7
		Generic Utilization, provided generic option exists	93.1	84.0	93.3	94.8	95.7	96.4
		Generic Substitution Rate	92.0	78.9	92.7	94.3	95.3	96.0
		Overall Generic Utilization	69.2	58.3	65.5	70.2	73.9	76.8
		RRU Quality Composite	63.7	54.2	58.9	64.1	69.6	73.3
	PPO	Total Prescriptions Per Member Per Month (PMPM)	3.3	2.4	2.5	3.2	3.8	4.3
		Generic Utilization, provided generic option exists	91.1	80.2	83.9	94.5	95.2	95.8
		Generic Substitution Rate	88.9	73.2	77.8	94.1	94.8	95.4
		Overall Generic Utilization	65.4	55.3	57.8	67.2	70.7	73.0
		RRU Quality Composite	58.5	52.9	54.7	58.6	61.8	66.1
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	5.2	3.7	4.3	4.9	6.2	6.9
		Generic Utilization, provided generic option exists	93.8	92.2	93.1	94.0	94.8	95.2
		Generic Substitution Rate	93.0	91.2	92.2	93.3	94.2	94.7
		Overall Generic Utilization	77.2	69.5	74.3	77.4	80.4	83.2
		RRU Quality Composite	54.7	44.7	49.7	54.6	60.9	65.1
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	5.6	2.7	4.9	5.4	5.9	7.2
		Generic Utilization, provided generic option exists	94.1	86.3	94.8	95.8	96.5	96.9
		Generic Substitution Rate	93.1	85.4	94.1	95.4	96.1	96.6
		Overall Generic Utilization	77.2	65.0	75.7	78.7	82.1	83.8
		RRU Quality Composite	70.9	61.0	65.7	71.6	76.5	80.4
	PPO	Total Prescriptions Per Member Per Month (PMPM)	5.4	4.1	5.0	5.5	5.9	6.3
		Generic Utilization, provided generic option exists	95.2	94.0	95.7	96.2	96.7	97.0
		Generic Substitution Rate	94.4	93.5	95.2	95.9	96.4	96.7
		Overall Generic Utilization	77.7	69.4	76.6	80.4	81.6	82.5
		RRU Quality Composite	69.1	61.0	64.9	68.9	73.8	77.7

**Table 12b: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Asthma**

Product Line	Reporting Type	Metric	Mean	Percentile Distribution				
				10th	25th	50th	75th	90th
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	2.8	2.0	2.4	2.8	3.1	3.3
		Generic Utilization, provided generic option exists	79.3	65.8	76.8	81.2	83.7	85.7
		Generic Substitution Rate	75.9	54.5	74.5	78.7	81.6	83.8
		Overall Generic Utilization	50.5	44.0	46.8	50.6	53.8	56.2
		RRU Quality Composite	91.9	88.9	90.9	92.3	93.9	95.2
		Medication Management for People With Asthma - 50% Compliance	65.0	55.9	61.1	65.2	69.2	72.8
		Medication Management for People With Asthma - 75% Compliance	41.2	30.8	35.8	41.2	45.4	50.5
	PPO	Total Prescriptions Per Member Per Month (PMPM)	2.7	1.9	2.3	2.7	3.1	3.2
		Generic Utilization, provided generic option exists	75.8	64.2	69.2	78.1	80.6	83.0
		Generic Substitution Rate	70.8	52.5	57.1	75.4	78.3	80.9
		Overall Generic Utilization	47.8	42.9	44.8	47.3	50.4	53.0
		RRU Quality Composite	91.6	89.0	90.5	91.8	93.0	93.9
		Medication Management for People With Asthma - 50% Compliance	66.4	61.3	63.0	66.3	69.2	71.4
		Medication Management for People With Asthma - 75% Compliance	42.5	36.2	38.7	41.9	45.7	48.4
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	2.8	2.0	2.3	2.7	3.1	3.7
		Generic Utilization, provided generic option exists	78.6	72.6	75.6	79.4	82.1	84.0
		Generic Substitution Rate	75.5	68.5	72.0	76.5	79.5	81.5
		Overall Generic Utilization	57.6	48.7	52.9	57.3	61.8	67.5
		RRU Quality Composite	85.0	79.7	82.5	85.9	88.2	90.6
		Medication Management for People With Asthma - 50% Compliance	52.3	42.9	47.3	52.3	57.0	62.4
		Medication Management for People With Asthma - 75% Compliance	30.3	20.4	24.6	29.1	33.7	40.2

**Table 12c: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Cardiovascular Conditions**

Product Line	Reporting Type	Metric	Mean	Percentile Distribution				
				10th	25th	50th	75th	90th
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	4.3	2.6	3.2	4.4	4.9	5.4
		Generic Utilization, provided generic option exists	93.3	85.1	93.0	95.0	95.9	96.6
		Generic Substitution Rate	92.0	79.6	92.2	94.5	95.5	96.2
		Overall Generic Utilization	65.3	55.5	61.4	65.9	69.4	72.8
		RRU Quality Composite	76.2	69.0	73.6	76.8	80.5	83.9
	PPO	Total Prescriptions Per Member Per Month (PMPM)	3.8	2.6	2.8	3.8	4.4	4.9
		Generic Utilization, provided generic option exists	91.3	80.1	85.3	94.5	95.5	96.5
		Generic Substitution Rate	88.9	71.9	79.7	93.9	95.0	96.1
		Overall Generic Utilization	61.9	53.9	55.9	62.8	66.6	68.5
		RRU Quality Composite	67.5	54.2	58.6	69.9	73.6	77.4
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	6.9	4.8	5.5	6.7	8.3	9.0
		Generic Utilization, provided generic option exists	94.1	92.5	93.3	94.1	95.2	96.0
		Generic Substitution Rate	93.4	91.5	92.4	93.3	94.6	95.5
		Overall Generic Utilization	76.0	68.6	73.4	75.6	79.9	82.7
		RRU Quality Composite	67.7	60.2	63.7	67.8	71.0	74.9
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	5.7	2.8	5.0	5.6	6.2	7.3
		Generic Utilization, provided generic option exists	94.1	88.0	94.3	95.7	96.5	97.0
		Generic Substitution Rate	93.0	86.9	93.8	95.3	96.2	96.8
		Overall Generic Utilization	75.3	65.3	73.7	76.8	79.6	82.2
		RRU Quality Composite	77.5	69.7	73.8	78.2	81.5	85.0
	PPO	Total Prescriptions Per Member Per Month (PMPM)	5.3	4.1	4.9	5.4	5.9	6.4
		Generic Utilization, provided generic option exists	95.1	93.1	95.4	96.3	96.8	97.2
		Generic Substitution Rate	94.3	92.4	94.9	95.9	96.6	97.0
		Overall Generic Utilization	75.5	65.3	73.8	77.6	80.1	81.2
		RRU Quality Composite	77.0	70.2	73.5	77.2	80.8	83.9

**Table 12d: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: COPD**

Product Line	Reporting Type	Metric	Mean	Percentile Distribution				
				10th	25th	50th	75th	90th
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	3.8	2.7	3.1	3.8	4.3	4.9
		Generic Utilization, provided generic option exists	89.5	77.1	89.2	91.8	92.8	93.8
		Generic Substitution Rate	87.3	68.9	87.9	90.8	91.8	93.1
		Overall Generic Utilization	66.6	55.4	63.6	68.2	70.4	72.6
		RRU Quality Composite	59.8	52.7	56.1	59.3	62.6	66.4
	PPO	Total Prescriptions Per Member Per Month (PMPM)	3.6	2.8	2.9	3.3	4.0	4.4
		Generic Utilization, provided generic option exists	86.9	73.0	76.7	91.1	92.0	92.6
		Generic Substitution Rate	83.2	61.5	66.0	90.0	91.0	91.7
		Overall Generic Utilization	63.8	53.0	55.4	66.5	69.2	70.8
		RRU Quality Composite	57.0	50.0	53.2	57.4	60.1	63.5
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	5.9	3.8	5.0	5.8	6.9	8.1
		Generic Utilization, provided generic option exists	90.9	89.4	90.2	91.1	92.5	93.2
		Generic Substitution Rate	89.5	88.0	88.6	89.8	91.5	92.2
		Overall Generic Utilization	74.4	68.8	72.0	73.9	77.7	81.0
		RRU Quality Composite	52.9	45.2	48.3	53.0	57.0	60.8
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	5.6	3.1	4.6	5.1	5.9	6.6
		Generic Utilization, provided generic option exists	91.7	84.1	92.0	93.5	94.5	95.1
		Generic Substitution Rate	90.0	82.5	91.1	92.8	93.9	94.5
		Overall Generic Utilization	74.1	60.6	72.9	75.5	78.5	80.6
		RRU Quality Composite	54.4	45.8	50.3	54.4	58.7	63.0
	PPO	Total Prescriptions Per Member Per Month (PMPM)	5.1	3.6	4.6	5.2	5.6	6.1
		Generic Utilization, provided generic option exists	93.2	92.1	93.5	94.5	94.9	95.2
		Generic Substitution Rate	92.0	91.3	92.7	93.9	94.3	94.7
		Overall Generic Utilization	75.0	68.5	73.9	76.9	78.8	80.0
		RRU Quality Composite	54.4	47.7	51.6	54.4	57.2	60.5

**Table 12e: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Hypertension**

Product Line	Reporting Type	Metric	Mean	Percentile Distribution				
				10th	25th	50th	75th	90th
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	3.2	2.3	2.5	3.2	3.7	4.1
		Generic Utilization, provided generic option exists	93.1	83.7	93.1	94.9	95.8	96.2
		Generic Substitution Rate	91.6	77.2	92.3	94.3	95.3	95.8
		Overall Generic Utilization	73.3	61.7	69.5	74.4	78.5	81.4
		RRU Quality Composite	65.4	54.2	61.1	66.3	70.5	76.2
	PPO	Total Prescriptions Per Member Per Month (PMPM)	3.1	2.2	2.4	2.9	3.2	3.7
		Generic Utilization, provided generic option exists	92.0	81.2	92.6	94.5	95.2	95.7
		Generic Substitution Rate	90.1	73.9	91.7	93.9	94.7	95.2
		Overall Generic Utilization	70.0	58.2	64.2	71.9	75.5	77.9
		RRU Quality Composite	58.4	45.5	51.4	59.9	65.3	68.2
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	4.8	3.5	4.1	4.6	5.7	6.3
		Generic Utilization, provided generic option exists	94.2	93.1	93.5	94.3	95.2	95.6
		Generic Substitution Rate	93.3	92.0	92.5	93.4	94.5	94.9
		Overall Generic Utilization	80.7	74.7	78.4	80.8	83.8	86.0
		RRU Quality Composite	56.8	42.2	50.0	57.5	63.6	69.1
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	4.8	2.6	4.2	4.7	5.2	5.8
		Generic Utilization, provided generic option exists	94.1	85.9	94.8	95.8	96.5	97.0
		Generic Substitution Rate	93.0	84.8	94.1	95.3	96.1	96.6
		Overall Generic Utilization	78.7	64.5	77.2	80.2	83.8	85.3
		RRU Quality Composite	64.0	50.2	57.9	64.4	70.9	75.5
	PPO	Total Prescriptions Per Member Per Month (PMPM)	4.7	3.7	4.3	4.8	5.1	5.4
		Generic Utilization, provided generic option exists	95.3	94.1	95.6	96.3	96.8	97.1
		Generic Substitution Rate	94.5	93.5	95.2	95.9	96.5	96.8
		Overall Generic Utilization	79.4	72.8	78.4	81.6	83.3	84.2
		RRU Quality Composite	60.6	49.1	54.2	60.7	67.5	70.9

**Results and Discussion:** Overall the percentile distribution data demonstrated that the distributions were skewed toward the higher percentiles for all rates across clinical conditions, product lines and reporting types. Additionally the means for the Asthma and COPD measures were lower in comparison to the Diabetes, Hypertension and CV Conditions measures. In terms of relationships between rates, generally speaking the data indicates an association between higher prescription rates and higher generic utilization. Moreover, the data empirically demonstrates direct relationships between the generic utilization (GU) and the overall generic utilization (OGU) rates, with the OGU rate being smaller than GU and both rates being marginally larger than the generic substitution rate (GSR).

For Tables A-16a to A-16e, correlations were inconsistent with respect to occurrence and directionality across clinical conditions and are thusly inconclusive at this time.

## Conclusion

Results of the sixth year analyses of the RRU measurement set illustrate the following overall findings:

- HMO plans continue to have higher data submission counts for both HEDIS data and RRU-specific data than PPO plans.
- Meeting the minimum EP size requirement continues to be the primary reason that plans do not meet public reporting status.
- Relative Resource Use for People with COPD (RCO) is the measure with the highest proportion of data missing from the corresponding EOC quality measures.
- The majority of plans' o/e results for Total Pharmacy and Total Medical stayed within or moved no more than one quartile regardless of product line, reporting type or disease condition.
- Correlation analyses demonstrated the increased precision of the updated risk adjustment model, with new positive and negative correlations emerging in 2012 while others remained unchanged or subsided.
- Returning plans were more successful in terms of not being eliminated due to outlier distribution and data completeness for both the *Total Pharmacy* and *Total Medical* O/E ratios. This was demonstrated across both reporting types (HMO and PPO).
- The increase in count of new Medicare PPOs (defined as new based on submissions associated with plan sub\_ID from 2009 to 2012) from 2011 to 2012 could be due in part to changes to the financial incentives offered to plans involved in the Medicare Advantage pay-for-performance program, as established by the Patient Protection and Affordable Care Act of 2010 (ACA).
- Successfully lowering the minimum sample size requirement from 400 to 200 will require one of two potential approaches: 1) reducing the minimum across all RRU measures to a standard error size to be determined; or 2) setting a measure-specific minimum sample size that allows for a customized standard error size.
- Given their contributions to medical care associated with Diabetes and CV Conditions, inclusion of end stage renal disease and specific transplant procedures (renal) as service categories for the RDI and RCA measures provides an opportunity to evaluate their effects on medical care costs and resource use further.
- For cohort-specific utilization patterns, increases in utilization per health plan member were noted alongside increasing age and HCC risk cohort in both the Total Medical and Total Pharmacy categories. Moving forward, the national weighted PMPMs can be compared with previous years which will provide an indication of how stable the effects of member characteristics on resource use.
- For pharmacy utilization patterns, generally speaking the data indicates an association between higher prescription rates and higher generic utilization. Correlation coefficients for the generic use rates with quality metrics, RRU, and the other generic rates across clinical conditions were inconclusive.



Appendix -Supplemental Data Tables

**Table A-4: Number and Percentage of Plans Submitting RRU HEDIS data as a Percent of All HEDIS Submissions (by Product Line, Reporting Type and Clinical Condition)–2009-2012**

Product Line	Condition	Reporting Type	Number and Percentage of plans reporting RRU							
			2009		2010		2011		2012	
			Count	%	Count	%	Count	%	Count	%
Commercial	Diabetes	HMO	204	79.1	217	88.2	210	86.8	182	82.4
		PPO	137	74.5	131	71.6	163	94.8	177	93.7
	Asthma	HMO	205	79.5	216	87.8	210	86.8	180	81.4
		PPO	138	75.0	132	72.1	163	94.8	177	93.7
	Cardiovascular	HMO	204	79.1	215	87.4	210	86.8	182	82.4
		PPO	136	73.9	131	71.6	163	94.8	177	93.7
	COPD	HMO	204	79.1	216	87.8	210	86.8	182	82.4
		PPO	136	73.9	132	72.1	163	94.8	177	93.7
	Hypertension	HMO	199	77.1	213	86.6	191	78.9	165	74.7
		PPO	3	1.6	43	23.5	91	52.9	136	72.0
Medicare	Diabetes	HMO	145	51.4	131	44.0	131	41.7	152	48.1
		PPO	20	21.5	31	28.2	32	25.0	67	48.2
	Cardiovascular	HMO	142	50.4	130	43.6	131	41.7	152	48.1
		PPO	20	21.5	29	26.4	31	24.2	67	48.2
	COPD	HMO	138	48.9	130	43.6	131	41.7	152	48.1
		PPO	20	21.5	29	26.4	31	24.2	67	48.2
	Hypertension	HMO	135	47.9	125	41.9	130	41.4	148	46.8
		PPO	1	1.1	22	20.0	31	24.2	65	46.8
Medicaid	Diabetes	HMO	84	51.5	94	55.0	99	53.8	90	47.1
		PPO	0	0.0	0	0.0	0	0.0	0	0.0
	Asthma	HMO	82	50.3	90	52.6	98	53.3	88	46.1
		PPO	0	0.0	0	0.0	0	0.0	0	0.0
	Cardiovascular	HMO	83	50.9	91	53.2	98	53.3	86	45.0
		PPO	0	0.0	0	0.0	0	0.0	0	0.0
	COPD	HMO	87	53.4	93	54.4	97	52.7	91	47.6
		PPO	0	0.0	0	0.0	0	0.0	0	0.0
	Hypertension	HMO	79	48.5	88	51.5	95	51.6	83	43.5
		PPO	0	0.0	0	0.0	0	0.0	0	0.0

**Table A-6a: Quartile Shifts - Proportion of Plans with O/E Ratios that changed by less than One Quartile between Successive Years – 2012 v. 2011**

Measure	Product Line	Percent of Plans (No more than 1 quartile change)							
		2012 vs. 2011							
		HMOs				PPOs			
		Total Medical		Total Pharmacy		Total Medical		Total Pharmacy	
		Count of Plans	% of Plans	Count of Plans	% of Plans	Count of Plans	% of Plans	Count of Plans	% of Plans
RDI	Commercial	116	76.7	129	94.6	75	81.3	75	94.7
	Medicare	74	81.1	83	94.0	13	76.9	13	100.0
	Medicaid	44	70.5	55	94.5	0	0.0	0	0.0
RAS	Commercial	58	81.0	65	87.7	51	94.1	58	98.3
	Medicaid	38	86.8	54	94.4	0	0.0	0	0.0
RCA	Commercial	82	78.0	88	89.8	82	75.6	82	87.8
	Medicare	50	82.0	56	94.6	6	33.3	6	100.0
	Medicaid	17	82.4	23	87.0	0	0.0	0	0.0
RCO	Commercial	56	85.7	63	90.5	52	67.3	53	88.7
	Medicare	60	83.3	67	92.5	8	100.0	8	100.0
	Medicaid	35	77.1	43	83.7	0	0.0	0	0.0
RHY	Commercial	116	81.0	127	90.6	62	82.3	62	93.5
	Medicare	69	73.9	77	87.0	14	78.6	15	93.3
	Medicaid	35	80.0	44	90.9	0	0.0	0	0.0

**Table A-6b: Quartile Shifts - Proportion of Plans with O/E Ratios that changed by less than One Quartile between Successive Years – 2011 v. 2010**

Measure	Product Line	Percent of Plans (No more than 1 quartile change)							
		2011 vs. 2010							
		HMOs				PPOs			
		Total Medical		Total Pharmacy		Total Medical		Total Pharmacy	
		Count of Plans	% of Plans	Count of Plans	% of Plans	Count of Plans	% of Plans	Count of Plans	% of Plans
RDI	Commercial	155	87.7	169	94.7	73	86.3	73	91.8
	Medicare	69	91.3	80	96.3	8	87.5	9	100.0
	Medicaid	55	92.7	59	91.5	0	0.0	0	0.0
RAS	Commercial	77	93.5	93	97.8	57	96.5	62	95.2
	Medicaid	37	86.5	48	93.8	0	0.0	0	0.0
RCA	Commercial	104	92.3	112	90.2	87	88.5	86	89.5
	Medicare	50	100.0	56	100.0	7	85.7	7	100.0
	Medicaid	18	94.4	19	100.0	0	0.0	0	0.0
RCO	Commercial	80	93.8	87	96.6	58	93.1	57	96.5
	Medicare	61	95.1	68	94.1	7	85.7	7	100.0
	Medicaid	39	89.7	43	97.7	0	0.0	0	0.0
RHY	Commercial	142	96.5	155	90.3	34	97.1	34	97.1
	Medicare	62	95.2	78	93.6	9	77.8	9	100.0
	Medicaid	43	83.7	47	87.2	0	0.0	0	0.0



**Table A-7a: Correlation of Plan O/E Ratios, 2011 v. 2012 – Commercial HMO**

Service Category	Spearman Correlation Coefficient				
	Diabetes	Asthma	Cardiovascular Conditions	COPD	Hypertension
Total Medical	0.37	0.11	0.28	0.28	0.40
Total Evaluation and Management	0.55	0.53	0.57	0.48	0.60
Inpatient	0.67	0.23	0.48	0.49	0.61
Outpatient	0.56	0.54	0.60	0.55	0.64
Procedures and Surgery	0.32	0.21	0.26	0.30	0.44
Inpatient	0.43	0.18	0.34	0.40	0.55
Outpatient	0.33	0.21	0.32	0.30	0.46
Inpatient Facility	0.47	0.20	0.29	0.27	0.46
Total Pharmacy	0.73	0.52	0.62	0.57	0.64
Total Discharges	0.52	0.26	0.48	0.41	0.60
Total ED Discharges	0.74	0.57	0.68	0.64	0.78

Note: Shaded cells indicate that a correlation coefficient is either not significant (p value > 0.01) or it is < 0.30.

**Table A-7b: Correlation of Plan O/E Ratios, 2011 v. 2012 – Commercial PPO**

Service Category	Spearman Correlation Coefficient				
	Diabetes	Asthma	Cardiovascular Conditions	COPD	Hypertension
Total Medical	0.46	0.38	0.04	0.23	0.50
Total Evaluation and Management	0.91	0.88	0.89	0.87	0.90
Inpatient	0.79	0.29	0.68	0.73	0.75
Outpatient	0.92	0.89	0.93	0.91	0.94
Procedures and Surgery	0.60	0.24	0.47	0.37	0.57
Inpatient	0.61	0.12	0.49	0.41	0.77
Outpatient	0.72	0.27	0.63	0.60	0.53
Inpatient Facility	0.41	0.09	0.19	0.25	0.44
Total Pharmacy	0.69	0.58	0.69	0.67	0.85
Total Discharges	0.51	0.27	0.30	0.49	0.53
Total ED Discharges	0.75	0.43	0.64	0.72	0.80

Note: Shaded cells indicate that a correlation coefficient is either not significant (p value > 0.01) or it is < 0.30.

**Table A-7c: Correlation of Plan O/E Ratios, 2011 v. 2012 – Medicaid HMO**

Service Category	Spearman Correlation Coefficient				
	Diabetes	Asthma	Cardiovascular Conditions	COPD	Hypertension
Total Medical	0.19	0.33	0.21	0.17	0.27
Total Evaluation and Management	0.53	0.73	0.49	0.67	0.61
Inpatient	0.27	0.54	0.39	0.42	0.44
Outpatient	0.80	0.78	0.65	0.81	0.77
Procedures and Surgery	0.60	0.59	0.25	0.52	0.67
Inpatient	0.27	0.52	0.21	0.19	0.22
Outpatient	0.72	0.56	0.38	0.69	0.70
Inpatient Facility	0.35	0.45	0.24	0.30	0.32
Total Pharmacy	0.70	0.80	0.54	0.51	0.64
Total Discharges	0.47	0.51	0.37	0.45	0.40
Total ED Discharges	0.86	0.71	0.62	0.72	0.70

**Table A-7d: Correlation of Plan O/E Ratios, 2011 v. 2012 – Medicare HMO**

Service Category	Spearman Correlation Coefficient				
	Diabetes	Asthma	Cardiovascular Conditions	COPD	Hypertension
Total Medical	0.56		0.50	0.65	0.40
Total Evaluation and Management	0.67		0.63	0.70	0.72
Inpatient	0.69		0.62	0.78	0.64
Outpatient	0.78		0.71	0.80	0.84
Procedures and Surgery	0.66		0.56	0.65	0.71
Inpatient	0.54		0.47	0.60	0.64
Outpatient	0.71		0.60	0.66	0.72
Inpatient Facility	0.57		0.50	0.69	0.50
Total Pharmacy	0.73		0.76	0.73	0.69
Total Discharges	0.48		0.42	0.60	0.43
Total ED Discharges	0.76		0.71	0.84	0.79

**Table A-7e: Correlation of Plan O/E Ratios, 2011 v. 2012 – Medicare PPO**

Service Category	Spearman Correlation Coefficient				
	Diabetes	Asthma	Cardiovascular Conditions	COPD	Hypertension
Total Medical	0.21		0.18	0.38	0.57
Total Evaluation and Management	0.53		0.37	0.47	0.46
Inpatient	0.59		0.39	0.70	0.61
Outpatient	0.54		0.67	0.57	0.48
Procedures and Surgery	0.74		0.50	0.33	0.55
Inpatient	0.58		0.25	0.37	0.66
Outpatient	0.51		0.37	0.28	0.48
Inpatient Facility	0.15		0.05	0.50	0.73
Total Pharmacy	0.78		0.44	0.61	0.65
Total Discharges	0.58		0.05	0.42	0.69
Total ED Discharges	0.62		0.55	0.80	0.86

Note: Shaded cells indicate that a correlation coefficient is either not significant (p value > 0.01) or it is < 0.30.

Table A-8a: Diabetes Inter-item Component Correlations, 2011 v. 2012 –Commercial HMO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	—												
Total Evaluation and Manageme nt	0.4202	1											
	(0.000)	—											
Inpatient	0.4165	0.42358	1										
	(0.000)	(0.000)	—										
Outpatient	0.35325	0.96552	0.21488	1									
	(0.000)	(0.000)	(0.004)	—									
Procedures and Surgery	0.6482	0.17316	0.11619	0.17053	1								
	(0.000)	(0.020)	(0.119)	(0.022)	—								
Inpatient	0.53444	0.0603	0.18251	0.02103	0.61463	1							
	(0.000)	(0.420)	(0.014)	(0.779)	(0.000)	—							
Outpatient	0.57537	0.23888	0.09355	0.24657	0.9384	0.35979	1						
	(0.000)	(0.001)	(0.210)	(0.001)	(0.000)	(0.000)	—						
Inpatient Facility	0.76663	0.244	0.44953	0.15107	0.35139	0.51101	0.24849	1					
	(0.000)	(0.001)	(0.000)	(0.042)	(0.000)	(0.000)	(0.001)	—					
Imaging	0.37914	0.15614	0.20011	0.13624	0.12496	0.03469	0.15542	0.02768	1				
	(0.000)	(0.036)	(0.007)	(0.067)	(0.094)	(0.643)	(0.036)	(0.711)	—				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	0.39006	0.16436	0.04292	0.17502	0.27157	0.13087	0.25674	0.00929	0.38827	1			
	(0.000)	(0.027)	(0.566)	(0.018)	(0.000)	(0.079)	(0.000)	(0.901)	(0.000)	—			
Total Pharmacy	0.46008	0.31206	0.10335	0.32375	0.42099	0.30143	0.40876	0.39585	0.03823	0.01771	1		
	(0.000)	(0.000)	(0.167)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.609)	(0.813)	—		
Total Discharges	0.63206	0.2449	0.53028	0.13095	0.29316	0.42377	0.21651	0.80193	0.05845	0.01483	0.33176	1	
	(0.000)	(0.001)	(0.000)	(0.080)	(0.000)	(0.000)	(0.003)	(0.000)	(0.434)	(0.843)	(0.000)	—	
Total ED Discharges	0.23429	0.19772	0.27881	0.15655	0.25914	0.15151	0.27417	0.1579	0.09614	0.1452	0.21411	0.20107	1
	(0.002)	(0.008)	(0.000)	(0.035)	(0.000)	(0.042)	(0.000)	(0.033)	(0.197)	(0.051)	(0.004)	(0.007)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

Table A-8b: Diabetes Inter-item Component Correlations, 2011 v. 2012 –Commercial PPO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	—												
Total Evaluation and Manageme nt	0.48095	1											
	(0.000)	—											
Inpatient	0.54449	0.53894	1										
	(0.000)	(0.000)	—										
Outpatient	0.41476	0.98232	0.3919	1									
	(0.000)	(0.000)	(0.000)	—									
Procedures and Surgery	0.48257	0.05421	0.08391	0.0445	1								
	(0.000)	(0.474)	(0.267)	(0.556)	—								
Inpatient	0.25174	0.23378	0.02178	-0.24212	0.55762	1							
	(0.001)	(0.002)	(0.774)	(0.001)	(0.000)	—							
Outpatient	0.4639	0.23287	0.11898	0.22847	0.88114	0.16633	1						
	(0.000)	(0.002)	(0.115)	(0.002)	(0.000)	(0.027)	—						
Inpatient Facility	0.59577	0.12691	0.53237	0.02986	0.01927	0.31122	-0.14541	1					
	(0.000)	(0.092)	(0.000)	(0.693)	(0.799)	(0.000)	(0.053)	—					
Imaging	0.63769	0.48167	0.38691	0.45861	0.27664	0.01076	0.38538	0.17456	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.887)	(0.000)	(0.020)	—				
Laboratory	0.59091	0.21923	0.07506	0.22413	0.61596	0.16025	0.68613	-0.08483	0.44236	1			
	(0.000)	(0.003)	(0.321)	(0.003)	(0.000)	(0.033)	(0.000)	(0.262)	(0.000)	—			



Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Pharmacy	0.14125	0.07864	0.1291	0.0456	0.04288	0.05246	0.0543	0.22287	0.07226	-0.06411	1		
	(0.061)	(0.298)	(0.087)	(0.547)	(0.571)	(0.488)	(0.473)	(0.003)	(0.339)	(0.397)	—		
Total Discharges	0.54623	0.19475	0.6288	0.08939	0.04936	0.14823	-0.01473	0.83977	0.20538	-0.06708	0.1438	1	
	(0.000)	(0.009)	(0.000)	(0.237)	(0.514)	(0.049)	(0.846)	(0.000)	(0.006)	(0.375)	(0.056)	—	
Total ED Discharges	0.27588	0.07852	0.22338	0.03896	0.08142	0.07685	0.14277	0.28183	0.17261	0.14241	0.2688	0.2776	1
	(0.000)	(0.299)	(0.003)	(0.607)	(0.281)	(0.309)	(0.058)	(0.000)	(0.022)	(0.059)	(0.000)	(0.000)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-8c: Diabetes Inter-item Component Correlations, 2011 v. 2012 –Medicaid HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.60124	1											
	(0.000)	–											
Inpatient	0.40839	0.20293	1										
	(0.000)	(0.055)	–										
Outpatient	0.51885	0.96083	0.01555	1									
	(0.000)	(0.000)	(0.884)	–									
Procedures and Surgery	0.43403	0.55807	0.09455	0.57226	1								
	(0.000)	(0.000)	(0.375)	(0.000)	–								
Inpatient	0.47737	0.42194	0.07412	0.42977	0.64885	1							
	(0.000)	(0.000)	(0.487)	(0.000)	(0.000)	–							
Outpatient	0.35415	0.52442	0.06604	0.53784	0.9209	0.39922	1						
	(0.001)	(0.000)	(0.536)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.79503	0.34706	0.47872	0.25021	0.21862	0.41566	0.11505	1					
	(0.000)	(0.001)	(0.000)	(0.017)	(0.038)	(0.000)	(0.280)	–					
Imaging	0.44736	0.389	0.24871	0.3546	0.37385	0.23825	0.41433	0.09631	1				
	(0.000)	(0.000)	(0.019)	(0.001)	(0.000)	(0.025)	(0.000)	(0.369)	–				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management		Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab				
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Laboratory	0.596	0.36303	0.1016	0.35236	0.25434	0.17651	0.23617	0.25642	0.50798	1			
	(0.000)	(0.000)	(0.341)	(0.001)	(0.016)	(0.096)	(0.025)	(0.015)	(0.000)	—			
Total Pharmacy	0.25931	0.37441	0.07402	0.38206	0.41638	0.3419	0.35464	0.16345	0.25319	0.09566	1		
	(0.015)	(0.000)	(0.493)	(0.000)	(0.000)	(0.001)	(0.001)	(0.128)	(0.018)	(0.375)	—		
Total Discharges	0.55138	0.1988	0.50242	0.09553	0.04635	0.18013	-0.02987	0.78351	0.05003	0.19337	-0.00933	1	
	(0.000)	(0.060)	(0.000)	(0.370)	(0.664)	(0.089)	(0.780)	(0.000)	(0.641)	(0.068)	(0.931)	—	
Total ED Discharges	0.15455	0.17992	0.36514	0.11513	0.07918	0.08217	0.16304	0.02317	0.54678	0.1437	0.14941	0.03377	1
	(0.148)	(0.090)	(0.000)	(0.280)	(0.458)	(0.441)	(0.125)	(0.828)	(0.000)	(0.177)	(0.165)	(0.752)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-8d: Diabetes Inter-item Component Correlations, 2011 v. 2012 –Medicare HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.56448	1											
	(0.000)	–											
Inpatient	0.68923	0.53781	1										
	(0.000)	(0.000)	–										
Outpatient	0.36019	0.89735	0.20761	1									
	(0.000)	(0.000)	(0.011)	–									
Procedures and Surgery	0.59203	0.40824	0.21559	0.42668	1								
	(0.000)	(0.000)	(0.009)	(0.000)	–								
Inpatient	0.53664	0.21624	0.2114	0.19165	0.70041	1							
	(0.000)	(0.008)	(0.010)	(0.020)	(0.000)	–							
Outpatient	0.5027	0.43032	0.19027	0.46536	0.92431	0.40637	1						
	(0.000)	(0.000)	(0.021)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.91003	0.40722	0.6882	0.16876	0.37717	0.45267	0.26823	1					
	(0.000)	(0.000)	(0.000)	(0.040)	(0.000)	(0.000)	(0.001)	–					
Imaging	0.54817	0.44261	0.41218	0.36298	0.36543	0.2045	0.41222	0.33553	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.013)	(0.000)	(0.000)	–				
	0.4699	0.2268	0.30981	0.16766	0.2245	0.27006	0.19964	0.30296	0.4139	1			

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	4	3			2				5				
	(0.000)	(0.006)	(0.000)	(0.042)	(0.006)	(0.001)	(0.015)	(0.000)	(0.000)	—			
Total Pharmacy	0.45106	0.43234	0.28275	0.35276	0.52628	0.33702	0.51212	0.37275	0.17629	0.06084	1		
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.032)	(0.461)	—		
Total Discharges	0.78362	0.40477	0.68124	0.17698	0.28355	0.24581	0.24653	0.8813	0.27846	0.24188	0.36604	1	
	(0.000)	(0.000)	(0.000)	(0.031)	(0.000)	(0.003)	(0.002)	(0.000)	(0.001)	(0.003)	(0.000)	—	
Total ED Discharges	0.23912	0.13199	0.35591	0.03507	0.04947	0.05333	0.03828	0.28838	-0.15854	0.24679	0.08904	0.31254	1
	(0.003)	(0.110)	(0.000)	(0.672)	(0.550)	(0.520)	(0.643)	(0.000)	(0.053)	(0.002)	(0.280)	(0.000)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-8e: Diabetes Inter-item Component Correlations, 2011 v. 2012 –Medicare PPO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.50431	1											
	(0.000)	–											
Inpatient	0.40674	0.4071	1										
	(0.001)	(0.001)	–										
Outpatient	0.39472	0.95331	0.14965	1									
	(0.001)	(0.000)	(0.227)	–									
Procedures and Surgery	0.58289	0.21063	0.07263	0.25704	1								
	(0.000)	(0.087)	(0.559)	(0.036)	–								
Inpatient	0.20904	0.20209	0.13197	-0.19299	0.27009	1							
	(0.090)	(0.101)	(0.287)	(0.118)	(0.027)	–							
Outpatient	0.55934	0.31279	-0.0018	0.35546	0.92821	-0.0247	1						
	(0.000)	(0.010)	(0.988)	(0.003)	(0.000)	(0.843)	–						
Inpatient Facility	0.52203	0.0583	0.49266	-0.12008	0.13976	0.28526	-0.22803	1					
	(0.000)	(0.639)	(0.000)	(0.333)	(0.259)	(0.019)	(0.063)	–					
Imaging	0.62954	0.46432	0.03236	0.50571	0.69595	0.00806	0.76439	- 0.10025	1				
	(0.000)	(0.000)	(0.795)	(0.000)	(0.000)	(0.948)	(0.000)	(0.420)	–				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Laboratory	0.50778	0.37681	0.14311	0.35561	0.32521	0.11066	0.34939	-0.01756	0.31794	1			
	(0.000)	(0.002)	(0.248)	(0.003)	(0.007)	(0.373)	(0.004)	(0.888)	(0.009)	—			
Total Pharmacy	0.19092	0.241	0.16031	0.22296	0.20884	0.11741	0.27931	-0.02359	0.26012	0.20457	1		
	(0.122)	(0.049)	(0.195)	(0.070)	(0.090)	(0.344)	(0.022)	(0.850)	(0.034)	(0.097)	—		
Total Discharges	0.26965	0.02726	0.51129	-0.18222	0.13058	0.19718	-0.18302	0.74631	0.14957	0.16869	-0.0536	1	
	(0.027)	(0.827)	(0.000)	(0.140)	(0.292)	(0.110)	(0.138)	(0.000)	(0.227)	(0.172)	(0.667)	—	
Total ED Discharges	0.29005	0.34233	0.20732	-0.433	0.50535	0.13465	-0.57068	0.20808	0.68006	0.17292	-0.18856	0.20225	1
	(0.017)	(0.005)	(0.092)	(0.000)	(0.000)	(0.277)	(0.000)	(0.091)	(0.000)	(0.162)	(0.126)	(0.101)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

Table A-9a: Asthma Inter-item Component Correlations, 2011 v. 2012 – Commercial HMO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.3888 9	1											
	(0.000)	–											
Inpatient	0.4802	0.3958 5	1										
	(0.000)	(0.000)	–										
Outpatient	0.3503 5	0.9901 6	0.28472	1									
	(0.000)	(0.000)	(0.000)	–									
Procedures and Surgery	0.5469	0.0638 8	0.03236	0.06916	1								
	(0.000)	(0.396)	(0.667)	(0.358)	–								
Inpatient	0.4578 7	0.1005 3	0.07839	-0.10967	0.4019 2	1							
	(0.000)	(0.181)	(0.297)	(0.144)	(0.000)	–							
Outpatient	0.4310 6	0.099	0.00452	0.11012	0.9175 8	0.11173	1						
	(0.000)	(0.187)	(0.952)	(0.142)	(0.000)	(0.136)	–						
Inpatient Facility	0.7770 8	0.0633 9	0.46277	0.01028	0.2306 9	0.44508	0.08278	1					
	(0.000)	(0.399)	(0.000)	(0.891)	(0.002)	(0.000)	(0.269)	–					
Imaging	0.4154 4	0.1667 8	0.24871	0.1501	0.0375 3	0.05009	0.05981	0.16047	1				
	(0.000)	(0.026)	(0.001)	(0.045)	(0.618)	(0.505)	(0.425)	(0.031)	–				



Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	0.3761 3	0.2933	0.10785	0.30027	0.1808	0.02747	0.22548	0.06427	0.3555 6	1			
	(0.000)	(0.000)	(0.151)	(0.000)	(0.015)	(0.715)	(0.002)	(0.391)	(0.000)	—			
Total Pharmacy	0.2179 7	0.2959 2	0.12176	0.30073	0.1251 2	0.04198	0.11892	0.1405	0.0863 1	- 0.0573	1		
	(0.003)	(0.000)	(0.105)	(0.000)	(0.096)	(0.578)	(0.113)	(0.061)	(0.251)	(0.443)	—		
Total Discharges	0.5684 5	0.0938 5	0.44916	0.04886	0.0779	0.276	-0.02619	0.76734	0.0806 7	0.0478 1	0.04827	1	
	(0.000)	(0.213)	(0.000)	(0.517)	(0.301)	(0.000)	(0.728)	(0.000)	(0.283)	(0.525)	(0.522)	—	
Total ED Discharges	0.1824 7	0.2785 2	0.34488	0.24823	0.1013 3	0.08464	-0.08665	0.15856	0.0710 1	0.0577 2	0.13853	0.22769	1
	(0.014)	(0.000)	(0.000)	(0.001)	(0.177)	(0.260)	(0.247)	(0.034)	(0.344)	(0.442)	(0.064)	(0.002)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

Table A-9b: Asthma Inter-item Component Correlations, 2011 v. 2012 – Commercial PPO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.68488	1											
	(0.000)	–											
Inpatient	0.62461	0.52319	1										
	(0.000)	(0.000)	–										
Outpatient	0.64733	0.99346	0.43951	1									
	(0.000)	(0.000)	(0.000)	–									
Procedures and Surgery	0.5672	0.36952	0.19459	0.35973	1								
	(0.000)	(0.000)	(0.009)	(0.000)	–								
Inpatient	0.42929	0.08455	0.09223	0.07576	0.35871	1							
	(0.000)	(0.263)	(0.222)	(0.316)	(0.000)	–							
Outpatient	0.44195	0.36647	0.1522	0.36126	0.93026	0.05453	1						
	(0.000)	(0.000)	(0.043)	(0.000)	(0.000)	(0.471)	–						
Inpatient Facility	0.72158	0.32543	0.65415	0.27426	0.17396	0.4957	-0.011	1					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.021)	(0.000)	(0.884)	–					
Imaging	0.66906	0.60856	0.42573	0.59264	0.37502	0.18049	0.33299	0.36134	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.016)	(0.000)	(0.000)	–				
Laboratory	0.61168	0.45549	0.22175	0.45158	0.43218	0.1342	0.44102	0.13317	0.46092	1			

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management		Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab				
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.075)	(0.000)	(0.077)	(0.000)	—			
Total Pharmacy	0.28405	0.43638	0.25878	0.43865	0.08118	0.15417	0.02822	0.22111	0.42927	0.05674	1		
	(0.000)	(0.000)	(0.001)	(0.000)	(0.283)	(0.040)	(0.709)	(0.003)	(0.000)	(0.453)	—		
Total Discharges	0.57747	0.30787	0.63875	0.25462	0.09757	0.26448	-0.01981	0.77407	0.32195	0.19674	0.18015	1	
	(0.000)	(0.000)	(0.000)	(0.001)	(0.196)	(0.000)	(0.794)	(0.000)	(0.000)	(0.009)	(0.016)	—	
Total ED Discharges	0.38001	0.28084	0.26416	0.26631	0.1288	0.06354	0.11382	0.32468	0.42414	0.24821	0.23749	0.35718	1
	(0.000)	(0.000)	(0.000)	(0.000)	(0.088)	(0.401)	(0.131)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-9c: Asthma Inter-item Component Correlations, 2011 v. 2012 – Medicaid HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.53115	1											
	(0.000)	–											
Inpatient	0.42909	0.20692	1										
	(0.000)	(0.053)	–										
Outpatient	0.48192	0.98639	0.08097	1									
	(0.000)	(0.000)	(0.453)	–									
Procedures and Surgery	0.52287	0.40924	0.09746	0.40296	1								
	(0.000)	(0.000)	(0.366)	(0.000)	–								
Inpatient	0.37382	0.23539	0.02353	0.24876	0.51623	1							
	(0.000)	(0.027)	(0.828)	(0.019)	(0.000)	–							
Outpatient	0.50812	0.40486	0.12662	0.39274	0.98552	0.41904	1						
	(0.000)	(0.000)	(0.240)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.7148	0.25924	0.66503	0.18627	0.11376	0.23822	0.10642	1					
	(0.000)	(0.015)	(0.000)	(0.082)	(0.291)	(0.025)	(0.324)	–					
Imaging	0.40574	0.084	0.01867	0.07104	0.34613	0.31878	0.33545	0.07249	1				
	(0.000)	(0.439)	(0.864)	(0.513)	(0.001)	(0.003)	(0.001)	(0.505)	–				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	0.6054 7	0.2462 6	0.18709	0.22498	0.2638 1	0.16241	0.26455	0.37616	0.3330 5	1			
	(0.000)	(0.021)	(0.081)	(0.035)	(0.013)	(0.131)	(0.013)	(0.000)	(0.002)	—			
Total Pharmacy	0.3048 8	0.1991 7	0.00892	0.2113	0.4169 1	0.40379	0.38592	0.17528	0.1886 2	0.0030 5	1		
	(0.004)	(0.063)	(0.934)	(0.048)	(0.000)	(0.000)	(0.000)	(0.102)	(0.080)	(0.978)	—		
Total Discharges	0.5646 4	0.1877 5	0.6905	0.1108	0.1113	0.14518	0.11617	0.84774	0.1091 8	0.4040 4	0.1113	1	
	(0.000)	(0.080)	(0.000)	(0.304)	(0.302)	(0.177)	(0.281)	(0.000)	(0.314)	(0.000)	(0.302)	—	
Total ED Discharges	- 0.0436 7	- 0.1934 2	0.26448	-0.23965	- 0.1986 3	- 0.18687	-0.16362	0.04727	0.2671 5	0.0568 7	-0.18643	0.09113	1
	(0.688)	(0.071)	(0.013)	(0.025)	(0.064)	(0.081)	(0.128)	(0.662)	(0.012)	(0.599)	(0.082)	(0.398)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

Table A-10a: CV Conditions Inter-item Component Correlations, 2011 v. 2012 – Commercial HMO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.35215	1											
	(0.000)	–											
Inpatient	0.52031	0.64123	1										
	(0.000)	(0.000)	–										
Outpatient	0.18028	0.91234	0.33098	1									
	(0.015)	(0.000)	(0.000)	–									
Procedures and Surgery	0.5405	0.18138	0.19238	0.12559	1								
	(0.000)	(0.015)	(0.009)	(0.092)	–								
Inpatient	0.54922	0.15295	0.2294	0.06423	0.69052	1							
	(0.000)	(0.040)	(0.002)	(0.390)	(0.000)	–							
Outpatient	0.35723	0.21651	0.15727	0.19719	0.84666	0.27427	1						
	(0.000)	(0.003)	(0.034)	(0.008)	(0.000)	(0.000)	–						
Inpatient Facility	0.90237	0.23744	0.50035	0.04737	0.33165	0.47424	0.13754	1					
	(0.000)	(0.001)	(0.000)	(0.527)	(0.000)	(0.000)	(0.064)	–					
Imaging	0.28631	0.14728	0.15447	0.14361	0.10894	0.04244	0.14754	0.10227	1				
	(0.000)	(0.048)	(0.038)	(0.054)	(0.144)	(0.571)	(0.047)	(0.170)	–				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	0.3917 1	0.0999 5	0.11177	0.0697	0.2905 7	0.26612	0.18969	0.18944	0.2896 1	1			
	(0.000)	(0.181)	(0.134)	(0.351)	(0.000)	(0.000)	(0.010)	(0.010)	(0.000)	—			
Total Pharmacy	0.2264	0.2853 8	0.16581	0.27263	0.2199 1	0.08963	0.24584	0.1615	0.0010 5	0.0287 3	1		
	(0.002)	(0.000)	(0.026)	(0.000)	(0.003)	(0.231)	(0.001)	(0.030)	(0.989)	(0.701)	—		
Total Discharges	0.5617 3	0.1970 8	0.45058	0.03394	0.1838	0.28626	0.03352	0.68203	0.0101 1	0.0451 6	0.17946	1	
	(0.000)	(0.008)	(0.000)	(0.651)	(0.014)	(0.000)	(0.654)	(0.000)	(0.893)	(0.546)	(0.016)	—	
Total ED Discharges	0.1004	0.0761 7	0.1409	0.01475	0.1973 5	0.09506	0.215	0.1052	0.0877 4	0.165	0.04162	0.0794	1
	(0.179)	(0.308)	(0.059)	(0.844)	(0.008)	(0.203)	(0.004)	(0.158)	(0.239)	(0.026)	(0.578)	(0.288)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

Table A-10b: CV Conditions Inter-item Component Correlations, 2011 v. 2012 – Commercial PPO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.29148	1											
	(0.000)	–											
Inpatient	0.43319	0.59901	1										
	(0.000)	(0.000)	–										
Outpatient	0.21154	0.96943	0.40892	1									
	(0.005)	(0.000)	(0.000)	–									
Procedures and Surgery	0.49148	0.00947	0.06863	-0.0181	1								
	(0.000)	(0.900)	(0.364)	(0.811)	–								
Inpatient	0.35812	0.30431	0.13189	-0.30785	0.55459	1							
	(0.000)	(0.000)	(0.080)	(0.000)	(0.000)	–							
Outpatient	0.3287	0.28503	0.20213	0.28034	0.73095	0.05239	1						
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.489)	–						
Inpatient Facility	0.85277	0.04711	0.32729	-0.04495	0.22774	0.38259	-0.02203	1					
	(0.000)	(0.534)	(0.000)	(0.552)	(0.002)	(0.000)	(0.771)	–					
Imaging	0.39803	0.44056	0.34996	0.41518	0.26873	0.05795	0.46627	0.11829	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.444)	(0.000)	(0.117)	–				



Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	0.46993	0.22598	0.08512	0.24317	0.47194	0.06316	0.53594	0.13402	0.33906	1			
	(0.000)	(0.002)	(0.260)	(0.001)	(0.000)	(0.404)	(0.000)	(0.075)	(0.000)	—			
Total Pharmacy	0.25269	0.32897	0.28874	0.29282	0.00997	0.04392	0.01664	0.20818	0.20982	0.08949	1		
	(0.001)	(0.000)	(0.000)	(0.000)	(0.895)	(0.562)	(0.826)	(0.005)	(0.005)	(0.236)	—		
Total Discharges	0.59788	0.11006	0.47627	-0.00351	0.04929	0.22068	-0.09303	0.73128	0.03266	-0.0948	0.11487	1	
	(0.000)	(0.145)	(0.000)	(0.963)	(0.515)	(0.003)	(0.218)	(0.000)	(0.666)	(0.209)	(0.128)	—	
Total ED Discharges	0.20383	0.13938	0.13307	-0.20166	0.17346	0.00996	0.18758	0.23435	0.00275	0.10792	0.07471	0.20428	1
	(0.007)	(0.064)	(0.077)	(0.007)	(0.021)	(0.895)	(0.012)	(0.002)	(0.971)	(0.153)	(0.323)	(0.006)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-10c: CV Conditions Inter-item Component Correlations, 2011 v. 2012 – Medicaid HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.43682	1											
	(0.000)	–											
Inpatient	0.41249	0.61038	1										
	(0.000)	(0.000)	–										
Outpatient	0.25228	0.81801	0.15156	1									
	(0.020)	(0.000)	(0.164)	–									
Procedures and Surgery	0.27672	0.0903	0.03138	0.17851	1								
	(0.010)	(0.408)	(0.774)	(0.100)	–								
Inpatient	0.48125	0.06088	0.00135	0.13126	0.70343	1							
	(0.000)	(0.578)	(0.990)	(0.228)	(0.000)	–							
Outpatient	-0.02048	0.08192	0.04068	0.14737	0.75608	0.19555	1						
	(0.852)	(0.453)	(0.710)	(0.176)	(0.000)	(0.071)	–						
Inpatient Facility	0.9042	0.32231	0.41851	0.13174	0.12147	0.38734	-0.18344	1					
	(0.000)	(0.002)	(0.000)	(0.227)	(0.265)	(0.000)	(0.091)	–					
Imaging	0.453	0.4682	0.29102	0.3537	0.34284	0.2779	0.35708	0.18884	1				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management		Procedures and Surgery		Inpatie nt Facility	Imagin g	Lab					
		Total	Inpatie nt	Outpatie nt	Total				Inpatie nt	Outpatie nt			
	(0.000)	(0.000)	(0.007)	(0.001)	(0.001)	(0.010)	(0.001)	(0.083)	—				
Laboratory	0.4069	0.4243 1	0.17222	0.35789	0.0254 6	0.01063	0.08433	0.18393	0.5140 3	1			
	(0.000)	(0.000)	(0.113)	(0.001)	(0.816)	(0.923)	(0.440)	(0.090)	(0.000)	—			
Total Pharmacy	0.0353 3	0.3666 2	0.19822	0.34698	0.1528 6	0.02079	0.29181	0.04755	0.1526 6	0.0318 5	1		
	(0.750)	(0.001)	(0.069)	(0.001)	(0.163)	(0.850)	(0.007)	(0.666)	(0.166)	(0.772)	—		
Total Discharges	0.6801 2	0.3158 6	0.37058	0.16562	0.0063 7	0.07285	-0.06913	0.78538	0.1995 2	0.2542 1	0.09281	1	
	(0.000)	(0.003)	(0.000)	(0.128)	(0.954)	(0.505)	(0.527)	(0.000)	(0.067)	(0.018)	(0.398)	—	
Total ED Discharges	0.0115 3	0.3823 9	0.28982	0.26187	0.1044 3	0.22314	0.1039	- 0.02918	0.3235 3	0.3239 3	0.22068	0.10202	1
	(0.917)	(0.000)	(0.007)	(0.015)	(0.339)	(0.039)	(0.341)	(0.790)	(0.003)	(0.002)	(0.042)	(0.350)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-10d: CV Conditions Inter-item Component Correlations, 2011 v. 2012 – Medicare HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.54056	1											
	(0.000)	–											
Inpatient	0.71092	0.63569	1										
	(0.000)	(0.000)	–										
Outpatient	0.26832	0.87078	0.24368	1									
	(0.001)	(0.000)	(0.003)	–									
Procedures and Surgery	0.53001	0.36244	0.25634	0.35085	1								
	(0.000)	(0.000)	(0.002)	(0.000)	–								
Inpatient	0.46046	0.13703	0.22601	0.09296	0.70117	1							
	(0.000)	(0.097)	(0.006)	(0.261)	(0.000)	–							
Outpatient	0.46127	0.42809	0.21863	0.43515	0.89132	0.34587	1						
	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.92218	0.37783	0.67053	0.08489	0.3162	0.36912	0.24468	1					
	(0.000)	(0.000)	(0.000)	(0.305)	(0.000)	(0.000)	(0.003)	–					
Imaging	0.52446	0.48318	0.42763	0.34523	0.3756	0.17677	0.43566	0.32322	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.032)	(0.000)	(0.000)	–				
	0.4815	0.2163	0.336	0.07735	0.2631	0.2608	0.21821	0.33438	0.4024	1			

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	5	5			6				5				
	(0.000)	(0.008)	(0.000)	(0.350)	(0.001)	(0.001)	(0.008)	(0.000)	(0.000)	—			
Total Pharmacy	0.19717	0.36097	0.11946	0.39475	0.30317	0.15451	0.35511	0.15203	0.11322	0.10227	1		
	(0.016)	(0.000)	(0.148)	(0.000)	(0.000)	(0.061)	(0.000)	(0.064)	(0.169)	(0.215)	—		
Total Discharges	0.76474	0.44698	0.62505	0.19212	0.23794	0.19218	0.23429	0.83216	0.29402	0.2033	0.2882	1	
	(0.000)	(0.000)	(0.000)	(0.019)	(0.004)	(0.019)	(0.004)	(0.000)	(0.000)	(0.013)	(0.000)	—	
Total ED Discharges	0.27835	0.19324	0.33885	0.06462	0.14954	0.15027	0.12617	0.27267	0.13169	0.22292	0.12017	0.2795	1
	(0.001)	(0.019)	(0.000)	(0.435)	(0.070)	(0.068)	(0.125)	(0.001)	(0.109)	(0.006)	(0.144)	(0.001)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

Table A-10e: CV Conditions Inter-item Component Correlations, 2011 v. 2012 – Medicare PPO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.3659 1	1											
	(0.002)	–											
Inpatient	0.5880 8	0.4737 8	1										
	(0.000)	(0.000)	–										
Outpatient	0.1610 7	0.9110 9	0.12116	1									
	(0.193)	(0.000)	(0.329)	–									
Procedures and Surgery	0.3994 3	0.0389 9	0.13026	0.13273	1								
	(0.001)	(0.754)	(0.293)	(0.284)	–								
Inpatient	0.3867 8	0.2571 6	0.03847	-0.25788	0.4916 2	1							
	(0.001)	(0.036)	(0.757)	(0.035)	(0.000)	–							
Outpatient	0.1897 6	0.1462 6	0.18537	0.28713	0.7768	0.00395	1						
	(0.124)	(0.238)	(0.133)	(0.018)	(0.000)	(0.975)	–						
Inpatient Facility	0.7835	0.0903 9	0.61932	-0.16629	0.0282 1	0.42996	-0.31176	1					
	(0.000)	(0.467)	(0.000)	(0.179)	(0.821)	(0.000)	(0.010)	–					
Imaging	0.4210	0.3484	0.01197	0.42769	0.5668	0.00223	0.70345	-	1				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management		Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab				
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
	2	3			1			0.05826					
	(0.000)	(0.004)	(0.923)	(0.000)	(0.000)	(0.986)	(0.000)	(0.640)	—				
Laboratory	0.29535	0.24312	0.20205	0.15612	0.18086	0.14243	0.17232	0.05759	0.10348	1			
	(0.015)	(0.047)	(0.101)	(0.207)	(0.143)	(0.250)	(0.163)	(0.643)	(0.405)	—			
Total Pharmacy	0.10121	0.25812	0.07782	0.25341	0.13018	0.19814	0.08061	0.06038	0.1022	0.04518	1		
	(0.415)	(0.035)	(0.531)	(0.039)	(0.294)	(0.108)	(0.517)	(0.627)	(0.411)	(0.717)	—		
Total Discharges	0.59043	0.03025	0.48982	-0.1572	0.09131	0.41568	-0.15943	0.77101	0.05356	0.01085	0.05719	1	
	(0.000)	(0.808)	(0.000)	(0.204)	(0.462)	(0.000)	(0.198)	(0.000)	(0.667)	(0.931)	(0.646)	—	
Total ED Discharges	0.01528	0.23162	0.35565	-0.4401	0.35861	0.03248	-0.46017	0.32836	0.56497	0.14802	-0.10085	0.23665	1
	(0.902)	(0.059)	(0.003)	(0.000)	(0.003)	(0.794)	(0.000)	(0.007)	(0.000)	(0.232)	(0.417)	(0.054)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-11a: COPD Inter-item Component Correlations, 2011 v. 2012 – Commercial HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.44136	1											
	(0.000)	–											
Inpatient	0.46783	0.62742	1										
	(0.000)	(0.000)	–										
Outpatient	0.28163	0.90779	0.28957	1									
	(0.000)	(0.000)	(0.000)	–									
Procedures and Surgery	0.48354	0.15721	0.08095	0.15005	1								
	(0.000)	(0.035)	(0.279)	(0.044)	–								
Inpatient	0.56005	0.19497	0.18433	0.13278	0.62886	1							
	(0.000)	(0.009)	(0.013)	(0.075)	(0.000)	–							
Outpatient	0.31213	0.15952	0.05298	0.19372	0.84436	0.21863	1						
	(0.000)	(0.032)	(0.479)	(0.009)	(0.000)	(0.003)	–						
Inpatient Facility	0.8712	0.29176	0.44374	0.11512	0.23676	0.45072	0.06165	1					
	(0.000)	(0.000)	(0.000)	(0.123)	(0.001)	(0.000)	(0.408)	–					
Imaging	0.31707	0.15361	0.07269	0.1233	0.15127	0.08522	0.15353	0.03878	1				
	(0.000)	(0.039)	(0.331)	(0.098)	(0.042)	(0.254)	(0.039)	(0.603)	–				



Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical									Total Pharmac y	Total Discharge s	Total ED Discharge s	
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g				Lab
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Laboratory	0.42539	0.17121	0.07018	0.16469	0.27787	0.22196	0.24552	0.15717	0.44484	1			
	(0.000)	(0.021)	(0.348)	(0.027)	(0.000)	(0.003)	(0.001)	(0.034)	(0.000)	—			
Total Pharmacy	0.20119	0.14997	0.03685	0.21303	0.25378	0.17433	0.21156	0.15155	0.10363	0.01214	1		
	(0.007)	(0.044)	(0.623)	(0.004)	(0.001)	(0.019)	(0.004)	(0.042)	(0.165)	(0.871)	—		
Total Discharges	0.6483	0.24294	0.42664	0.05583	0.11146	0.28008	-0.00986	0.73827	0.06087	0.09893	0.19252	1	
	(0.000)	(0.001)	(0.000)	(0.457)	(0.136)	(0.000)	(0.895)	(0.000)	(0.416)	(0.185)	(0.010)	—	
Total ED Discharges	0.1046	0.0631	0.18525	-0.01076	0.13405	0.02075	0.12635	0.10738	0.04371	0.27207	0.01428	0.20406	1
	(0.161)	(0.399)	(0.013)	(0.886)	(0.072)	(0.782)	(0.089)	(0.149)	(0.558)	(0.000)	(0.849)	(0.006)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-11b: COPD Inter-item Component Correlations, 2011 v. 2012 – Commercial PPO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	—												
Total Evaluation and Manageme nt	0.48146	1											
	(0.000)	—											
Inpatient	0.58194	0.66938	1										
	(0.000)	(0.000)	—										
Outpatient	0.34505	0.9437	0.42139	1									
	(0.000)	(0.000)	(0.000)	—									
Procedures and Surgery	0.39003	0.06822	0.07181	0.07441	1								
	(0.000)	(0.367)	(0.342)	(0.325)	—								
Inpatient	0.355	0.04777	0.02106	-0.05251	0.6429	1							
	(0.000)	(0.528)	(0.781)	(0.488)	(0.000)	—							
Outpatient	0.30474	0.2487	0.15537	0.25944	0.77842	0.13305	1						
	(0.000)	(0.001)	(0.039)	(0.000)	(0.000)	(0.078)	—						
Inpatient Facility	0.82412	0.28537	0.49885	0.13341	0.03867	0.26193	-0.12033	1					
	(0.000)	(0.000)	(0.000)	(0.077)	(0.609)	(0.000)	(0.111)	—					
Imaging	0.53867	0.43249	0.39349	0.38285	0.3117	0.07664	0.4267	0.20144	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.311)	(0.000)	(0.007)	—				
	0.3416	0.1957	0.12484	0.19588	0.5362	0.15179	0.6609	-	0.4009	1			

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	2 (0.000)	4 (0.009)	 (0.098)	 (0.009)	1 (0.000)	 (0.044)	 (0.000)	0.08702 (0.249)	6 (0.000)	 —			
Total Pharmacy	0.1548 7 (0.040)	0.1445 8 (0.055)	0.05735 (0.448)	0.14309 (0.057)	0.1319 7 (0.080)	0.03939 (0.603)	-0.09245 (0.221)	0.21318 (0.004)	0.0173 (0.819)	0.0971 5 (0.198)	1 —		
Total Discharges	0.6776 (0.000)	0.2831 3 (0.000)	0.56208 (0.000)	0.10695 (0.157)	0.0007 2 (0.992)	0.14129 (0.061)	-0.04252 (0.574)	0.78233 (0.000)	0.2499 5 (0.001)	0.0214 3 (0.777)	0.12804 (0.089)	1 —	
Total ED Discharges	0.0454 7 (0.548)	0.1327 7 (0.078)	0.04001 (0.597)	-0.17386 (0.021)	0.0306 6 (0.685)	-0.0806 (0.286)	0.00001 (1.000)	0.12044 (0.110)	0.0769 2 (0.309)	0.0885 8 (0.241)	0.26738 (0.000)	0.19822 (0.008)	1 —

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-11c: COPD Inter-item Component Correlations, 2011 v. 2012 – Medicaid HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	—												
Total Evaluation and Manageme nt	0.47566	1											
	(0.000)	—											
Inpatient	0.39969	0.28999	1										
	(0.000)	(0.005)	—										
Outpatient	0.33149	0.86609	-0.123	1									
	(0.001)	(0.000)	(0.245)	—									
Procedures and Surgery	0.38666	0.28267	0.0837	0.30398	1								
	(0.000)	(0.007)	(0.430)	(0.003)	—								
Inpatient	0.50612	0.18984	0.17568	0.1697	0.67364	1							
	(0.000)	(0.071)	(0.096)	(0.108)	(0.000)	—							
Outpatient	0.21266	0.25584	0.06384	0.33989	0.85673	0.31136	1						
	(0.044)	(0.014)	(0.548)	(0.001)	(0.000)	(0.003)	—						
Inpatient Facility	0.88851	0.37753	0.44855	0.22872	0.20633	0.41279	0.04819	1					
	(0.000)	(0.000)	(0.000)	(0.029)	(0.050)	(0.000)	(0.650)	—					
Imaging	0.35437	0.21371	0.08173	0.18235	0.38226	0.25619	0.34367	0.05259	1				
	(0.001)	(0.043)	(0.444)	(0.085)	(0.000)	(0.015)	(0.001)	(0.623)	—				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Laboratory	0.49895	0.29065	0.10999	0.26154	0.21427	0.16985	0.18743	0.25968	0.45391	1			
	(0.000)	(0.005)	(0.299)	(0.012)	(0.041)	(0.107)	(0.075)	(0.013)	(0.000)	—			
Total Pharmacy	0.03837	0.28655	0.07844	0.32126	0.2149	0.23332	0.18859	0.06277	0.10979	0.03698	1		
	(0.723)	(0.006)	(0.465)	(0.002)	(0.043)	(0.028)	(0.077)	(0.559)	(0.309)	(0.731)	—		
Total Discharges	0.60095	0.25051	0.45776	0.07882	0.04326	0.19085	-0.07167	0.71534	0.08073	0.25823	0.08611	1	
	(0.000)	(0.017)	(0.000)	(0.458)	(0.684)	(0.070)	(0.500)	(0.000)	(0.449)	(0.013)	(0.422)	—	
Total ED Discharges	-0.00793	0.22231	0.16923	0.18716	0.25759	0.14367	0.22548	-0.06796	0.3357	0.10401	0.27892	0.05256	1
	(0.941)	(0.034)	(0.109)	(0.076)	(0.014)	(0.174)	(0.032)	(0.522)	(0.001)	(0.327)	(0.008)	(0.621)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

Table A-11d: COPD Inter-item Component Correlations, 2011 v. 2012 – Medicare HMO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.57728	1											
	(0.000)	–											
Inpatient	0.73652	0.65458	1										
	(0.000)	(0.000)	–										
Outpatient	0.24434	0.78852	0.14188	1									
	(0.003)	(0.000)	(0.085)	–									
Procedures and Surgery	0.43346	0.26378	0.13249	0.35071	1								
	(0.000)	(0.001)	(0.108)	(0.000)	–								
Inpatient	0.43337	0.13487	0.14869	0.1669	0.75266	1							
	(0.000)	(0.102)	(0.071)	(0.043)	(0.000)	–							
Outpatient	0.36026	0.29645	0.11694	0.38658	0.91514	0.46017	1						
	(0.000)	(0.000)	(0.157)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.9493	0.48871	0.72384	0.12367	0.25774	0.335	0.18163	1					
	(0.000)	(0.000)	(0.000)	(0.134)	(0.002)	(0.000)	(0.027)	–					
Imaging	0.53268	0.39498	0.36372	0.26085	0.34509	0.22241	0.39441	0.3649	1				
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.007)	(0.000)	(0.000)	–				
Laboratory	0.41556	0.14258	0.25986	0.04339	0.17642	0.21893	0.14455	0.30009	0.40332	1			
	(0.000)	(0.084)	(0.001)	(0.601)	(0.032)	(0.008)	(0.079)	(0.000)	(0.000)	–			

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Pharmacy	0.21429	0.33824	0.15437	0.33221	0.28291	0.18709	0.26956	0.19516	0.03202	0.19924	1		
	(0.009)	(0.000)	(0.061)	(0.000)	(0.000)	(0.023)	(0.001)	(0.017)	(0.698)	(0.015)	—		
Total Discharges	0.81442	0.47883	0.64715	0.16982	0.19066	0.21198	0.16428	0.84848	0.32279	0.22173	0.27418	1	
	(0.000)	(0.000)	(0.000)	(0.039)	(0.020)	(0.010)	(0.045)	(0.000)	(0.000)	(0.007)	(0.001)	—	
Total ED Discharges	0.12248	0.11208	0.26369	-0.00738	0.04189	0.00354	-0.05695	0.15583	0.23927	0.22933	0.0213	0.21537	1
	(0.138)	(0.175)	(0.001)	(0.929)	(0.613)	(0.966)	(0.490)	(0.058)	(0.003)	(0.005)	(0.797)	(0.008)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

Table A-11e: COPD Inter-item Component Correlations, 2011 v. 2012 – Medicare PPO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.60927	1											
	(0.000)	–											
Inpatient	0.6202	0.55116	1										
	(0.000)	(0.000)	–										
Outpatient	0.38742	0.8962	0.21287	1									
	(0.001)	(0.000)	(0.084)	–									
Procedures and Surgery	0.42082	0.2084	0.03859	0.30705	1								
	(0.000)	(0.091)	(0.757)	(0.011)	–								
Inpatient	0.20105	0.13513	0.00052	-0.17068	0.35115	1							
	(0.103)	(0.276)	(0.997)	(0.167)	(0.004)	–							
Outpatient	0.37062	0.31503	0.01301	0.42046	0.91176	0.01161	1						
	(0.002)	(0.009)	(0.917)	(0.000)	(0.000)	(0.926)	–						
Inpatient Facility	0.79583	0.38519	0.69231	0.09107	0.03871	0.23928	-0.13956	1					
	(0.000)	(0.001)	(0.000)	(0.464)	(0.756)	(0.051)	(0.260)	–					
Imaging	0.57004	0.45878	0.15109	0.52099	0.66901	0.01173	0.76032	0.09809	1				



Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management		Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab				
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
	(0.000)	(0.000)	(0.222)	(0.000)	(0.000)	(0.925)	(0.000)	(0.430)	—				
Laboratory	0.22528	0.25521	0.13577	0.20923	0.10715	-0.2135	0.12982	0.08832	0.03388	1			
	(0.067)	(0.037)	(0.273)	(0.089)	(0.388)	(0.083)	(0.295)	(0.477)	(0.785)	—			
Total Pharmacy	0.13672	0.08293	0.26195	0.0512	0.03532	0.00048	0.03899	0.16222	0.03041	0.10392	1		
	(0.270)	(0.505)	(0.032)	(0.681)	(0.777)	(0.997)	(0.754)	(0.190)	(0.807)	(0.403)	—		
Total Discharges	0.55	0.14738	0.53644	-0.06373	0.03145	0.30094	-0.0947	0.76654	0.01437	0.00834	0.16087	1	
	(0.000)	(0.234)	(0.000)	(0.608)	(0.801)	(0.013)	(0.446)	(0.000)	(0.908)	(0.947)	(0.193)	—	
Total ED Discharges	0.28917	0.31886	0.0413	-0.44102	0.48958	0.05779	-0.61777	0.04701	0.77281	0.1647	0.07714	0.20297	1
	(0.018)	(0.009)	(0.740)	(0.000)	(0.000)	(0.642)	(0.000)	(0.706)	(0.000)	(0.183)	(0.535)	(0.100)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-12a: Hypertension Inter-item Component Correlations, 2011 v. 2012 – Commercial HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.27527	1											
	(0.000)	–											
Inpatient	0.35541	0.46622	1										
	(0.000)	(0.000)	–										
Outpatient	0.20963	0.9633	0.25032	1									
	(0.007)	(0.000)	(0.001)	–									
Procedures and Surgery	0.674	0.10385	0.10933	0.10333	1								
	(0.000)	(0.186)	(0.163)	(0.188)	–								
Inpatient	0.66333	0.00216	0.11869	-0.01825	0.70603	1							
	(0.000)	(0.978)	(0.130)	(0.817)	(0.000)	–							
Outpatient	0.5509	0.15754	0.09105	0.16705	0.91425	0.40798	1						
	(0.000)	(0.044)	(0.246)	(0.033)	(0.000)	(0.000)	–						
Inpatient Facility	0.81644	0.07995	0.32879	-0.0026	0.4791	0.64016	0.3252	1					
	(0.000)	(0.309)	(0.000)	(0.974)	(0.000)	(0.000)	(0.000)	–					
Imaging	0.37362	0.06619	0.1759	0.02363	0.02998	0.05634	-0.00508	0.14932	1				
	(0.000)	(0.400)	(0.024)	(0.764)	(0.703)	(0.474)	(0.948)	(0.056)	–				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	0.42524	0.23963	0.05512	0.2455	0.20511	0.16923	0.18685	0.18346	0.27528	1			
	(0.000)	(0.002)	(0.483)	(0.002)	(0.008)	(0.030)	(0.016)	(0.018)	(0.000)	—			
Total Pharmacy	0.25439	0.21417	0.13938	0.19826	0.25187	0.20155	0.22052	0.23209	0.01131	0.08944	1		
	(0.001)	(0.006)	(0.075)	(0.011)	(0.001)	(0.010)	(0.004)	(0.003)	(0.885)	(0.253)	—		
Total Discharges	0.64652	0.07485	0.31355	-0.00667	0.35642	0.5358	0.20985	0.79802	0.14053	0.13812	0.22432	1	
	(0.000)	(0.342)	(0.000)	(0.933)	(0.000)	(0.000)	(0.007)	(0.000)	(0.073)	(0.078)	(0.004)	—	
Total ED Discharges	0.27048	0.0966	0.24348	0.04062	0.23471	0.25181	0.179	0.273	0.05032	0.15813	0.08959	0.2857	1
	(0.000)	(0.219)	(0.002)	(0.606)	(0.002)	(0.001)	(0.021)	(0.000)	(0.521)	(0.043)	(0.252)	(0.000)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-12b: Hypertension Inter-item Component Correlations, 2011 v. 2012 – Commercial PPO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.12096	1											
	(0.161)	–											
Inpatient	0.4435	0.41259	1										
	(0.000)	(0.000)	–										
Outpatient	0.05423	0.97713	0.23474	1									
	(0.531)	(0.000)	(0.006)	–									
Procedures and Surgery	0.62975	-0.10884	0.11153	-0.1212	1								
	(0.000)	(0.207)	(0.196)	(0.160)	–								
Inpatient	0.42107	0.31851	0.01644	-0.32213	0.69102	1							
	(0.000)	(0.000)	(0.849)	(0.000)	(0.000)	–							
Outpatient	0.59416	0.11261	0.17543	0.10265	0.8536	0.27194	1						
	(0.000)	(0.192)	(0.041)	(0.234)	(0.000)	(0.001)	–						
Inpatient Facility	0.63992	0.25442	0.39082	-0.34878	0.35578	0.50871	0.15126	1					
	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.079)	–					
Imaging	0.49275	0.36763	0.42335	0.32027	0.10841	0.07223	0.23121	0.10466	1				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management		Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab				
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.209)	(0.403)	(0.007)	(0.225)	—				
Laboratory	0.4924 1	0.1423 4	0.11398	0.13724	0.3724 4	0.01038	0.52118	- 0.04664	0.2799 2	1			
	(0.000)	(0.098)	(0.186)	(0.111)	(0.000)	(0.905)	(0.000)	(0.590)	(0.001)	—			
Total Pharmacy	0.0516 7	0.1095 6	0.10648	0.08612	0.0592 4	0.05881	-0.00667	- 0.01032	0.0260 9	0.0017 4	1		
	(0.550)	(0.204)	(0.217)	(0.319)	(0.493)	(0.496)	(0.939)	(0.905)	(0.763)	(0.984)	—		
Total Discharges	0.6587 3	0.1339 8	0.51986	-0.24489	0.3840 6	0.45401	0.22325	0.86288	0.1831 7	0.0180 5	-0.00138	1	
	(0.000)	(0.120)	(0.000)	(0.004)	(0.000)	(0.000)	(0.009)	(0.000)	(0.033)	(0.835)	(0.987)	—	
Total ED Discharges	0.2030 2	0.2049 7	0.19458	-0.26255	0.1175 7	0.00528	0.15349	0.33187	0.1626 7	0.1414 8	0.23045	0.34402	1
	(0.018)	(0.017)	(0.023)	(0.002)	(0.173)	(0.951)	(0.074)	(0.000)	(0.058)	(0.100)	(0.007)	(0.000)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-12c: Hypertension Inter-item Component Correlations, 2011 v. 2012 – Medicaid HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.52626	1											
	(0.000)	–											
Inpatient	0.4475	0.07724	1										
	(0.000)	(0.488)	–										
Outpatient	0.36638	0.94362	0.18303	1									
	(0.001)	(0.000)	(0.098)	–									
Procedures and Surgery	0.42682	0.50758	0.02126	0.49906	1								
	(0.000)	(0.000)	(0.849)	(0.000)	–								
Inpatient	0.56598	0.37465	0.07443	0.36056	0.62357	1							
	(0.000)	(0.000)	(0.504)	(0.001)	(0.000)	–							
Outpatient	0.34023	0.45896	0.04114	0.45	0.95892	0.41453	1						
	(0.002)	(0.000)	(0.712)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.85873	0.28353	0.51706	0.11526	0.1891	0.46982	0.08585	1					
	(0.000)	(0.009)	(0.000)	(0.299)	(0.087)	(0.000)	(0.440)	–					
Imaging	0.43814	0.24964	0.2053	0.18205	0.39213	0.33538	0.37493	0.12916	1				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
	(0.000)	(0.024)	(0.064)	(0.102)	(0.000)	(0.002)	(0.001)	(0.247)	—				
Laboratory	0.5523 3	0.3024 2	0.11622	0.23901	0.1719 7	0.18055	0.1569	0.31027	0.3926 7	1			
	(0.000)	(0.005)	(0.295)	(0.030)	(0.120)	(0.102)	(0.157)	(0.004)	(0.000)	—			
Total Pharmacy	0.2364	0.3635 3	0.17139	0.37658	0.2792 5	0.31366	0.23202	0.13695	0.1857 5	0.0322 9	1		
	(0.035)	(0.001)	(0.126)	(0.001)	(0.012)	(0.004)	(0.037)	(0.223)	(0.099)	(0.775)	—		
Total Discharges	0.6463 7	0.1599	0.52187	-0.00984	0.0156 8	0.20549	-0.08411	0.82849	0.0009 5	0.2484 6	0.0458	1	
	(0.000)	(0.149)	(0.000)	(0.930)	(0.888)	(0.062)	(0.450)	(0.000)	(0.993)	(0.024)	(0.685)	—	
Total ED Discharges	0.0860 4	0.1202 3	0.30572	0.06587	0.1786	0.01585	0.2371	- 0.03835	0.4918 6	0.0895 6	0.19004	-0.04372	1
	(0.442)	(0.279)	(0.005)	(0.554)	(0.106)	(0.887)	(0.031)	(0.731)	(0.000)	(0.421)	(0.089)	(0.695)	—

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-12d: Hypertension Inter-item Component Correlations, 2011 v. 2012 – Medicare HMO**

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.43023	1											
	(0.000)	–											
Inpatient	0.63774	0.43655	1										
	(0.000)	(0.000)	–										
Outpatient	0.23902	0.89036	0.08558	1									
	(0.004)	(0.000)	(0.308)	–									
Procedures and Surgery	0.58833	0.36208	0.13133	0.37688	1								
	(0.000)	(0.000)	(0.117)	(0.000)	–								
Inpatient	0.52547	0.0947	0.11171	0.10392	0.69726	1							
	(0.000)	(0.259)	(0.183)	(0.215)	(0.000)	–							
Outpatient	0.52859	0.40952	0.1288	0.4234	0.94041	0.44151	1						
	(0.000)	(0.000)	(0.124)	(0.000)	(0.000)	(0.000)	–						
Inpatient Facility	0.85212	0.18075	0.65443	-0.04753	0.28696	0.41714	0.20527	1					
	(0.000)	(0.030)	(0.000)	(0.572)	(0.000)	(0.000)	(0.013)	–					
Imaging	0.59472	0.38675	0.40676	0.26731	0.38292	0.18841	0.4133	0.31294	1				
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.024)	(0.000)	(0.000)	–				
	0.5160	0.2060	0.31497	0.14347	0.1896	0.22883	0.16283	0.31516	0.3927	1			



Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
Laboratory	8	9			8								
	(0.000)	(0.013)	(0.000)	(0.086)	(0.023)	(0.006)	(0.050)	(0.000)	(0.000)	—			
Total Pharmacy	0.2029 2	0.4158	0.11479	0.39035	0.3639 5	0.15636	0.40283	0.10366	0.0512 7	0.0526 6	1		
	(0.015)	(0.000)	(0.171)	(0.000)	(0.000)	(0.061)	(0.000)	(0.215)	(0.540)	(0.529)	—		
Total Discharges	0.6680 3	0.1902 1	0.63175	-0.02936	0.1833 4	0.23068	0.1497	0.80912	0.2466 9	0.2017 6	0.1893	1	
	(0.000)	(0.022)	(0.000)	(0.727)	(0.028)	(0.005)	(0.072)	(0.000)	(0.003)	(0.015)	(0.023)	—	
Total ED Discharges	0.1741 1	0.0295 9	0.29594	-0.05568	0.0011 8	0.07224	-0.03653	0.30701	0.2410 8	0.1586 2	0.04675	0.37428	1
	(0.037)	(0.725)	(0.000)	(0.507)	(0.989)	(0.390)	(0.663)	(0.000)	(0.003)	(0.057)	(0.577)	(0.000)	—

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

Table A-12e: Hypertension Inter-item Component Correlations, 2011 v. 2012 – Medicare PPO

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
Total		Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt							
Total Medical	1												
	–												
Total Evaluation and Manageme nt	0.43221	1											
	(0.000)	–											
Inpatient	0.39261	0.26722	1										
	(0.001)	(0.031)	–										
Outpatient	0.27771	0.92762	0.03326	1									
	(0.025)	(0.000)	(0.793)	–									
Procedures and Surgery	0.70389	0.29414	0.01447	0.32281	1								
	(0.000)	(0.017)	(0.909)	(0.009)	–								
Inpatient	0.3969	0.17504	0.04292	-0.21302	0.44921	1							
	(0.001)	(0.163)	(0.734)	(0.088)	(0.000)	–							
Outpatient	0.65035	0.35844	0.03903	0.38969	0.92583	0.1771	1						
	(0.000)	(0.003)	(0.758)	(0.001)	(0.000)	(0.158)	–						
Inpatient Facility	0.50066	0.20026	0.51827	-0.42526	0.01473	0.48221	-0.11945	1					
	(0.000)	(0.110)	(0.000)	(0.000)	(0.907)	(0.000)	(0.343)	–					
Imaging	0.74956	0.49563	0.17102	0.4632	0.70844	0.10704	0.76171	0.07456	1				

Service Category	Spearman Correlation Coefficients and Associated (p-Values in parentheses)												
	Medical										Total Pharmac y	Total Discharge s	Total ED Discharge s
	Total	Evaluation and Management			Procedures and Surgery			Inpatie nt Facility	Imagin g	Lab			
		Total	Inpatie nt	Outpatie nt	Total	Inpatie nt	Outpatie nt						
	(0.000)	(0.000)	(0.173)	(0.000)	(0.000)	(0.396)	(0.000)	(0.555)	–				
Laboratory	0.58348	0.55874	0.28208	0.4639	0.4017	0.09274	0.45533	0.02439	0.5087	1			
	(0.000)	(0.000)	(0.023)	(0.000)	(0.001)	(0.462)	(0.000)	(0.847)	(0.000)	–			
Total Pharmacy	0.05297	0.18584	0.18999	0.18169	0.02487	-0.1927	0.1104	-0.14694	0.13016	0.13942	1		
	(0.675)	(0.138)	(0.130)	(0.147)	(0.844)	(0.124)	(0.381)	(0.243)	(0.301)	(0.268)	–		
Total Discharges	0.32622	0.30874	0.44524	-0.49213	0.02596	0.47295	-0.15184	0.82885	0.09742	0.04825	-0.09008	1	
	(0.008)	(0.012)	(0.000)	(0.000)	(0.837)	(0.000)	(0.227)	(0.000)	(0.440)	(0.703)	(0.475)	–	
Total ED Discharges	0.34104	-0.4014	0.17994	-0.50861	0.51547	0.05127	-0.57535	0.21735	0.65197	0.25555	-0.05157	0.42255	1
	(0.005)	(0.001)	(0.151)	(0.000)	(0.000)	(0.685)	(0.000)	(0.082)	(0.000)	(0.040)	(0.683)	(0.000)	–

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-13a: Correlation of RRU Ratio Index and Quality Composite – Commercial HMO**

Service Category	Effectiveness of Care Quality Composite									
	Diabetes		Asthma		Cardiovascular Conditions		COPD		Hypertension	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
Total Medical	0.01445	0.854328	-0.05259	0.489417	0.09474	0.226114	0.05009	0.643060	0.13777	0.079472
Total Evaluation and Management	-0.1276	0.103468	-0.03194	0.674737	-0.08421	0.282223	-0.05951	0.581809	-0.1191	0.129952
Inpatient	-0.37313	0.000001	-0.13775	0.069084	-0.17091	0.028173	0.00676	0.950138	-0.1114	0.156871
Outpatient	-0.05881	0.454436	-0.01358	0.858441	-0.04346	0.579355	-0.08263	0.444044	-0.11511	0.143424
Procedures and Surgery	0.19831	0.010910	-0.05422	0.476027	0.16569	0.033433	-0.12788	0.235108	0.16103	0.040022
Inpatient	0.04504	0.566893	0.00509	0.946713	0.10159	0.194168	-0.10716	0.320329	0.15913	0.042468
Outpatient	0.16675	0.032297	-0.05744	0.448930	0.08178	0.294877	-0.14302	0.181203	0.09307	0.235898
Inpatient Facility	-0.00493	0.949928	-0.06029	0.426727	0.07185	0.357636	0.09164	0.393039	0.13686	0.080562
Imaging	-0.12942	0.097579	0.00525	0.944857	-0.0138	0.859895	0.0967	0.367344	0.13579	0.082970
Laboratory	-0.06618	0.398359	-0.11588	0.125645	0.02064	0.791795	-0.05533	0.606564	-0.16918	0.030336
Total Pharmacy	0.01504	0.847975	0.2878	0.000113	-0.12421	0.110831	-0.04811	0.654359	-0.1038	0.185941
Total Discharges	-0.04675	0.552258	-0.09711	0.201084	0.06749	0.389092	0.03086	0.774013	0.14248	0.069627
Total ED Discharges	-0.22342	0.003920	0.01353	0.858572	-0.06827	0.382125	-0.03953	0.713024	-0.09259	0.238307

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)

**Table A-13b: Correlation of RRU Ratio Index and Quality Composite – Commercial PPO**

Service Category	Effectiveness of Care Quality Composite				
	Diabetes	Asthma	Cardiovascular Conditions	COPD	Hypertension

	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
Total Medical	-0.18598	0.035562	0.24171	0.001230	-0.02642	0.744224	0.05315	0.601345	0.02943	0.734697
Total Evaluation and Management	-0.02399	0.788055	0.32894	0.000008	0.27635	0.000500	0.22469	0.025359	-0.16186	0.060717
Inpatient	-0.11419	0.199336	0.16839	0.025486	0.1632	0.042457	0.10391	0.306062	0.06126	0.480297
Outpatient	0.00509	0.954552	0.33908	0.000004	0.25564	0.001325	0.20329	0.043576	-0.17488	0.042494
Procedures and Surgery	-0.11735	0.187105	0.09069	0.231286	-0.11614	0.150115	-0.33359	0.000740	0.11988	0.166068
Inpatient	-0.13462	0.129770	0.0225	0.766880	-0.13193	0.101762	-0.29067	0.003515	-0.02689	0.756918
Outpatient	-0.12754	0.151381	0.10605	0.161261	-0.07488	0.354445	-0.25699	0.010233	0.13163	0.128044
Inpatient Facility	-0.05959	0.504048	0.2012	0.007414	-0.08267	0.306478	0.11633	0.251534	0.06517	0.452693
Imaging	-0.15437	0.081886	0.14899	0.048441	-0.08041	0.319910	0.07712	0.448031	-0.00042	0.996147
Laboratory	-0.20317	0.021440	0.03056	0.687240	0.00289	0.971492	-0.13878	0.170718	-0.02152	0.804289
Total Pharmacy	-0.04992	0.575743	0.33032	0.000008	-0.01123	0.889692	0.11772	0.245843	-0.12495	0.148745
Total Discharges	-0.05435	0.542304	0.08542	0.259638	0.01478	0.855148	0.15202	0.133062	0.11629	0.179202
Total ED Discharges	-0.1643	0.063858	0.08541	0.259730	-0.14702	0.067924	-0.17244	0.087858	0.00914	0.916224

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient* >0.30 with a *p-value* <0.01)

Red: Moderate to strong negative (*Spearman correlation coefficient* < -0.30 with a *p-value* < 0.01)

**Table A-13c: Correlation of RRU Ratio Index and Quality Composite – Medicaid HMO**

Service Category	Effectiveness of Care Quality Composite									
	Diabetes		Asthma		Cardiovascular Conditions		COPD		Hypertension	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
Total Medical	-0.00882	0.934975	0.09133	0.411573	0.05603	0.652459	0.1383	0.279733	0.11158	0.321358

Service Category	Effectiveness of Care Quality Composite									
	Diabetes		Asthma		Cardiovascular Conditions		COPD		Hypertension	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
Total Evaluation and Management	0.15606	0.144173	0.17744	0.106362	0.01283	0.917321	0.33141	0.007471	0.1518	0.173397
Inpatient	-0.34792	0.000835	-0.24044	0.027591	0.02855	0.817210	0.12724	0.316360	-0.17104	0.124444
Outpatient	0.24351	0.021473	0.19702	0.072440	-0.01786	0.885030	0.29212	0.019166	0.19446	0.080009
Procedures and Surgery	0.24479	0.020778	0.14401	0.191235	-0.01714	0.889668	0.18269	0.148479	0.15463	0.165425
Inpatient	0.16667	0.118514	0.07476	0.499128	0.00634	0.959099	0.24904	0.047208	0.13684	0.220234
Outpatient	0.23871	0.024268	0.14438	0.190103	0.01054	0.932047	0.14501	0.252929	0.15383	0.167635
Inpatient Facility	-0.09903	0.355846	-0.03592	0.745635	0.00164	0.989401	0.08622	0.498144	0.03189	0.776096
Imaging	-0.03616	0.738054	-0.12688	0.253013	0.14091	0.255370	0.05319	0.678873	-0.03941	0.726863
Laboratory	0.12732	0.234425	-0.07105	0.520695	0.00076	0.995070	0.14428	0.255360	0.08242	0.461630
Total Pharmacy	0.29598	0.005378	0.34998	0.001101	0.2364	0.052273	0.27308	0.029018	0.12316	0.276418
Total Discharges	-0.15375	0.150294	-0.13609	0.217060	-0.01302	0.916095	-0.10719	0.399206	-0.01547	0.890314
Total ED Discharges	-0.29957	0.004344	-0.22252	0.041909	-0.12814	0.297683	0.10298	0.418096	-0.37187	0.000582

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient* >0.30 with a *p-value* <0.01)

Red: Moderate to strong negative (*Spearman correlation coefficient* < -0.30 with a *p-value* < 0.01)

**Table A-13d: Correlation of RRU Ratio Index and Quality Composite – Medicare HMO**

Service Category	Effectiveness of Care Quality Composite									
	Diabetes		Asthma		Cardiovascular Conditions		COPD		Hypertension	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value

Service Category	Effectiveness of Care Quality Composite									
	Diabetes		Asthma		Cardiovascular Conditions		COPD		Hypertension	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
Total Medical	0.111	0.179250			0.04006	0.633585	-0.02323	0.800349	0.04304	0.608503
Total Evaluation and Management	0.00781	0.924971			-0.03258	0.698291	-0.07259	0.428789	0.12497	0.135596
Inpatient	-0.21116	0.009989			-0.16502	0.048088	-0.16962	0.062885	-0.08158	0.331038
Outpatient	0.07273	0.379720			0.03542	0.673456	-0.02598	0.777293	0.16167	0.052886
Procedures and Surgery	0.36994	0.000004			0.23934	0.003862	0.14963	0.101395	0.29456	0.000339
Inpatient	0.32312	0.000062			0.24326	0.003304	0.05675	0.536371	0.18278	0.028321
Outpatient	0.27048	0.000849			0.12347	0.138978	0.11886	0.192252	0.25149	0.002278
Inpatient Facility	0.04461	0.589009			0.00959	0.908865	-0.06349	0.487220	-0.0196	0.814975
Imaging	0.12059	0.142920			0.01176	0.888335	0.16859	0.063413	0.13489	0.105742
Laboratory	-0.08561	0.299207			-0.11606	0.164480	-0.14024	0.123400	-0.17841	0.031788
Total Pharmacy	0.22324	0.006207			0.2331	0.004779	0.21861	0.015557	0.29183	0.000369
Total Discharges	0.05084	0.538059			0.0281	0.737226	-0.04855	0.595419	0.03867	0.644252
Total ED Discharges	-0.45278	0.000000			-0.36882	0.000005	-0.36965	0.000028	-0.36313	0.000007

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.30 with a p-value < 0.01)

**Table A-13e: Correlation of RRU Ratio Index and Quality Composite – Medicare PPO**

Service Category	Effectiveness of Care Quality Composite									
	Diabetes		Asthma		Cardiovascular Conditions		COPD		Hypertension	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
Total Medical	0.20253	0.100245			0.06168	0.622704	0.14232	0.314187	0.12425	0.324087
Total Evaluation and Management	0.1825	0.139372			0.30091	0.014086	0.20114	0.152754	0.06178	0.624896
Inpatient	-0.04649	0.708706			-0.13299	0.287089	0.05216	0.713419	0.13096	0.298434
Outpatient	0.2068	0.093136			0.3847	0.001426	0.29762	0.032129	0.02446	0.846667
Procedures and Surgery	0.33095	0.006228			0.4401	0.000218	0.36148	0.008464	0.21156	0.090696
Inpatient	-0.02514	0.839954			0.0798	0.524152	0.09186	0.517174	-0.06404	0.612314
Outpatient	0.33031	0.006335			0.39735	0.000955	0.37591	0.006027	0.26724	0.031390
Inpatient Facility	-0.07367	0.553539			-0.29256	0.017137	-0.07359	0.604114	-0.03901	0.757676
Imaging	0.26622	0.029437			0.26216	0.033463	0.34509	0.012230	0.20323	0.104441
Laboratory	0.11194	0.367128			0.1608	0.197128	0.1284	0.364306	0.02033	0.872327
Total Pharmacy	0.2406	0.049848			0.00795	0.949465	-0.07573	0.593637	0.0669	0.596472
Total Discharges	-0.104	0.402300			-0.14502	0.245333	-0.09178	0.517565	-0.03779	0.765057
Total ED Discharges	-0.31902	0.008506			-0.41756	0.000486	-0.46991	0.000440	-0.32636	0.007972

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.01*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.30 with a p-value < 0.01*)



**Table A-14a: Proportion of Plans Submitting RRU Data that have Missing or Outlier Data - Commercial**

RRU Measure	HEDIS Year	Commercial							
		HMO				PPO			
		Returning		New		Returning		New	
		Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data
Diabetes	2012	169	84.0	13	69.2	119	72.3	58	65.5
	2011	196	90.3	14	85.7	150	71.3	13	61.5
	2010	180	95.0	37	100.0	79	67.1	52	61.5
Asthma	2012	167	47.3	13	53.8	119	63.0	58	62.1
	2011	196	50.5	14	35.7	150	54.0	13	46.2
	2010	201	56.2	15	26.7	85	57.6	47	53.2
Cardiovascular Conditions	2012	169	59.2	13	61.5	119	78.2	58	69.0
	2011	196	61.7	14	57.1	150	76.0	13	53.8
	2010	200	67.0	15	33.3	84	76.2	47	74.5
COPD	2012	169	46.2	13	53.8	119	52.9	58	60.3
	2011	196	50.5	14	42.9	150	56.0	13	38.5
	2010	200	54.5	16	18.8	85	65.9	47	66.0
Hypertension	2012	152	94.7	13	84.6	71	97.2	65	98.5
	2011	177	91.0	14	92.9	38	100.0	53	92.5
	2010	198	95.5	15	100.0	1	100.0	42	92.9

**Note:** "Outlier or missing data" includes the following scenarios: 1) A plan's O/E ratio was > 3.000 or < 1/3 for Total Medical or Total Pharmacy; 2) A plan's eligible population was < 400; 3) A quality composite was not available.

**Table A-14b: Proportion of Plans Submitting RRU Data that have Missing or Outlier Data – Medicare**

RRU Measure	HEDIS Year	Medicare							
		HMO				PPO			
		Returning		New		Returning		New	
		Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data
Diabetes	2012	121	91.7	31	71.0	24	87.5	43	88.4
	2011	115	90.4	16	62.5	19	84.2	13	61.5
	2010	107	86.9	24	50.0	19	73.7	12	41.7
Asthma	2012	0	0.0	0	0.0	0	0.0	0	0.0
	2011	0	0.0	0	0.0	0	0.0	0	0.0
	2010	0	0.0	0	0.0	0	0.0	0	0.0
Cardiovascular Conditions	2012	121	63.6	31	32.3	24	50.0	43	58.1
	2011	114	61.4	17	23.5	16	43.8	15	20.0
	2010	106	62.3	24	25.0	18	55.6	11	9.1
COPD	2012	121	80.2	31	48.4	23	73.9	44	79.5
	2011	114	73.7	17	41.2	16	56.3	15	46.7
	2010	105	80.0	25	28.0	18	61.1	11	18.2
Hypertension	2012	119	97.5	29	89.7	19	94.7	46	100.0
	2011	109	88.1	21	52.4	13	92.3	18	77.8
	2010	103	86.4	22	54.5	2	100.0	20	75.0

**Note:** "Outlier or missing data" includes the following scenarios: 1) A plan's O/E ratio was > 3.000 or < 1/3 for Total Medical or Total Pharmacy; 2) A plan's eligible population was < 400; 3) A quality composite was not available.

**Table A-14c: Proportion of Plans Submitting RRU Data that have Missing or Outlier Data – Medicaid**

RRU Measure	HEDIS Year	Medicaid							
		HMO				PPO			
		Returning		New		Returning		New	
		Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data	Count With Any RRU Data	% With Non-Outlier and Non-Missing Data
Diabetes	2012	75	76.0	15	66.7	0	0.0	0	0.0
	2011	87	83.9	12	58.3	0	0.0	0	0.0
	2010	78	84.6	16	43.8	0	0.0	0	0.0
Asthma	2012	76	80.3	12	75.0	0	0.0	0	0.0
	2011	84	73.8	14	50.0	0	0.0	0	0.0
	2010	75	73.3	15	26.7	0	0.0	0	0.0
Cardiovascular Conditions	2012	74	36.5	12	25.0	0	0.0	0	0.0
	2011	86	32.6	12	8.3	0	0.0	0	0.0
	2010	75	30.7	16	6.3	0	0.0	0	0.0
COPD	2012	76	61.8	15	26.7	0	0.0	0	0.0
	2011	84	61.9	13	38.5	0	0.0	0	0.0
	2010	78	62.8	15	20.0	0	0.0	0	0.0
Hypertension	2012	68	80.9	15	66.7	0	0.0	0	0.0
	2011	82	70.7	13	46.2	0	0.0	0	0.0
	2010	70	71.4	18	38.9	0	0.0	0	0.0

**Note:** "Outlier or missing data" includes the following scenarios: 1) A plan's O/E ratio was > 3.000 or < 1/3 for Total Medical or Total Pharmacy; 2) A plan's eligible population was < 400; 3) A quality composite was not available.

**Table A-15: Summary of Significant Differences between Mean O/E Ratios - New and Returning Plans**

		Total Medical	Evaluation & Management			Procedures and Surgery			Inpatient Facility	Imaging	Laboratory	Total Pharmacy	Total Discharges	Total ED Discharges
			Total	Inpatient	Outpatient	Total	Inpatient	Outpatient						
Diabetes	2012					<b>CP, MH, MP</b>	<b>CP</b>	<b>MH, MP</b>		<b>MH, MP</b>				MP
	2011					<b>CP</b>								
Asthma	2012													
	2011						<b>CP</b>							
Cardiovascular Conditions	2012	<b>CP</b>			<b>MH</b>	<b>MH</b>		<b>MH, MP</b>						<b>CH</b>
	2011													
COPD	2012					<b>CP, MH</b>		<b>CP, MH, MP</b>		<b>MH, MP</b>				MP
	2011													
Hypertension	2012	<b>MH</b>				<b>CP, MH, MP</b>		<b>CP, MH, MP</b>		<b>MH, MP</b>				
	2011					CP		CP						

**CH** = Commercial HMO; **CP** = Commercial PPO; **DH** = Medicaid HMO; **DP** = Medicaid PPO; **MH** = Medicare HMO; **MP** = Medicare PPO

***Bold and italicized:*** Mean O/E of new plans is significantly less than the mean of returning plans (p<0.01)

Standard font: Mean O/E of new plans is significantly higher than the mean of returning plans (p<0.01)

**Table A-16a: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Diabetes**

Product Line	Reporting Type	Metric	Spearman Correlation Coefficient								
			Total Medication O/E	Total Pharmacy O/E	Total Inpatient Discharges (O/E)	Total ED Discharges (O/E)	PMPM	GU	GSR	OGU	RRU-Q
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.28	0.37	0.06	0.19	1.00	0.41	0.40	0.45	0.27
		Generic Utilization, provided generic option exists (GU)	0.18	0.08	0.14	0.12	0.41	1.00	1.00	0.62	0.31
		Generic Substitution Rate (GSR)	0.19	0.08	0.15	0.12	0.40	1.00	1.00	0.62	0.30
		Overall Generic Utilization (OGU)	-0.07	-0.29	-0.03	0.01	0.45	0.62	0.62	1.00	0.50
	PPO	Total Prescriptions Per Member Per Month (PMPM)	0.23	0.21	-0.05	0.27	1.00	0.41	0.41	0.41	-0.01
		Generic Utilization, provided generic option exists (GU)	-0.10	-0.31	-0.05	0.10	0.41	1.00	1.00	0.87	0.26
		Generic Substitution Rate (GSR)	-0.10	-0.31	-0.05	0.09	0.41	1.00	1.00	0.87	0.26
		Overall Generic Utilization (OGU)	-0.17	-0.42	-0.11	0.08	0.41	0.87	0.87	1.00	0.30
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.05	0.56	-0.08	0.28	1.00	-0.11	-0.12	-0.05	0.32
		Generic Utilization, provided generic option exists (GU)	0.05	-0.03	-0.12	-0.14	-0.11	1.00	1.00	0.44	-0.07
		Generic Substitution Rate (GSR)	0.04	-0.03	-0.12	-0.16	-0.12	1.00	1.00	0.43	-0.07
		Overall Generic Utilization (OGU)	0.02	-0.52	0.05	0.00	-0.05	0.44	0.43	1.00	-0.13
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.01	0.36	0.06	0.24	1.00	0.13	0.13	0.20	-0.02
		Generic Utilization, provided generic option exists (GU)	-0.05	-0.08	-0.04	0.22	0.13	1.00	1.00	0.68	0.00
		Generic Substitution Rate (GSR)	-0.05	-0.08	-0.04	0.21	0.13	1.00	1.00	0.69	0.00
		Overall Generic Utilization (OGU)	-0.30	-0.44	-0.24	0.17	0.20	0.68	0.69	1.00	-0.05
	PPO	Total Prescriptions Per Member Per Month (PMPM)	-0.22	0.28	0.27	0.55	1.00	0.27	0.26	0.49	-0.05
		Generic Utilization, provided generic option exists (GU)	-0.35	-0.31	0.05	0.43	0.27	1.00	1.00	0.79	-0.02
		Generic Substitution Rate (GSR)	-0.34	-0.31	0.05	0.42	0.26	1.00	1.00	0.79	-0.01
		Overall Generic Utilization (OGU)	-0.40	-0.33	0.19	0.61	0.49	0.79	0.79	1.00	-0.11

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.05*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.3 with a p-value < 0.05*)

**Table A-16b: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Asthma**

Product Line	Reporting Type	Metric	Spearman Correlation Coefficient										
			Total Medication O/E	Total Pharmacy O/E	Total Inpatient Discharges (O/E)	Total ED Discharges (O/E)	PMPM	GU	GSR	OGU	RRU-Q	MM A 50	MM A 75
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.11	0.26	-0.06	-0.05	1.00	0.09	0.12	0.18	0.05	0.26	0.20
		Generic Utilization, provided generic option exists (GU)	0.12	0.17	-0.04	0.15	0.09	1.00	0.99	0.55	0.08	0.40	0.39
		Generic Substitution Rate (GSR)	0.13	0.19	-0.03	0.13	0.12	0.99	1.00	0.58	0.06	0.40	0.40
		Overall Generic Utilization (OGU)	0.01	-0.18	0.04	0.01	0.18	0.55	0.58	1.00	-0.16	0.06	0.10
	PPO	Total Prescriptions Per Member Per Month (PMPM)	0.04	0.35	-0.02	0.08	1.00	0.33	0.33	0.18	0.00	0.11	0.09
		Generic Utilization, provided generic option exists (GU)	0.11	-0.12	0.04	0.11	-0.33	1.00	0.99	0.70	-0.04	0.41	0.42
		Generic Substitution Rate (GSR)	0.10	-0.13	0.04	0.09	-0.33	0.99	1.00	0.69	-0.04	0.39	0.41
		Overall Generic Utilization (OGU)	-0.15	-0.33	-0.01	-0.01	-0.18	0.70	0.69	1.00	-0.23	0.28	0.31
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.09	0.61	0.13	-0.10	1.00	0.36	0.37	0.28	-0.04	0.48	0.53
		Generic Utilization, provided generic option exists (GU)	0.05	0.03	0.01	0.14	0.36	1.00	1.00	0.69	-0.18	0.09	0.11
		Generic Substitution Rate (GSR)	0.07	0.05	0.02	0.12	0.37	1.00	1.00	0.69	-0.18	0.10	0.12
		Overall Generic Utilization (OGU)	0.02	-0.31	0.13	0.14	0.28	0.69	0.69	1.00	-0.47	0.11	0.02

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.05)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.3 with a p-value < 0.05)

**Table A-16c: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Cardiovascular Conditions**

Product Line	Reporting Type	Metric	Spearman Correlation Coefficient								
			Total Medication O/E	Total Pharmacy O/E	Total Inpatient Discharges (O/E)	Total ED Discharges (O/E)	PMP M	GU	GSR	OGU	RRU-Q
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.21	0.31	0.06	0.25	1.00	0.40	0.39	0.40	0.23
		Generic Utilization, provided generic option exists (GU)	0.17	-0.05	0.14	0.20	0.40	1.00	1.00	0.63	0.22
		Generic Substitution Rate (GSR)	0.17	-0.05	0.14	0.20	0.39	1.00	1.00	0.63	0.22
		Overall Generic Utilization (OGU)	-0.03	-0.41	0.08	0.16	0.40	0.63	0.63	1.00	0.41
	PPO	Total Prescriptions Per Member Per Month (PMPM)	0.26	0.16	-0.04	0.28	1.00	0.43	0.44	0.38	0.11
		Generic Utilization, provided generic option exists (GU)	-0.14	-0.47	-0.04	0.19	0.43	1.00	1.00	0.87	0.16
		Generic Substitution Rate (GSR)	-0.14	-0.47	-0.05	0.19	0.44	1.00	1.00	0.86	0.16
		Overall Generic Utilization (OGU)	-0.15	-0.55	-0.02	0.28	0.38	0.87	0.86	1.00	0.14
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.03	0.65	0.05	0.34	1.00	0.02	0.00	0.03	0.33
		Generic Utilization, provided generic option exists (GU)	-0.07	-0.14	-0.21	-0.22	-0.02	1.00	1.00	0.35	-0.17
		Generic Substitution Rate (GSR)	-0.08	-0.13	-0.22	-0.22	0.00	1.00	1.00	0.34	-0.19
		Overall Generic Utilization (OGU)	0.08	-0.39	0.06	0.08	0.03	0.35	0.34	1.00	-0.12
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	-0.02	0.43	0.11	0.35	1.00	0.06	0.04	0.25	-0.15
		Generic Utilization, provided generic option exists (GU)	-0.08	-0.19	-0.10	0.16	0.06	1.00	1.00	0.64	-0.01
		Generic Substitution Rate (GSR)	-0.08	-0.20	-0.10	0.15	0.04	1.00	1.00	0.64	-0.01
		Overall Generic Utilization (OGU)	-0.22	-0.40	-0.18	0.21	0.25	0.64	0.64	1.00	-0.08
	PPO	Total Prescriptions Per Member Per Month (PMPM)	-0.13	0.40	0.21	0.46	1.00	0.26	0.26	0.39	-0.07
		Generic Utilization, provided generic option exists (GU)	-0.20	-0.37	0.11	0.49	0.26	1.00	1.00	0.78	-0.16
		Generic Substitution Rate (GSR)	-0.20	-0.37	0.10	0.49	0.26	1.00	1.00	0.78	-0.16
		Overall Generic Utilization (OGU)	-0.21	-0.41	0.11	0.58	0.39	0.78	0.78	1.00	-0.19

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.05*)

Red: Moderate to strong negative (*Spearman correlation coefficient < -0.3 with a p-value < 0.05*)

**Table A-16d: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: COPD**

Product Line	Reporting Type	Metric	Spearman Correlation Coefficient								
			Total Medication O/E	Total Pharmacy O/E	Total Inpatient Discharges (O/E)	Total ED Discharges (O/E)	PMP M	GU	GSR	OGU	RRU-Q
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.13	0.37	0.01	0.25	1.00	0.36	0.36	0.36	-0.08
		Generic Utilization, provided generic option exists (GU)	0.15	0.01	0.04	0.16	0.36	1.00	1.00	0.69	-0.15
		Generic Substitution Rate (GSR)	0.15	0.02	0.03	0.15	0.36	1.00	1.00	0.68	-0.15
		Overall Generic Utilization (OGU)	0.00	-0.24	0.07	0.22	0.36	0.69	0.68	1.00	0.07
	PPO	Total Prescriptions Per Member Per Month (PMPM)	0.08	0.21	-0.10	0.23	1.00	0.38	0.40	0.39	-0.27
		Generic Utilization, provided generic option exists (GU)	-0.05	-0.25	-0.11	0.15	0.38	1.00	1.00	0.86	-0.17
		Generic Substitution Rate (GSR)	-0.04	-0.24	-0.10	0.15	0.40	1.00	1.00	0.86	-0.18
		Overall Generic Utilization (OGU)	-0.15	-0.32	-0.12	0.13	0.39	0.86	0.86	1.00	-0.19
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	-0.01	0.61	0.03	0.38	1.00	0.05	0.04	0.04	0.34
		Generic Utilization, provided generic option exists (GU)	-0.04	-0.13	-0.10	-0.08	0.05	1.00	0.99	0.67	-0.06
		Generic Substitution Rate (GSR)	-0.03	-0.12	-0.10	-0.10	0.04	0.99	1.00	0.68	-0.05
		Overall Generic Utilization (OGU)	-0.01	-0.39	-0.03	-0.08	-0.04	0.67	0.68	1.00	0.04
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	-0.07	0.43	0.01	0.27	1.00	0.04	0.03	0.12	0.01
		Generic Utilization, provided generic option exists (GU)	-0.26	-0.26	-0.27	0.15	0.04	1.00	1.00	0.75	-0.06
		Generic Substitution Rate (GSR)	-0.26	-0.26	-0.28	0.13	0.03	1.00	1.00	0.75	-0.07
		Overall Generic Utilization (OGU)	-0.39	-0.36	-0.36	0.16	0.12	0.75	0.75	1.00	-0.11
	PPO	Total Prescriptions Per Member Per Month (PMPM)	-0.18	0.42	0.26	0.50	1.00	0.29	0.29	0.34	-0.13
		Generic Utilization, provided generic option exists (GU)	-0.33	-0.13	0.11	0.56	0.29	1.00	1.00	0.85	-0.27
		Generic Substitution Rate (GSR)	-0.32	-0.13	0.11	0.56	0.29	1.00	1.00	0.85	-0.28
		Overall Generic Utilization (OGU)	-0.43	-0.17	0.12	0.63	0.34	0.85	0.85	1.00	-0.33

Green: Moderate to strong positive (*Absolute value of Spearman correlation coefficient* > 0.30 with a *p-value* < 0.05)

Red: Moderate to strong negative (*Spearman correlation coefficient* < -0.3 with a *p-value* < 0.05)



**Table A-16e: Percentile Distribution of Prescription and Generic Substitution Rates by Product Line and Reporting Type: Hypertension**

Product Line	Reporting Type	Metric	Spearman Correlation Coefficient								
			Total Medication O/E	Total Pharmacy O/E	Total Inpatient Discharges (O/E)	Total ED Discharges (O/E)	PMP M	GU	GSR	OG U	RRU-Q
Commercial	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.36	0.43	0.25	0.22	1.00	0.30	0.30	0.32	0.07
		Generic Utilization, provided generic option exists (GU)	0.19	-0.07	0.18	0.17	0.30	1.00	1.00	0.67	0.06
		Generic Substitution Rate (GSR)	0.19	-0.06	0.18	0.17	0.30	1.00	1.00	0.67	0.05
		Overall Generic Utilization (OGU)	0.09	-0.34	0.13	0.15	0.32	0.67	0.67	1.00	0.26
	PPO	Total Prescriptions Per Member Per Month (PMPM)	0.37	0.27	0.19	0.33	1.00	0.33	0.34	0.29	0.08
		Generic Utilization, provided generic option exists (GU)	0.18	-0.39	0.21	0.19	0.33	1.00	1.00	0.90	0.41
		Generic Substitution Rate (GSR)	0.19	-0.37	0.21	0.19	0.34	1.00	1.00	0.89	0.41
		Overall Generic Utilization (OGU)	0.12	-0.48	0.16	0.17	0.29	0.90	0.89	1.00	0.39
Medicaid	HMO	Total Prescriptions Per Member Per Month (PMPM)	0.09	0.59	-0.05	0.30	1.00	-0.12	-0.11	-0.15	0.19
		Generic Utilization, provided generic option exists (GU)	0.12	-0.11	0.05	-0.07	-0.12	1.00	0.99	0.52	-0.16
		Generic Substitution Rate (GSR)	0.11	-0.10	0.04	-0.07	-0.11	0.99	1.00	0.51	-0.15
		Overall Generic Utilization (OGU)	0.04	-0.46	0.14	-0.08	-0.15	0.52	0.51	1.00	-0.05
Medicare	HMO	Total Prescriptions Per Member Per Month (PMPM)	-0.03	0.41	-0.01	0.28	1.00	0.14	0.14	0.20	-0.02
		Generic Utilization, provided generic option exists (GU)	-0.13	-0.20	-0.08	0.23	0.14	1.00	1.00	0.75	-0.20
		Generic Substitution Rate (GSR)	-0.12	-0.20	-0.08	0.23	0.14	1.00	1.00	0.75	-0.20
		Overall Generic Utilization (OGU)	-0.24	-0.39	-0.14	0.25	0.20	0.75	0.75	1.00	-0.17
	PPO	Total Prescriptions Per Member Per Month (PMPM)	-0.28	0.40	0.29	0.48	1.00	0.30	0.30	0.37	-0.07
		Generic Utilization, provided generic option exists (GU)	-0.44	-0.31	0.29	0.49	0.30	1.00	1.00	0.87	-0.08
		Generic Substitution Rate (GSR)	-0.43	-0.31	0.29	0.49	0.30	1.00	1.00	0.86	-0.09
		Overall Generic Utilization (OGU)	-0.46	-0.31	0.30	0.58	0.37	0.87	0.86	1.00	-0.13

Green: Moderate to strong positive (Absolute value of Spearman correlation coefficient >0.30 with a p-value <0.05)

Red: Moderate to strong negative (Spearman correlation coefficient < -0.3 with a p-value < 0.05)