

Price Variation Analysis

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Prepared for the
Green Mountain Care Board

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Executive Summary

The Green Mountain Care Board (GMCB) has broad authority to develop policy in Vermont to stabilize health care costs while improving the quality of care. The GMCB's authority includes oversight of the rates paid by insurance companies and Medicaid to health care providers.

Previous reports documented in detail that there is wide variation in health care prices. The GMCB referenced a January 2012 report commissioned by the Department of Vermont Health Access that found "there was significant variation in the amount paid for the same services to different hospitals."¹ The Vermont Association of Hospitals and Health Systems (VAHHS) then produced a report documenting the wide variation in payments that each provider receives from the same payer for the same service.

The GMCB contracted with the University of Vermont, College of Medicine (UVM), and UVM's subcontractor, the University of Massachusetts Medical School (UMass), to explain why health care providers are paid differently for essentially the same service. In order to address this question, we conducted interviews with key stakeholders and analyses of claims data.

As noted in the box below, we use the term "price" to refer to the total amount that a payer pays to a health care provider plus the amount the patient owes out of pocket. A provider's charge for a service is similar to the "manufacturer's suggested retail price" in a car dealership. Providers rarely receive the full amount they charge for a service.

Key Terms

Price – the total amount that a health care provider received from a payer for a particular service (sometimes called "reimbursement"), including any prepaid amounts related to the service, plus the amount due from a patient through copayment, co-insurance and deductible. Payers and providers sometimes refer to price as the **allowed charge** or **allowed amount**.

Charge – the full, undiscounted amount established by the provider for a particular service. Providers charge all payers the same amount for the same service.

Patient liability – also referred to as out-of-pocket cost, including co-payment, deductible and coinsurance. This is the amount due from the patient after the payer has calculated what it owes.

Cost – the amount a provider spent to produce a service, including for example, salaries, supplies, capital equipment and overhead.

¹ GMCB Request for Proposal for Price Variation Analysis, April 1, 2013.

Analysis

UVM conducted interviews of key informants, including representatives of hospitals, physician groups, and payers. The team also conducted statistical analyses of inpatient hospital and professional claims data from the Vermont Healthcare Claims Uniform Reporting and Evaluation System (VHCURES) for calendar year 2012.

These analyses included descriptive statistics, financial ratio analysis, and regression analysis in order to better understand the data and identify factors that explain variation in prices.

Interviews

The interviews we conducted provided a unique view into provider contracting in Vermont. Key findings included the following:

- Payers and hospitals typically negotiate an aggregate rate increase. Negotiations may also address adjustments of fee schedules and quality reporting.
- There is very little negotiation of prices between payers and physician groups; most physician groups are “price takers.”
- The way that a price is calculated can contribute to price variation. For example, some rates are set as a percentage discount from charges, while others are based on fee schedules.
- Some contracts provide for lump sum payments that are not tied to individual claims. These payments may come in the form of withholds, end of year settlements, or separately negotiated amounts, such as a fixed amount to support medical education.
- Both payers and providers reported that the GMCB budget decisions play a significant role in hospital contract negotiations. However, both groups felt that the regulatory process advantaged the other.

Inpatient Analysis

Analysis of price differences for inpatient care explored this question through two different lenses – provider and population. Adjusting for differences in case mix, average prices among Vermont hospitals and Mary Hitchcock Memorial Hospital vary from 72 percent of the state average at Northwestern Medical Center to over 130 percent at Rutland Regional Medical Center and Grace Cottage Hospital.

Variation among major payers was somewhat smaller, ranging from 90 percent of the state average (TVHP) to over 130 percent (CBA Blue).

Professional Analysis

The goal of our analysis was to estimate the role of various factors in explaining the variation in commercial prices for 20 common professional services. For this analysis, we selected the most common professional visit types, as defined by Current Procedural Terminology (CPT) codes, in each of 4 service categories: Evaluation and Management Office Visits, Medical and Ancillary visits, Radiology services, and Surgical visits.

Our analysis evaluated the degree to which ten factors correlate with and could potentially explain the variation in prices that the largest commercial insurers paid for professional services. We examined the following factors, which we describe in detail in the body of the report.

Payer-related factors

1. Payer: Blue Cross Blue Shield of Vermont, Cigna, Cigna East, Cigna Life, MVP Select, and MVP HIC
2. Health Plan Product: HMO, PPO, POS, EPO, Indemnity, Catamount, The Vermont Health Plan (TVHP)
3. Imputed Payment Method: Fee schedule, Charge, Other Method such as negotiated rate or percent of charge
4. Patient Share of Payment: Patient paid out-of-pocket up to 50% of the total price, 51%-99% of the total price, 100% of the total price
5. Calendar quarter: 1, 2, 3, 4

Provider-related factors

1. Provider size: Small, Medium, Large
2. Provider region: Burlington Metropolitan Statistical Area, 5 Micropolitan Statistical Areas (population 10,000-49,000), Governor's Certified Rural Shortage Area, other rural areas, out of state
3. Provider type: Primary care physician or clinic; Specialist physician; Nurse, Midwife or Physician Assistant; Allied health; Behavioral health clinician; Hospital or other facility
4. Site of service: Clinician's office, hospital, Federally Qualified Health Center (FQHC) or Rural Health Clinic (RHC), other clinic
5. Service Code Modifier: Modifiers can provide additional information about a service, such as the type of provider performing the service or whether other services were performed that day.

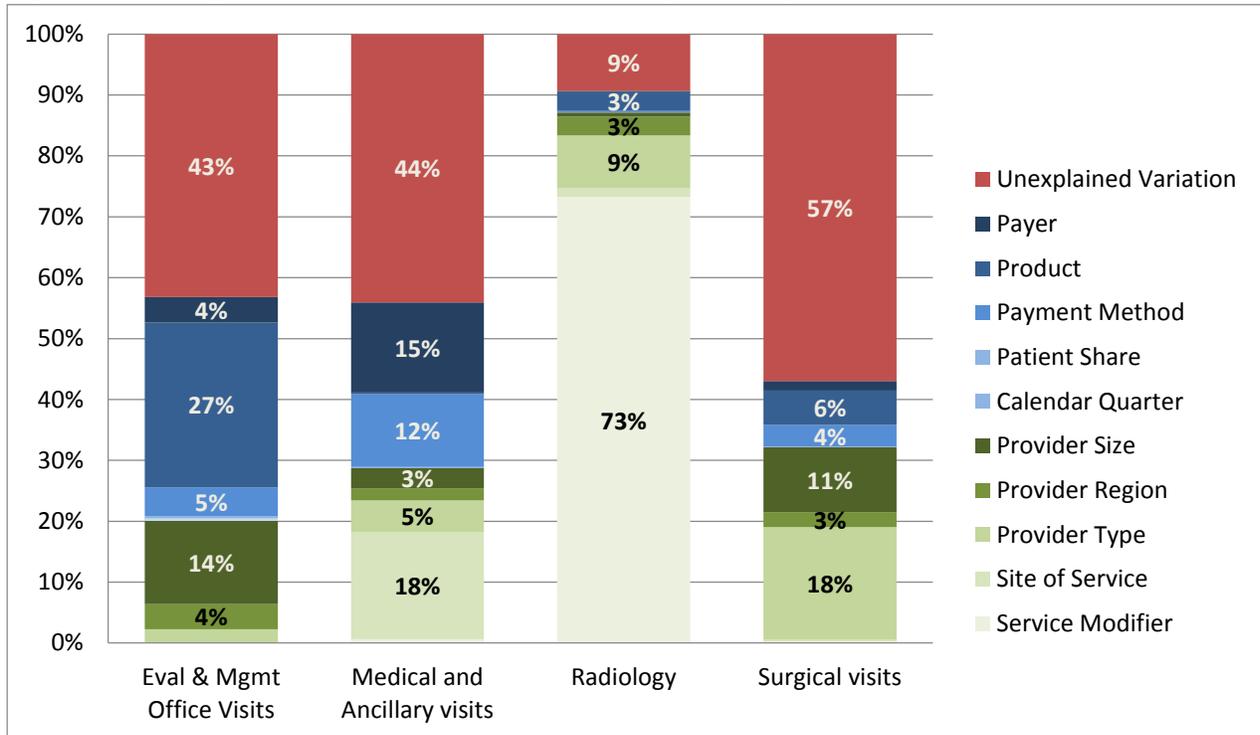
We used statistical analysis to calculate the share of the price variation that each factor explained. As shown in **Figure 1** below, these ten factors explain approximately 56% of the price variation for Evaluation and Management office visits and for Medical and Ancillary visits, 91% of the price variation for Radiology services, and 43% of the price variation in Surgical visits.

- Evaluation and Management office visits: The health plan product and provider size together explain 40% of the variation in office visit prices.
- Medical and Ancillary visits: The site of service explains 18% of price variation for Medical and Ancillary visits, and this factor explains a larger share of variation in prices of physical therapy services. The payer and imputed payment method together explain 27% of the price variation for these services, suggesting that different payers may use different payment methods or fee schedules.
- Radiology services: The service code modifier designating whether a service was provided by a technician or a radiologist explained 73% of the price variation in Radiology services. Seven other factors together explain another 18% of the price variation in Radiology services.
- Surgical visits: Provider type, provider size, and provider region together explain 32% of the variation in Surgical visit prices, while factors relating to the payer explain another 11%.

The remaining unexplained variation, that is, the variation that was not explained by the factors we examined, suggests that there may be unique factors associated with an individual payment from a payer to a provider. Unique contributors to price variation might include, for example, a unique payment

adjustment negotiated between a payer and a provider, an individual provider’s historical method for setting charges, or a special circumstance that the payer did not report in the claims data for the specific service provided.

Figure 1: Average variation in Professional Prices explained by each factor



Recommendations

The UVM/UMass team has several recommendations regarding steps that the Green Mountain Care Board (GMCB) could take to move forward with its analysis of existing price variation and development of pricing policies.

1. Develop a set of principles for establishing payment methods and rates in alignment with the statutory requirements. In developing these principles, seek input from advisory committees and other stakeholders.
2. Develop draft payment methods and rates based on the principles.
3. Model the impact of implementing consistent payment methods and rates statewide in terms of dollars gained or lost by individual health care providers, payers, as well as by state government and groups of consumers.
4. Develop a plan for phasing in standard methods and rates over several years in order to buffer the initial effects and to give health care providers time to adjust their business practices to meet the new financial requirements
5. Continue efforts to improve the accuracy and utility of VHCURES data.

I. Introduction

This report has been produced in response to the Green Mountain Care Board RFP “Price Variation Analysis,” issued April 1, 2013. The Board was looking to delve into the findings of a previous report, Vermont Health Systems Payment Variation Report², written by the Vermont Association of Hospitals and Health Systems and issued in June, 2013.

While the focus of that project was to quantify variation, this project is primarily intended to explore the “whys,” and ultimately to make policy recommendations to address any issues raised by variation. In order to do that, we combined analyses of claims data with interviews of payers and providers.

Price variation

What exactly is meant by price or payment variation? It is the variation, among payers and among providers, in the amount contractually set for a particular health care service or group of services, referred to in this report as **price**.³ In addition to that specific measurement, this report looks at variation through several additional lenses in the hope of providing a more comprehensive look. Additional views include:

- Variation in out-of-pocket spending – how much the patient is directly liable for
- Variation in **charges**, for two reasons. First, because the uninsured are initially liable for charges, rather than an amount that reflects contractual discounts. Second, because to the extent that payments are based on discounted charges, differences in charges produce differences in payments.
- Variation in spending among populations. If our interest is in understanding total spending, prices are only one part of that equation. For example, a local delivery system may have higher than average prices, but lower than average utilization rates.

Price variation affects us at two different levels – as individuals and in the aggregate. As mentioned above, variation affects spending by the uninsured, but as a result of cost-sharing, it also affects spending by the insured. Those with very rich benefits are sheltered from the financial impact of differences in price, but for the rest of us, price matters.

In the aggregate, price variation contributes to total health spending, particularly as a result of the lack of transparency in prices. All else being equal, use of providers with lower prices will reduce the state’s total health care bill.

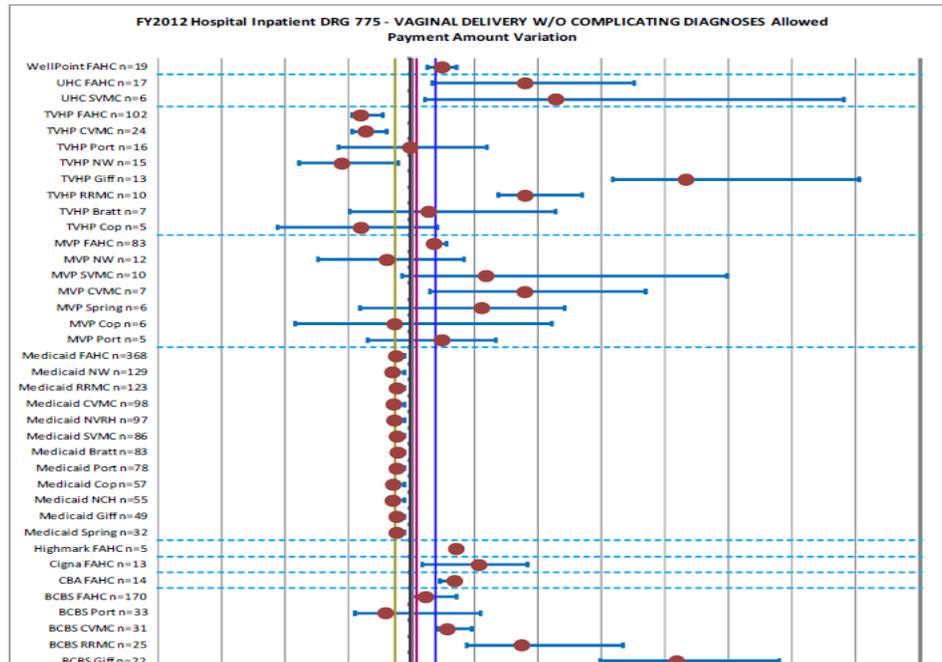
VAHHS Payment Variation Report

In 2013, the Vermont Association of Hospitals and Health Systems reported on their initial analyses of price variation in Vermont. That report focused primarily on quantifying variation, rather than exploring the causes. An example of their analysis is shown below.

² http://gmcbboard.vermont.gov/sites/gmcbboard/files/Variation_Jun03.pdf

³ Terms in **bold** are defined below.

Figure 4.8 Inpatient Payment Variation by Payer, by Hospital, by DRG 775 – Vaginal Delivery



VAHHS documented wide variation in prices paid to providers, finding that in some cases, there can be more variation in payments from a single payer to a single provider (blue lines) than in the average price paid by each payer (spread of red dots). This finding is important because it indicates that variation is driven by many more factors than relative negotiating power.

Influences on Variation

Both parties in the payment transaction – providers and payers – may have a role in setting the price for that service. In some circumstances, the price is the result of negotiations between two parties with a similar level of influence.

Often, the payer has the dominant position. This dominance can be a consequence of law – public payers such as Medicaid and Medicare have the authority to unilaterally set prices – or it can be a consequence of market structure. For example, small physician practices report that payers often offer them a “take it or leave it” contract.

Less commonly, a provider may have the dominant negotiating position, but for a variety of reasons including regulatory restrictions, providers cannot unilaterally dictate prices.

Provider characteristics can influence prices, especially those set by public payers. For example, Critical Access Hospitals are reimbursed by Medicare based on their **costs**, not through Medicare's Prospective Payment System. A similar situation applies to Federally-Qualified Health Centers (FQHCs).

Provider characteristics also influence charges (which affect prices when price is based on **discounted charge**). These influences include payer mix, decisions about cross-subsidizing certain services, and the competitive environment in which they operate.

Finally, prices are influenced by payment mechanisms. A payment system that relies on discounted charges will show much higher variation than one that relies on fee schedules. The use of DRGs, which base payment on diagnoses and procedures, rather than on what was done to treat a specific patient, reduce or even eliminate variation within a specific DRG.

Through our interviews, we also identified the state regulation as having a substantial impact on prices. In particular, both providers and payers identified the state's hospital budget process as playing a significant role in negotiations.

Patients feel the consequences of price variation most directly through the calculation of **patient liability**. While patient liability is most often calculated based on price, the terms of that calculation are established in the contract between the payer and the patient.

Definition of Key Terms

Price – the total amount that a health care provider received from a payer for a particular service, including any prepaid amounts related to the service, plus the amount due from a patient through copayment, co-insurance and deductible. Payers and providers sometimes refer to price as the allowed charge or allowed amount. This amount is often established in a contract between the provider and the payer.

Charge – the full, undiscounted amount established by the provider for a particular service. Providers charge all payers the same amount for the same service.

Discounted charge – a price for a service that is established by applying a negotiated discount to charges, in contrast to a price that is set directly under the contract.

Patient liability – also referred to as out-of-pocket cost. This is the amount due from the patient after the payer has calculated what it owes, based on the patient's specific benefits. This liability may include copayment (a fixed amount the patient owes, regardless of the price of the underlying service), coinsurance (a fixed percentage of the total price, after the patient's deductible has been met), and deductible (an amount the patient must pay before coverage from the payer begins).

Cost – the amount a provider spent to produce a service, including for example, salaries, supplies, capital equipment and overhead.

Case mix – a measure of how severely ill a population is on average. This is used to adjust price comparisons to recognize that sicker populations will cost more to care for.

Health plan types⁴:

EPO (Exclusive Provider Organization) - A more restrictive type of preferred provider organization plan under which employees must use providers from the specified network of physicians and hospitals to receive coverage; there is no coverage for care received from a non-network provider except in an emergency situation.

HMO (Health Maintenance Organization) - A health care system that assumes both the financial risks associated with providing comprehensive medical services (insurance and service risk) and the responsibility for health care delivery in a particular geographic area to HMO members, often in return for a fixed, prepaid fee. Financial risk may be shared with the providers participating in the HMO.

Indemnity - A type of medical plan that reimburses the patient and/or provider as expenses are incurred. A “conventional indemnity plan” allows the participant the choice of any provider without effect on reimbursement.

POS (Point of Service) - A POS plan is an "HMO/PPO" hybrid; sometimes referred to as an "open-ended" HMO when offered by an HMO. POS plans resemble HMOs for in-network services. Services received outside of the network are usually reimbursed in a manner similar to conventional indemnity plans (e.g., provider reimbursement based on a fee schedule or usual, customary and reasonable charges).

PPO (Preferred Provider Organization) - An indemnity plan where coverage is provided to participants through a network of selected health care providers (such as hospitals and physicians). The enrollees may go outside the network, but would incur larger costs in the form of higher deductibles, higher coinsurance rates, or non-discounted charges from the providers.

Catamount⁵ - Catamount was a health insurance program administered by BCBS of Vermont and MVP Health Care, targeted to Vermont residents who met at least one of the following conditions: were uninsured for at least 12 months; were between the ages of 18 and 26 and on their parents' health insurance plan; had insurance that only provides hospital care or doctors' visits (but not both); had an individual health insurance plan for 6 months or longer with a deductible of at least \$7,500 for a single person/\$15,000 for a family; or had lost their insurance due to a specified list of reasons, such as divorce or retirement. Catamount ended in March, 2014, and Catamount members transitioned to the Health Benefit Exchange (“the Exchange”).

⁴ Bureau of Labor Statistics, *Definitions of Health Insurance Terms* <http://www.bls.gov/ncs/ebs/sp/healthterms.pdf> (June 2013), unless otherwise noted.

⁵ Catamount Health, February 2014. <http://www.catamounthealth.org/catamount-health-information.html>

The Vermont Health Plan (TVHP)⁶ - The Vermont Health Plan (TVHP) is “a BCBSVT affiliate that [is] a Vermont-based managed care organization offering a...portfolio of managed care products.” BCBSVT and several Vermont hospitals created TVHP and targeted it to small employers with 50 or fewer employees.

Sources of Information

This report was built on a combination of interviews and data analysis. We conducted interviews with hospitals, physician practices, and payers. We also analyzed data from the Vermont Healthcare Claims Uniform Reporting and Evaluation System (VHCURES). VHCURES contains claims from the vast majority of private health insurers and from the Vermont Medicaid program.

While VHCURES is the best source of information available, readers should keep several caveats in mind:

1. Individual payers have not had an opportunity to verify information in VHCURES.
2. In our analyses, we relied on DRG assignments made by Onpoint, the state’s database contractor, rather than using DRGs submitted by the payers. This was necessary to ensure comparability, completeness, and accuracy.
3. Data issues which may be relevant to the analyses in this report have been identified by other data users.
4. While we have made every effort to censor results based on small numbers, statistical uncertainties remain.

⁶ BCBSVT, Provider Manual 2014: Blue Cross and Blue Shield of Vermont and The Vermont Health Plan.
<http://www.bcbsvt.com/wps/wcm/connect/ae8c26f9-d317-41c6-b7be-0488ef2719f3/2013+Provider+Manual.pdf?MOD=AJPERES>

II. Interviews

An initial list of interviewees was developed in consultation with GMCB staff. The list included a range of providers, three different payers, and other individuals with knowledge about pricing and payment. All interviewees were given an opportunity to review interview notes.

To date, 9 interviews have been conducted and 12 people have been interviewed. The table below shows their affiliations. Interviewees are listed in the appendix.

Table 2.1: Summary of Interviews Conducted

Sector	Number of People Interviewed
Consultant	1
Hospital-physician	3
Independent practice	3
Private payer	4
Public payer	1
Total	12

Findings – Overview

Several key themes emerged from these interviews. These can be described as follows:

1. Market power and the negotiation process
2. Other factors that influence price
3. Payment mechanics
4. Non-claim revenues
5. The roles of regulation
6. How beneficiaries experience price

Market Power and the Negotiation Process

True price negotiation is relatively rare in Vermont health care, for two main reasons. First, there is no direct negotiation process with either Medicare or Medicaid. While Medicaid does have general discussions with providers, setting of Medicare reimbursement is done at the national level.

Second, both in the provider and private insurance markets there is a single dominant player. On the provider side, Fletcher Allen Health Care (FAHC) is that dominant player as a result of both its market share (between one-third and one-half, depending on how market share is measured) and its role as the only tertiary hospital in Vermont. As an example of FAHC's market power, the organization made a decision six years ago to "level the playing field" among the state's major private insurers. As Todd Moore of OneCare put it, the organization felt that this was appropriate for a "big market maker." After six years of negotiations, FAHC believes that it has achieved that goal.

The area where negotiation is least likely to occur is physician practices. For many providers, face to face discussions with payers simply do not happen. Independent physician practices are "price takers." For them, fee schedules are non-negotiable.

As Sean Uiterwyk, a physician at White River Family Practice described it, “the practice is very much a price-taker.” He is concerned about a “shocking lack of negotiations” or even communications with payers. They are “finally having a sit-down with one commercial insurer” as a result of a proposed reduction in payment rates for services provided by the advanced practice registered nurses (APRNs). While the practice has never terminated a contract with a payer, it sounds like this is a possibility in the future, although it would be done very reluctantly.

When price negotiation occurs, according to several interviewees, it most commonly focuses on an aggregate increase, rather than prices for individual services. How this increase is implemented will depend on the underlying payment methodology. For example, in a DRG-based system, the base amount is the central topic of discussion.

However, negotiations can also address other topics. Most significantly, changes in payment relativity among services and changes in methodology were mentioned by several interviewees. These changes may be proposed by either the payer or the provider. BCBSVT reported that while negotiations with hospitals are “90 percent pricing,” they also include other topics, such as quality reporting and, most importantly for understanding price variation, when services are subject to a bundled payment.

Other Factors that Influence Price

Variation is driven by more than just market power. In some cases, price variation may reflect the need to subsidize essential but not always profitable services. In other cases, it may reflect payer mix – providers with a high reliance on public payers appear to have higher charges which, to the extent that payments are based on negotiated discounts, may translate to higher prices. Price variation may be tied to product – one interviewee reported that prices would be lower for insurance products with tighter networks. Finally, price variation may reflect public policy. The fact that public payers set lower prices than private payers is well-known, but the use of statutory reimbursement rates to improve the affordability of Catamount Health is less so.

While a substantial but difficult to measure portion of payments are made based on discounted charges, other mechanisms, most notably physician fee schedules and DRGs, play a large and increasing role. However, capitation is extremely rare in Vermont.

Organizational affiliations have a varied effect on pricing. This is because consolidated negotiations can only occur under limited circumstances, most importantly when risk is shared. For example, because risk was shared among participants under the Vermont Managed Care model, prices did not vary among providers. In contrast, while FAHC negotiates all contracts on behalf of its partners, each contract is different.

Complex financing arrangements may produce true prices that are different from those reflected in VHCURES. For example, payment withholds, used in conjunction with per member per month targets, are becoming more common. It is not clear how post-settlement prices can be incorporated into comparisons.

Payers develop their fee schedules and prospective payment systems (PPS) in different ways. For physicians, payers will often adopt resource-based relative value systems (RBRVS) as the base for their fee schedule. In the simplest case, they also adopt a fixed ratio to Medicare. Other payers will make adjustments such as using more than one base value. BCBSVT has created its own fee schedule, based in part on history and in part on policy goals. For inpatient, Medicaid uses the standard CMS grouper, but develops its own relative weights.

Transparency needs to cover more than prices. One physician saw an important role for himself in helping patients to select other providers. He cited the example of MRI. One MRI provider advertises how low its prices are, but should he suggest that provider in the absence of quality information?

Financing of medical education occurs in different ways. FAHC includes a small factor for graduate medical education (GME) in its professional fees, less so for facility. Medicaid makes a fixed annual payment to FAHC, which is made outside the claims system.

Payment Mechanics

The way that a price is calculated can contribute to variation. Contracts typically establish payments in two different ways – discounts from charges or direct setting of prices. Discounted charge contracts permit variation at the patient level, while directly-set prices vary only at higher levels (service / product / provider / payer).

In Vermont, physician payments are almost always set directly. BCBS, MVP, Medicaid (and Medicare) all have physician fee schedules, but these schedules have been developed differently.

Several payers' fee schedules are built on top of the Medicare RBRVS system. One private payer calculates its fee schedule as a percentage of Medicare. It negotiates that percentage with some, but not all providers. Medicaid also uses the Medicare system, but some providers, such as FQHCs, are paid using a different system, with payments settled to costs. This means that the initial payment for a service is made using a fee-for-service model, but actual payments are later compared to costs and payments may be adjusted.

Another private payer's fee schedule is built on internal policies and goals, rather than on an external system. Factors that go into service prices include "competition, medical information, and costs." Specific prices are negotiated with tertiary providers, but negotiation with other practices are rare.

Payments for hospital inpatient services are a mix of discounted charges and DRG payments. The choice of which to use varies, with some payers using DRGs as much as possible, while others use them only at selected hospitals or for selected services. All payers that we spoke with use a standard DRG grouper, but some have developed their own weighting systems.

Payments for hospital services are a mix of discounted charges and APCs (a grouping system similar to DRGs).

Non-Claim Revenues

The topic of non-claim revenues came up in several discussions. Understanding these revenues is essential in gaining a full picture of price variation. The pattern that is seen when claim payments are compared may change substantially when other funds from other sources are included in the picture. The best example of this is the way Vermont Managed Care operated. Under VMC contracts, there was a single fee schedule for all physicians. However, payments were subject to a 15 percent withhold and settled to a target per-member per-month. The settlement process could produce actual payments that were lower than those indicated on claims.

In addition, VMC contracts included a capacity fee. These were paid to UVM medical practice physicians on top of fee-for-service payments. According to Todd Moore, “the intent was to recognize the costs of selected services that the academic practice provided, but community docs didn’t (e.g. Level 1 Trauma Center). “ Any claim-based comparisons would exclude the financial impact of these payments.

Primary care physicians spoke about the importance of non-claim payments to the financial survival of their practices. Sean Uiterwyk mentioned Blueprint payments. “Blueprint is an important source of revenue. Like most Family Practices, we have thin margins.”

Two additional examples of non-claim payments – the Medicaid program makes annual Disproportionate Share Hospital (DSH) payments to Vermont hospitals which are independent of any specific services provided and Medicaid also makes a fixed annual payment to FAHC / UVM to support medical education.

The Role of Regulation

Both payers and hospitals mentioned the role of regulatory processes in their contract negotiations. Both indicated that GMCB budget decisions play a significant role, but both sides felt that the regulatory process advantaged the other. As BCBSVT described it, some hospital negotiating positions start with GMCB-approved budgets. “The board approved an increase of x%, therefore you must give me x%...” In contrast, Central Vermont Medical Center reported that payers liked to start with the approved total net revenue increase, which does not recognize the cost shift.

One payer expressed a concern about the interaction between hospital budget reviews and health insurance rate reviews. They feel that more pressure is put on rates than on budgets, which puts them in a squeeze.

How Insured Individuals Experience Price Differences

While the focus of price variation reporting has been on what providers receive, there is another dimension of variation – what patients pay. The price set by the contract between the payer and the provider is the starting point, but what the patient actually spends is established by the patient’s insurance benefits.

This patient contribution can introduce variation in several different ways. The most obvious is cost-sharing. If one patient has a \$1,000 deductible and another has a \$5,000 deductible, whether the total

price for a surgery is \$25,000 or \$30,000 is of less direct importance than whether they have to pay \$1,000 or \$5,000.

MVP representatives described a more subtle way that benefits can affect prices. The example they gave was a service provided in a physician office, for which there is a \$20 copay. If the practice is purchased by a hospital, the same service may be classified as hospital outpatient care, subject to a deductible and coinsurance. The price may or may not vary, but patient spending certainly does.

III. Analysis of Facility / Inpatient Price Variation

Exploration of price variation for payments to facilities presents a different set of challenges than professional analyses. The biggest difference is that in professional analyses, the unit of analysis (a specific service) is, in most cases, also the unit of payment. Facility payment structures vary both by methodology (prospective, charge-based, or cost-based) and by type of care (inpatient or outpatient).

Charge-based payments typically apply a contractually-established discount to charges submitted by a provider. Each provider has a “charge master” that manages charges at a very detailed level. There are roughly 1,000 different codes in a charge master.

Prospective payment systems such as DRG (Diagnosis-Related Group) and APC (Ambulatory Payment Classification) are built around algorithms that classify encounters into groups based on diagnoses and procedures. A payment is established for each group, regardless of underlying charges billed by the hospital for a specific stay.

Cost-based payment systems are becoming rare. The most significant cost-based payment system is Medicare payment for care in critical access hospitals. Claims data cannot be used to analyze payments under cost-based models because while an initial payment is made based on a claim, there is a process under which payments are settled to costs. This settlement may take a year or more to occur.

Methodology

Using VHCURES, we constructed single-line summaries for all inpatient hospital events with an admission date in calendar 2012. Individual detail lines were aggregated using IPDISCHARGE, a field provided by Onpoint which identifies all lines associated with an inpatient stay, even if multiple claims were submitted.

These summary records included the IPDISCHARGE value, a DRG (assigned by Onpoint), diagnoses, useflag, identifiers for the hospital and the primary payer, and three financial fields – payer-paid, patient-paid (sum of deductible, coinsurance, and copayment) and allowed charge, estimated as the sum of payer-paid and patient-paid.

This produced a total of 23,425 records. Of these, 14,334 (61.2%) were used for analysis, 7,420 were paid as secondary coverage, either to Medicare or another commercial insurance product, and 966 were excluded for other reasons, including non-VT resident, denied claim, or adjustment to a non-existent claim.

Table 3.1 below shows the distribution of admissions by hospital in the dataset.

Table 3.1: Number of Admissions by Hospital

Hospital	Admissions	% of Total Admissions
Fletcher Allen Health Care	5,249	36.6%
Mary Hitchcock Memorial Hospital	2,004	14.0%
Rutland Regional Medical Center	932	6.5%
Central Vermont Medical Center	743	5.2%
Northwestern Medical Center	571	4.0%
Porter Medical Center	494	3.4%
Southwestern Vermont Medical Center	421	2.9%
Brattleboro Memorial Hospital	361	2.5%
Gifford Medical Center	338	2.4%
Copley Hospital	325	2.3%
Springfield Hospital	270	1.9%
Northeastern Vermont Regional Hospital	255	1.8%
North Country Hospital	240	1.7%
Mount Ascutney Hospital and Health Center	58	0.4%
Grace Cottage Hospital	40	0.3%
Out of state hospital	2,033	14.2%
Total	14,334	

Average Price Analyses

Looking at average price across DRGs can be a useful way of making higher-level price comparisons, such as hospital to hospital or payer to payer. However, looking at simple averages does not reflect differences in patient severity. One way to adjust for those differences is to use the weight associated with each DRG as a surrogate for patient severity. This approach is called case-mix adjustment.

Table 3.2 shows average crude and case-mix adjusted average prices for Vermont hospitals and Dartmouth-Hitchcock for patients with commercial insurance, admitted during 2012. The “Percent of Group” column compares each hospital’s case-mix adjusted price to the average case-mix adjusted price for all hospitals in the table. This information is shown graphically in Appendix 4.

Table 3.2 Crude and Case-Mix Adjusted Average Price, Selected Hospitals 2012

Hospital	Average Price	Average Case Weight	Case-mix Adjusted Avg. Price	Percent of Group
Northwestern Medical Center	\$9,198	1.048	\$8,780	72%
Central Vermont Medical Center	\$9,517	0.965	\$9,861	81%
Springfield Medical Care Systems	\$8,529	0.859	\$9,923	81%
Brattleboro Memorial Hospital	\$10,139	0.944	\$10,737	88%
Fletcher Allen Health Care	\$13,338	1.181	\$11,292	92%
Porter Medical Center	\$9,558	0.834	\$11,459	94%
Southwestern Vermont Medical Center	\$11,683	0.944	\$12,375	101%
North Country Hospital	\$12,336	0.987	\$12,499	102%
Mount Ascutney Hospital and Health Center	\$16,792	1.238	\$13,563	111%
Copley Hospital	\$13,700	1.002	\$13,672	112%
Northeastern Vermont Regional Hospital	\$12,016	0.876	\$13,712	112%
Mary Hitchcock Memorial Hospital	\$23,416	1.691	\$13,848	113%
Gifford Medical Center	\$11,161	0.741	\$15,061	123%
Rutland Regional Medical Center	\$17,669	1.101	\$16,049	131%
Grace Cottage Hospital	\$14,450	0.896	\$16,130	132%
All	\$14,381	1.175	\$12,245	100%

The same approach can be taken to compare payers, as shown in the **Table 3.3** below. There is substantially less variation among the major payers than among hospitals. Some questions have been raised concerning the CBA Blue figures by reviewers of this paper. We are following up with them.

Table 3.3 – Crude and Case-Mix Adjusted Average Price, Selected Payers, 2012

Payer	Commercial Discharges	Average Price	Average Case Weight	Case-mix Adjusted Avg. Price	Percent of Group
TVHP	1695	\$13,381	1.180	\$11,340	90.4%
MVP Select	451	\$13,758	1.180	\$11,655	92.9%
CIGNA East	357	\$13,719	1.136	\$12,072	96.3%
MVPHI	1009	\$14,288	1.166	\$12,253	97.7%
CIGNA	1595	\$15,354	1.224	\$12,545	100.0%
BCBS	4732	\$15,714	1.234	\$12,735	101.5%
CBA Blue	635	\$14,504	0.871	\$16,659	132.8%
Group Total	10474	\$14,919	1.189	\$12,542	

Detailed Analyses

In order to explore these relationships further we have compared average allowed price for the 10 most common DRGs at each Vermont hospital (and Mary Hitchcock). Note that DRGs are being used as an analytic tool, regardless of the underlying payment mechanism. **Table 3.4** below shows how average price at each hospital in our comparison group compares to the group average for each DRG. For example, the average price for a normal newborn at Porter is 79 percent of the average price for the group of hospitals included in the table. Results are shown only when there were 10 or more discharges in that cell.

It is interesting to note that while comparisons at the DRG level are somewhat similar to comparisons at the hospital level, there is also substantial variation. This may, in part, be due to variations among hospitals in charges for specific services.

Table 3.4: Hospital price as a percent of group price for the top 10 DRGs in Vermont Hospitals

Diagnostic Group	NW	BR	SPF	PO	SW	CO	MH	FA	NC	CV	GI	RU	NE
Esophagitis	119%		117%	86%	109%	88%	106%	88%		81%	119%	117%	105%
Major joint replacement or reattachment of lower extremity w/o MCC	89%	86%	120%	119%	124%	123%	87%	80%	111%	76%	126%	146%	133%
Cesarean section w CC/MCC	84%	93%	76%	109%	109%		115%	89%	88%	73%	164%	127%	
Cesarean section w/o CC/MCC	83%	119%	93%	110%	130%	123%	107%	82%	116%	79%	165%	157%	123%
Vaginal delivery w complicating diagnoses	77%	102%	84%	83%	136%	66%	121%	90%	115%	97%	156%	114%	
Vaginal delivery w/o complicating diagnoses	74%	96%	91%	87%	123%	88%	119%	90%	89%	101%	182%	126%	116%
Neonate w other significant problems	60%	73%	64%	72%	62%	44%	206%	72%	81%	146%	61%	92%	
Normal newborn	117%	131%	118%	79%	144%	96%	103%	77%	179%	95%	111%	180%	138%
Psychoses			60%				97%	115%		88%		84%	
Alcohol/drug abuse or dependence w/o rehabilitation therapy w/o MCC							116%	95%			65%	123%	

Population

While service-level analysis of prices can be very valuable on its own, it becomes even more so if put into context. In this report, we chose to supplement our price analyses with an analysis of population-based spending patterns. This context can be helpful for two reasons. First, it enables the exploration of the direct relationships among price, utilization, and total spending. A provider may have low unit prices, but the population that it serves may have a high use rate, potentially offsetting the low prices.

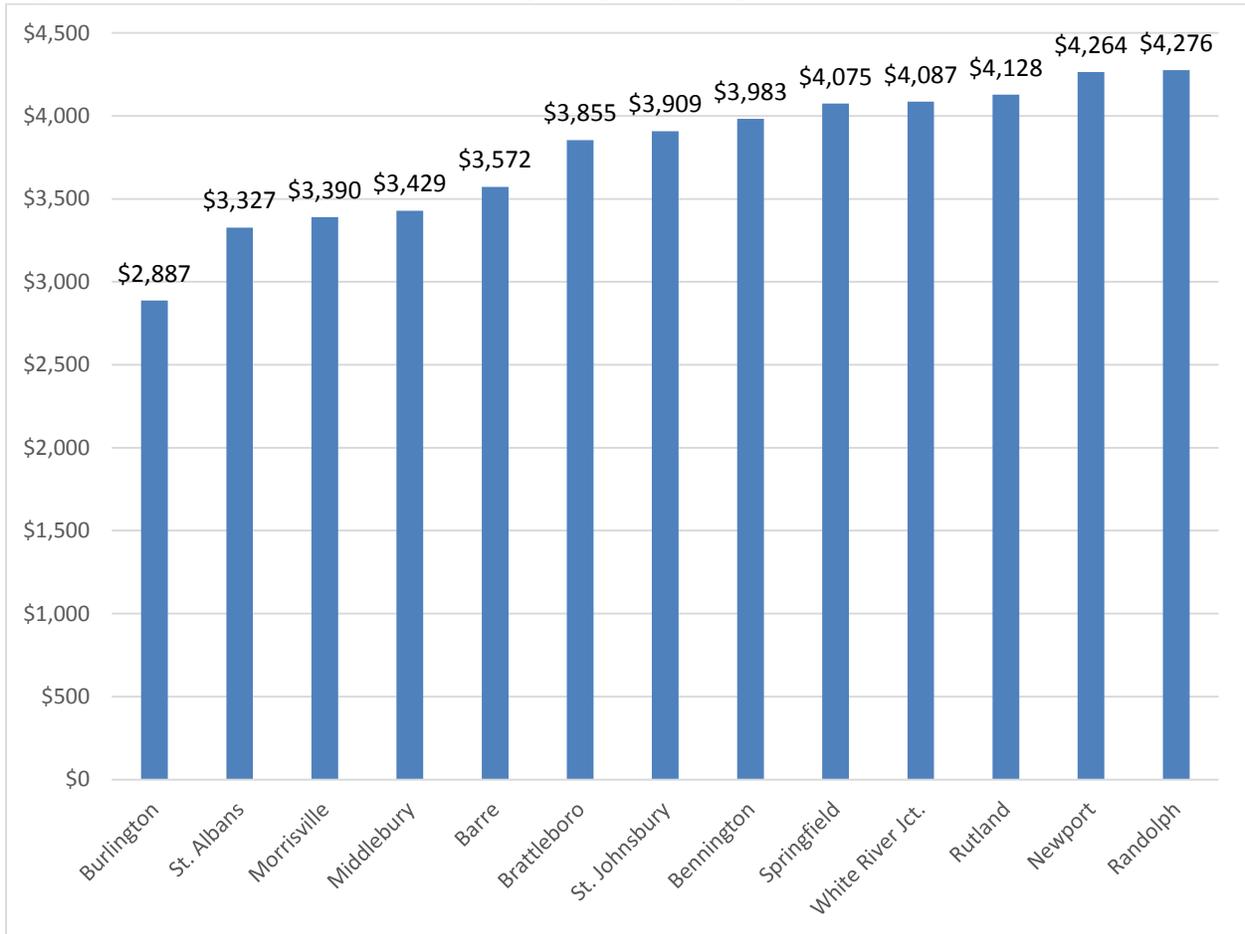
Second, characteristics of the delivery system may have a paradoxical effect on prices. Consider two areas – one has a well-integrated delivery system that often treats patients in the most cost-effective setting. The other has a less well-developed system, so patients are sometimes treated at a higher level of care than would be indicated by their severity of illness. These simpler cases can reduce the average price in the second area.

Figure 3.1 below shows the 2012 commercial per capita allowed price by hospital service area. This spending is for all health services, and is not adjusted for age or severity of illness. Hospital service areas are geographically-defined populations that are highly dependent on a specific hospital⁷. They are

⁷ Or hospitals. Two service areas include multiple hospitals – White River Junction (Mary Hitchcock and Mount Ascutbey) and Brattleboro (Brattleboro Memorial Hospital and Grace Cottage Hospital)

established by the Green Mountain Care Board, in co-operation with the Vermont Department of Health. HSAs have been used in Vermont since the 1980s. For additional information on HSAs, see: http://healthvermont.gov/research/hospital-utilization/documents/2009_Inpatient_Report.pdf, beginning on page 27.

Figure 3.1: Commercial allowed amount per capita by hospital service area, all services, 2012



IV. Analysis of Professional Price Variation

This section of the report analyzes the variation in prices for physician and other professional services in Vermont's commercial insurance market. Often, the same providers receive different payment amounts for the same service, as documented by the Vermont Association of Hospitals and Health Systems (VAHHS) in its 2013 report, Vermont Health Systems and Payment Variation. This report now takes that work a step further, by conceptually and statistically investigating reasons behind the range of prices paid for professional services.

Methodology

The goal of our analysis was to estimate the role of various factors in explaining the variation in commercial prices. We identified a number of factors that could explain price variation, and describe these factors in detail below. We used statistical analysis to calculate the share of the price variation that each factor explained. The statistical method employed stepwise regression models described in detail in Appendix C.

The remaining unexplained variation, that is, the variation that was not explained by the factors we examined, suggests that there may be unique factors associated with an individual payment from a payer to a provider. Unique contributors to price variation might include, for example, a unique payment adjustment negotiated between a payer and a provider, an individual provider's historical method for setting charges, and a special circumstance that the payer did not report in the claims data for the specific service provided.

Data Source

We completed our analysis using the Vermont Healthcare Claims Uniform Reporting and Evaluation System (VHCURES). This data includes claims data from most commercial insurers in Vermont and the Vermont Medicaid program. For the purposes of this professional claims analysis, we created a smaller analytic dataset, which included only the following:

1. Data from the highest volume commercial payers in the state, namely
 - Blue Cross Blue Shield of Vermont (BCBSVT)
 - Cigna Health and Life Insurance Company, formerly Alta Health (Cigna)
 - Cigna Health and Life Insurance Company - Cigna East Claims (Cigna East)
 - Connecticut General Life Insurance Company (Cigna Life)
 - MVP Health Insurance Company (MVP HIC)
 - MVP Health Plan, Inc. (MVP HP)
 - MVP Select Care, Inc. (MVP Select)
2. Claims with service dates between January 1, 2012 and December 31, 2012;
3. Claims for professional services provided in offices, clinics, hospitals, and community health centers;
4. Primary payer claims for commercial claims only, excluding Medicare and Medicaid;
5. Claims that had only a single unit of service, to ensure comparability in the price paid for each claim;
6. Claims that were identified in the VHCURES data as "good to use", e.g. excluding intrapayer duplicates, adjustments, payment amounts less than zero, etc.

Even after applying the filters above, our analysis identified outlier claims that often appeared to be secondary or adjusted claims that were not identified due to coding errors. Therefore, we applied outlier thresholds at the 5th and 95th percentile of prices for each service type. Applying this filter is a standard practice for claims analysis.⁸ We excluded claims where prices were less than or equal to the 5th percentile; we also excluded claims where it was greater than or equal to the 95th percentile.

Appendix C provides technical details regarding these filters.

Data Limitations

VHCURES is a huge dataset that provides detail that was previously unavailable, but it does not provide all of the information that we would want to use for this analysis. Key limitations of the data include the following:

1. Third party payers submit data to VHCURES. The information included in the dataset is only as good as the data submitted. Payers and providers have not validated the data we used in this report. Others, including the authors of the prior payment variation analysis commissioned by the GMC Board, have identified issues with VHCURES data in the past.
2. VHCURES does not include a unified identifier that links all of a provider's claims back to that provider. Each payer has its own system for identifying and tracking its members and health care providers; VHCURES includes each payer's distinct tracking numbers. For this analysis, we examined payments from a payer to a provider, but we could not group all of the payments made to a particular provider from all payers. (Other states are developing a Master Provider Index to support such analyses, as well as a Master Patient Index that allows analysis of an individual's care across payers.)
3. The dataset includes payment amounts, but not payment methods.
4. The dataset does not include claims for care provided to uninsured individuals.

Visits and Procedures Analyzed

Our analysis of price variation for professional services focused on 20 common services, listed in **Table 4.1**. For this analysis, we selected the most common Current Procedural Terminology (CPT) codes⁹ billed by offices and clinics in each of 4 service categories:

- Evaluation and Management office visit codes,
- Medical and Ancillary visit codes, which include a broad range of medical and ancillary services,
- Radiology service codes, and
- Surgical visit codes.¹⁰

⁸ Hellerstein, Joseph (27 February 2008). "[Quantitative Data Cleaning for Large Databases](http://db.cs.berkeley.edu/jmh/papers/cleaning-unece.pdf)". *EECS Computer Science Division: 3*. Accessed February 26, 2014 (http://db.cs.berkeley.edu/jmh/papers/cleaning-unece.pdf)

⁹ The American Medical Association (AMA) develops and maintains CPT codes to provide a common nomenclature for procedures performed by health care providers. Both public health care coverage programs and private health plans rely on CPT codes.

Table 4.1: Visit and Procedure Types Analyzed

Service Type	CPT Code	Code Description
Evaluation and Management Office Visit Codes	99212	Evaluation and Management (E&M) office visit (10 min)
	99213	E&M office visit (15 min)
	99214	E&M office visit (25 min)
	99396	E&M office visit for patients ages 40-64
	99203	E&M office visit for new patients
Medical and Ancillary Visits	90471	Immunization Administration; one vaccine
	90806	Psychotherapy, Individual Counseling (45-50 minutes)
	97110	Therapeutic exercise
	97140	Manual physical therapy
	98941	Chiropractic manipulative treatment (CMT); spinal
Radiology services	71010	Chest x-ray, single view, frontal
	71020	Chest x-ray, two views, frontal and lateral
	73630	X-ray exam of foot
	77052	Mammogram add-on code for computer-aided detection
	77057	Screening mammogram, bilateral
Surgical Visits	11100	Biopsy skin lesion
	17000	Remove skin lesion
	17110	Wart/lesion removal
	20610	Joint injection
	45378	Colonoscopy

Factors that may contribute to variation

We examined ten factors that could potentially explain the variation of prices in Vermont’s commercial insurance market. We grouped these factors into those related to the payer and those related to the provider. We describe these factors in greater detail in the following pages. The ten factors we analyzed were:

Payer-related factors

1. Payer: Blue Cross Blue Shield of Vermont, Cigna, Cigna East, Cigna Life, MVP Select, and MVP HIC
2. Health Plan Product: HMO, PPO, POS, EPO, Indemnity, Catamount, The Vermont Health Plan (TVHP)
3. Imputed Payment Method: Fee schedule, Charge, Other Method such as negotiated rate or percent of charge

¹⁰ We excluded from the analysis two of the most common surgical visit codes, 36415 and 36416, both routine venipunctures (blood draws), because there is often \$0 payment for venipuncture as a stand-alone service. Payers often include the cost of the venipuncture in the price of a primary procedure, rather than paying for it separately.

4. **Patient Share of Payment:** Patient paid out-of-pocket up to 50% of the total price, 51%-99% of the total price, 100% of the total price
5. **Calendar quarter:** 1, 2, 3, 4

Provider-related factors

6. **Provider size:** Small, Medium, Large
7. **Provider region:** Burlington Metropolitan Statistical Area, 5 Micropolitan Statistical Areas (population 10,000-49,000), Governor's Certified Rural Shortage Area, other rural areas, out of state
8. **Provider type:** Primary care physician, Specialist physician, Nurse, Midwife or Physician Assistant, Allied health, Behavioral health clinician, Hospital or other facility
9. **Site of service:** Clinician's office, hospital, Federally Qualified Health Center (FQHC) or Rural Health Clinic (RHC), other clinic
10. **Service Code Modifier:** Modifiers can provide additional information about a service, such as the type of provider performing the service or whether other services were performed that day.

In the following sections we discuss each factor in detail and how it might affect price variation. We have included charts to illustrate the variation that may be associated with each factor. The charts demonstrate price variation for each factor for one sample procedure, CPT 11100, Biopsy Skin Lesion. Note that the variation patterns may differ for each visit and procedure type.¹¹ We provide these charts solely for illustrative purposes.

A price variation chart shows several key pieces of information:

- **The maximum and minimum prices** indicate the highest and lowest price paid for each factor value listed.
- **The range** illustrates the minimum to maximum price; a small range indicates more consistent prices (less price variation) while a wide range indicates less consistent prices (more price variation)
- **The average price** paid illustrates the relative difference in prices paid for each factor value.
- **The volume** (n) indicates the number of claims paid for each factor value. Note that we excluded from the charts those factor values where the number of claims paid was very small.

In addition, **Table 4.9** on page 43 lists the average price for professional services by each of these factors both for all VHCURES claims and for our analytic dataset.

Payer-related factors

1. Payer

The payer, or insurance company, affects price variation because each payer sets or negotiates its prices separately. Large payers may be able to negotiate steeper discounts from providers in exchange for high patient volume. For our research, we looked at claims for the top three payers in Vermont: BCBS, MVP

¹¹ See the Vermont Association of Hospitals and Health Systems (VAHHS) 2013 report, [Vermont Health Systems and Payment Variation](#) for many more examples of price variation by CPT.

and Cigna. Together these payers represent 97.5% of the fully insured market in Vermont¹² and 75% of the claims records included in the VHCURES dataset. We excluded claims paid by other payers because they represent payments made by many payers from around the country; each of these payers' market share is too small to analyze.

The three payers we analyzed have a combined total of seven lines of business:

- Blue Cross Blue Shield of Vermont (BCBSVT)
- Cigna Health and Life Insurance Company, formerly Alta Health (Cigna)
- Cigna Health and Life Insurance Company - Cigna East Claims (Cigna East)
- Connecticut General Life Insurance Company (Cigna Life)
- MVP Health Insurance Company (MVP HIC)
- MVP Health Plan, Inc. (MVP HP)
- MVP Select Care, Inc. (MVP Select)

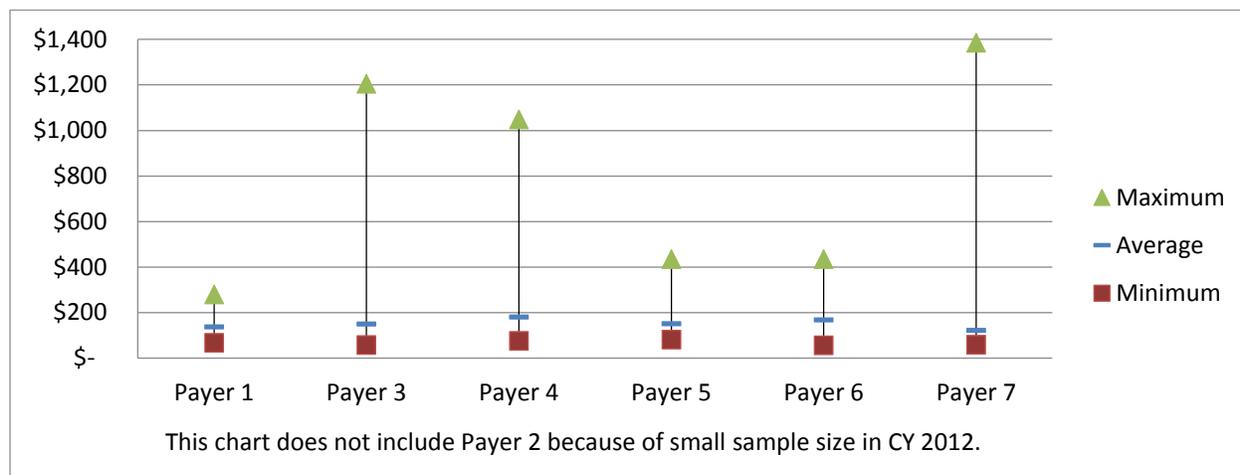
Figure 4.1 shows the price variation by payer for CPT 11100, Biopsy Skin Lesion. Figure 4.1 illustrates the range in prices that a single payer can pay for a single service. There is some variation in the average price that payers pay for this service, with Payer 4 paying the highest average price and Payer 7 paying the lowest. More striking, however, is the range of payments. Each payer's average payment is on the low end of the range, indicating that it sometimes pays a lower amount for the service and sometimes pays a much higher amount for the service. Payers 3, 4 and 7 sometimes pay over \$1,000 for this service and sometimes less than \$100. The other payers have a smaller range of payments, but even Payer 1, which has the smallest range, makes payments that vary from a low of \$68 for this service to a high of \$280.

If we created similar charts for each of the 20 services we examined, the charts would show somewhat different patterns. For example, Payer 3 may pay the highest average price for one service and lower average price for another service. Payer 6 pays a relatively narrow range of payments for this service, but may pay a wider range for another service.

Our analysis aims to explain these differences in the prices paid by the same payer and across payers.

¹² VT Department of Financial Regulation – Insurance Division, The Commercial Health Insurance Market in Vermont, September 2013.
http://www.dfr.vermont.gov/sites/default/files/ASSR_2012_Commercial_Health_Insurance_in_Vermont.pdf

Figure 4.1: Example of Price Variation by Payer (CPT 11100 – Biopsy Skin Lesion)



2. Health Plan Product

Product refers to the health plan design, such as Health Maintenance Organization (HMO), Preferred Provider Organization (PPO), or Indemnity. Contracts between payers and providers differ for each type of product. For example, a payer may negotiate lower prices (payment rates to providers) for its HMO product with its network providers and pay higher rates out of network. A payer may establish different prices for its HMO and PPO products with the same health care provider, perhaps because the payer provides (or requires the provider to provide) more care management services to one member population than the other.

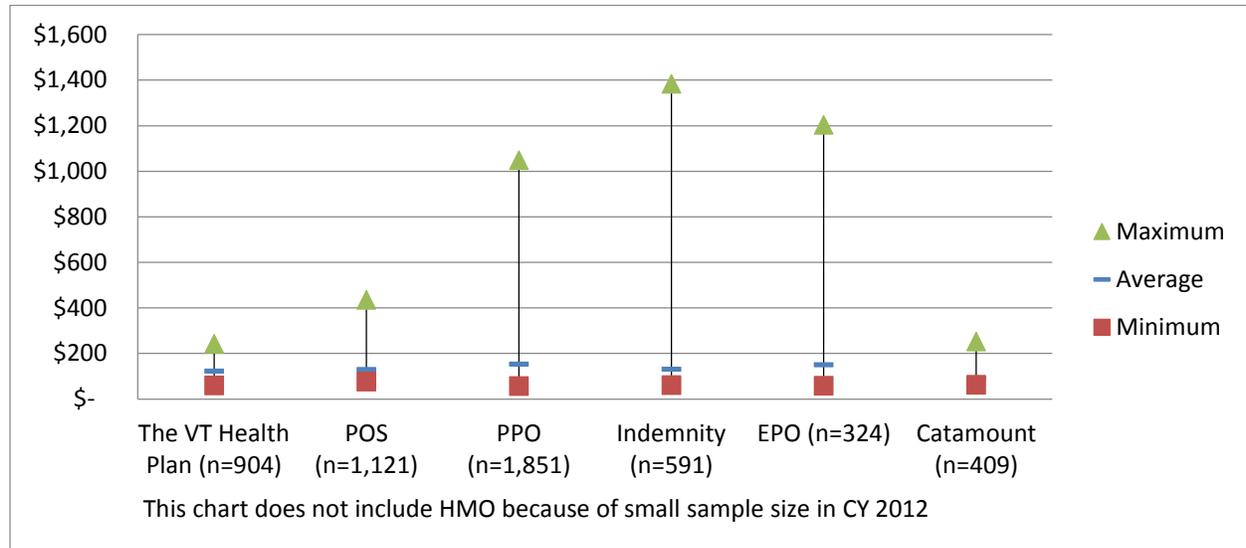
The VHCURES dataset identifies five product types: HMO, PPO, Indemnity, Point-of-Service (POS) and Exclusive Provider Organization (EPO). See the Definitions of Key Terms on pages 12 through 14 for a list of standard, national definitions of these product types. Note however, that the products that payers offer in Vermont may differ in some respects from these standard models.

For the purposes of this analysis, we included two additional product types. We designated BCBSVT and MVP contracts for Catamount as a product type (Catamount) because it was a unique product administered by Blue Cross Blue Shield of Vermont and MVP on behalf of the state of Vermont. This plan was available for individuals with incomes under 300 percent of poverty and who did not have access to insurance through an employer. Catamount rates were set according to a statutory formula that was originally benchmarked to Medicare rates, so the pricing for these claims differs from all other claims for these payers. Similarly, we analyzed The Vermont Health Plan (TVHP) as a product type, distinct from other products that BCBSVT offered or administered.

Figure 4.2 shows the price variation for CPT 11100, Biopsy Skin Lesion based on the product in which the member is enrolled. There is some variation in the average price for this service: Catamount’s average price of \$90 is significantly lower than the average price for the other products, which range from \$123 to \$153. Similar to the variation by payer, each product’s average payment is on the low end of the range, indicating that it sometimes pays a lower amount for the service and sometimes pays a much higher amount for the service. PPO, Indemnity and EPO products sometimes pay over \$1,000 for this service and sometimes less than \$100. POS products, TVHP and Catamount have a much narrower range

of prices. Catamount prices were originally benchmarked to Medicare prices, which vary only with respect to a few prescribed factors; the state made some additional adjustments to Catamount prices over time.

Figure 4.2 Example of Price Variation by Product (CPT 11100 – Biopsy Skin Lesion)



There is a different pattern of price variation for other services. For example, all products paid a similar maximum price (\$162) for a 25 minute office visit (CPT 99214); the range of prices for this office visit was much smaller than the range of prices for biopsy skin lesion.

3. Imputed payment method

The price that a payer pays for a service may vary depending on the method it uses to make a payment. A payer may price services using a standard fee schedule. The fee schedule may include different payment rates for different health plan products (e.g. HMO, PPO), for different types of clinicians (e.g. physician, nurse practitioner, clinical social worker), or for other factors.

A payer may negotiate different payment rates in its contract with a particular health care provider. The contract may specify, for example, that the payer will pay the provider a percentage of the payer's standard fee schedule, a percentage of the provider's charge, a bundled or capitated amount, or a payment established based on another method.

Most payers include a provision in their contracts specifying that they will pay the lower of the amount allowed under their contract with the provider or the provider's charge. In addition, payers sometimes pay the provider's charged amount, most often when the payer and provider operate in different states and have no contractual relationship.

The VHCURES dataset includes the amounts that the provider charged, the payer paid and the patient owed, but it does not provide information about how the provider and payer calculated those amounts. We imputed the payment method based on the available data. **Table 4.2** lists the payment methods we imputed.

Table 4.2: Imputed Payment Method

Fee Schedule	A payer paid the same price for many claims, even though providers charged varying amounts for the service
Charge	The payer paid the amount that the provider charged for the service
Other method	The payer paid a price that was not equal to the charge and did not appear to be a fee schedule price

Figure 4.3 shows the prices one payer paid for a 25 minute office visit (CPT 99214), relative to the amount the provider charged for that service.

- Each circle represents the intersection of one price and one charge amount.
- The orange boxes highlight claims that the payer paid using a standard fee schedule. Note that this payer paid the same price for all claims within each orange box, even though the range from the lowest provider charge to the highest provider charge is about \$200. **Figure 4.3** shows that this payer paid providers fees of \$150, \$124, \$121, and \$89, but this chart does not explain why the payer paid these different amounts.
- The yellow line in **Figure 4.3** highlights claims where the price equals the charge. Note that the price never exceeds the charge.
- The remaining circles scattered throughout the graph indicate that the payer paid a price that was not equal to the charge and did not appear to be a fee schedule price. Some of these other prices may stem from individual agreements between this payer and health care providers.

Figure 4.3: Example of Price vs. Charge

(CPT 99214 – Evaluation & Management Office Visit, 25 minutes for one payer)

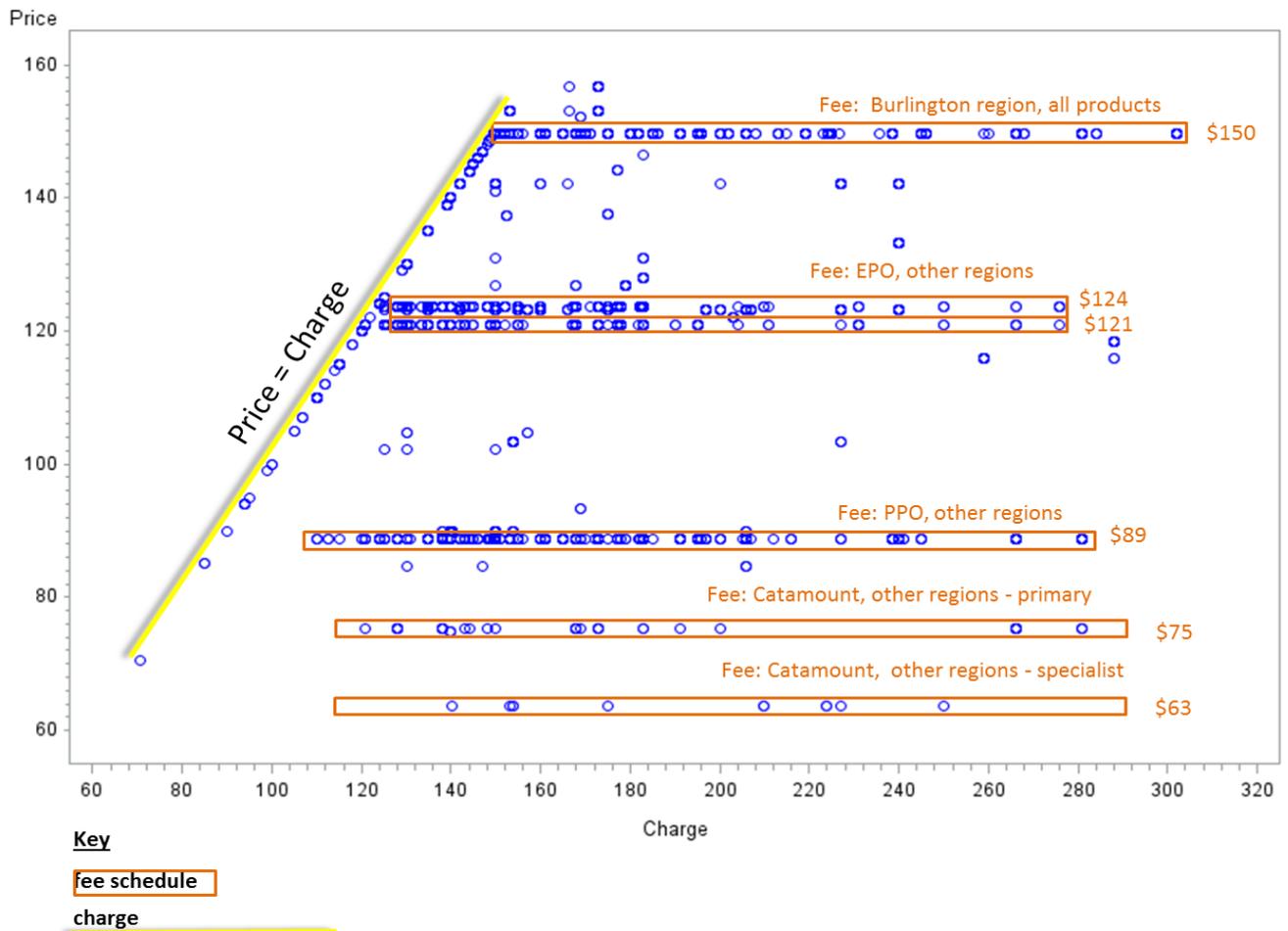
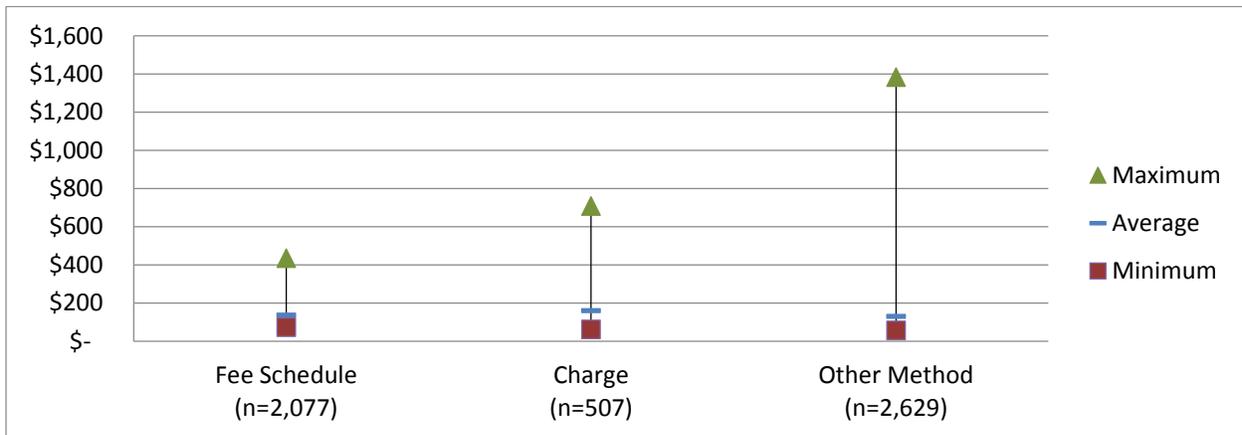


Figure 4.4 shows price variation results by imputed payment method for CPT 11100, Biopsy Skin Lesion. For this service, the price range is the smallest when the payer uses a fee schedule, the price range is larger when the payer pays charges, and the price range is the largest when the payer uses other payment methods.

Figure 4.4: Example of Price Variation by Imputed Payment Method
(CPT 11100 – Biopsy Skin Lesion)



4. Patient share

Another factor that could affect the price of service is the share that insured patients pay out-of-pocket. (Note that VHCURES does not include uninsured patients.) For example, providers might set charges differently or payers might set prices differently for services where many patients are liable for a large share of the price. Insured patient who have a deductible pay 100% of the price until they meet their deductible. For the purposes of our analysis, we created three patient payment levels, as described in **Table 4.3**.

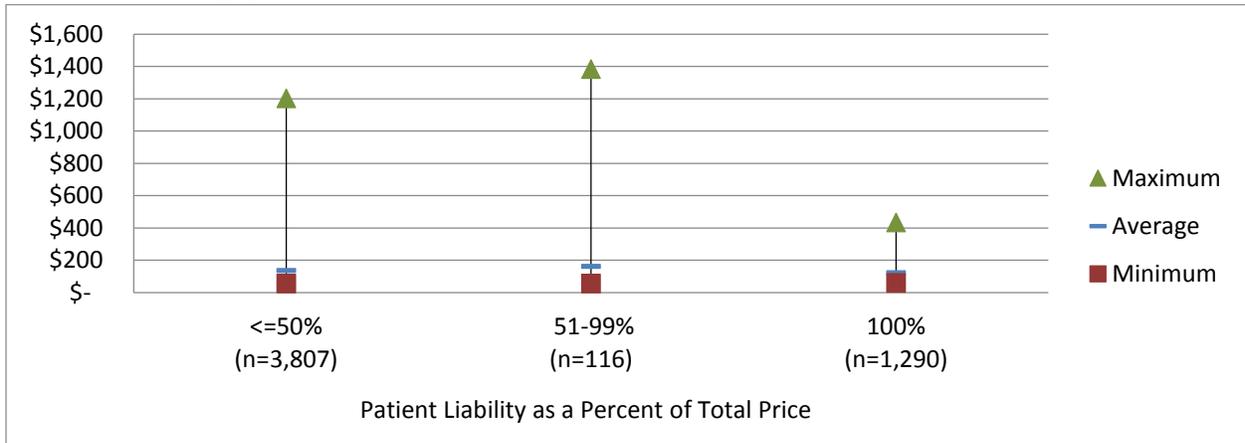
Table 4.3: Patient Share of Payment	
0 - 50%	Patient paid up to 50% of the claim, while the payer paid the majority.
51-99%	Patient paid 51% to 99% of the claim, while the payer paid the remaining amount.
100%	Patient paid 100% of the claim. The payer did not pay for this procedure.

Figure 4.5 shows the price variation by patient share of payment for CPT 11100, Biopsy Skin Lesion. **Figure 4.5** shows a lower average price and a much smaller price range when the patient pays the entire price for this service. Patients paid 100% of the price for this service 25% of the time (1,290 out of 5,213 claims).

This pattern is not consistent across other services. For example, patients paid 100% of the price of a 15 minute office visit (CPT 99213), only 15% of the time. The average price was highest when patients paid 100% of the price of a 15 minute office visit.

Figure 4.5: Example of Price Variation by Patient Share of Payment

(CPT 11100 – Biopsy Skin Lesion)



5. Calendar Quarter

Some payers may increase prices over the course of a year, for example as they renew contracts with providers. We found no material differences in price by calendar quarter.

Provider related factors

1. Provider size

The size of a provider’s practice can affect its prices. For example, a payer’s members may demand more services from larger providers, thus giving the provider greater clout in negotiations with the payer.

As noted in the Data Limitation section above, VHCURES does not include a unified identifier that links all of a provider’s claims back to that provider. Without a unified identifier, we could not simply add up each provider’s total number of claims to determine its size.

For this analysis, we developed a proxy for provider size based on the relative volume of claims each payer paid to each provider within each of the four service areas (Evaluation and Management, Medical and Ancillary, Radiology, and Surgical visits). To develop this proxy measure, we ranked all of the health care providers to which each payer made a payment, from the largest number of claims to the smallest number of claims. We designated providers as “large” if they were ranked in the top 10% in terms of providing the highest volume of a payer’s claims for the service area. We designated providers as “medium” if they were ranked in the top 25%, but below the top 10%, in terms of providing the highest volume of a payer’s claims for the service area. We designated the remaining providers as “small.”

Table 4.4 summarizes these size categories.

Table 4.4: Size categories

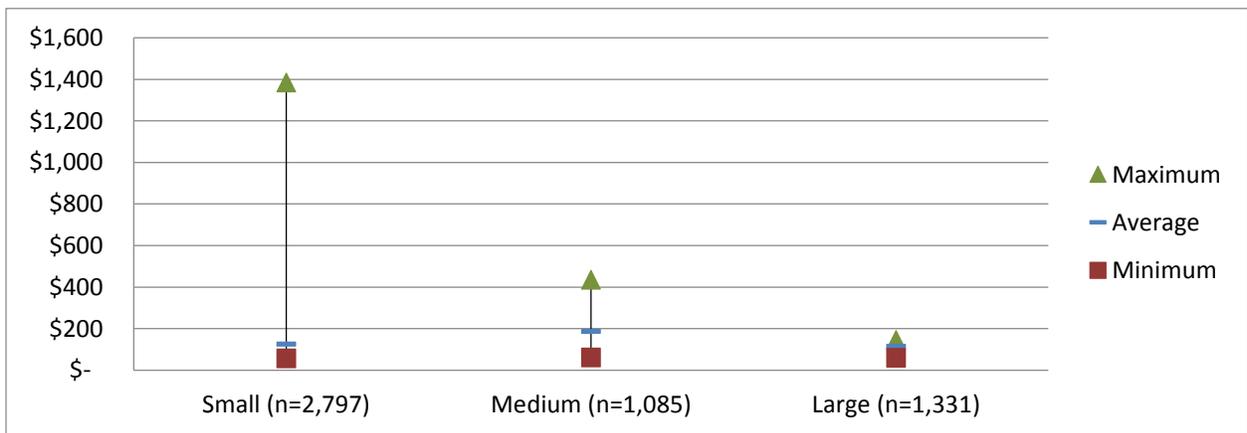
Large: provider is ranked in the top 10% in terms of providing the highest volume of a payer’s claims in a service area

Medium: provider is ranked in the top 25%, but below the top 10%, in terms of providing the highest volume of a payer’s claims in a service area

Small: provider is ranked below the top 25% in terms of providing the highest volume of a payer’s claims in a service area

Figure 4.6 shows the price variation by provider size for CPT 11100, Biopsy Skin Lesion. The price range for large providers is very narrow (\$86) compared to the very wide price range for small providers (\$1,328). The pattern is different for other services; for example, the price range for psychotherapy (CPT 90806) is similar across provider sizes.

Figure 4.6: Example of Price Variation by Provider Size
(CPT 11100 – Biopsy Skin Lesion)



2. Provider Region

A provider’s region can affect prices. For example, a payer might pay higher rates to providers in urban areas to reflect their higher costs or it might pay higher rates to providers in a rural area to ensure that services are available to their members in that area. Payers tend to have more members in urban areas, and they may be able to use that volume to demand lower prices.

For this study, we assigned providers to one of several region categories based on the provider’s ZIP code. We used Census Bureau definitions of Metropolitan Statistical Areas (MSAs) for urbanized regions with populations of 50,000 or more and Micropolitan Statistical Areas (Micro-SAs) for urban clusters

with a population of 10,000 to 50,000.¹³ Some of the MicroSAs included both Vermont and New Hampshire ZIP codes; Vermont residents of these border communities often use health care providers in both Vermont and New Hampshire. We identified rural shortage areas using the Governor’s Certified Rural Shortage Area¹⁴ (GCRSA) designation for rural areas with extreme barriers to health care access. Note that if a town in a Census-designated urban region was also a GCRSA, then we assigned it to the GCRSA category. We designated all remaining Vermont towns as “other rural” and we assigned all other non-Vermont ZIP codes to the “out of state” category.

Table 4.5 provides a listing of region categories.

Table 4.5: Region categories

- **Burlington-S. Burlington Metropolitan Statistical Area (MSA)**—based on Census designation for Chittenden, Franklin, and Grand Isle counties
- **Five Micropolitan Statistical Areas (MicroSAs):**
 - Barre, VT Micro-SA—based on Census designation for Washington county, VT
 - Bennington, VT Micro-SA—based on Census designation for Bennington county, VT
 - Berlin, NH Micro-SA—based on Census designation for Essex county, VT and Coos county, NH
 - Claremont-Lebanon, NH-VT Micro-SA—based on Census designation for Orange and Windsor counties, VT and Sullivan and Grafton counties, NH
 - Rutland Micro-SA—based on Census designation for Rutland county
- **Governor Certified Rural Shortage Area (GCRSA)**—designation “allows an area experiencing unusual local conditions or barriers to health care access to develop or maintain a Rural Health Clinic (RHC). Recommended by Governor and community leaders. Must be updated every 3 years.”¹⁵
- **Other rural**—all remaining towns in Vermont, not urban and not experiencing an extreme health care shortage
- **Out of state**—all remaining non-Vermont ZIP codes

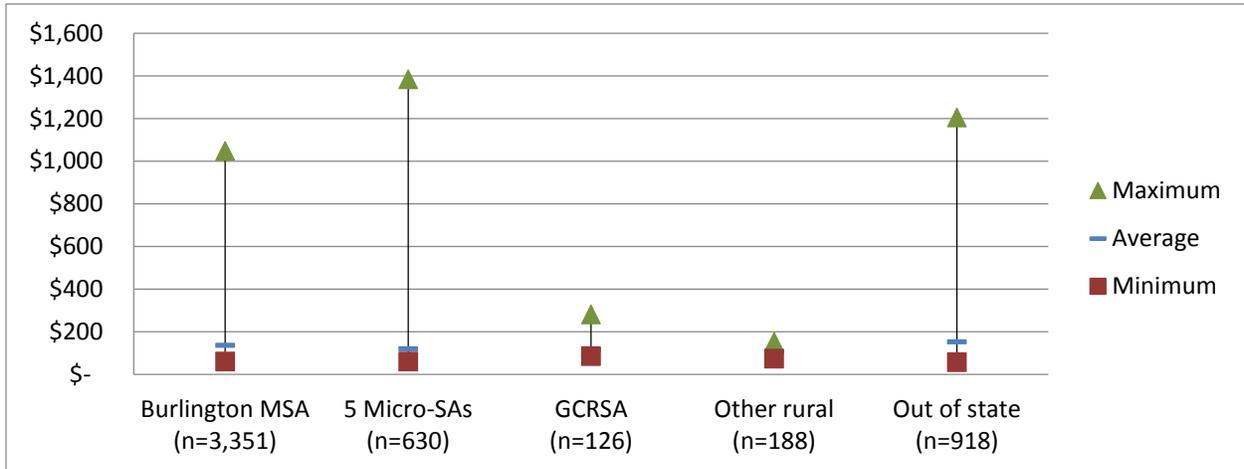
Figure 4.7 shows price variation results by provider region for CPT 11100, Biopsy Skin Lesion. **Figure 4.7** shows that the price range for urban and out-of-state regions is very wide relative to the price range for rural regions. In addition, out-of-state providers receive the highest average payments for Biopsy Skin Lesion (CPT 11100); the highest priced providers may be specialty providers or out of network. Note also that a large provider in a particular region may dominate the results for its area.

¹³ U.S. Census Bureau <http://www.census.gov/population/metro/data/def.html> and <http://www.whitehouse.gov/sites/default/files/omb/bulletins/2013/b-13-01.pdf>

¹⁴ Vermont Department of Health, Rural Health, February 2014. <http://healthvermont.gov/rural/maps.aspx>

¹⁵ Vermont Department of Health, Rural Health, February 2014. <http://healthvermont.gov/rural/maps.aspx>

Figure 4.7: Example of Price Variation by Provider Region
(CPT 11100 – Biopsy Skin Lesion)



3. Provider type

Payers often set different prices for different provider types. For example, physicians often receive higher prices than nurse practitioners do for the same visit or procedure. VHCURES includes a very long list of provider descriptions; we grouped each provider description into categories of similar provider types.

Table 4.6 lists sample provider descriptions in each category. Note that all categories are mutually exclusive.

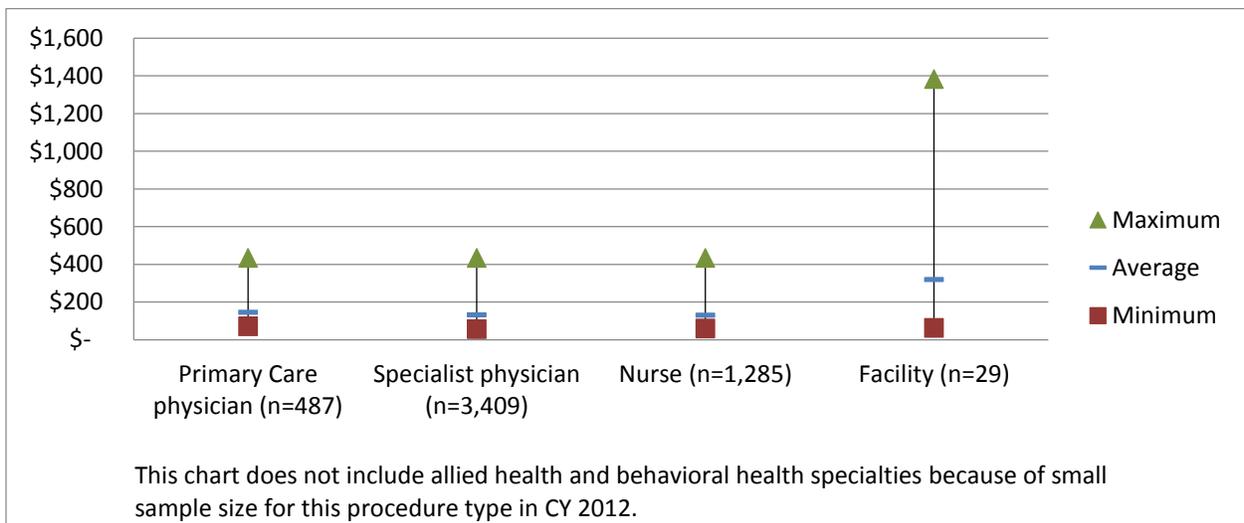
Category	Sample list of provider descriptions included in category
Primary care physician or clinic	Adolescent medicine, family health/medicine, general practice, internal medicine, medical clinic/doctor/group, pediatrics, osteopathic manipulative medicine, other medical care, urgent care, primary care physician, etc.
Specialty physician	Immunology, oncology, orthopedics, emergency care, radiology, endocrinology, cardiology, respiratory therapist, pediatric urology, etc.
Registered Nurse, Nurse Practitioner, Midwife, Physician Assistant	Nurse practitioner (NP), physician assistant (PA), midwife, registered nurse (RN), nurse anesthetist, medical-surgical nurse, licensed practical nurse (LPN), etc.
Allied health	Chiropractor, physical therapist, optometrist, social worker, laboratory services, nutritionist, pharmacist, durable medical equipment, home health aide, sleep study, etc.
Facility	Hospital, skilled nursing facility, residential treatment facility, substance abuse facility, etc.

Table 4.6: Provider Type Categories and Sample Descriptions

Category	Sample list of provider descriptions included in category
Non-physician behavioral health	Psychologist, Licensed Independent Clinical Social Worker (LICSW), counselor, mental health counselor, marriage and family therapist, substance abuse rehabilitation program, etc.

Figure 4.8 shows the price variation by provider type for CPT 11100, Biopsy Skin Lesion. **Figure 4.8** shows that hospitals and other facilities received average payments over twice as high as non-facilities (\$320). The price range is much higher for facilities as well; the maximum payment to a facility is over three times the maximum payment to an individual practitioner. This pattern differs for some services. For example, payments to specialty physicians for a 10 minute office visit (CPT 99212, are 29% higher on average, than payments to primary care physicians for a visit of the same length.

Figure 4.8: Example of Price Variation by Provider Type
(CPT 11100 – Biopsy Skin Lesion)



4. Site of service

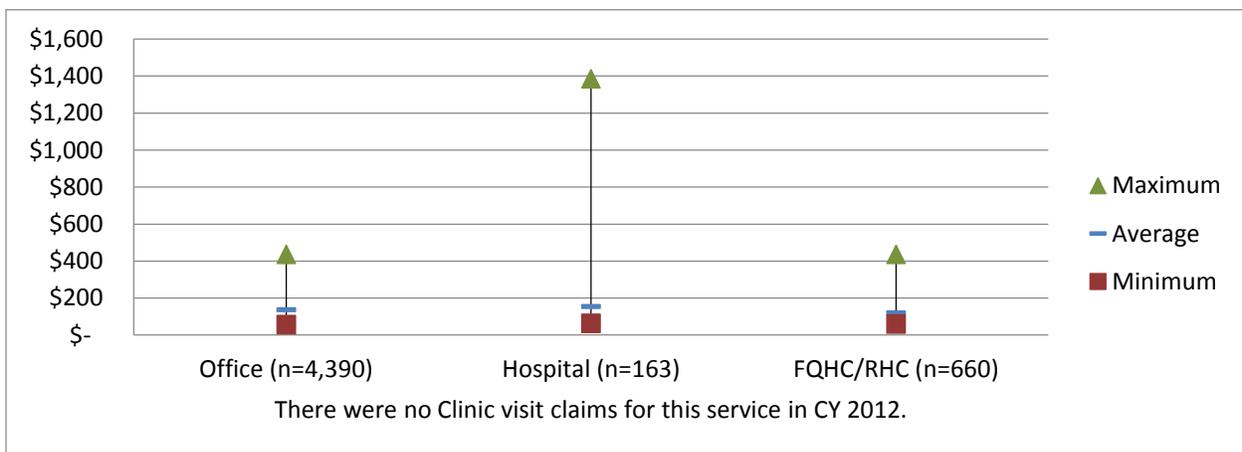
The site where services are provided--in a hospital, provider’s office, or health center—may affect prices. Payers may pay higher prices for services provided in hospitals to cover costs of maintaining emergency services, graduate medical education, or other costs. In addition, hospitals can often command higher prices than sole practitioners located in office settings. We created four site of service categories using site designations in the claims data: office, hospital, Federally Qualified Health Center (FQHC)/Rural Health Clinic (RHC) and other clinic. **Table 4.7** lists site of service categories.

Table 4.7: Site of Service categories

- **Office**—services were provided in a provider’s office
- **Hospital**—services were provided in a hospital
- **Federally Qualified Health Center (FQHC) and Rural Health Clinics (RHC)**—services were provided in an FQHC or RHC (identified in VHCURES using the Medicaid Category of Service)
- **Other clinic**—urgent care centers, walk-in health centers, retail clinics, and other clinics

Figure 4.9 shows the price variation by site of service for CPT 11100, Biopsy Skin Lesion. **Figure 4.6** shows that the price range is much wider for services provided in hospitals than for services provided in other sites. The pattern is different for other services. For example, the average price, price range and maximum price for a 15 minute office visit (CPT 99213) are similar across all four sites of service.

Figure 4.9: Example of Price Variation by Site of Service
(CPT 11100 – Biopsy Skin Lesion)



5. Service Code Modifier

CPT codes identify the service provided, such as a chest x-ray, psychotherapy visit, or 15 minute office visit. When billing for the service, providers can include with the CPT code additional characters called “modifiers” that provide more information about the service. For instance, service code modifiers can identify the type of provider performing the service or whether the service was provided together with other services on the same day.

Service code modifiers can explain some price variation by distinguishing between higher-priced and lower-priced variants of the same procedure. For example, an array of mental health clinicians uses the CPT code for psychotherapy (90806). Modifiers for this CPT identify the educational level of the provider, such as Licensed Independent Clinical Social Worker (LICSW) and Ph.D. Psychologist. Payers generally pay a higher price to a psychologist for a psychotherapy visit (CPT 90806, modifier AH) than to a social worker for a psychotherapy visit (CPT 90806, modifier AJ).

Other modifiers provide information that we would not expect to affect prices. For example, providers can add a modifier to radiology CPT codes that identifies whether the x-ray was taken of the left or right side of the body. Since the procedure is the same regardless of which leg or arm was x-rayed, we would expect the price to be the same.

We identified several service code modifiers that providers commonly include with one or more of the 20 CPT codes we used in our analysis, and that we believed could affect prices. **Table 4.8** lists the service code modifiers we analyzed.

Table 4.8: Service Code Modifiers		
Modifier	Definition¹⁶	Service Type
25	Modifier 25 indicates that the patient's condition on the day of the procedure required a significant, separately identifiable E & M service beyond the usual pre-operative and post-operative care associated with the procedure or service performed.	E&M
26	Modifier 26 identifies the professional component of certain services that combine both the professional and technical portions into one procedure code. Using modifier 25 identifies the professional component.	Radiology
TC	Modifier TC identifies the technical component of certain services that combine both the professional and technical portions in one procedure code. Using modifier TC identifies the technical component.	Radiology
59	Modifier 59 indicates that a procedure or service was distinct or separate from other services performed on the same day.	Medical and Ancillary; Surgery
AH	A Clinical Psychologist rendered a diagnostic or therapeutic service	Medical and Ancillary
AJ	A Clinical Social Worker rendered a diagnostic or therapeutic service	Medical and Ancillary

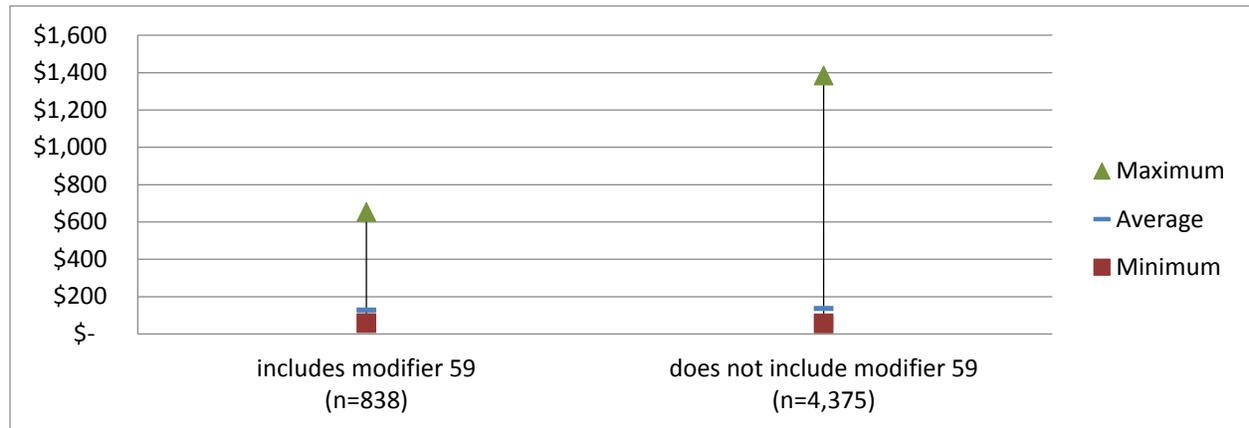
The effect of modifiers on prices varies by visit type and by modifier. Specific modifiers predominate among certain service types. For example, coders can use a service code modifier to distinguish between a technician taking the x-ray (Technical Component, TC) from a radiologist reading the x-ray (Professional Component, 26) for radiology services such as a chest x-ray (CPTs 71010 and 71020). The x-ray technicians and radiologists receive different payment amounts for their respective services, based on the modifier included with the CPT.

Figure 4.10 shows price variation for CPT 11100, Biopsy Skin Lesion, comparing claims that included modifier 59, designating a “distinct procedural service,” with claims that either did not include modifier

¹⁶ Wisconsin Physicians Service Insurance Corporation (WPS), Modifiers Fact Sheets, February 2014. <http://wpsmedicare.com/j5macpartb/resources/modifiers/>

59. **Figure 4.10** shows a smaller price range for Biopsy Skin Lesion services coded with modifier 59 than without it.

Figure 4.10: Example of Price Variation by Service Code Modifier
(CPT 11100 – Biopsy Skin Lesion)



Descriptive Statistics

Descriptive statistics provide an initial view of the data. **Table 4.9** lists the variables we examined, along with patient age and sex. For each variable, we list the total number of claims, the total dollars paid, and the average price per claim. We also provide the distribution of claims across each factor and the distribution of dollars paid across each factor. The VHCURES dataset column includes all claims commercial payers paid for professional services in calendar year 2012. The Analytic Sample column includes claims for the 20 services we examined closely. Appendix C lists the data filters we applied to the VHCURES dataset to produce the smaller analytic dataset that we used for this study.

Note that the 20 services we examined are all relatively inexpensive. The VHCURES dataset includes claims for some very expensive professional services, such as ambulatory surgery and chemotherapy, which we did not analyze. As a result, the average cost of services in the Analytic sample is quite a bit lower than the average cost of all services in VHCURES.

Table 4.9 provides simple cuts of the data, unadjusted for any other variable. **Table 4.9** shows, for example, that commercial payers pay far higher average prices for Surgical visits than for Medical and Ancillary visits, and that payers pay higher average prices to large providers than to small providers. These two results could be related; that is, large providers' average prices might be higher because they provide more Surgical visits than Medical and Ancillary visits. The next section explores the degree to which each factor might explain the variation in prices.

Table 4.9: Descriptive Statistics for Professional Services

Variable	VHCURES Dataset					Analytic Sample				
	Number of Claims (N)	% of claims	Total Price*	% of Dollars	Average Price per Claim	Number of Claims (N)	% of claims	Total Price*	% of Dollars	Average Price per Claim
	(column % within category)		(column % within category)			(column % within category)		(column % within category)		
<i>Total</i>	6,270,312	100%	\$1,214,327,743	100%	\$194	1,065,434	100%	\$88,575,551	100%	\$83
<i>Health Care Service Type</i>										
Evaluation and Management Office Visits	1,211,217	19%	\$168,519,390	14%	\$139	551,318	52%	\$54,408,554	61%	\$99
Medical and Ancillary visits	1,724,842	28%	\$141,088,162	12%	\$82	381,376	36%	\$17,347,086	20%	\$45
Radiology	539,488	9%	\$165,590,995	14%	\$307	103,055	10%	\$8,300,382	9%	\$81
Surgical visits	467,162	7%	\$203,240,298	17%	\$435	29,685	3%	\$8,519,528	10%	\$287
Other services	2,327,603	37%	\$535,888,899	44%	\$230					
<i>Patient Sex</i>										
Female	3,798,760	61%	\$694,528,834	57%	\$183	672,055	63%	\$55,024,754	62%	\$82
Male	2,471,546	39%	\$519,793,550	43%	\$210	393,379	37%	\$33,550,797	38%	\$85
Data missing	6	0	\$5,359	0	\$893					
<i>Patient Age</i>										
0-19	864,505	14%	\$137,000,682	11%	\$158	147,839	14%	\$11,648,048	13%	\$79
20-44	1,912,343	31%	\$337,813,987	28%	\$177	320,650	30%	\$24,367,728	28%	\$76
45-64	3,493,464	56%	\$739,513,074	61%	\$212	596,945	56%	\$52,559,775	59%	\$88

Variable	VHCURES Dataset					Analytic Sample				
	Number of Claims (N)	% of claims	Total Price*	% of Dollars	Average Price per Claim	Number of Claims (N)	% of claims	Total Price*	% of Dollars	Average Price per Claim
	(column % within category)		(column % within category)			(column % within category)		(column % within category)		
<i>Payer</i>										
Blue Cross Blue Shield of Vermont**	2,949,653	47%	\$536,896,227	44%	\$182	717,264	67%	\$57,191,929	65%	\$80
Cigna	79,436	1%	\$15,594,640	1%	\$196	15,774	1%	\$1,327,806	2%	\$84
Cigna East	182,151	3%	\$33,991,535	3%	\$187	33,599	3%	\$2,915,402	3%	\$87
Cigna Life	937,932	15%	\$167,595,086	14%	\$179	186,903	18%	\$15,660,567	18%	\$84
MVPHIC	315,642	5%	\$78,895,344	6%	\$250	60,646	6%	\$6,020,642	7%	\$99
MVPHP	11,138	0%	\$2,069,006	0%	\$186	2,565	0%	\$250,273	0%	\$98
MVP Select	218,703	3%	\$48,141,701	4%	\$220	48,683	5%	\$5,208,933	6%	\$107
Other	1,575,657	25%	\$331,144,202	27%	\$210					
<i>Health Plan Product Type</i>										
EPO	530,405	8%	\$123,715,529	10%	\$233	68,909	6%	\$6,909,093	8%	\$100
HMO	177,801	3%	\$30,440,281	3%	\$171	2,562	0%	\$251,241	0%	\$98
Indemnity	811,699	13%	\$164,660,053	14%	\$203	107,916	10%	\$8,799,218	10%	\$82
POS	1,170,115	19%	\$237,350,108	20%	\$203	234,009	22%	\$18,711,430	21%	\$80
PPO	2,377,716	38%	\$463,043,462	38%	\$195	364,785	34%	\$31,330,524	35%	\$86
Catamount	431,535	7%	\$63,082,067	5%	\$146	97,646	9%	\$6,801,259	8%	\$70
The Vermont Health Plan (TVHP)	771,041	12%	\$132,036,242	11%	\$171	189,607	18%	\$15,772,785	18%	\$83
<i>Imputed Payment Method</i>										
Fee schedule	1,653,579	26%	\$145,976,892	12%	\$88	362,095	34%	\$29,746,345	34%	\$82
Charge	422,824	7%	\$69,433,186	6%	\$164	36,516	3%	\$2,933,899	3%	\$80
Other payment method	4,193,909	67%	\$998,917,665	82%	\$238	666,823	63%	\$55,895,306	63%	\$84
<i>Patient share</i>										
Patient paid ≤ 50 percent	5,210,026	83%	\$1,112,640,312	92%	\$214	859,024	81%	\$74,554,183	84%	\$87
50 < Patient paid < 100 percent	172,978	3%	\$23,940,916	2%	\$138	63,896	6%	\$3,047,826	3%	\$48
Patient paid 100 percent	887,239	14%	\$77,744,368	6%	\$88	142,514	13%	\$10,973,541	12%	\$77
Data invalid/missing	69	0%	\$2,147	0%	\$31					
<i>Visit Date Fiscal Quarter</i>										
Q1: January - March, 2012	1,570,061	25%	\$308,473,132	25%	\$196	270,779	25%	\$22,766,286	26%	\$84
Q2: April - June, 2012	1,567,165	25%	\$305,508,928	25%	\$195	266,995	25%	\$22,426,126	25%	\$84
Q3: July - September, 2012	1,511,253	24%	\$291,700,737	24%	\$193	251,664	24%	\$20,856,812	24%	\$83
Q4: October - December, 2012	1,621,833	26%	\$308,644,945	25%	\$190	275,996	26%	\$22,526,326	25%	\$82

Variable	VHCURES Dataset					Analytic Sample				
	Number of Claims (N)	% of claims	Total Price*	% of Dollars	Average Price per Claim	Number of Claims (N)	% of claims	Total Price*	% of Dollars	Average Price per Claim
	(column % within category)		(column % within category)			(column % within category)		(column % within category)		
<i>Provider Size ***</i>										
Large	655,914	10%	\$226,895,311	19%	\$346	113,434	11%	\$10,261,927	12%	\$90
Medium	939,556	15%	\$267,674,718	22%	\$285	169,790	16%	\$14,147,221	16%	\$83
Small	4,674,842	75%	\$719,757,714	59%	\$154	782,210	73%	\$64,166,403	72%	\$82
<i>Provider Location</i>										
Burlington	2,375,427	38%	\$463,372,917	38%	\$195	450,647	42%	\$39,206,677	44%	\$87
Micropolitan Statistical Area (population 10,000-49,000)	2,242,600	36%	\$490,023,458	40%	\$219	307,533	29%	\$24,988,446	28%	\$81
Rural-Shortage	407,557	7%	\$56,209,187	5%	\$138	85,921	8%	\$6,559,773	7%	\$76
Other rural	695,388	11%	\$98,838,892	8%	\$142	131,994	12%	\$9,814,204	11%	\$74
Out of state	549,340	9%	\$105,883,289	9%	\$193	89,339	8%	\$8,006,450	9%	\$90
<i>Provider Type</i>										
Primary Care (MD or General Clinic)	1,140,875	18%	\$86,919,566	7%	\$76	358,846	34%	\$32,799,646	37%	\$91
Specialist Physician	1,570,338	25%	\$332,768,630	27%	\$212	221,279	21%	\$20,974,570	24%	\$95
NPs, PAs, RNs, Midwives	239,472	4%	\$24,979,750	2%	\$104	96,817	9%	\$8,973,347	10%	\$93
Allied Health	1,004,703	16%	\$84,170,128	7%	\$84	199,490	19%	\$7,598,364	9%	\$38
Facility	1,920,327	31%	\$618,946,463	51%	\$322	63,786	6%	\$10,184,012	12%	\$160
All non-physician BH	214,969	3%	\$20,262,505	2%	\$94	123,751	12%	\$7,966,799	9%	\$64
Data invalid/missing	179,628	2%	\$46,280,702	2%	\$257	1,465	0%	\$74,602	0%	\$53
<i>Site of Service</i>										
Hospital Outpatient Department	2,867,965	46%	\$691,425,054	57%	\$241	138,877	13%	\$15,042,621	17%	\$108
Physician's Office	2,946,746	47%	\$237,320,983	20%	\$81	860,097	81%	\$67,571,900	76%	\$79
Clinic	27,664	0%	\$2,040,697	0%	\$74	5,086	0%	\$463,812	1%	\$91
FQHC and Other	427,937	7%	\$283,541,009	23%	\$663	61,374	6%	\$5,497,218	6%	\$90
* Total Price = Allowed Amount = paid amount + prepaid amount + copay + coinsurance + deductible										
** Includes Catamount and The Vermont Health Plan										
*** Provider Size is measured based on provider's share of claims as a percent of all claims reported by a payer										

Statistical Analysis

The goal of our analysis was to estimate the role of various factors in explaining the variation in commercial prices. As noted previously, the factors we examined included:

Payer-related factors

1. Payer
2. Health Plan Product
3. Imputed Payment Method
4. Patient Share of Payment
5. Calendar quarter

Provider-related factors

1. Provider size
2. Provider region
3. Provider type
4. Site of service
5. Service Code Modifier

To quantify the contribution of each factor to the variation in prices, the team used stepwise multiple regression models. Multiple regression models produce values called R-squareds, which describe the proportion of the total variation that is explained by factors in the model. For instance, a model that produced an R-squared value of 20% means that 20% of the variation seen in the data can be explained by the factors that were included in the regression model. For our purposes, we were interested in the share of variation that each factor could explain. The stepwise framework is helpful in this regard because it produces a partial R-squared per factor that enters the model. Each partial R-squared measures the additional contribution of a factor when all other factors are included in the model. The sum of the partial R-squareds is equivalent to the total R-squared for the model.

The team designed the stepwise multiple regression such that the focus is on the contribution of the entire factor (e.g. product, payer, etc.), rather than on the contribution of a single factor value (e.g. HMO, Cigna, etc.). While we included all 10 factors in the analysis, we present only statistically significant ($p < .05$) factors in our results sections.

The team ran the analysis for each of the 20 selected services, and grouped the regression analysis results for each service into a weighted average for each service category, with the weight determined by the number of claims for each service.

Results

The results of the regression analysis show the variation in pricing of some service types is readily explainable by factors found in claims data, while other service types had a higher level of unexplained variation. The regression model had the most explanatory power for Radiology services, for which 90% of the price variation could be explained. On the other hand, for Surgical visits codes, the regression model explained only 43% of the variation. The factors we analyzed explained about 56% of the

variation in prices paid for Evaluation and Management Office Visits and Medical and Ancillary visits. The factors that explained the most price variation varied by service type and included payer, product, site of service, service code modifier, provider type and provider size. Provider related factors had the most impact on price variation for Radiology services and Surgical visits, while payer related factors had the most impact on price variation for Evaluation and Management Office Visits. Payer and provider related factors had equal impact on price variation for Medical and Ancillary visits.

It is not unusual in regression analyses for the model to explain only a portion of the variation within the data. The model can only include those variables present in the claims data. Additional variation may be caused by differences in individually negotiated rates, an individual provider's historical method for setting charges, a special circumstance that the payer did not report in the claims data for the specific service provided, or other payment or contracting methods or provider factors that are not apparent in the data.

Regression Results by Service Type

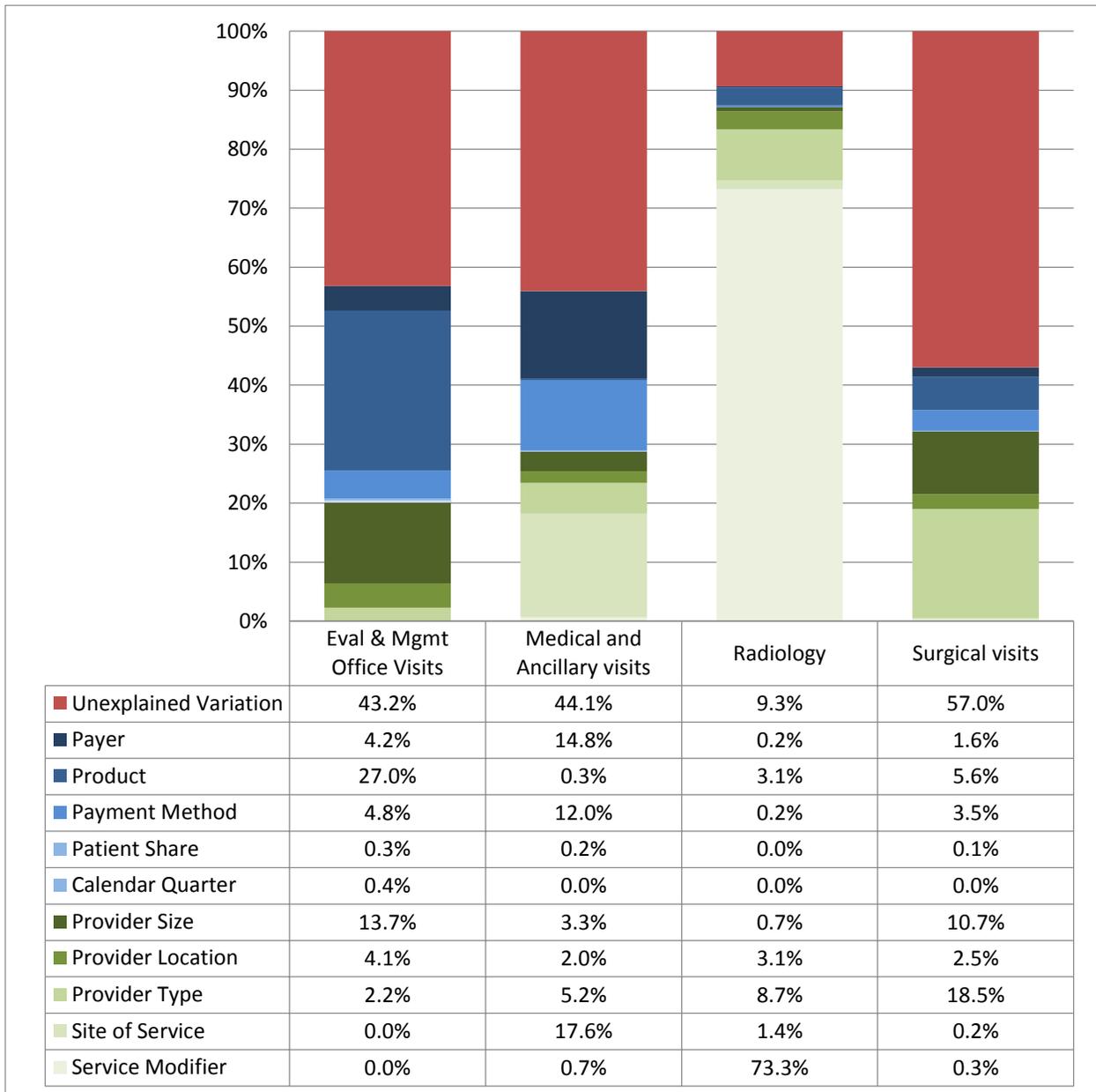
For the Evaluation and Management Office Visits, the factor that explained the most price variation was the health plan product in which members were enrolled, such as HMO, PPO, or Indemnity. This factor alone accounted for 27% of the price variation, while provider size accounted for 14% of the variation.

For the Medical and Ancillary visits, the site of service explained 17% of the variation, while the payer explained 15% of the variation, and the payment method explained 12% of the variation.

Radiology codes had unique results, with most of the variation (73%) explained by the service code modifier. For Radiology services, the service code modifier distinguishes the technician taking the x-ray (Technical Component, TC) from the radiologist reading the x-ray (Professional Component, 26), each of whom receive different payment amounts.

Surgical visits, which had the fewest numbers of claims, had the most unexplained variation, with 57% of the price variation unexplained by the regression model. Of the variation explained, the most prominent factors were the provider type and the provider size. Because physicians perform small numbers of many different types of surgery, it is difficult to detect the effect of each factor on price variation. **Figure 4.11** provides a summary of these results by service type.

Figure 4.11: Average variation explained by factor by service type, weighted by number of claims

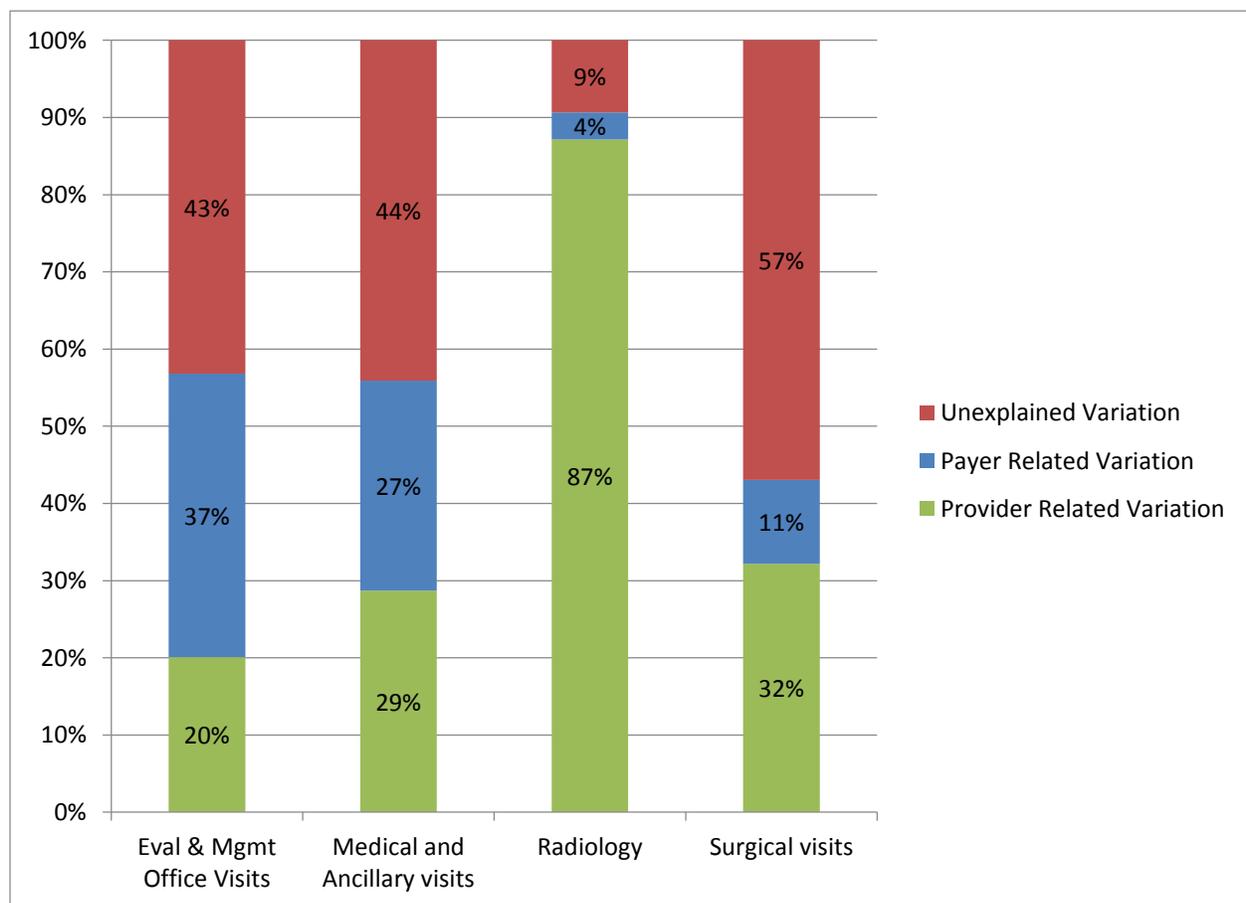


Does price variation depend more on payer or provider?

All of the factors included in the analysis can be grouped broadly into payer related factors (payer, product, payment method, patient share of payment, calendar quarter) and provider related factors (provider size, provider region, provider type, site of service, and service code modifiers). Service code modifiers are used in multiple ways, some relating to provider and some relating to the service, but the modifiers that affected the cost variation were related to the provider. Service code modifier has a small impact for most services, with the exception of radiology. The analysis combined calendar quarter, which has a very minimal impact on price variation, with the payer related factors, since typically payers determine when rates in provider contracts are renegotiated.

For Evaluation and Management Office Visits, payer related factors are the most significant drivers of price variation, while for Medical and Ancillary services provider and payer related factors explain roughly equal shares of price variation. For Radiology services and Surgical visits, provider related factors have the most impact on price variation. **Figure 4.12** provides a summary of results grouped by payer and provider related factors.

Figure 4.12: Provider Characteristics vs. Payer Characteristics, weighted average variation explained by service type



Results of analysis by specific visit type

Tables 4.10a and 4.10b include, for each of the 20 CPT codes analyzed, the contribution to price variation by factor, as determined by the partial R-squared in the regression analysis. For example, line 1 shows that the regression model explains .4325 or 43.25% of the variation in prices for a new patient office visit office visit (CPT code 99203). For a new patient office visit office visit (CPT code 99203), payer explains 6.76% of the variation, product explains 18.66% of the variation, and so on.

The colored shading in Table 4.10 highlights patterns in the factors affecting price variation within each of these service types that are fairly consistent within the codes. For example, product is the strongest predictor of price variation in four of the five Evaluation and Management codes, while modifier is the strongest predictor in four of the five Radiology service codes.

For Medical and Ancillary visits, as well as Surgical visits, there is no consistent pattern of which factors explain the most variation by code. For example, for Medical and Ancillary codes, site of service most explains the price variation for physical therapy, while payer explains the variation for chiropractic services and provider size most explains the price variation for immunizations. Among the surgical visits codes, the regression model best explains the price variation for colonoscopy, with the provider type as the primary factor (49%). For codes related to the skin lesion surgery, provider type explained only .6% – 4% of the price variation, with provider size explaining 13% - 15%.

Across the board, some of the factors which were incorporated into the regression model show very little explanatory power for any of the CPT codes. These include calendar quarter and patient share of payment.

Tables 4.10a and 4.10b provide a detailed summary of these results. These tables include only statistically significant results. A blank indicates that the factor did not explain a statistically significant share of variation for that particular service. Table 4.10a displays payer-related factors, while Table 4.10b displays provider-related factors. The column in Table 4.10a, Total Variation Explained, represents the sum of both payer-related (Table 4.10a) and provider-related (Table 4.10b) factors for each service.

Table 4.10a: Regression Analysis Results (Partial R-Square) by CPT codes

Row	CPT	Service Description	Number of Claims	Total Variation explained*	Payer	Product	Payment Method	Patient Share	Calendar Quarter
1	99203	E&M - ofc visit new	27324	0.4325	0.0676	0.1866	0.0063	0.0076	
2	99212	E&M - ofc visit (10 min)	19802	0.5498	0.0159	0.0413	0.0463	0.0037	0.0034
3	99213	E&M - ofc visit (15 min)	297341	0.5363	0.048	0.2462	0.0472	0.0019	0.0072
4	99214	E&M - ofc visit (25 min)	167123	0.6275	0.0167	0.2923	0.0635	0.0053	0.0001
5	99396	E&M - ofc visit age 40-64	39728	0.6595	0.0959	0.5321	0.0161	0.0002	0.0015
6	90471	medicine - immunization	48598	0.54	0.0184	0.0016	0.1109	0.0003	0.0004
7	90806	medicine - psychotherapy	130102	0.355	0.0321	0.0042	0.1999	0.0049	0.0004
8	97110	medicine - therapeutic exercise	55751	0.7429	0.022	0.004	0.1186	0.0002	
9	97140	medicine - manual physical therapy	45846	0.8482	0.0203	0.0025	0.0004	0.0002	0.0001
10	98941	medicine - chiropractic	101079	0.5992	0.4853	0.0017	0.0751	0.0001	
11	71010	radiology - chest x-ray	7265	0.862		0.0139	0.0095		0.0005
12	71020	radiology - chest x-ray	25475	0.872	0.0014	0.0151	0.0023		
13	73630	radiology - x-ray exam of foot	10182	0.8601	0.0057	0.0133	0.0041		0.0004
14	77052	radiology - mammogram add-on	49279	0.9266	0.0019	0.0326	0.0007	0.0005	0.0001
15	77057	radiology - mammogram	10854	0.9706	0.001	0.0863	0.0002	0.0001	0.0004
16	11100	surgery - biopsy skin lesion	5213	0.3016	0.0151	0.0499	0.0148	0.0055	
17	17000	surgery - remove skin lesion	3563	0.3927	0.0153	0.0442	0.1401		
18	17110	surgery - wart/lesion removal	6317	0.2718	0.0156	0.0359			
19	20610	surgery - joint injection	7931	0.435	0.0134	0.0667	0.0253		
20	45378	surgery - colonoscopy	6661	0.6961	0.0202	0.0751	0.0405		

- Overall Model explains > 75% of variance
- Overall Model explains 50%-75% of variance
- Overall Model explains 25% -50% of variance
- Payer Factors explaining > 35% of variance
- Payer Factors explaining 15% -35% of variance
- Payer Factors explaining 5% -15% of variance

* Total variation explained is the sum of each factor on tables 4.13a and 4.13b.

Table 4.10b: Regression Analysis Results (Partial R-Square) by CPT codes

Row	CPT	Service Description	Provider Size	Region	Provider Type	Site of Service	Service Code Modifier
1	99203	E&M - ofc visit new	0.0264	0.0118	0.1239	0.0023	
2	99212	E&M - ofc visit (10 min)	0.0401	0.1125	0.2854	0.0012	
3	99213	E&M - ofc visit (15 min)	0.1215	0.0564	0.0076	0.0001	0.0002
4	99214	E&M - ofc visit (25 min)	0.2256	0.0201	0.0036		0.0003
5	99396	E&M - ofc visit age 40-64	0.0026	0.0025	0.0062	0.0024	
6	90471	medicine - immunization	0.2316	0.0346	0.1361	0.0059	0.0002
7	90806	medicine - psychotherapy	0.0006	0.0015	0.093	0.0005	0.0179
8	97110	medicine - therapeutic exercise	0.0168	0.0548	0.0007	0.5232	0.0026
9	97140	medicine - manual physical therapy	0.0037	0.0025	0.0072	0.811	0.0003
10	98941	medicine - chiropractic	0.0006	0.0259	0.0075	0.003	
11	71010	radiology - chest x-ray	0.0025	0.0061	0.0041	0.0577	0.7677
12	71020	radiology - chest x-ray	0.0014	0.0044	0.1006	0.0064	0.7404
13	73630	radiology - x-ray exam of foot	0.0061	0.0114	0.6134	0.0767	0.129
14	77052	radiology - mammogram add-on	0.0101	0.0446	0.0024	0.0015	0.8322
15	77057	radiology - mammogram	0.0094	0.0662	0.0001	0.0015	0.8054
16	11100	surgery - biopsy skin lesion	0.1316	0.038	0.0446		0.0021
17	17000	surgery - remove skin lesion	0.158	0.0074	0.0066		0.0211
18	17110	surgery - wart/lesion removal	0.1405	0.0445	0.0353		
19	20610	surgery - joint injection	0.0793	0.0215	0.2207	0.0081	
20	45378	surgery - colonoscopy	0.0601	0.01	0.4894		0.0008

- Provider Factors explaining > 35% of variance
- Provider Factors explaining 15% - 35% of variance
- Provider Factors explaining 5% - 15% of variance

Facility Fees

Facility fees are hospital charges for overhead or facility costs. Healthcare stakeholders are concerned that hospitals may be billing for facility fees for services at off-site facilities, such as provider practices purchased by the hospitals. Under this billing practice, two bills would be submitted for patient visits, one by the provider for medical treatment and one by the hospital for facility costs.

Medicare currently allows concurrent billing of facility fees and professional fees. This practice yields higher total payments to hospital-owned provider practices than to independent providers, who can only submit a single, treatment-related bill. For example, Medicare pays \$124 for an E&M 15 minute office visit (CPT code 99213) to hospital-owned provider practices, broken out into approximately \$49 to the provider directly and \$75 for the hospital overhead. By contrast, Medicare pays an independent physician approximately \$69 for the same visit type; this payment could be allocated as \$49 for the provider and \$20 for the office overhead.

Interviewees provided conflicting responses regarding current facility fee billing practices in Vermont. Some respondents expressed concerns about the practice, while payers stated that they do pay facility fees to hospitals for services provided at off-site facilities.

Our findings for facility payments in VHCURES were inconclusive. For most CPT visit types, we did not find clear and consistent evidence of payments for both a medical services visit component and a facility fee visit component. However, we identified a small number of claims that payers paid to multiple providers for the same patient on the same day for the same visit type, most often for radiology or surgical visit types. Some of these payments may have been for facility fees, but we do not have sufficient information about the relationship between the billing providers to know for certain. We describe this analysis in detail in **Appendix B**.

Conclusion

The analysis showed that there is no consistency in the share of variation explained by each factor across services.

Because the explanation for price variation varies across services, the guidance it provides for rate development is service-specific. The analysis does not provide guidance as to standard factors that should be used to adjust all payment rates.

V. Policy Recommendations

The UVM/UMass team has several recommendations regarding steps that the Green Mountain Care Board (GMCB) could take to move forward with its analysis of existing price variation and development of pricing policies.

1. *Develop a set of principles for establishing payment methods and rates in alignment with the statutory requirements. In developing these principles, seek input from advisory committees and other stakeholders.*

Statutory requirements

In developing these principles, the GMCB must incorporate the requirements and guidance set forth in Chapter 220, §9376, requiring the GMCB to “set reasonable rates for health care professionals, health care provider bargaining groups created pursuant to section 9409 of this title, manufacturers of prescribed products, medical supply companies, and other companies providing health services or health supplies based on methodologies pursuant to section 9375 of this title, in order to have a consistent reimbursement amount accepted by these persons.”

In particular, section (b)(1) directs that “in establishing rates, the board may consider legitimate differences in costs among health care professionals, such as the cost of providing a specific necessary service or services that may not be available elsewhere in the state, and the need for health care professionals in particular areas of the state, particularly in underserved geographic or practice shortage areas.”

And furthermore, “(c) The board shall approve payment methodologies that encourage cost-containment; provision of high-quality, evidence-based health services in an integrated setting; patient self-management; access to primary care health services for underserved individuals, populations, and areas; and healthy lifestyles. Such methodologies shall be consistent with payment reform and with evidence-based practices, and may include fee-for-service payments if the board determines such payments to be appropriate.”

Examples of Guiding Principles

The GMCB should consider adopting a principle that in some way addresses each of the following topics, which are key to establishing rates for health care professionals. We include an example principle for each topic as a starting place, recognizing that the GMCB may wish to make substantive changes to each.

- a. Process: The GMCB will establish payment methods and rates in a fair, predictable, and transparent manner.
- b. Cost level: The GMCB will establish payment rates that are sufficient to meet the reasonable costs of an efficiently and economically operated provider and that takes into account the education, capital equipment, and other resources required to provide specific services.

- c. Basis of payment: The GMCB will establish an index payment per discharge for inpatient services and per visit for ambulatory services that will serve as the base for consistent payment rates statewide.
- d. Rate adjustments: The GMCB will adjust rates to reflect legitimate differences in costs related to:
- i. providing a specific necessary service or services that may not be available elsewhere in the state, such as trauma services;
 - ii. the need for health care professionals in particular areas of the state, particularly in underserved geographic or practice shortage areas;
 - iii. access to primary care health services for underserved individuals, populations, and areas;
 - iv. a clinician's licensure or certification;
 - v. graduate medical education costs;
 - vi. support for Critical Access Hospitals, Federally Qualified Health Centers (FQHCs), FQHC lookalikes, Rural Health Clinics (RHCs); and
 - vii. charity care or bad debt.
- e. Quality-based payment adjustments: The GMCB may adjust payment rates to provide incentives for:
- provision of high-quality, evidence-based health services in an integrated setting;
 - patient self-management; and
 - healthy lifestyles.
- f. Alternative payment methods: The GMCB will allow providers to enter into agreements with payers to accept alternative payment methods, such as shared savings agreements, bundled payments, episode-based payments, and global payments, for providing high-quality, evidence-based health services in an integrated setting, provided that total payments made under these alternative methods are no greater than total payments would have been using prior payment methods.
- g. Applicability of Payment Rates: The GMCB will require all Vermont fully insured plans, and will encourage other payers, to pay providers using either the standard payment rates or alternative payment methods approved by the GMCB. Providers may charge no more than the GMCB established rates to individuals who pay out of pocket for health care services.
- h. Annual update factor: The GMCB will increase rates annually by a factor no greater than the increase in Gross State Product, Consumer Price Index, or other standard. The GMCB could consider holding the standard fee schedule to a lower rate of growth than alternative payment methods.

- i. Phase-in period: The GMCB will phase-in standard payment methods and rates over a period of three years.
- j. Transparency: The GMCB will post standard payment methods and rates online on a consumer-friendly website and in formats that payers and providers can easily download and apply.

Advice from Stakeholders

The rate setting system developed by the GMCB will be an integral part of health reform, and as such, could affect every health care consumer and health care provider in Vermont. In order to implement payment reform successfully and to avoid unintended consequences, the GMCB should fully vet its draft principles with its advisory groups and other key stakeholders.

The GMCB may want to invite stakeholders to submit technical papers (referred to as White Papers) on specific topics and post them publicly. For example, the Maryland Health Services Cost Review Commission, which establishes hospital and service-specific rates, posts stakeholders' White Papers here: <http://www.hsrc.state.md.us/hsrc-modernization-white-papers.cfm>.

The GMCB may want to adjust the draft principles based on the feedback it receives.

2. *Develop draft payment methods and fee schedules based on the principles developed in step 1.*

Grouping

Before establishing a fee schedule, services must be sorted into groups of services that are similar clinically and require similar resources to provide. There are a number of grouping methods available, and commercial software is available that performs the grouping and assigns a “case-mix weight” to each group. The case-mix weight represents the resources required to provide the service, on average, relative to an index.

- a. Inpatient care. Inpatient services are generally grouped into Diagnosis Related Groups (DRGs). Medicare DRGs were developed specifically for the Medicare population (elders and people with disabilities). All Patient Refined Diagnosis Related Groups (APR-DRGs) have a number of additional groups that are needed for a younger population, particularly in the areas of labor and delivery, neonatal care, HIV, and substance abuse. APR-DRGs also expand on DRGs by assigning each case a severity of illness, which provides a better measure of resource use.
- b. Ambulatory care. Grouping systems for ambulatory services (including services provided in hospital outpatient departments) include Ambulatory Patient Groups (APGs), Enhanced Ambulatory Patient Groups (EAPGs) and Ambulatory Payment Classification (APC). The Resource-Based Relative Value Scale (RBRVS) provides resource weights for other ambulatory services.
- c. Episodes of care. There are systems that group all of a patient's care related to one condition into an episode of care. For example, all of a patient's hospital, doctor and physical therapy visits related to a fall would be grouped into one episode, while visits and other services related to a heart condition would be grouped into a different episode. Episode of care grouping systems

include DxCGs, Episode Treatment Groups (ETGs), and CMS' free Clinical Classifications Software (CCS).

Fee schedule formula

Fee schedules are usually calculated using a formula like this:

Payment for service 123 = base payment amount

X (resources required to provide service 123 relative to the base)

X (other approved adjustments, e.g. from 1.d. above)

Rates by Service vs. PMPM

The GMCB could use this formula to establish global per member per month (PMPM) payments, adjusted using an episode of care grouper, or to establish rates of payment for individual services.

Because many health care providers in Vermont are not yet ready to manage their costs and financial risk on a global PMPM basis, we recommend that the GMCB begin by setting rates on a service by service basis.

Moreover, actuaries most often build PMPM rates from an existing fee schedule. For providers who wish to negotiate global rates on a PMPM basis, the GMCB can evaluate proposed PMPM rates in comparison to a PMPM built from a standard fee schedule, and can approve PMPM rates on a case by case basis.

Approach to developing a standard fee schedule

These are steps the GMCB could apply in developing a standard fee schedule for inpatient and outpatient hospital services.

- a. Group all claims into DRGs and ambulatory groups using grouper software.
- b. Estimate cost to each provider for providing each service. This estimate can be developed by multiplying the provider's charge for the service by a provider-specific ratio of costs to charges.
- c. Adjust the cost per service by the allowed factors for variation (e.g. case-mix, graduate medical education, geographic area).
- d. Use the adjusted costs to establish the base payment amount. The base payment amount may be set at the median adjusted cost, the mean adjusted cost, or another level.
- e. Apply the fee schedule formula to calculate payment rates for individual services to each provider.

The GMCB could establish standard payment rates for other provider types by similarly indexing them to a standard base payment amount. Payment rates for individual services can be weighted using the RBRVS or other method and adjusted using the allowed factors for variation.

3. *Model the impact of implementing consistent payment methods and rates statewide in terms of dollars gained or lost by individual health care providers, payers, as well as by state government and groups of consumers.*

This modeling will require determining current payment levels received by health care providers (by provider type) as well the current payment levels paid by commercial payers, state government, and individuals out-of-pocket. The modeling would compare current payment levels to payment levels under the proposed standard fee schedules. Depending on the results of this analysis, the GMCB may wish to fine-tune its proposed formula at this point.

4. *Develop a plan for phasing in standard methods and rates over several years in order to buffer the initial effects and to give health care providers time to adjust their budgets and business practices to meet the new financial requirements.*

Use the modeling results to identify areas where there will be material changes in total payments. The phase-in plan could include making one-time adjustments to the fee schedule, making one-time lump sum payments, applying variable update factors, and other approaches.

5. *Continue efforts to improve the accuracy and utility of VHCURES data.*

Maximizing the utility of VHCURES data will be essential to accomplishing recommendations one through four above. Specifically, GMCB should:

- a. Task its data vendor with applying a grouping algorithm to all outpatient claims, similar to the approach it has taken with inpatient claims. This will allow comparison of outpatient prices in a consistent manner. Consider grouping all claims using an episode of care grouper, as well.
- b. Complete development of a Master Provider Index that assigns a unique identification number to each provider. Currently each payer assigns its own provider identification number.
- c. Work with payers and providers to develop a data validation process. Providing an opportunity for payers and providers to validate their own data and make corrections will improve the quality and utility of the dataset.

Additional Policy Questions and Recommendations

1. Should payments based on discounts off charges be eliminated entirely? If, so, what would replace them and over what period of time.

A: Inpatient: A substantial portion of inpatient care is currently paid for using DRGs. While not all providers are paid by private insurers using DRGs, all providers are accustomed to DRG payments from Medicare and Medicaid. This would be a fairly straightforward replacement for discounts.

Outpatient: Our interviews and analysis indicated that less than half of professional services are paid for using fee schedule, and a smaller percent of hospital outpatient uses fee schedules. Discount off charges appears to be a common practice, therefore careful modeling of a fee schedule basis of payment would be needed.

2. Should FFS contracts always incorporate quality metrics into the negotiated reimbursement rates?

A: Provider contracts should include quality metrics. Payers require providers to meet minimum quality standards in order to receive payment. Additional payment for meeting or exceeding quality targets is usually paid separately, or incorporated into bundled or global payment amounts. Quality metrics are generally not incorporated into FFS rates.

3. Should those with high deductibles or the uninsured only be required to pay an amount for services that would be capped at some percentage above what Medicare or Medicaid would pay?

A: It would be simpler for providers to administer a system where all payers, including individuals paying out of pocket, pay the same rates.

4. Should the cost of medical education be carved out of the amount paid for hospital services and reimbursed separately through a negotiated budget amount that is shared by all payers?

A: It would be administratively simpler for the GMCB to determine the total amount to be allocated for medical education and include it as an explicit adjustment to payment rates. Otherwise, the GMCB would need to administer a separate system for collecting and remitting payment for medical education costs.

5. Should higher payment for facility-based services that can be performed in a lower cost setting be eliminated entirely?

A: Payment rates should not include incentives to provide services in a more costly environment. Payment rates should be based on the reasonable costs of the education, capital equipment, and other resources required to provide the service.

However, payment rates may include adjustments to maintain certain facilities' capacity to provide necessary services, such as emergency and trauma services or a specific necessary service that may not be available elsewhere in the state.

The cost of maintaining this capacity may be spread across payment rates for other services, resulting in higher payment rates for services provided in certain facilities than would be paid for those services when they are provided elsewhere.

6. For all payers should annual updates be increased for evaluation and management codes, and updates for procedural diagnosis codes frozen for a period of three years, except for those that are demonstrated to be currently undervalued?

A: The GMCB should establish consistent payment methods and rates for health care services in Vermont, as well as a plan for phasing in these methods and rates over several years.

The phase-in plan will likely include larger increases for services that are currently undervalued and freezing rates for services that are currently overvalued.

VI. Appendices

Appendix A: List of Interviewees

Appendix B: Facility Fee Analysis

Appendix C: Technical Data Summary

Appendix D: Hospital Average Price Figure

Appendix A: List of Interviewees

The authors wish to thank the following individuals for their time and their candor in providing information for this report.

Provider	FAHC	Marc Stanislas
Provider	Primary Care Health Partners	Stacey Sadowsky
Provider	FAHC	Todd Moore
Payer	BCBSVT	Kelly Lange
Payer	BCBSVT	James Mauro
Payer	MVP	Carmone Austin
Payer	MVP	Lou McLaren
Payer	MVP	Bill Little
Provider	White River Family Practice	Sean Uiterwyk
Payer	Medicaid	Kara Suter
Provider	HealthFirst	Seth Frezen
Provider	CVMC	Cheyenne Holland
	Consultant	Cliff Frank

Appendix B: Facility Fee Analysis

UMass used several methods to search for evidence of facility fee billings in VHCURES. First, we looked for concurrent bills for patients for the same service (CPT) on the same day. The goal was to determine whether the hospital billed for facility fees at the same time that the provider billed for medical services. Next, we researched three fields in VHCURES that had the potential to be used for facility fee billing: site of service code, claim type code, and two CPT modifier codes.

Concurrent billing

In VHCURES, we searched for multiple bills for the same patient for the same CPT on the same day, to determine if these multiple claims included concurrent billing for both provision of medical services and facility overhead costs. In the analytic data set, only 0.9% of all claims belonged to concurrent bills (see **Table 6.1**). High levels of concurrent bills are in the surgical visits and radiology service categories, with a total of six CPTs in those service categories having at least 20% of all claims for that CPT are for concurrent bills, and four of those CPTs having rates of over 80%. However, three of the surgical visits CPTs and one of the radiology CPTs have very low rates of multiple records, 1% - 2%, so concurrent billing cannot be assumed to be prevalent in all surgical visits and radiology CPTs. In addition, two physical therapy CPTs have approximately 2% of claims for concurrent bills, and for the remaining twelve CPTs, the incidence level of concurrent bills is less than one percent each. Thus multiple bills per medical incident are clearly not a common occurrence for those CPTs.

Table 6.1: Incidence of concurrent billing for top 20 CPTs used in regression analysis

CPT/description	# multiple records for 1 person for 1 CPT on 1 day	Total records	% multiples
11100 - surgery - biopsy skin lesion	68	5,565	1.2%
17000 - surgery - remove skin lesion	38	4,308	0.9%
17110 - surgery - wart/lesion removal	28	6,358	0.4%
20610 - surgery - joint injection	1,742	8,070	21.6%
45378 - surgery - colonoscopy	7,753	8,451	91.7%
71010 - rad - chest x-ray	4,213	7,275	57.9%
71020 - rad - chest x-ray	22,925	26,480	86.6%
73630 - rad - x-ray exam of foot	8,903	10,358	86.0%
77052 - rad - mammogram add-on	48,095	53,023	90.7%
77057 - rad - mammogram	272	15,806	1.7%
90471 - medicine - immunization	223	70,991	0.3%
90806 - medicine - psychotherapy	467	136,175	0.3%
97110 - medicine - therapeutic exercise	1,561	77,875	2.0%
97140 - medicine - manual physical therapy	1,189	51,813	2.3%
98941 - medicine - chiropractic	134	101,295	0.1%
99203 - E&M - ofc visit new	277	35,613	0.8%
99212 - E&M - ofc visit (10 min)	447	42,657	1.0%
99213 - E&M - ofc visit (15 min)	3,540	302,599	1.2%
99214 - E&M - ofc visit (25 min)	2,230	178,347	1.3%
99396 - E&M - ofc visit age 40-64	107	45,775	0.2%
Total	10,988	1,188,834	0.9%

UMMS sampled multiple bills for 15 members each for three CPTs codes representing the radiology, surgical, and medical/ancillary service types. For surgical visits and radiology CPTs, the leading reason for multiple bills was different modifiers used in the two bills (see **Table 6.2**). The distinct modifiers may represent separate services regardless of whether the service provider was the same or different. For example, an x-ray technician who takes an x-ray of both the left and right foot needs to bill each foot separately, identifying the side of the body in the modifier. More research would need to be done to investigate the appropriate use of and billing for these modifiers; such analysis was beyond the scope of this project.

For many of the medical and ancillary visit bills, the charge and amount paid by the insurer were the same, for reasons unknown. However, conclusions cannot be drawn from this data because voids (reversals of bills) were not included. Thus some of the multiple bills may have been voided.

The details from a sample of the bills suggest that the potential for facility fee billing is even less than 0.9%, since a portion of the concurrent bills have potentially valid explanations.

Table 6.2: Potential explanations for multiple bills for same member for same CPT on the same day

Issues unrelated to facility fees	This category includes situations where one claim was paid by the payer and the other claim was paid by the patient as part of the patient’s deductible.
Duplicate charge and payment amount	Claims in this category had the same provider charge and amount paid by the payer.
Modifier Use	Claims in this category used different CPT modifiers for the multiple bills; researching the appropriateness of these modifiers in claims from a single provider for a particular medical incident is outside the scope of this analysis.
Service providers	These claims had different service providers, suggesting that two separate medical facilities shared care for that patient for the CPT on that day.

To get a broader picture of the scope of the issue, we then created a separate facility fee dataset by selecting 81 CPT codes¹⁷ with high claim frequencies, most in the surgical visits and radiology service types. This new dataset has a total of 2.23M valid claims, of which 70,000 claims included multiple bills for 30,000 members who had more than one claim for the same CPT, service provider and date of service. These incidences of multiple billing represent only 3.1% of the 2.23M claims. Note that we included service provider in this second analysis, to investigate reasons why the same provider would bill more than once for a single medical incident with a patient.

¹⁷ Note, we did not use CPTs that end in F (e.g., 3095F) since the F refers to care coordination.

We found some evidence of multiple providers submitting claims for the same visit for the same patient on the same day. In some cases, information in the claim, such as different modifiers, suggested a rationale for the multiple bills. But in other cases, we do not have sufficient information to determine the relationship between those providers to determine whether some of those claims were facility fees. Research into provider affiliations was beyond the scope of this study.

Site of Service and Claim Type codes

Site of service is a field that could potentially be used to distinguish office and hospital claims and thus be used for concurrent billing for the same medical incident. The field is intended for professional claim types, explained further below, and is filled in by the payers. Each record, or claim, has a single site of service associated with it, though non-professional claim types often opt for the default “site not listed” option for that field.

In the Service Site Type field, 11 represents office visits, while 22 represents outpatient hospital visits, and -1 is “site not listed”. In the facility fee dataset, almost half of visits were Office (11), while only 6% were for Outpatient Hospital (22). See **Table 6.3**.

Table 6.3: Claims by Service Site

Service Site Type	Frequency	Percent
11/Office	1,016,887	46%
22/Hospital Outpatient	124,589	6%
23/Hospital - ER	77,168	3%
81/Independent Laboratory	33,373	1%
21/Hospital Inpatient	33,041	1%
20/Urgent Care Facility	3096	0%
72/Rural Health Clinic	1283	0%
50/FQHC	43	0%
71/State or Local Public Health Clinic	39	0%
49/Independent Clinic	7	0%
all other sites	13,443	1%
-1/site not listed	928,531	42%
Total	2,231,500	100%

The low percent of hospital service site claims would imply that facility fees billed using site 22 could only appear in a maximum of 6% of claims—far less frequently than would occur if facility fees were commonly billed. However, given that 42% of claims did not have a site listed, we wanted to determine whether hospital outpatient departments bill for facility fees in claims with site -1/site not listed. More information on this is detailed below.

Claim type is another field that could potentially be used for facility fee billing. Different provider types submit claims to insurers using different claim forms. The claim type is captured in the Claim Type code in VHCURES. See **Table 6.4**.

A survey of claims in our facility fee dataset did not find evidence of a provider using multiple claim types when billing for a single medical incident.

Table 6.4: Claims by Claim Type

CLAIM_TYPE	Frequency	Percent
4/professional	1,256,824	56%
2/hospital outpatient	930,100	42%
3/other facility	23,419	1%
8/Unknown	17,394	1%
1/hospital inpatient	1,812	0%
5/Home/Amb/DME	1,423	0%
6/Pharmacy	304	0%
7/Other unclassified	224	0%
Total	2,231,500	100%

In our analytic dataset, we wanted to ensure we included services at outpatient departments, even if no site of service was listed in the claim. We therefore included any records with site of service -1/site not listed, and 2/hospital outpatient department for the claim type.

Appendix C: Technical Data Summary

Table 6.5 Steps taken to create the analytic data set from the original VHCURES dataset.

Step	Description	Code Notes	Number of Claims (N)	% of "Step 1" Claims	sum of PAID	% of "Step 1" Paid Amount
	VHCURES dataset, all years		59,830,178		7,349,852,086	
1	Keep only observations where service date is in 2012		9,358,927		1,232,745,654	
2	Site of service--office, hospital, community health center	Keep "svc_site_type"=(-1, 11,22,21,23,20,72,49,71,50,17); if -1, then keep only claim_type 2 (OP) and 4 (professional).	8,454,955	90%	893,937,345	72.5%
3	Delete intrapayer duplicates, Medicare, non-VT ZIP codes, reversals/adjustments, secondary payments, denials, other	Keep "use flag" = 0	6,272,858	67%	789,799,787	64.1%
4	Delete denials and reversals	Delete if claim_status = 4 or 22.	5,848,808	62%	790,026,107	64.1%
5	Top payers-- BCBS, MVP, Cigna	Keep top payers -- BCBS, MVP, Cigna (payerIDs 1058,1079,1174,4109,1163,1246,1290,1287,1242)	4,369,734	47%	578,217,403	46.9%
6	Keep only the top 20 CPT codes listed below.		1,280,895	14%	85,351,215	6.9%
7	Keep only cases where Allowed Amount > 0	Define Allowed Amount as the sum of amounts paid by payer and member: paid,prepaid,copay,deductible,coinsurance	1,280,228	14%	85,351,215	6.9%
8	Delete cases with multiple units for same service.	Keep Qty =1	1,188,834	13%	78,210,304	6.3%
9	Location is missing or invalid		1,188,834	13%	78,210,304	6.3%

Step 10: Select Top 5 CPTS per specialty		Code Notes	Number of Claims (N)	% of "Step 10" Claims	sum of PAID	% of "Step 10" Paid Amount
	E&M (CPT=99213, 99214, 99212, 99396, 99203)		604,991	51%	42,662,482	54.5%
	Medicine (CPT = 97110, 90806, 97140, 98941, 90471)		438,149	37%	14,960,321	19.1%
	Radiology (CPT=77052,71020, 77057, 71010, 73630)		112,942	10%	9,432,324	12.1%
	Surgery (CPT=20610, 17000, 45378, 11100, 17110)	2 blood draw CPTs not included.	32,752	3%	11,155,178	14.3%
	Total		1,188,834		78,210,304	
Step 11: Exclude Outliers		Code Notes	Number of Claims (N)	% of "Step 11" Claims	sum of PAID	% of "Step 11" Paid Amount
	E&M less the top and bottom 5 percent		551,318	52%	37,323,981	58.28%
	Medicine less the top and bottom 5 percent		381,376	36%	11,699,563	18.27%
	Radiology less the top and bottom 5 percent		103,055	10%	7,300,461	11.40%
	Surgery less the top and bottom 5 percent		29,685	3%	7,717,941	12.05%
	Total		1,065,434		64,041,946	

Assessing the Independent Contribution of Each Factor:

To assess the independent contribution of each factor, “dummy variables” were created for each of the factor values. That is, we create a dummy variable for each of the product values (EPO, HMO, PPO, etc.), as well as each of the payers, each site of service type, etc. In the case of products, for example, an HMO dummy value of 1 is attributed to claims paid by an HMO, regardless of the payer. In the case of payers, as another example, a CIGNA dummy value of 1 is attributed to claims paid by CIGNA, regardless of the product. The stepwise multiple regression models are set up such that the focus is on the contribution of entire factor (e.g. product, payer, etc.), rather than on the contribution of a factor value (e.g. HMO, Cigna, etc.). Stated another way, all of the dummy variables corresponding to a factor enter the model as a group, rather than individually.

The “zero category” for each factor included in the regression analysis is shown in **Table 6.6**.

Table 6.6: Variables used in Regression Analysis

Factor	Value	Zero category
Payer	Cigna, CignaEast, Cigna Life, MVPHIC, MVPHP, MVPSelect	Blue Cross
Health Plan Product	HMO, PPO, Indemnity, POS, EPO, VHP	Catamount
Imputed payment method	Fee schedule, Charge	Other Method
Patient share of Payment	Patient paid 100 percent, patient paid between 50 percent and 100 percent	Patient paid less than or equal to 50 percent
Calendar Quarter	Q1 – Q3 2012	Q4 2012
Provider Size	Largest, Medium	Smallest
Provider Region	Micro MSA, rural shortage, other rural, out of state	Burlington MSA
Provider Type	PCP or clinic, specialty physician, RN/NP/Midwife/PA, allied health, facility, non-physician behavioral health	No specialty
Site of service	Office, Clinic, FQHC	Hospital
Service Code Modifier	Evaluation and Management (25), Medicine (59, AH, AJ), Surgery (59), Radiology (26, TC)	No modifier

Appendix D: Hospital Average Price Figure

The figure on the next page shows the information in Table 3.2 in a graphic format.

In order to give the reader a sense of volume, the area of each circle represents the relative number of discharges of commercially-insured Vermont residents from that hospital in 2012. The center of each circle is the point at which to read the crude and case-mix adjusted average prices for that hospital. For example, Porter Hospital (PO) had an average unadjusted price of \$9,558 (bottom axis) and an adjusted price of \$11,459 (left axis). Porter's average price rises after adjustment because its case mix (0.83, shown after the hospital abbreviation) is lower than the state average.

<u>Abbreviation</u>	<u>Hospital</u>
BR	Brattleboro Memorial Hospital
CV	Central Vermont Medical Center
CO	Copley Hospital
FAHC	Fletcher Allen Health Care
GC	Grace Cottage Hospital
GI	Gifford Medical Center
MH	Mary Hitchcock Memorial Hospital
MT	Mount Ascutney Hospital and Health Center
NC	North Country Hospital
NE	Northeastern Vermont Regional Hospital
NW	Northwestern Medical Center
PO	Porter Medical Center
RU	Rutland Regional Medical Center
SP	Springfield Hospital

Hospital Average Inpatient Price, Crude and Severity-Adjusted, Commercial Payers, 2012

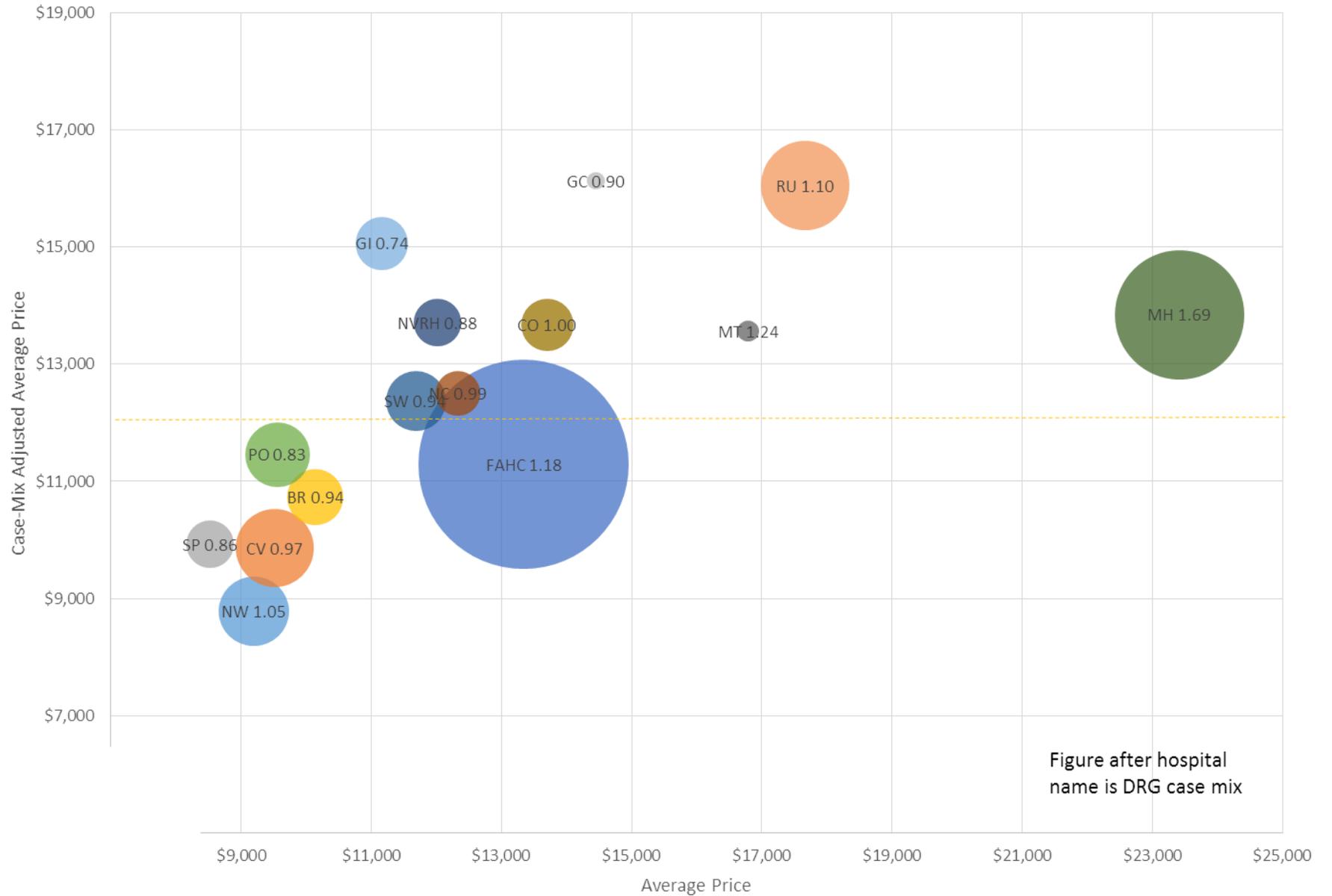


Figure after hospital name is DRG case mix

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