

Healthcare Affordability: Untangling Cost Drivers

Section I: Benchmark Overview

Section II: Benchmarking Methodology

February 13, 2018

Acknowledgments

Support for this report was provided by the Robert Wood Johnson Foundation. The views expressed here do not necessarily reflect the views of the Foundation.

Network for Regional Healthcare Improvement (NRHI)
Utah Department of Health, Office of Health Care Statistics
Berry Dunn McNeil & Parker, LLC (formerly Compass Health Analytics)

The following organizations contributed data and analysis for this project.

- Colorado** Center for Improving Value in Health Care (CIVHC)
- Maryland** Maryland Health Care Commission (MHCC) in partnership with Social and Scientific Systems, Inc.
- Minnesota** Minnesota Community Measurement (MNCM)
- Oregon** Oregon Health Care Quality Corp (Q Corp)
(Q Corp merged with HealthInsight in 2017)
- St. Louis, MO** Midwest Health Initiative (MHI)
- Utah** HealthInsight Utah in partnership with the Utah Department of Health, Office of Health Care Statistics

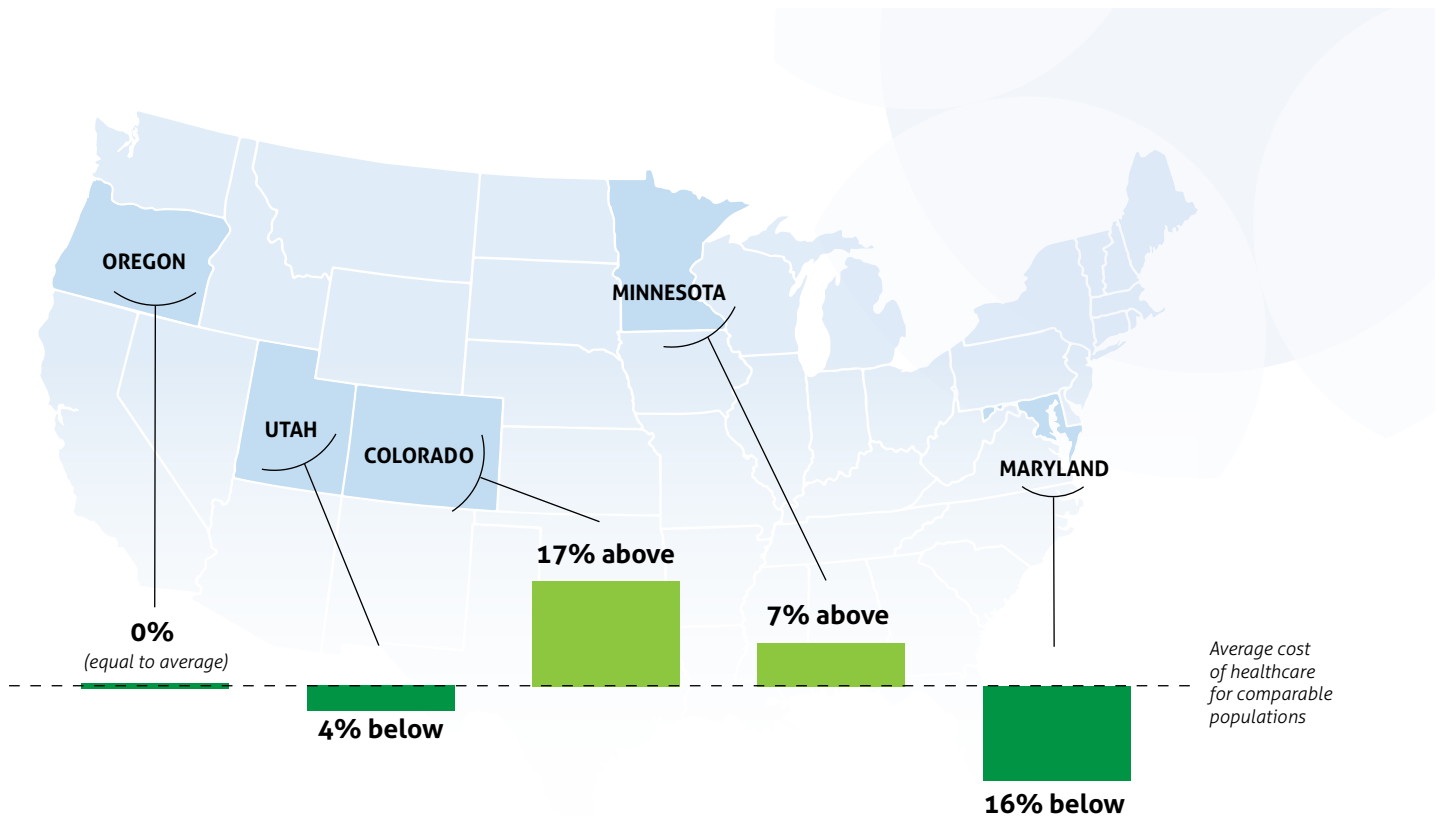
ABOUT THE NETWORK FOR REGIONAL HEALTHCARE IMPROVEMENT (NRHI)

The Network for Regional Healthcare Improvement (NRHI) is a national organization of more than thirty member regional health improvement collaboratives (RHICs) across the United States. These multi-stakeholder organizations are working in their regions and collaborating across regions to transform the healthcare delivery system to improve the patient experience of care, including quality and satisfaction; improve the health of populations; and reduce the per-capita cost of healthcare. For more information about NRHI, visit www.nrhi.org.

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Relative Cost of Healthcare

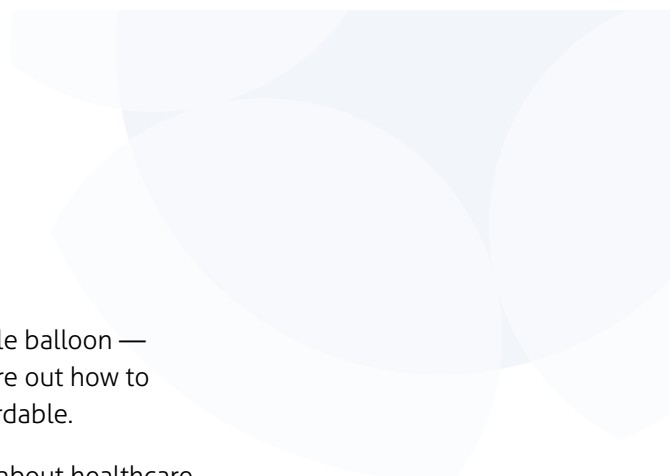
Opportunities for reducing the cost of healthcare are revealed by comparing 2015 risk-adjusted spending across participating states for private payers. Bringing the higher than average cost states highlighted above down to the average of the participating

states could potentially save over \$1 billion. Imagine if all the participating states could match the lowest cost state, several billion dollars would be available for other parts of the economy.

Shrinking the Healthcare Cost Balloon

The idea of a healthcare cost balloon is well known and often cited. Squeeze the balloon to save in one part of the system and the balloon will expand elsewhere — leaving you with the same high healthcare costs. Shrinking that balloon requires understanding what’s behind the total cost of care. And, like most things in healthcare, there is no single answer. While total costs of care vary across regions, as demonstrated by NRHI’s 2017 report, [From Claims to Clarity: Deriving Actionable Healthcare Cost Benchmarks from Aggregated Commercial Claims Data](#), the reasons for that variation vary too. While some recent studies find that pricing is the biggest driver of healthcare cost increases, that is not consistently true. More granular analyses make it possible to identify important differences in regional cost drivers. In some regions cost are high due to physician practice patterns and utilization of services; in other regions pricing is the principle driver of high costs.

Affordability requires us to address all sides of the balloon. Despite intensive work by physicians to ensure appropriate utilization of resources, total cost of care may remain high as prices increase to make up for lost revenue. Higher utilization rates may bring down the price per service, but such usage may ignore the appropriateness or quality of the services provided.



We need to think about the total cost of care — or the whole balloon — which includes both price and utilization. And until we figure out how to shrink that whole balloon we will not make healthcare affordable.

These insights matter because if we want to do something about healthcare affordability we need to adopt strategies that reduce the total cost. There is no one-size-fits-all solution. If a region's costs are driven primarily by high utilization, the right strategies may include engaging physicians to consider their referral patterns or use of testing and procedures. But, if the region's total costs are largely driven by prices, different strategies involving purchasers or policymakers may be required. Understanding these differences can enable local stakeholders to act strategically and effectively. It's not enough to know costs are high. This information enables us to do something about it.

This multi-region analysis of total cost of care and its drivers shows a striking variation between regions. These communities will need to enlist different actors and employ tailored approaches to their different challenges. But these regions now have a level of insight into their own cost drivers that can help them reduce their total cost of care and move to real affordability.

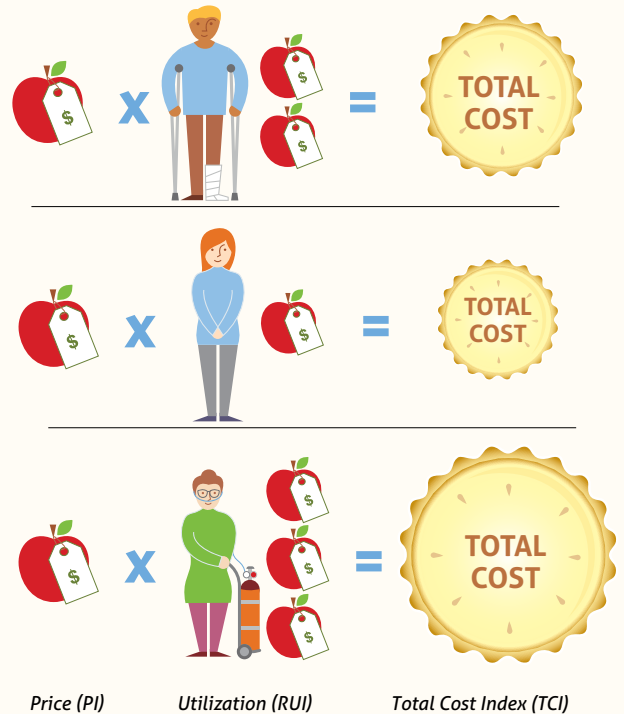
Actionable Data to Identify Cost Drivers

Healthcare spending consumes one in every six dollars of the American economy. More than 15 years ago, The Institute of Medicine (IOM), now known as The Health and Medicine Division of The National Academies of Sciences, Engineering, and Medicine, first estimated that one-third of this spending provides no health benefit. The figure has held, perhaps because improving value requires data to illuminate cost drivers and point to solutions. And, there's been a problem. Many cost comparisons produce results that are too high-level to be actionable or too specific to quantify real change.

In partnership with the Network for Regional Healthcare Improvement (NRHI), regional health improvement collaboratives (RHICs) are overcoming this obstacle. Using nationally-standardized, risk-adjusted measures, NRHI members are measuring how prices and care delivery patterns influence healthcare costs in states around the country. The results give providers, policymakers, employers, health plans and consumers new insights as they craft the solutions needed to improve healthcare affordability locally and nationally.

Price x Utilization = Total Cost

The HealthPartners Total Cost of Care Index (TCI)¹ shows how spending varies for similar patients in different geographies after adjusting for morbidity and minimizing the impact of catastrophic cases. Then, through a Price Index (PI) and a Resource Use Index (RUI), the analysis assigns how much of the variation can be attributed to price versus the number and intensity of tests, services and treatments patients received. Further, the results quantify this variation for all services combined and separated into inpatient care, outpatient care, professional services and prescriptions. When analyzed by primary care practice site, the measure set shows providers the relative costs and resource use of their patients compared to their peers. Further, results provide insight into the aspects of care they are managing well and where they could focus improvement strategies.



The Total Cost Index (TCI) can be separated into two components, the Resource Use Index (RUI) and the Price Index (PI). By breaking TCI into these component parts, we're able to ascertain whether observed cost differentials are a result of above (or below) average resource use, prices paid for services, or a combination thereof. And when standardized, high-quality data is available in multiple regions, it's possible to make meaningful cost comparisons at the state, local and national levels, identify outliers, and better understand where to look for the underlying causes of those differentials.

"Whether comparing costs across the nation or across town, by isolating the impact of two important and alterable cost drivers – price and resource use – the HealthPartners measure set provides a roadmap for providers, policymakers, purchasers and payers to consider how their actions contribute to or diminish healthcare value," said Elizabeth Mitchell, President and CEO of the Network for Regional Healthcare Improvement.

Though many of the participating RHICs provide comparative quality information, this work does not measure quality. Academic research shows no consistent association between cost and quality of care² and regional value charts such as the one included on page 5 in *From Claims to Clarity: Deriving Actionable Healthcare Cost Benchmarks from Aggregated Commercial Claims Data*³ support this conclusion.

Risk Adjusted Total Cost and Resource Use Compared to Average:

Commercial Population 2015
Combined Attributed and Unattributed

Measure	Colorado	Maryland	Minnesota	Oregon	Utah
Risk Score	-8%	20%	2%	1%	-10%
Total Cost	17%	-16%	7%	0%	-4%
Resource Use	11%	-3%	5%	-8%	-3%
Price	6%	-13%	1%	9%	-1%

*Note: This is the midpoint of the ranges created from the sensitivity analysis and represents the percent above or below the risk adjusted average across all regions.
[View the full range of results in Table 1 on page 19](#)*

¹ <https://www.healthpartners.com/hp/about/tcoc/index.html>

² Hussey, P. S., Wertheimer, S., & Mehrotra, A. (2013). The Association Between Health Care Quality and Cost: A Systematic Review. *Annals of Internal Medicine*, 27-34.

³ nrhi.org/uploads/rwj_tcoc_phaseii_benchmarkbrief_nov30_final_print.pdf

National benchmark comparisons and the primary care practice reports produced by NRHI and its RHIC members have proved valuable to many trying to better understand what drives healthcare costs.

WHO IS USING THE INFORMATION:

Providers developing referral patterns that guide patients to high-value care

"We're getting a lot more interest from providers, who want to see how they compare to peers and what's driving the cost of care in their practice. Many also are interested in knowing how care delivery and pricing in Utah compares to other states. There's power in the local results and in the benchmark report and they are even more powerful when we pair them together." — Rita Hanover, Senior Healthcare Analyst, HealthInsight Utah

State **policy makers** budgeting limited government resources

"There is tremendous interest in this benchmark report in Oregon. Legislators see it as an important source of information as they consider how to create a higher-value health care system for our state."
— Meredith Roberts Tomasi, Senior Director, Q Corp, Oregon

Employers and **health plans** aligning benefit designs and provider payments with higher quality, lower cost care

"The benchmark data provides national health plans, employers and medical associations with comparative cost information across states and insights regarding which service categories may be driving observed differences. At CIVHC, we've recently begun a formal collaboration with the Colorado Business Group on Health because both organizations know how valuable this data is to the employer community in supporting better informed health care purchasing decisions." — Jonathan Mathieu, Vice President for Research and Compliance and Chief Economist at CIVHC, Colorado

"We share comparative cost, resource use and price information with our local health plans as well as our providers. We include information on the benchmark as well so they can see how our state compares to others."
— Gunnar Nelson, Health Economist, MNMCM, Minnesota

Consumers choosing healthcare providers with an eye toward their own healthcare spending

"We're going to include the regional benchmark information on our [WeartheCost.org](https://www.wearthecost.org) website. The benchmark shows Maryland as a market with high relative value. It's a nice complement to [WeartheCost.org](https://www.wearthecost.org), which shows the local variation in cost of care for certain procedures."
— Linda Bartnyska, Director, Center for Analysis and Information Services, MHCC, Maryland

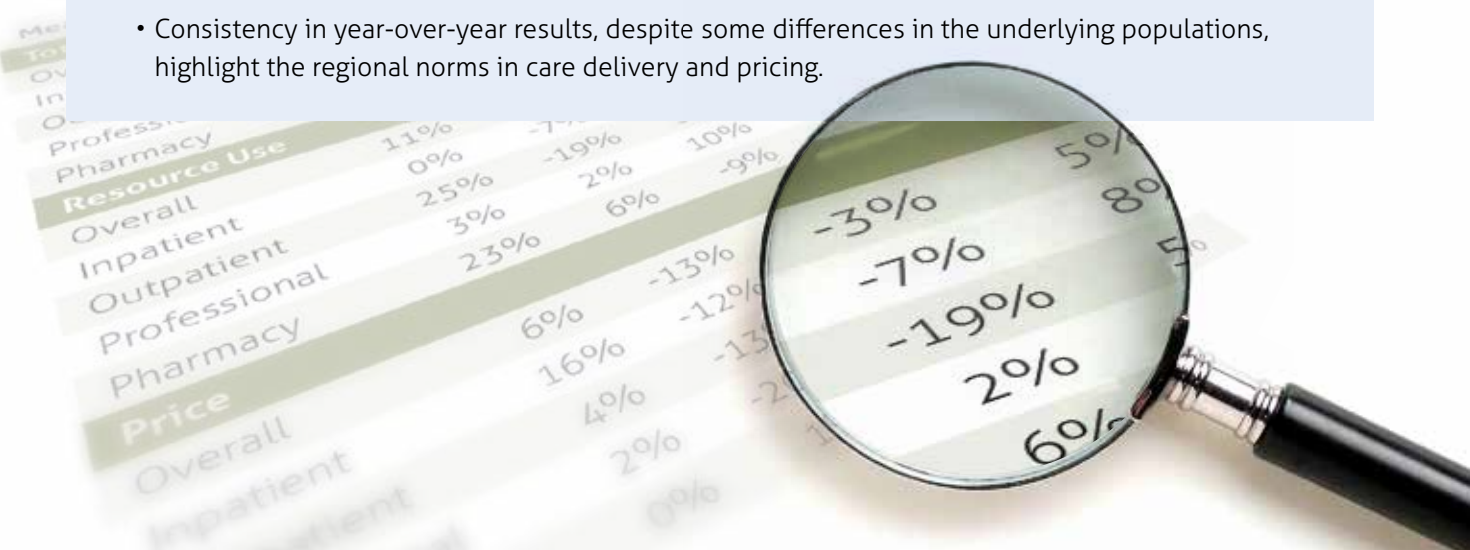
NRHI has collaborated with several of its member RHICs on its Total Cost of Care initiative since November 2013. Now in Phase III of this work, they have gained confidence in the strength of this process, specifically in the validity of the measures when they're applied by different teams across different datasets. In turn, project participants have become more assured in their results.

Variation in Prices and Care Delivery

The Total Cost of Care (TCOC) and Total Care Relative Resource Value™ measures developed by HealthPartners were first endorsed by the National Quality Forum in 2012 and again in October 2017. Five NRHI members collaborated to standardize the application of these measures to 2015 multi-payer commercial claims and then worked with NRHI's technical advisor to compare their results. Any and all presentations of the results of this study should make it clear that the numbers do not represent the complete market in all regions and though every effort has been made to standardize, some differences remain.

KEY FINDINGS

- Pricing structures and care delivery patterns vary across states and those differences drive differences in cost.
- Each state's numbers tell a story, giving stakeholders a framework to consider the roles of policies, demographics and market factors in steering healthcare costs.
- Results showed variability in every category of care except pharmacy pricing, which is largely a result of the influence of a few, large pharmacy benefit managers and pharmaceutical manufacturers' national pricing policies.
- Consistency in year-over-year results, despite some differences in the underlying populations, highlight the regional norms in care delivery and pricing.



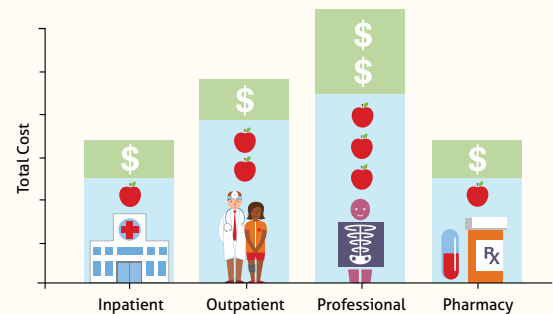
Detailed Analysis—Deeper Insights

As more high-quality data become available, our ability to understand the factors driving regional disparities in the TCI will improve. The concept, demonstrated by the data table to the right is a simple one:

- TCI is (and can be expressed as) a combination of the PI and RUI.
- TCI, PI and RUI can be calculated separately for Inpatient, Outpatient, Professional and Pharmacy components.
- With sufficient data, those service level categories can be further drilled down to their component parts. This detail is often most helpful on an attributed patient basis at the practice level within a region(s).

Beginning with a look at differences in total cost, Maryland was 16 percent lower than the average, risk-adjusted per member, per month cost across the participating regions. In other participating states, risk-adjusted costs ranged from Utah, which was 4 percent lower than the average to Colorado, which was 17 percent higher than the average. View the full range of results in [Table 1](#) on page 19.

For more than 35 years, Maryland has operated the nation's only all-payer hospital rate regulation program. In 2014, this program was expanded. Under the new model, the state agreed to limit all-payer per capita hospital growth, including inpatient and outpatient care, to 3.58 percent. And, Maryland agreed to limit annual Medicare per capita hospital cost growth to a rate lower than the national annual per capita growth rate per year for 2015-2018. Ben Steffen, Executive Director of the Maryland Health Care Commission (MHCC), noted while he can obtain comparison data for public payers elsewhere, the TCOC results are the only commercial benchmarks available to test the impact of this pricing strategy.



High-level data can demonstrate generalized national and even regional healthcare cost disparities, but a clear understanding of cost drivers—and the actions required to alter their course—requires more detailed analysis that breaks generalizations down into more granular insights.

Total Cost of Care by Service Category

Commercial Population 2015

Combined Attributed and Unattributed

Measure	Colorado	Maryland	Minnesota	Oregon	Utah
Total Cost					
Overall	17%	-16%	7%	0%	-4%
Inpatient	16%	-18%	7%	0%	-1%
Outpatient	30%	-30%	0%	-7%	17%
Professional	5%	-18%	21%	12%	-17%
Pharmacy	24%	7%	-11%	-12%	-8%
Resource Use					
Overall	11%	-3%	5%	-8%	-3%
Inpatient	0%	-7%	8%	-14%	16%
Outpatient	25%	-19%	5%	-16%	13%
Professional	3%	2%	10%	-3%	-13%
Pharmacy	23%	6%	-9%	-10%	-9%
Price					
Overall	6%	-13%	1%	9%	-1%
Inpatient	16%	-12%	-1%	16%	-14%
Outpatient	4%	-13%	-5%	11%	4%
Professional	2%	-20%	10%	15%	-5%
Pharmacy	0%	1%	-2%	-2%	2%

Note: This is the midpoint of the ranges created from the sensitivity analysis and represents the percent above or below the risk adjusted average across all regions.

[View the entire Table 2 on page 21](#)

Untangling The Cost Drivers

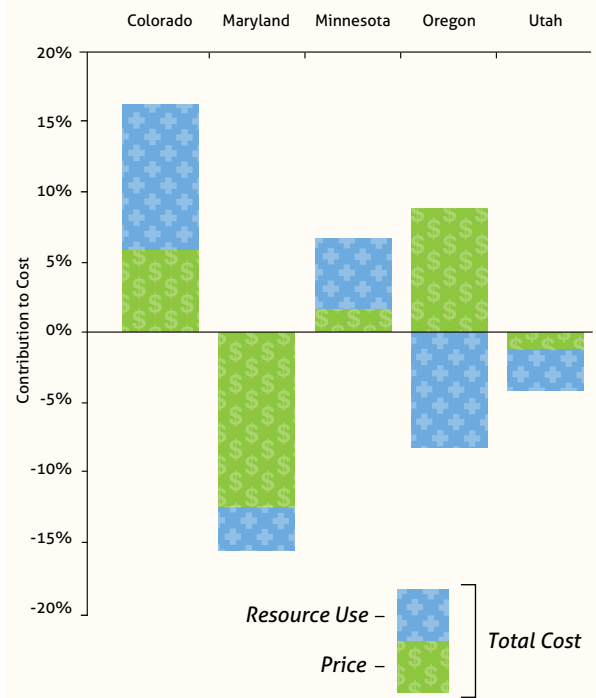
Maryland patients used resources at a rate only 3 percent lower than the benchmark but paid prices 13 percent lower. MHCC noted Maryland healthcare may provide better value than some other states but within the state opportunities remain. The MHCC “Wear the Cost” campaign highlights the risks and costs of potentially avoidable complications. A focus of the campaign is the WearTheCost.org website, which shows a patient’s average cost for common hospital procedures at different Maryland hospitals. For each procedure, MHCC shows two costs: the typical and expected costs for the procedure; and, the costs that may be due to events that could harm patients and that could be avoided — also known as potentially avoidable complications. Hospitals that have low total costs and low rates of potentially avoidable complications may offer the best value for patients.

“TCOC shows good value and Wear the Cost shows that even in a market where there is good relative value, there are ample opportunities for improvement because there are still disappointingly large amounts of variation when one compares episodes among providers in the same market,” said Linda Bartnyska, Director, Center for Analysis & Information Services at MHCC.

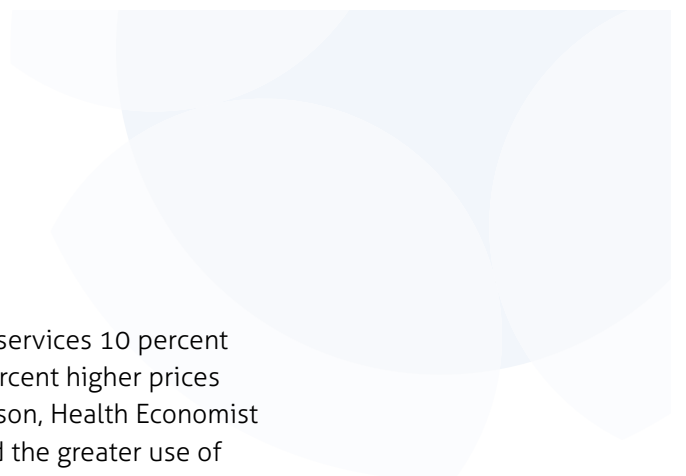
Across Colorado, Minnesota, and Utah, resource use influenced total cost more than price did. However, the types of utilization driving costs differed in each state.

In Colorado, use of outpatient resources had the most impact of any single driver on total cost of care. Outpatient resource use in Colorado was 25 percent above the benchmark, the highest percentage above the average in any category in any participating state. Coloradans also had the highest utilization of prescriptions, at 23 percent above the benchmark.

“We believe these results are directionally correct, provide validation of what some Colorado stakeholders already believe and could be driven by a variety of factors that require closer examination. This information will help stakeholders and policy makers identify specific categories of utilization and spending on which to focus efforts to improve care and control costs for Colorado residents,” concluded Jonathan Mathieu, PhD, VP of Research & Compliance and Chief Economist at Center for Improving Value in Health Care (CIVHC).



The size of the bars represents the impact of price and resource use on the total cost. As seen in the above graphic (based on Table 3 on page 22), price and resource use played different roles in the variation of total cost by state.



Minnesotans saw physicians and used other professional services 10 percent more than the benchmark. Minnesota also reported 10 percent higher prices for professional services than the benchmark. Gunnar Nelson, Health Economist at Minnesota Community Measurement (MNCM), observed the greater use of professional services may not be a negative if it keeps patients healthier and prevents the need for costly outpatient and inpatient services.

With the nation's highest birth rates per capita, Utah reported inpatient resource use 16 percent above the benchmark, though the associated costs were largely offset by 14 percent lower prices for those hospital services.

In Oregon, the relative impact of higher price and lower resource use was nearly identical but offsetting. A more conservative use of resources may be related to residents' culture of conservation.

"Oregonians are very efficient with resources. This is ingrained in the environment," said Meredith Roberts Tomasi, Senior Director at Oregon Health Care Quality Corp (Q Corp). Q Corp merged with HealthInsight in 2017.

In talking with the state's physicians and health plans, Roberts Tomasi has heard the high cost of living in the state's urban areas coupled with the high cost of care delivery in its rural areas may be contributing to the higher prices.

Across states, inpatient care saw the most variation in price. Hospital prices were 16 percent higher than the benchmark in Oregon and Colorado compared to 12 and 14 percent lower than the benchmark in Maryland and Utah, respectively.

Maryland's lower relative prices extended across all aspects of care except pharmacy, where it found prices 1 percent higher than the benchmark. In addition to the rate-setting policies, MHCC referenced other market factors possibly influencing the state's relatively lower prices for professional services including the nation's second highest rate of physicians per capita, high percentages of physicians in small practices and a single dominant health plan.

"We have lots of doctors so they need to be in as many health plan networks as possible," Maryland's Steffen said. "That really drives prices down."

Pharmacy prices were the only data with little variation across participating states, likely due to the high percentage of prescription drugs purchased through large, national pharmacy benefit managers.

Comparing Participants in Both Years

Year to Year Comparison of Total Cost of Care
Compared to Average

Commercial Population 2014 vs 2015

Combined Attributed and Unattributed

Measure	Maryland	Minnesota	Oregon	Utah
Total Cost				
2014	-16%	11%	7%	0%
2015	-12%	11%	4%	0%
Rank				
2014	1	4	3	2
2015	1	4	3	2

Note: This table compares results based only on the four regions participating in both years of analysis (See [Table 5](#) on page 24). They will differ from the values in other tables, which reflect the five participants in a specific year (either 2014 or 2015). The 2015 values represent the midpoint of the ranges created from the sensitivity analysis.

Rank Order: 1 = Lowest; 4 = Highest

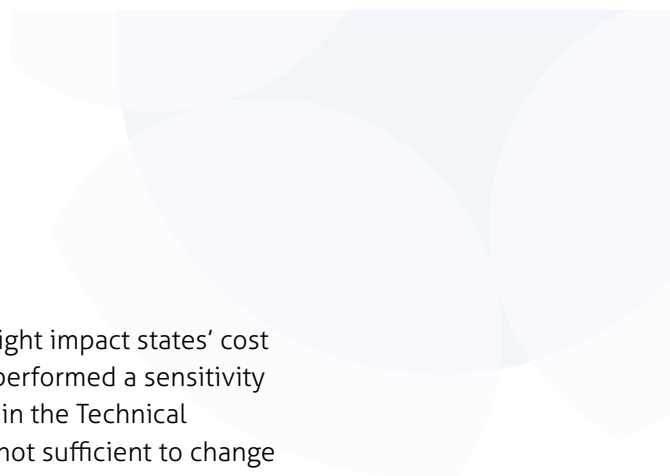
Results Show Consistency Despite Changing Populations

In performing this work, RHICs must rely on available data. The data sets used are not random samples of states' commercially-insured populations. And, despite the best efforts of the RHICs and NRHI's technical advisors, some data quality issues may remain. A more extensive discussion of data limitations is included in the Technical Appendix.

Four of the five regions participating in the 2015 benchmark also participated in a 2014 NRHI Total Cost of Care benchmark. Data included in the benchmark is subject to a rigorous quality review process to ensure only data meeting the comparability thresholds is included. Midwest Health Initiative (MHI), a region included in the 2014 benchmark report, experienced a data delay which prevented completion of the quality review process in time for inclusion in the benchmark. MHI expects to participate in the next report.

Despite considerable population changes in three of the four data sets included in both benchmarks, year-over-year results were largely consistent. The lack of wide variation in year over year results signals stability in the methodology. As shown in [Table 5](#), the greatest change in Total Cost Index results was 4 percent. A more detailed discussion of the changes in population by region and the differences in year-over-year results is included in the Technical Appendix.

Several RHICs questioned whether regional variation in tendency of providers to record detailed diagnosis information on insurance claims affected the risk score calculations across the states. Providers in markets with more risk-based contracts may have more motivation to invest time in capturing every possible diagnosis code. Peculiarities in coding occur within regions as well. MNMCM has found patients in rural areas are more likely to have conditions classified as "other" by risk scoring methodologies, and less likely to have mental health diagnoses. Nelson believes this may be because rural providers are afraid of the stigma patients might encounter after receiving a mental health diagnosis.



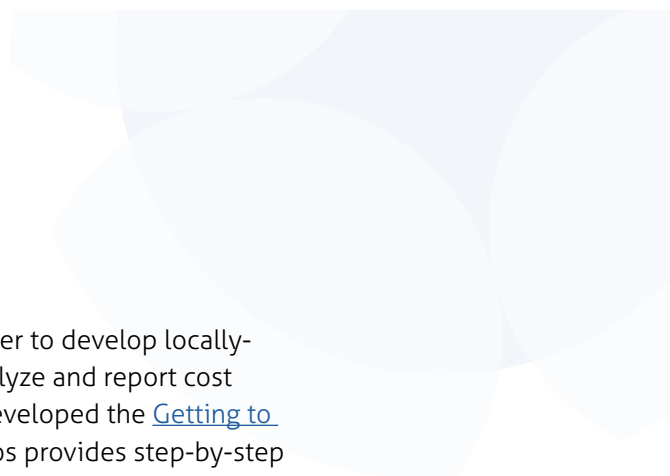
To better understand how changes in states' risk scores might impact states' cost and resource use results, the project's technical advisors performed a sensitivity analysis. The analysis, which is discussed in greater detail in the Technical Appendix, found regional differences in risk scoring were not sufficient to change the order ranking of any of the participating states. The sensitivity analysis was conducted after project participants and technical advisors determined there were differences in the claim level detail across regions. Throughout the project, the data quality assurance process has uncovered possible differences across regions and conducted analysis to determine the potential impact. This willingness to question the results and probe the underlying data helps the project to assure comparability.

Since the HealthPartners measure set is based on medical and pharmacy claims information, it does not capture money being spent through capitation, pay-for-performance payments and other revenue streams outside the claims system. Though the impact of these payments is estimated to be small at this time, RHICs are exploring ways to quantify and capture this data as alternative payment models become more widely used.

Sharing Cost Data — Where We're Headed

In 2015 alone, healthcare cost information on over 5 million patients attributed to approximately 20,000 individual physicians was shared in seven regions and continues to grow, including multiple year comparisons. Project participants are already conducting 2016 multi-payer claims analysis to develop another set of local reports. With the publication of this report, we now have two sets of regional cost comparisons with another round scheduled for release in late 2018. With three years of data, trends will begin to emerge to support existing hypotheses and/or challenge long-held assumptions.

For local medical groups and purchasers, the underlying primary care practice level reports can support individual improvement and the development of value-based payments and benefits. With this in mind, the project is working to expand data analysis to Medicare and Medicaid populations to give practices the most comprehensive view of their patient panels with the potential to shed light on how costs vary across payers.



Meanwhile, a total of eighteen regions are working together to develop locally-feasible and nationally-replicable solutions to assess, analyze and report cost data. To capture and broadly share their learnings, they developed the [Getting to Affordability Learning Modules](#). This series of online videos provides step-by-step technical instruction and valuable lessons learned from regions with a wealth of implementation and engagement experience.

America's healthcare cost crisis will not be solved by data, and it cannot be solved without it. The Total Cost of Care measure set provides a high-level framework to know where to focus efforts and measure the success of interventions. RHICs' extensive local networks provide a natural highway for sharing this data and coordinating action. NRHI connects these statewide efforts to create a national web of HealthDoers improving affordability in their own communities.

Building off the momentum started at the National Affordability Summit held in Washington, DC on September 27, 2017, NRHI will continue to lead a regional ground up approach to tackling healthcare affordability. Leveraging the strength and experience of NRHI's 30+ members, along with the HealthDoers Network consisting of almost 3,000 individuals representing over 950 organizations and its collective power to implement change at the local level, NRHI is committed to partnering with other organizations to change the trajectory of healthcare costs toward a state of affordability.

Don't miss out and stay connected by joining the conversation, accessing resources and connecting with HealthDoers at <https://g2a.healthdoers.org> or email them at Gettingtoaffordability@nrhi.org.



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Section II: Benchmarking Methodology

Purpose

The Benchmarking Methodology summarizes the process and results of NRHI's Total Cost of Care (TCOC): Phase III¹. Regional participants collaborated to compare cost of care using 2015 commercial data across several regions in the US using the National Quality Forum (NQF) endorsed HealthPartners TCOC Measure Set.² This report provides an in-depth disclosure of the technical and policy barriers to transparency and the progress made to date.

Summary

The data quality control process used in Phase II³ was reproduced by the regions and monitored by the technical advisor for Phase III. As in Phase II, Phase III regions only included data that met comparability thresholds.

Phase III of the Total Cost of Care project advances transparency in several ways:

- Regions with different healthcare markets and population demographics were compared;
- Participants produced TCOC measure benchmarks after a careful and thorough data quality review;
- Regions learned more about the contents of their data and improved data quality to refine current and future submission streams;
- Several potential cost drivers were examined for impact;
- Results compared to prior year showed stability, increasing confidence in the TCOC measure set's ability to produce meaningful results despite limitations of the data.

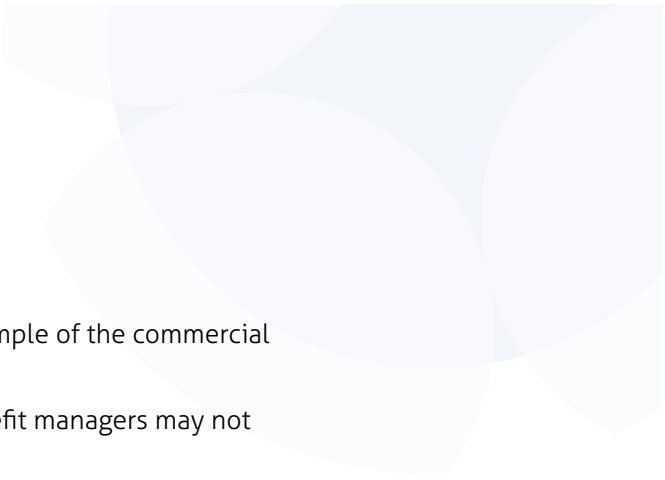
Many data limitations identified during Phase II⁴ persist in Phase III and pose the risk of distorted benchmarks, particularly for regions with single-year benchmarks. Data limitations should be included as caveats in any presentation of the benchmark results.

1 http://www.nrhi.org/uploads/g2a_onepager_r17.pdf

2 <https://www.healthpartners.com/hp/about/tcoc/index.html>

3 http://www.nrhi.org/uploads/g2a_onepager_r17.pdf

4 http://www.nrhi.org/uploads/rwj_tcoc_phaseii_benchmarkbrief_nov30_final_print.pdf

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- Data used to produce measures are not a random sample of the commercial market in each region.
 - Claims paid by pharmacy and behavioral health benefit managers may not be included.
 - Substance abuse and other behavioral claims are sometimes excluded from data submissions or aggregated data stores for privacy reasons.
 - Variation in provider coding patterns affects risk scores.
 - Non-claims payments (e.g. capitation, pay for performance payments) are not in the data stores.
 - Data processes in some regions limited data quality control processes or attempts to correct issues identified during that process.

The calculation of the various measures in the TCOC methodology provides a starting point for understanding variation in healthcare costs among different areas of the country. Cost drivers can be identified by deconstructing per member cost into its individual components. Conceptual cost drivers might include:

- Health status - measured and adjusted for in the TCOC methodology through risk adjustment;
- Differences in services covered by the health benefit plan (e.g. mandate differences by state);
- Patient cost-sharing levels in the benefit plan;
- Utilization rates of health services — measured by the Resource Use Index (RUI);
- Provider reimbursement methods;
- Provider price levels (including influences of cost shifting from other payers and uncompensated care and from market power) - measured by the price index;
- Narrowness of provider networks;
- Wage levels and general cost of living.

Refining identification of cost drivers and their relative impact provides an agenda for better understanding cost differences across regions. Resolution of data limitations and finer examination of cost drivers are areas of potential improvement in the application of TCOC.

Participants and Process

PARTICIPANTS

In November of 2013, Phase I began and pilot sites agreed to collectively report TCOC measures in their regions and develop benchmark comparisons under the leadership of the Network for Regional Healthcare Improvement (NRHI) and through funding from the Robert Wood Johnson Foundation (RWJF). These NRHI member Regional Health Improvement Collaboratives (RHICs) included:

- Center for Improving Value in Health Care (CIVHC)
- Maine Health Management Coalition (MHMC)
- Midwest Health Initiative (MHI)
- Minnesota Community Measurement (MNCM)
- Oregon Health Care Quality Corporation (Q Corp)⁵

In May 2015, Phase II began when RWJF extended the pilot through October 2016 and Compass Health Analytics was retained as the Technical Advisor. Phase II included two additional regions to test scaling of the standardized measurement:

- HealthInsight Utah in partnership with the Utah Department of Health, Office of Health Care Statistics
- Maryland Health Care Commission (MHCC) in partnership with The Hilltop Institute

Four additional regions joined Phase II as Development Sites to address specific barriers to price transparency. The Development Sites and MHMC did not participate in Phase II benchmarking. Development Sites for Phase II included:

- The Health Collaborative
- The University of Texas Health Science Center at Houston
- Washington Health Alliance
- Wisconsin Health Information Organization

Phase III began in November 2016 and all previously participating regions except Maine, Texas and Wisconsin continued direct participation in the project. During Phase III, seven new Development Sites joined the project.

⁵ Q Corp merged with HealthInsight in 2017.



Phase III Development Sites include:

- Greater Detroit Area Health Council
- HealthInsight Nevada
- HealthInsight New Mexico
- Health Care Improvement Foundation
- Integrated Healthcare Association
- Massachusetts Health Quality Partners
- Virginia Health Information

GENERAL PROCESS

Regions participating in Phase III TCOC benchmarking performed robust data quality assurance and data quality control processes using their data store to determine fitness for TCOC analysis. Tables examining the following characteristics were produced and compared across contributors' data stores as well as across data sources within them:

- Member counts and claim dollars by month
- Members and claims indicating primary insurance
- Payment deduplication
- Procedure code integrity and coverage
- Diagnosis code fields
- Surgical procedure code fields
- Professional place of service
- High cost pharmacy
- Consistency of member ID across claims and eligibility

An iterative process between the Technical Advisor and each region addressed most data quality issues. The results presented in this report represent data from each participating region that met rigorous data quality, stability and completeness requirements for supporting the TCOC measure set. The intensive process used to improve data quality yielded final results that improved on Phase I and Phase II. However, limitations remain and provide an important agenda for future refinement. These limitations are enumerated in the technical data issues discussed further in this report.

Results

The analytical results produced by the project include the TCOC measures, as well as additional analysis drilling further into the cost drivers underlying the aggregate measures. These results represent multi-payer commercial data for 2015.

TCOC RESULTS

[Table 1](#) shows the Total Cost Index (TCI), the Resource Use Index (RUI), and the Price Index for the five participating regions based on the commercial population (ages 1-64). The TCI compares total per person per month spending and the RUI focuses on differences in utilization and resource intensity. Both the TCI and RUI are adjusted for differences in the populations' underlying health status using the Johns Hopkins Adjusted Clinical Groups® System (ACG® System)⁶. The RUI measure and the Price Index allow separate analysis of the impacts of utilization and price on Total Costs.

[Table 1](#) displays these TCOC measures as ranges. The cost, utilization, and price shown in the first section of this report are derived from the midpoint of the ranges in [Table 1](#) and [Table 2](#) and displayed as a percentage above or below 1. The risk score ranges were determined by conducting a sensitivity analysis on the risk scores. This analysis took into consideration variation in claim detail across data contributors. After consulting with subject matter experts about the potential effect of variation in claim detail, maximum potential variation was applied to affected risk scores. The range of risk scores produces ranges in TCI and RUI because these indexes depend on the risk score. The Price Index measures the relative pricing of healthcare in the region and does not vary with the risk score. A region's index is above the risk-adjusted average if the range is greater than one, approximately average if the range spans one, and below average if the range is less than one.

⁶ For more detailed information on the TCOC measure set, including TCI and RUI, see the HealthPartners White Paper: https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/dev_057649.pdf

**TABLE 1: TOTAL COST INDEX AND RESOURCE USE INDEX:
COMMERCIAL POPULATION 2015**

	Colorado	Maryland	Minnesota	Oregon	Utah
Average Risk Score	0.88 – 0.97	1.17 – 1.23	1.01 – 1.03	0.99 – 1.02	0.89 – 0.91
TCI	1.13 – 1.22	0.82 – 0.87	1.05 – 1.08	0.98 – 1.02	0.94 – 0.97
RUI	1.06 – 1.15	0.94 – 1.00	1.04 – 1.07	0.90 – 0.93	0.95 – 0.99
Price Index	1.06	0.87	1.01	1.09	0.99

HealthPartners’ TCOC measure set is designed to produce results at the primary care practice level. Results reflect only those patients who can be attributed to a primary care practice. However, this report compares regions rather than practices. The measures reported here reflect the entire available population regardless of whether individuals visited a primary care provider. Using the entire available population provides the largest possible sample and avoids complications associated with differences in attribution methodologies across regions. Analysis showed that the regional results based on primary care practice populations did not vary substantially from the TCI, RUI, and Price Index of the entire available population suggesting a high level of stability in the measure.

The measures are indexed to the non-weighted average of the participating regions. This approach avoids larger regions dominating the average. Interpretation of the results must be done with close attention to the technical data issues discussed in the next section.

COST DRIVER EXPLORATION

Measuring and reporting healthcare costs supports efforts to pursue higher quality healthcare, with more satisfied patients, at a lower cost. Having some response to the question, “what is the difference in the cost of healthcare in various regions?” we can turn our attention to “why does it differ?” Answers to that question will suggest specific strategies that can be employed to reduce cost.

Factors that drive the cost of healthcare can be divided into two main components: those that affect the unit price of services and those that affect the amount of services used (utilization).

Factors Affecting Commercial Unit Price:	Factors Affecting Utilization:
Provider market power	Health status (morbidity)
Health Plan market power	Physician practice patterns
Cost-shifting	Patient cost-sharing level
Regional cost of living	State mandates
Location of service	Providers in network

Each factor that contributes to differences in cost can be used as both an adjustment to isolate the other factors contributing to cost and as an important stand-alone measure for further exploration of potential strategies to reduce healthcare costs. For example, risk scores are used to adjust for basic health status in the regional groups to make costs more comparable. At the same time, we might examine the regional risk scores themselves to explore ways to reduce cost through improved health status (lower morbidity) potentially through policies to improve underlying causes. Similarly, the RUI measure controls for provider prices, allowing us to focus on reducing certain types of utilization to lower overall cost. We might also examine why unit prices vary, including consideration of wage levels and cost of living, or provider and payer market power. Changes in provider contracts or health plan product types may also impact price while provider coding practices may contribute to differences in risk score. The ongoing process of improving our understanding of the drivers of differences in cost provides the most useful results for finding strategies that will reduce costs.

The TCOC results presented in [Table 1](#) begin to break cost into components by showing average risk score, the cost measure adjusted for risk score, and the effect of eliminating unit cost differences through the Total Care Relative Resource Value (TCRRV™) and RUI. The TCOC measure set offers some additional insight into service categories which are displayed in [Table 2](#).

[Table 2](#) breaks down the components of medical cost by region. As an example of how to interpret this table and an interesting finding, notice that Maryland has a below average cost for facility claims (inpatient TCI range is 0.79 - 0.85). This may be related to Maryland's longstanding efforts to regulate hospital payments, including global budgets for inpatient and outpatient revenues introduced in 2014. Maryland's low overall TCI (0.82 - 0.87) suggests this approach may be associated with lower healthcare costs overall, an important finding which merits further investigation.

**TABLE 2: COMPONENTS OF MEDICAL COST:
COMMERCIAL POPULATION 2015**

	Colorado	Maryland	Minnesota	Oregon	Utah
TCI					
Overall	1.13 – 1.22	0.82 – 0.87	1.05 – 1.08	0.98 – 1.02	0.94 – 0.97
Inpatient	1.12 – 1.21	0.79 – 0.85	1.06 – 1.09	0.98 – 1.02	0.98 – 1.01
Outpatient	1.25 – 1.35	0.68 – 0.73	0.99 – 1.02	0.92 – 0.95	1.15 – 1.19
Professional	1.01 – 1.09	0.79 – 0.85	1.19 – 1.23	1.10 – 1.13	0.81 – 0.84
Pharmacy	1.19 – 1.29	1.04 – 1.11	0.88 – 0.91	0.86 – 0.89	0.91 – 0.94
RUI					
Overall	1.06 – 1.15	0.94 – 1.00	1.04 – 1.07	0.90 – 0.93	0.95 – 0.99
Inpatient	0.97 – 1.04	0.90 – 0.96	1.06 – 1.10	0.85 – 0.88	1.14 – 1.17
Outpatient	1.20 – 1.29	0.78 – 0.84	1.03 – 1.07	0.83 – 0.86	1.11 – 1.15
Professional	0.99 – 1.07	0.98 – 1.05	1.09 – 1.12	0.96 – 0.99	0.85 – 0.88
Pharmacy	1.19 – 1.28	1.02 – 1.09	0.90 – 0.92	0.88 – 0.91	0.89 – 0.92
PRICE INDEX					
Overall	1.06	0.87	1.01	1.09	0.99
Inpatient	1.16	0.88	0.99	1.16	0.86
Outpatient	1.04	0.87	0.95	1.11	1.04
Professional	1.02	0.80	1.10	1.15	0.95
Pharmacy	1.00	1.01	0.98	0.98	1.02
PROPORTION OF MEDICAL COST BY PLACE OF SERVICE**					
Inpatient	19%	20%	18%	18%	19%
Outpatient	37%	29%	29%	29%	39%
Professional	44%	51%	53%	53%	42%

**Pharmacy data not applicable

Phase II began exploratory analysis of additional cost drivers including the impact of patient cost sharing levels and region-specific cost of living. Continued analysis is warranted to fully understand the impact these factors may have on the variation in healthcare costs across regions. Phase III builds on the analysis of

cost drivers by comparing data from Phase II. [Table 3](#) explores cost drivers and [Table 5](#) and [Table 6](#) compare cost drivers in 2014 and 2015. The TCI in [Table 3](#) represents the midpoint of the ranges presented in [Table 2](#).

[Table 3](#) explains how much utilization and price contribute to the difference between total cost and the benchmark (where TCI = 1). Understanding utilization and price as cost drivers can help target efforts to reduce healthcare cost. A positive percentage indicates utilization or price is driving cost higher compared to the benchmark, and a negative percentage indicates utilization or price is driving cost lower compared to the benchmark. When the Price Index and RUI have different signs (when one is positive and the other negative), utilization and price are working in opposite directions (one drives cost up and the other drives cost down) as is the case for Oregon.

TABLE 3. PRICE AND UTILIZATION CONTRIBUTIONS TO TOTAL COST

	Colorado	Maryland	Minnesota	Oregon	Utah
TCI	1.17	0.84	1.07	1.00	0.96
RUI	1.11	0.97	1.05	0.92	0.97
Contribution to Cost	65%	-19%	78%	Offset by Price	-72%
Price Index	1.06	0.87	1.01	1.09	0.99
Contribution to Cost	35%	-81%	22%	Offset by Utilization	-28%

*Note indexes are displayed as midpoints of the ranges presented in [Table 1](#).

Information on healthcare costs in a geographic region must also be interpreted in light of the relative cost of living in that region. Direct comparison of dollars would be misleading. As an example, suggestive of the importance of adjusting for cost of living, [Table 4](#) displays an indicator of health cost of living as assessed by the Missouri Department of Economic Development’s Economic Research and Information Center (MERIC). MERIC’s Health Cost of Living Index⁷ tracks closely with the TCI as calculated by the regions in the project (correlation coefficient = 0.64) and with the Price Index (correlation coefficient = 0.80).

7 Cities across the nation participate in the Council for Community & Economic Research (C2ER) survey on a volunteer basis. Price information in the survey is governed by C2ER collection guidelines (<http://coli.org/wp-content/uploads/2016/06/2016-COLI-Manual.pdf>). Weights assigned to relative costs are based on government survey data on expenditure patterns for professional and executive households. MERIC derives the health cost of living index for each state by averaging the indices of participating cities and metropolitan areas in that state. https://www.missourieconomy.org/indicators/cost_of_living/

TABLE 4: COMPARING HEALTH COST OF LIVING INDEX TO TCI, RUI AND PRICE INDEX

	Colorado	Maryland	Minnesota	Oregon	Utah
<i>Health Cost of Living Index 2015</i>	1.03	0.89	1.10	1.11	0.90
TCI	1.17	0.84	1.07	1.00	0.96
RUI	1.11	0.97	1.05	0.92	0.97
Price Index	1.06	0.87	1.01	1.09	0.99

The analysis highlights the role of cost of living, along with other factors, in explaining differences in the cost of healthcare across regions and the importance of including them in future refinements of benchmarking.

Other comparability issues not explored in this study, but which can affect the cost of healthcare, include the services covered by the health benefit plan and provider reimbursement methods. Likely to be most significant, the general level of payment from public payers has a substantial impact on the rates paid by the commercial insurers whose claims are the basis of this study.⁸ Uncompensated care, Medicare rates, and Medicaid rates are all related to the degree to which costs have been shifted to the commercial population. Differences in TCOC across regions can also reflect differences in the rate of uninsured individuals, funding levels for Medicaid, and the degree of Disproportionate Share Hospital and Graduate Medical Education funding from Medicare.

YEAR-TO-YEAR COMPARISONS

Phase III is the second year that four of the regions produced TCOC measures: Maryland, Minnesota, Oregon, and Utah. Having more than one year of data provides the opportunity to review the stability of the measures over time as well as across regions. Variation in payers contributing to multi-payer databases and variation in the quality of submitted data pose a unique challenge when trying to develop a consistent sample for analysis. Data contributors within a region have varying levels of compliance with submission specifications and quality assurance standards at any given time. A good example of an external factor in data quality is the variability in self-funded ERISA data contributions. The Supreme Court's

⁸ Frakt, Austin B. "How Much Do Hospitals Cost Shift? A Review of the Evidence." *The Milbank Quarterly* 89.1 (2011): 90–130. PMC. Web. 11 Jan. 2018.

decision in *Gobeille v. Liberty Mutual (2016)* will have lasting effects on data stores⁹ and is being addressed differently across regions. This is one reason the sample for a region's data can change from year-to-year.

[Table 5](#) demonstrates the consistency in the TCOC measures despite changes in payer mix and sample size. The stability of TCI across regions is noteworthy considering changes in payer mix, decreases in total unique members, and fluctuations in the underlying data. The other three regions participating in Phase II and Phase III benchmarking have sample size decreases greater than 40%. Minnesota is the exception as their payer mix did not change.

TABLE 5. COMPARING TCOC MEASURES FROM 2014 TO 2015 WITH COMMON PARTICIPANTS IN BOTH YEARS

	Maryland	Minnesota	Oregon	Utah
2014 TCI	0.84	1.11	1.07	1.00
2015 TCI	0.88	1.11	1.04	1.00
2014 RUI	0.90	1.07	0.95	1.09
2015 RUI	0.99	1.08	0.94	0.99
2014 Price Index	0.93	1.04	1.12	0.91
2015 Price Index	0.88	1.03	1.11	1.00
Change in Sample Size from 2014 to 2015	-44%	-2%	-40%	-45%

*Utah adjusted 2014 figures to address previously unidentified data anomaly.
 ** Note the indexes are based on the regions participating in both years.

Maryland's sample changed from 2014. Maryland no longer includes data from self-funded employers with ERISA health plans, and changes in the individual market (ACA-compliant and non-compliant plans) introduced more high-risk patients. Utah also had changes in its data store from 2014 to 2015. This change increased accuracy in the detailed data on inpatient claims and improved the precision of the TCRRV™, which led to a lower RUI in 2015.

⁹ For more information about *Gobeille v. Liberty Mutual (2016)* and the impact on APCDs, please see the APCD Council's statement: <https://www.apcdouncil.org/news/2016/03/apcd-council-statement-scotus-decision-gobeille-v-liberty-mutual-case>

TABLE 6. COMPARING TCOC MEASURES FROM 2014 TO 2015 WITH ALL PARTICIPANTS

	Colorado	Maryland	Minnesota	Oregon	Utah	St. Louis, MO
2014 TCI	-	0.86	1.14	1.10	1.02	0.90
2015 TCI	1.17	0.84	1.07	1.00	0.96	-
2014 RUI	-	0.88	1.05	0.93	1.07	1.08
2015 RUI	1.11	0.97	1.05	0.92	0.97	-
2014 Price Index	-	0.98	1.09	1.18	0.96	0.83
2015 Price Index	1.06	0.87	1.01	1.09	0.99	-

*Utah adjusted 2014 figures to address previously unidentified data anomaly.

** Note the index is based on regions participating in each year.

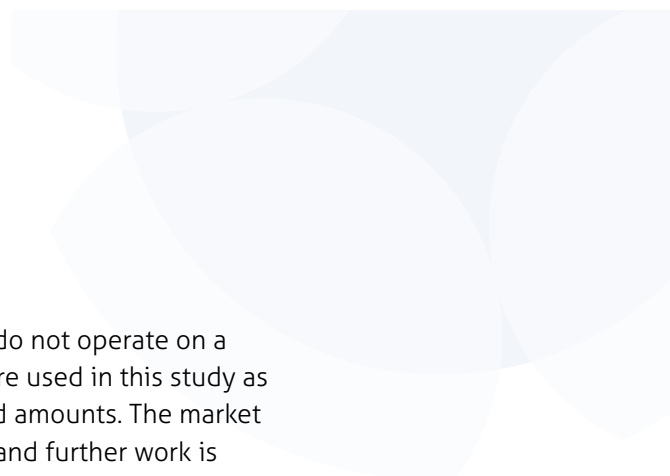
Comparing [Table 5](#) and [Table 6](#) demonstrates how including different regions in the benchmark will impact the measures. The difference is due to the fact that any measure based on a small number of contributors depends on the specific participants. [Table 6](#) shows that the order of regions in the measures are relatively consistent from 2014 to 2015 despite the inclusion of different regions in the average.

Opportunities for Further Exploration for Improved Transparency

Technical data issues that persist and have the potential to affect regional comparisons are:

1. NON-RANDOM SAMPLE OF COMMERCIAL POPULATION

The data provided by the RHICs do not reflect the complete commercial markets in the states in which they operate. First, some payers were reluctant to share the detailed cost information necessary to participate, and so they are missing from their region’s sample. Second, state laws mandating specific benefits apply only to state-regulated fully-insured products (and sometimes only to subsets of those) and not to self-insured employer health plans operated under Federal ERISA law rather than state insurance law. The degree to which the samples are representative of fully-insured/self-insured mix in each state varies across the regions. Third, the cost of preparing and processing data extracts created a hurdle that kept payers with smaller market share out of the mix for non-voluntary all-



payer claims data sets. Finally, provider-based plans that do not operate on a fee-for-service basis were not included in the cost measure used in this study as the NQF-endorsed measure set requires use of actual paid amounts. The market size of these plans varied greatly among the participants and further work is required to better understand if and how to include in future data sets. Any and all presentations of the results of this study should make it clear that the numbers do not represent the complete market in all regions.

2. PHARMACY AND BEHAVIORAL HEALTH CARVE OUTS

Self-insured plans sometimes carve out behavioral health and pharmacy benefits to management companies such as Magellan or Express Scripts. Carve outs are sometimes excluded from TCOC measures because the members are identified differently in the carve out data than they are in the medical claims file, preventing costs from being combined accurately at the patient level. While every attempt was made to limit the analysis of pharmacy claims to those patients with pharmacy benefits in the data store, some uncertainty remains about how well the data conform to expectation.

3. COST TRUNCATION

Patient-level truncation at \$100,000, part of the TCOC methodology to limit the impact of outlier patients, is based on having both medical and pharmacy claims. Medical and pharmacy components are factored down so that the total does not exceed \$100,000. For patients whose pharmacy data is missing from the data store, the medical amount can be overstated. Simulation suggests the impact is less than 1%.

4. BEHAVIORAL HEALTH CLAIMS

Behavioral health claims are treated inconsistently among regions. Data contributors in some regions include all claims in their extracts while others exclude Substance Use Disorder (SUD) claims and/or other health conditions or treatments deemed sensitive due to stringent interpretations of governing privacy statutes. For similar reasons, vendor policies may prevent the inclusion of sensitive claims in data stores used for TCOC calculations even if the data contributors send all claims. Differences in the process of aggregating data across contributors limit the ability to create an artificial commonality by excluding behavioral health claims from all regions. Regions that collect summarized data from contributors cannot make changes to exclude behavioral health claims.

The inclusion/exclusion of behavioral health claims affects the total cost of care but the impact on the risk score is less clear. Eight ACG health status categories have a description indicating a component of psychosocial condition as perceived from diagnoses. The portion of the population assigned to these eight categories varies from 3.7% to 4.4% among the regions, suggesting that the diagnoses required to detect conditions relevant to this label did appear in the claims despite partial or complete suppression of sensitive claims.

This degree of variation suggests that the proportion of missing behavioral health claims varies across regions, introducing a (likely modest) source of error in the overall benchmark comparisons.

5. CODING PATTERNS BY PROVIDERS

A US Government Accountability Office (GAO) report¹⁰ found a 4% – 6% difference in the risk score assigned to a member depending on coding characteristics of the provider completing the claims. More information on differences in coding practices across regions would be helpful in quantifying how those differences impact TCOC results, which depend in part on risk scoring.

6. NON-CLAIM PAYMENTS

Payments made to providers outside the standard fee-for-service environment are not captured on claims. Using claims alone will underestimate total cost to the degree that services (such as labs or office visits) are paid on a capitated basis; services are bundled; claims are paid based on encounter; patients use pharmacy discount programs such as Walmart; pharmacy rebates are made to plan sponsors; patients pay costs above the allowed amount for out-of-network care (balance billing); patients pay out-of-pocket; or providers receive payments through programs such as ACO risk sharing, Pay for Performance, or bulk payments against future claims. These practices are likely to differ across regions and data to assess these differences were not available as part of this project.

7. DATA QUALITY ASSESSMENT

Regions had varying degrees of access to their data. This limited the ability of some to assess data quality and mitigate issues as thoroughly as other regions.

These issues create comparability problems for the benchmarking results that are material but impossible to quantify precisely. These issues should be included as caveats in any presentation of the benchmark results and represent an agenda for continuing refinement of the TCOC methodology.

¹⁰ <https://www.gao.gov/assets/660/651712.pdf>



Conclusion

Phase III of the NRHI Total Cost of Care project built upon the work of Phase II in several ways. Regional benchmarks of TCOC measures were generated for a second year and the results were mostly consistent regardless of changes in payer mix. Cost was analyzed by price and utilization to identify cost drivers in different regions. Foundational work was completed on utilization measures to provide insight into variation including high utilization services and procedures. This work advances the understanding of variation in healthcare cost, a significant step toward cost reduction.