

# The Price-Quality Paradox in Health Care

## Higher prices for medical services are not always indicative of higher quality of care

The recent push for greater transparency in health care has often focused on making prices more accessible and useful to all health care stakeholders—consumers, payers, employers, etc. Yet, with only price information, stakeholders have no way to determine if paying a higher price is warranted. Public information about the quality of health care services needs to be provided alongside prices if health care transparency efforts have any chance of reducing costs while improving health outcomes. This data brief examines how the quality of health care services is related to prices.

The Health Care Cost Institute (HCCI) calculated quality of care measures with the same claims data used to estimate the average prices of common health care services, publically available on [guroo.com](http://guroo.com). Like the price estimates, these quality measures are reported at the local, state, and national levels.

Quality and price of five measures are discussed in this brief; one related to asthma (asthma evaluation), two related diabetes (diabetes evaluation and hemoglobin A1C test), and two related to hypertension (hypertension evaluation and creatinine test). Higher measure values imply higher quality of care. (See “Data and Methods” for additional details.)

Table 1 presents the mean and standard deviation of the five state-level quality measures and their comparable price estimates, which were reportable for 42 states and D.C.<sup>1</sup> The results show that there are significant differences in the provision of recommended care across quality measures.

While nearly every diabetes patient receives an annual evaluation (97%), only about half of the individuals with asthma have an annual physician visit related to their condition.

### There is no consistent relationship between quality measures and prices

Figures 1-5 are scatter plots showing the relationship between the state-level quality and relative price measures. Quality is measured along the horizontal axis with quality measure values increasing left to right. The vertical axis is a normalized price measure, calculated as the ratio of each state-level price divided by the national average price for the same service. Thus, the vertical axis shows to what extent a state-level price is above ( $>1.0$ ) or below ( $<1.0$ ) the national average price.

The red dot on each graph represents the intersection of the national average price and national average quality level for each measure. Among the negatively correlated measures, asthma and hypertension evaluation, most of the state-level points are in the upper left and lower right quadrants of the graph. This indicates higher quality in states with lower relative prices and lower quality in states with higher relative prices. The hemoglobin evaluation measure graph depicts an opposite distribution—higher quality where there are higher prices. The creatinine measure points are scattered evenly across the graph, suggesting no relationship between price and quality. The points on the diabetes evaluation measure graph are highly concentrated around the quality average, but have a wide range of prices. This suggests that no matter the price of the diabetes evaluation,

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### KEY FINDINGS

#### Health care quality is largely unrelated to health care price

Four of the five price-quality correlation coefficients were between  $-0.45$  and  $0.00$ , suggesting a negative or null relationship between price and quality.

#### Prices for health care services are generally related, while quality measures are not

All ten price correlations were larger than  $0.50$  and nine of the ten quality measure correlations were less than  $0.35$ , suggesting states may be characterized as high or low priced, but the level of quality may vary within a state.

the quality will be the same; and, thus, are not correlated.

We calculated the correlation between the state-level quality measures and prices to address the question “is higher quality associated with higher prices?” The correlation coefficients are presented in Table 1. A positive correlation implies higher quality measures occur where prices are higher. A negative correlation implies the quality measures are relatively lower where prices are higher and higher quality occurs where there are lower prices. Furthermore, the magnitude of the correlation coefficient suggests how strong the relationship is between price and quality. A correlation of  $1.00$  implies for every unit increase in price, quality increases proportionally (a  $-1.00$  correlation implies price and quality move in opposite directions). On the other hand, a correlation coefficient of  $0.00$  implies there is no consistent relationship between the two measures.

The results suggest that higher prices are not indicative of better quality of care. Of the five price-quality correlations, only hemoglobin A1C test had a weakly positive correla-

tion of 0.18. Creatinine tests had a weak but negative correlation coefficient of -0.11. The quality measures for asthma evaluation and hypertension evaluation were both *negatively* correlated with their corresponding prices and the magnitudes were moderately high; -0.37 and -0.45 respectively. No relationship between diabetes evaluation quality and price was found—the correlation was 0.00.

#### **A higher quality measure for one health care service does not guarantee higher quality for another**

We also tested the correlation between the five quality measures, the resulting matrix of correlations is presented in Table 2. Positive correlations between the different measures suggests similar patterns in quality across different services. While one would expect a highly positive correlation between the services related to the same underlying condition, the results did not support this expectation. Hemoglobin testing and diabetes evaluation were only moderately correlated (0.34) and the creatinine testing-hypertension evaluation correlation was even weaker at 0.16.

There was a strong, positive correlation between hemoglobin A1C testing and creatinine testing (0.84). Hypertension evaluation was moderately correlated with diabetes (0.34) and asthma (0.37) evaluations. The remaining quality pairings had weak to no correlation.

#### **Higher price levels for one health care service suggest prices may be higher for other services**

Finally, we examined the relationship between the prices of the corresponding medical procedures. Unlike the quality measure relationships, all of the price correlations were positive and greater than 0.50 (Table 3). The results suggest that health care prices are related even where prices and quality for the same services are not. The correlation of diabetes evaluation and hemoglobin A1C testing prices, both of which are related to treatment for diabetes, was 0.89. Similarly, the correlation of prices for treatments of hypertension, hypertension

evaluation and creatinine testing, was 0.70.

Among all 10 state-level price-to-price pairings, the lowest correlation (0.55) was among two different categories of health care services (creatinine testing and asthma evaluation). However, the nearly perfect correlation of 0.97, was also between different service categories (asthma and diabetes evaluations).

#### **Conclusion**

Although stakeholders need more information about the costs of health care services, they are limited in how they can use that information without knowing what to expect for a given price. The results of this evaluation of the relationship between state-level quality and price measures demonstrate how price alone may not be sufficient for identifying quality. In some cases, it appears that higher prices are actually associated with lower quality. If policy makers and health care industry leaders expect transparency efforts to have real impacts on the health care system, making quality information more accessible and useable by stakeholders is also necessary.

#### **Limitations**

Both the price and quality measures used in this analysis were calculated at a state level and may differ from a particular provider's prices or quality. The measures reflect the average for the state allowing for nationwide analysis. Additionally, the quality measures were calculated from claims data and reflect a measure of quality of care based on whether recommended services were provided. A provider's treatment may differ from the recommended care for many reasons and there are numerous other ways to evaluate quality. The quality measures do provide a sense of whether particular patient populations are receiving the types of services associated with improved outcomes.

#### **Data and Methods**

HCCI's data set includes de-identified, HIPPA compliant health insurance claims from multiple national health

insurers, representing over 50 million covered lives. The membership and claims data include details such as zip codes, diagnostic codes, procedure codes, actual amounts paid by the insurer as well as the copayments, deductibles, and coinsurance paid by the insured. Both individual and employer sponsored insurance claims were included in the analyses.

The quality measures were calculated with person-level claims data using Symmetry EBM Connect software version 9.0.<sup>2</sup> The person-level results were aggregated to local, state, and national levels for reporting and analysis. The quality measures assess whether patients with a specific diagnosis received recommended health care services, which are known to improve health outcomes. The measures are reported as the percentage of patients who received the recommended care.

The price measures included in the analysis were the most comparable to the services for which quality measures were calculated. For additional details on the average price estimates and reporting requirements see [guroo.com](http://guroo.com).<sup>3</sup>

#### **Endnotes**

1. HCCI data are insufficient for reporting prices in Alabama, Idaho, Hawaii, Michigan, Montana, South Dakota, Vermont, and Wyoming.
2. Additional details are available at: <https://www.optum.com/government/fed/analytics-hit/population-analytics/measuring-value-understanding-costs/symmetry-ebm-connect.html>.
3. Additional details are available at: <http://www.guroo.com/#!/terms-and-conditions>.

## Table 1. Summary Statistics and Quality-Price Correlations

Quality Measure Description		Quality Mean (SD)	Price Measure Description	Price Mean (SD)	Quality—Price Correlation
<b>Asthma Evaluation</b>	People with asthma should have regular doctor visits to monitor and review control of their asthma, treatment plan, and medications. This measure reports the percentage of people with asthma who had an office visit for asthma care within the last 6 months. For this measure, a higher score is better.	54.85 (1.83)	Four visits with a primary care physician to evaluate your asthma and determine the best course of treatment	\$734.47 (190.14)	-0.37
<b>Diabetes Evaluation</b>	People with diabetes should receive regular medical care. At a minimum, an annual doctor visit is recommended. This measure reports the percentage of people with diabetes who had at least 1 visit during the last 12 months. For this measure, a higher score is better.	97.57 (0.88)	Two visits with a specialist for a detailed evaluation and treatment of your diabetes	\$353.65 (99.60)	0.00
<b>Hemoglobin A1c Test</b>	Hemoglobin A1c (HbA1c) testing should be performed routinely for all people with diabetes. HbA1c testing is recommended at least 2 times per year. This measure reports the percentage of people who had at least 1 HbA1C test in the last 6 months. For this measure, a higher score is better.	79.70 (2.73)	HbA1c test is a blood test used to diagnose or check for diabetes	\$183.91 (62.53)	0.18
<b>Hypertension Evaluation</b>	People being treated for hypertension should have a minimum of one doctor visit per year to assess their adherence to the treatment and changes in target organ function. This measure reports the percentage of people with hypertension who had a visit for a hypertension assessment within the last 12 months. For this measure, a higher score is better.	58.17 (5.54)	One visit with a primary care physician to evaluate your blood pressure and determine the best course of treatment	\$17.30 (9.53)	-0.45
<b>Creatinine Test</b>	At least one serum creatinine test per year is recommended for people being treated for hypertension. This measure reports the percentage of people with hypertension that had a serum creatinine test in last 12 months. For this measure, a higher score is better.	68.31 (3.75)	Creatinine test to check the level of creatinine in the blood system	\$13.35 (5.49)	-0.11

Source: HCCI, 2016.

Notes: All reported correlations are Pearson product moment correlation coefficients, which measure the linear correlation between variables. The standard deviation is listed in parentheses.

**Table 2. Quality to Quality Correlation**

	Asthma	Diabetes	Hemoglobin	Hypertension	Creatinine
Asthma Evaluation	1.00				
Diabetes Evaluation	0.05	1.00			
Hemoglobin A1c Test	-0.03	0.35	1.00		
Hypertension Evaluation	0.37	0.34	-0.03	1.00	
Creatinine Test	-0.02	0.21	0.84	0.16	1.00

Source: HCCI, 2016.

Notes: All reported correlations are Pearson product moment correlation coefficients, which measure the linear correlation between variables.

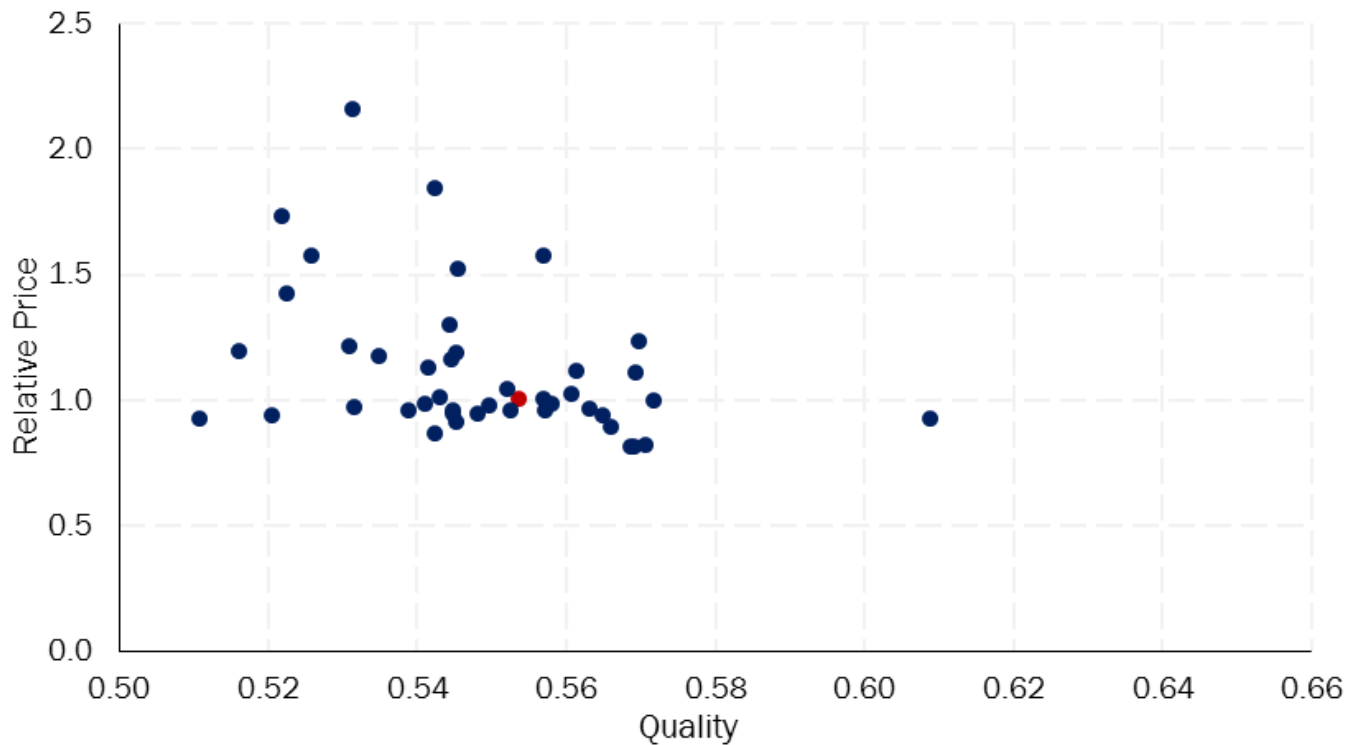
**Table 3. Price to Price Correlation**

	Asthma	Diabetes	Hemoglobin	Hypertension	Creatinine
Asthma Evaluation	1.00				
Diabetes Evaluation	0.97	1.00			
Hemoglobin A1c Test	0.81	0.89	1.00		
Hypertension Evaluation	0.90	0.97	0.92	1.00	
Creatinine Test	0.55	0.62	0.64	0.70	1.00

Source: HCCI, 2016.

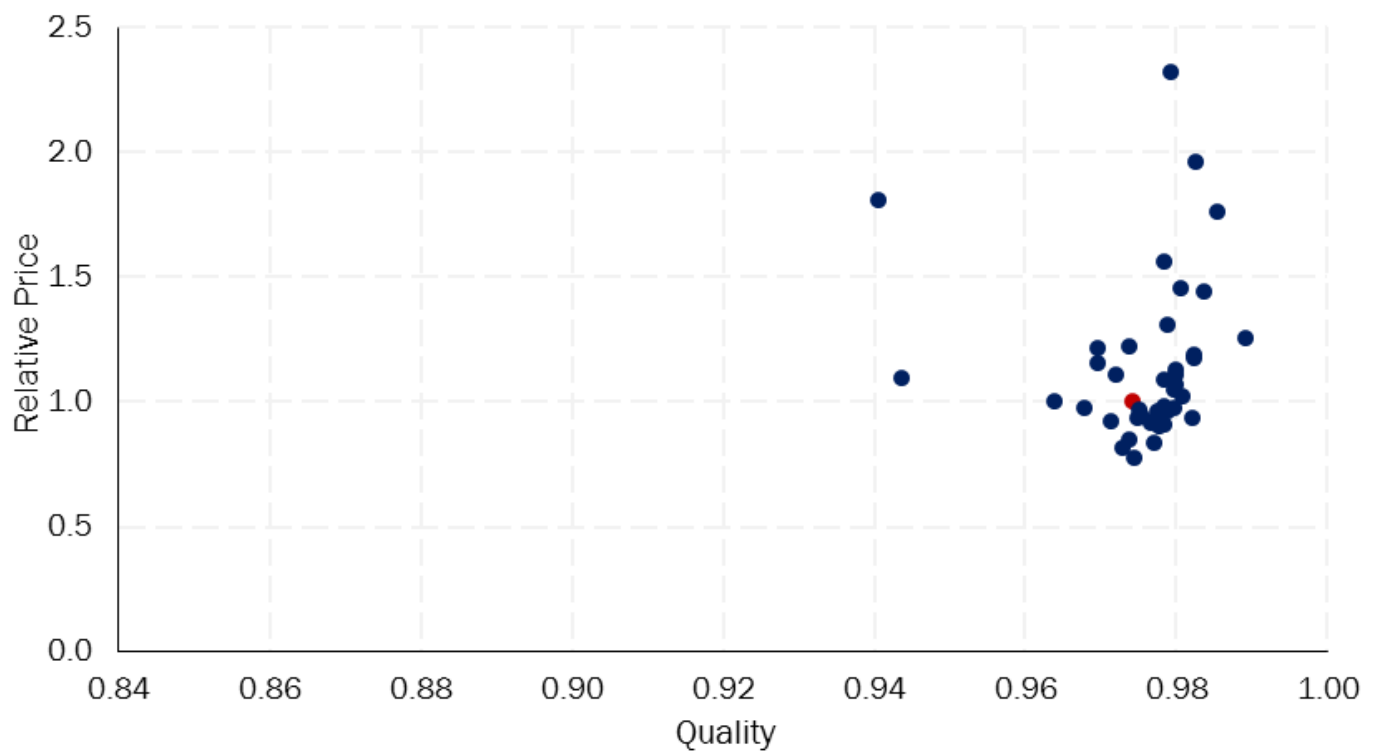
Notes: All reported correlations are Pearson product moment correlation coefficients, which measure the linear correlation between variables.

**Figure 1. Asthma Evaluation Price—Quality Relationship (n=43)**



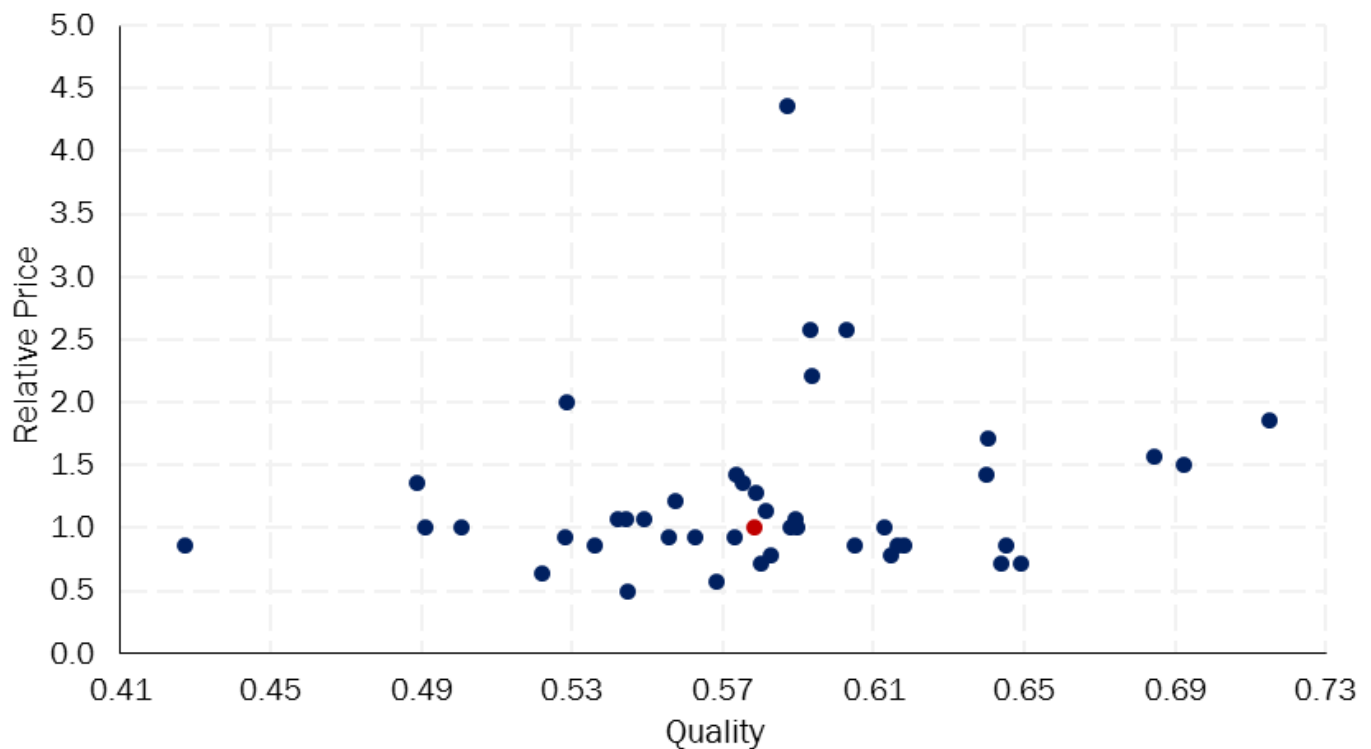
Source: HCCI, 2016.

**Figure 2. Diabetes Evaluation Price—Quality Relationship (n=43)**



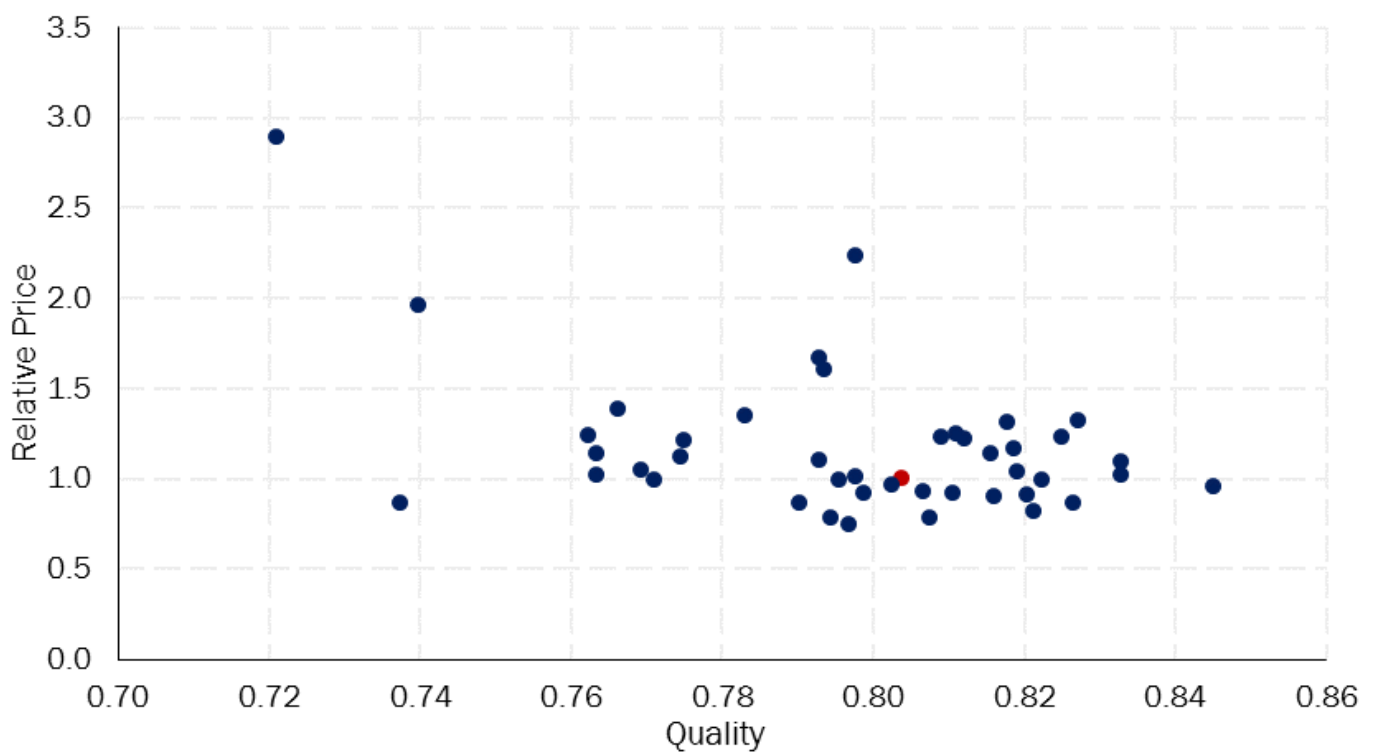
Source: HCCI, 2016.

**Figure 3. Hemoglobin A1C Price—Quality Relationship (n=43)**



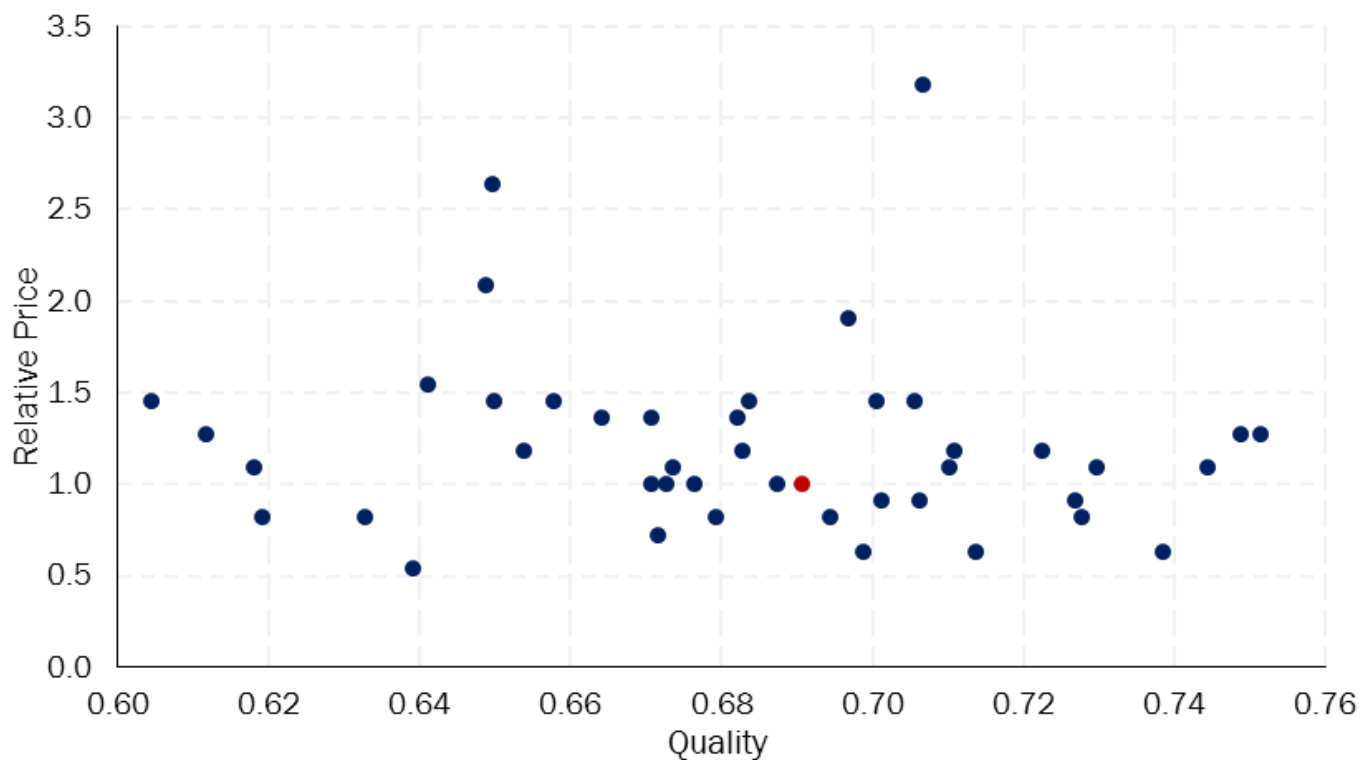
Source: HCCI, 2016.

**Figure 4. Hypertension Evaluation Price—Quality Relationship (n=43)**



Source: HCCI, 2016.

**Figure 5. Creatinine Test Price—Quality Relationship (n=43)**



Source: HCCI, 2016.

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