

Health Spending Growth Drivers in Vermont: Medicare, 2008-2012

Vermont residents

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Definitions

Annual enrollment - total monthly enrollment, based on VHCURES enrollment data, divided by 12.

Case mix - a description of the severity or complexity of patients admitted to a hospital. A set of consistent DRG weights (e.g., the MS-DRG v26 developed for 2008 claims) is employed to measure each hospital's case mix and facilitate fair comparison of cost of treatment.

Inpatient acute stays - includes all inpatient stays at acute care hospitals. Consistent with Truven defined CASEID, which measures consecutive room and board days as a "stay." For this analysis, hospital stays exclude all physician and other professional services that are provided within a hospitalization, as these are included under the "professional services" category.

Inpatient services - Includes all institutional claims submitted for dates within the stay dates with UB-04 revenue codes from: hospital inpatient facilities, renal dialysis centers, rehabilitation facilities, freestanding birth centers, and critical access hospitals.

Intensity – A measure of the number and complexity of services and resource use within a hospital stay. For example, the number and technologic complexity of the diagnostic imaging tests provided during a hospital stay. Intensity is a further adjustment to inpatient stays after case mix is accounted for. Intensity is calculated using DRG weights but acknowledges year to year updates in services required to treat each patient. Thus, MS-DRG v26 is used for 2008 admissions and so on up to MS-DRG v30, which is used for 2012 admissions.

Medicaid-specific service codes for dual eligibles - Medicaid service codes that have been defined in the outpatient sector as Category of Service (COS) equals Government Health Care Activities (GHCA) have been separated out within professional services.

Outpatient facility services - institutional claims submitted with UB-04 (facility-based) revenue codes, including: hospital outpatient, hospital lab services to non-patients, skilled nursing outpatient, rural clinics, renal dialysis centers, freestanding clinics, outpatient rehab facilities, community mental health centers, federally qualified health centers, clinic/other, hospice facilities, ambulatory surgery centers, freestanding birthing centers, and critical access hospitals.

Price growth - the percentage change in allowed payment of some standard measure of service (the market basket in the case of outpatient and professional services, or a hospitalization with unit DRG weight in the case of inpatient stays). Price growth is the increase in allowed payment after adjustment for other factors such as mix of services and utilization in the case of outpatient or professional services, or intensity, case mix, and volume in the case of inpatient services.

Professional services - includes professional bills, CMS 1500 form professional services procedure codes with no facility charges. This includes all professional physician and non-MD services (e.g., physical therapy, occupational therapy).

Service mix - the distribution of health care services within categories during a defined period of time. Service mix may be calculated at the state, the region, or even the hospital level. Service mix is

calculated as a combined control for intensity and case-mix for outpatient or professional services because there is nothing equivalent to a DRG weight available for all outpatient or professional services.

Spending growth - the increase in allowed payment amount PMPY from one time period (a year) to another. In this report, annualized spending growth is measured both as an overall measure for all service types, and by different service types (inpatient, outpatient, professional services).

Spending per member per year (PMPY) - the ratio of total allowed payment amount to annual enrollment.

Total allowed payment amount - the sum of payments made by the insurance providers (payer) to the health care providers for medical services provided to the patients, and patient's out-of-pocket costs (co-insurance, co-payments, deductibles), for all non-drug services.

UB-04- a uniform institutional billing form used in billing by multiple payers. It pertains to facility-based services.

Volume of services - the number of health care services (stays or individual services) provided during a defined period of time. Volume of service can be calculated for the state, for a region, for a provider, or for a population group.

1. Executive summary

1.1 Overview

Health spending growth results from a combination of changes in population health, payments for services and the number and mix of services used. To manage and control future health spending, it is critical to understand the underlying factors that have contributed to health spending levels and growth over time. This analysis examines Medicare spending growth by Vermonters over the years 2008-2012, and serves as a companion to the report, “Health Spending Growth Drivers in Vermont: commercial and Medicaid, 2008-2012,” dated June, 2015. Both studies calculate the portion of health spending growth between 2008 and 2012 that was incurred due to increased payments per service (“price”), increased service use, and a change in the mix of services over time. The studies focus on hospital acute inpatient facility services (Medicare Part A), outpatient facilities, and physician and other professional services (largely Part B services). Spending growth drivers are examined both statewide and by region of residence within Vermont. Methods and metrics are consistent with the commercial and Medicaid report, to allow for comparisons across payer. However, it is important to note that certain comparisons across payers, particularly for outpatient and professional services, should be interpreted with caution, as there may be differences in billing practices by payer.

Vermont has historically experienced lower Medicare spending than the national average. The Centers for Medicare and Medicaid Services publishes data by state through 2009, and the Dartmouth Atlas estimates Medicare utilization and spending through 2012. According to the Dartmouth Atlas, between the years 2008 and 2012, Vermont per capita spending ranged between 74 and 77 percent of the national average for Medicare spending.¹ The Medicare spending growth per capita for Vermont was slightly higher than national during these years. Both Vermont and national Medicare in recent years reflect a considerable slowing compared to 1991 to 2009, when Medicare spending grew about 6.8 percent annually, nationally.²

Health spending in this report includes total Medicare allowed paid amounts for a service, including both the payer portion and the patient out-of-pocket portion, for all services excluding prescription drugs. In general, Medicare payments account for about 80 percent of allowed payments. Additional payments to hospitals or providers that are not associated with claims (e.g., care management payments) are also excluded from this analysis.

This analysis includes all Vermont resident Medicare beneficiaries. The analytic sample includes approximately 100,000-120,000 Vermont residents covered by Medicare (80 percent over age 65), including approximately 20,000 full benefit dually eligible Medicare/Medicaid beneficiaries.³ (See

¹ The Dartmouth Atlas of Health Care (<http://www.dartmouthatlas.org/data/table.aspx?ind=65&tf=34&ch=32,125&loc=47&loct=2&rus=1&fmt=90>)

² Medicare in Vermont (www.medicareresources.org/vermont/).

³ Full benefit dually eligible beneficiaries receive full Medicaid coverage for Medicare premiums and copayments. Partial benefit beneficiaries participate in state programs that cover a portion of Medicare cost sharing, but are not full Medicare/Medicaid dually eligible.

Appendix A1 for documentation of population sample included in the report). Sub-analyses for inpatient stays and total spending were conducted for the dually eligible.

1.2 Findings

Overall health spending levels and growth: Health spending per member per year (PMPY), measured as Medicare total allowed costs,⁴ excluding prescription drugs, for Vermont's Medicare beneficiary residents, grew at an average annual rate of 2.0 percent between 2008 and 2012 (\$7,524 to \$8,148).

As is the case with commercially insured residents, this average reflects a slowing of growth in Medicare spending each year after 2008, for Medicare from 3.3 percent in 2008-2009 to 0.6 percent in 2011-2012. Average spending growth during this period was similar to national estimates. Medicare allowed spending levels per member per year for the full dually eligible population was about 30 percent higher than that of Medicare overall. Full dually eligible beneficiaries accounted for approximately 17 percent of Medicare beneficiaries (by total member months), and accounted for 25 percent of Medicare allowed spending during this period.⁵

Medicare per capita allowed spending growth varied by the type of service: Hospital inpatient acute care (excluding skilled nursing facilities, hospice, and home health) decreased by 0.2 percent annually per member per year from 2008-2012, consistent with a national trend of decreasing hospital admission rates. Outpatient facility spending per member per year increased at five percent annually, and professional spending (inpatient and outpatient) by 1.2 per cent.

Spending growth drivers:

For hospital acute inpatient facility care, the average case-mix adjusted price per inpatient admission for Medicare grew at nearly two percent per year. Resource-adjusted price increased at a rate of 1.8 percent annually, and case mix/severity increased at 1.4 percent annually. This was partially offset by a decrease in the rate of admissions. On a per-enrollee basis, the rate of admissions decreased from 234 to 205 per 1000 enrollees; in each year, the rate was approximately 30 percent below the national average admission rate.⁶ The decrease in utilization, however, was consistent with national trends.⁷ For dually eligible beneficiaries, hospitalization rates were nearly twice that of overall Medicare, though admission types were less resource intensive for this population.

For outpatient facility services (mostly hospital-based), spending per member per year grew at five percent annually, with price per service the greatest contributor to outpatient spending growth, accounting for over 80 percent of spending growth(4.2% out of 5.0%). This is the setting in which Medicare prices increased the most, and were generally not offset by utilization decreases. Comparison across payers, and to national data, is limited due to differences in definitions, coding practices, and types of services offered for each. However, outpatient spending in Vermont was at a higher baseline in

⁴ Allowed costs = Medicare payments plus secondary insurer, and copayments.

⁵ Much of total health spending by dually eligible beneficiaries is through Medicaid programs that are not part of Medicare covered services.

⁶ The Dartmouth Atlas of Health Care

(<http://www.dartmouthatlas.org/data/table.aspx?ind=65&tf=34&ch=32,125&loc=47&loct=2&rus=1&fmt=90>)

⁷ MedPAC report to Congress, March 2014.

2008 than national rates (according to both this analysis and Dartmouth Atlas), and grew more slowly than national rates during this time (5.0 percent annual growth vs. 7.4 percent nationally).⁸ Vermont per capita outpatient facility spending, in contrast to other services, appears to be approximately 30 percent higher than national rates in all years. However, this comparison may be limited by differences in definitions between the current analysis and national reporting.

For physician and other professional services (which includes both inpatient and outpatient place-of-service), spending per member increased at a rate of 1.2 percent between 2008 and 2012, comparable to national growth, but from a lower dollar amount each year than national.⁹ Similar to inpatient stays, case mix-adjusted prices increased less than two percent annually, offset by a small decrease in volume.

Additional Medicare-specific findings include:

- Within Vermont, there is some variation in Medicare inpatient spending growth by geographic location of resident.** Because Medicare pays inpatient care based on standard rates, adjusted for certain hospital factors, variation in hospital price growth per admission across Vermont regions is limited. Differences in Medicare price growth per region are due to differences in the types of acute admissions (the relative resource use of admissions for each hospital) across regions. From the resident perspective (all admissions for residents of an area, regardless of location of service), Medicare payments per member per year for acute hospitalizations increased most for residents of the Rutland area. The fastest growth in intensity-adjusted price, both inpatient and outpatient services, was for residents of the Rutland and St. Johnsbury area.¹⁰
- As is the case for other payers, and similar to national trends,¹¹ observed billing trends and patterns reveal a shift away from stand-alone outpatient professional services toward more facility-based outpatient services.** The changing mix of services in the outpatient setting over time, including the increased use of facility-based radiology, pharmacy, and outpatient surgery, reflects national trends. As shown in other studies, the cost of a service generally is higher when provided in an outpatient facility, rather than a physician’s office, adjusted for service category mix.

1.3 Comparison of Medicare spending growth to other payers in Vermont

Measures of hospital admissions are to some extent standardized across payers, but because of differences in outpatient and professional billing services across payers and populations covered, it is challenging to compare levels of spending and price growth across payers for non-inpatient services.

⁸ The Dartmouth Atlas of Health Care
<http://www.dartmouthatlas.org/data/table.aspx?ind=65&tf=34&ch=32,125&loc=47&loct=2&rus=1&fmt=90>

⁹ The Dartmouth Atlas of Health Care
<http://www.dartmouthatlas.org/data/table.aspx?ind=65&tf=34&ch=32,125&loc=47&loct=2&rus=1&fmt=90>

¹⁰ Differences in Medicare price growth per region are due to differences in case mix across regions.

¹¹ MedPAC report to Congress, March 2014.

However, a useful policy application for this work is to compare the rate of growth in spending for each payer, and isolate intensity-adjusted price changes across payers. Health spending growth rates are generally considered to be interrelated across payers: as public payers (i.e., Medicare and Medicaid) control rates of growth, providers are believed to charge commercial payers increasing rates, in order to maintain acceptable margins.¹²

Between 2008 and 2012, annual Medicare non-drug spending in growth in Vermont per beneficiary per year averaged 2.2 percent, compared to two percent for Medicaid non-duals, and five percent for commercially insured Vermonters. Again, because of differences in populations, the level of spending is not directly comparable across payers, but relative growth is instructive.

For inpatient care, annual Medicare growth per beneficiary per year was relatively stable (-0.2%), compared to over ten percent per member per year for Medicaid non-duals, and six percent per member per year for the commercial population. While this is a considerable variation in growth, by 2012, Medicare unadjusted spending per admission was 82 percent of commercial, and Medicaid still just 62 percent of commercial spending per admission. Over this time, as price growth (adjusting for changes in the intensity of care) remained low for Medicare, it increased 4.1% annually for commercial, and 8.9% for Medicaid. Admission rates decreased most for Medicare.

For outpatient facility services, Medicare spending per member per year started out higher than commercial (\$2,007 compared to \$1,511)¹³ and grew at a rate between that of the other payers, at 5.0 percent annually, compared to four percent for Medicaid and 6.4 percent for commercial. Medicare intensity-adjusted price growth per beneficiary per year was 4.2 percent annually, compared to 2.6 percent for Medicaid, and 5.4 percent for commercial services. For each payer, for outpatient services, price was a main driver of outpatient spending, though per member services contributed for Medicaid.

For physician and other professional services, Medicare spending growth was minimal, half that of commercial spending, at 1.2 percent growth annually. By 2012, Medicare physician and other professional service spending was \$1,958 compared to commercial professional service spending (\$1,453). Again, comparisons of levels of spending across payer are complicated by differences in billing patterns and case mix. However, adjusted price growth per service, though small, was less than two percent for Medicare and Medicaid, while at three percent for commercial, drove commercial spending growth.

1.4 Summary/Conclusions/Recommendations

During the years 2008-2012, Medicare allowed spending per beneficiary grew relatively slowly as did national Medicare spending, and much slower than commercial and Medicaid. For Medicare, per member per year spending growth of two percent per year over this time was driven by a combination of increasing prices and severity, with overall program spending growth driven higher by increases in the

¹²Health Care Financing and Organization. A Review of the Evidence on Hospital Cost Shifting. May 2011.

(<http://www.academyhealth.org/files/HCF0/HCF0BriefMay2011FINAL.pdf>)

¹³ Outpatient facility spending per member per year levels for Medicare and commercial cannot be directly compared to Medicaid in VHCURES data, due to the Medicaid category of Government Health Care Activities, which includes both institutional and professional services.

number of beneficiaries. This is in contrast to commercial health care spending growth, for which price grew more rapidly, and was a clear driver of spending increases for most services.

Medicare inpatient spending grew much more slowly than outpatient care, which increased by five percent annually during this time. This contrasts with commercial and Medicaid inpatient spending, for which price mainly drove rapid growth, more than offsetting any decrease in admission rates. Professional service spending (physician and other professional services) was relatively stable for Medicare, similar to findings for Medicaid and commercial.

Applying the current analyses to support all payer payment reform

While there are challenges in merging data across payers in the current VHCURES format, the data in this report, combined with results from the analysis of commercial and Medicaid spending levels and drivers, can be used to compare payments and payment growth across payers. Further, the results can serve as potential input for all-payer simulations. In particular, one standard metric that is reasonably comparable across payers is the DRG weight, a measure of resource use that is assigned to each inpatient stay DRG at a national level by the Centers for Medicare and Medicaid Services (CMS). It is important to note, however, that estimating the impact of transitioning to a new payment system on expenditures is a complex process that must take into account the baseline levels of reimbursement across payers, number of services, recent trends, quality of care, and the behavioral impact on providers and patients from altering reimbursement.

2. Background

2.1 Purpose/Rationale of study

Health spending growth results from a combination of changes in payments for services and the number and mix of services used. The change in number and mix of services used is driven by population need and demand, as well as by clinical practice patterns and variations in available technology. Payments for services are determined by a combination of supply and demand factors, including Federal and state payment policies, market structure, provider costs, and negotiated rates. Because different policy levers are needed to address the various factors affecting health expenditure growth, knowing the relative impacts of these factors is critical for policy decision making.

Medicare has standard fee schedules by which providers are paid, taking many of provider and patient factors into account. Inpatient acute hospital care is paid through a prospective payment methodology, Diagnostic Related Groups (DRGs), adjusted for regional and provider-related factors. Outpatient and professional services are paid via Medicare fee schedules, with rates adjusted by region and other factors.¹⁴ Studies that have compared Vermont Medicare spending to national rates have found that Vermont has historically experienced lower Medicare spending than the national average. The Centers for Medicare and Medicaid Services publishes data by state through 2009, and the Dartmouth Atlas estimates Medicare utilization and spending through 2012. According to the Dartmouth Atlas, between the years 2008 and 2012, Vermont per capita spending ranged between 74 and 77 percent of the national average for Medicare spending.¹⁵ As well, Medicare spending growth per capita for Vermont was slightly higher than national during these years. However, both Vermont and national Medicare reflect a considerable slowing after the years 1991 to 2009, where Medicare spending grew about 6.8 percent annually, nationally.¹⁶

To manage and control future health spending, it is critical to understand the underlying factors that have contributed to Medicare spending growth over time, and compare that to that of other payers. In order to identify and target potential areas for policy changes by governing bodies, the broad drivers of spending can be classified as utilization, price, and some measure of intensity and service mix. In this model, the growth in health care costs over time is due to changes in the number of services provided per member (“utilization”), the number of enrollees (“enrollment”) and the allowed payments (“prices”) actually paid for those services.¹⁷ In addition, there are often changes over time in the number and complexity of services and resources use within a hospital stay. For example, there may be a change in the number and technologic complexity of the diagnostic imaging tests provided during a hospital stay.

¹⁴ For inpatient services, see <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/index.html?redirect=/AcuteInpatientPPS/>. For fee schedule for non-inpatient services, see (<http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/FeeScheduleGenInfo/index.html>). For an example of fee schedule use and rates, see: <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ClinicalLabFeeSched/clinlab.html>

¹⁵ The Dartmouth Atlas of Health Care (<http://www.dartmouthatlas.org/data/table.aspx?ind=65&tf=34&ch=32,125&loc=47&loct=2&rus=1&fmt=90>)

¹⁶ Medicare in Vermont (www.medicareresources.org/vermont/).

¹⁷ Health Care Cost Institute. *2012 Health Care Cost and Utilization Report*. Washington, D.C.: Health Care Cost Institute;2013.

This is often referred to as a change in “intensity.” In the case of outpatient and professional services, service mix is used as a combined measure for case-mix and intensity.

The current analysis examines a change in level of health spending, and the portion of health spending growth incurred due to increased payments for services (“price growth”), and the portion due to increased volume of services between 2008 and 2012. This analysis focuses on inpatient hospital care, facility-based outpatient care, and professional services, both inpatient and outpatient, for the Medicare covered population.

2.2 Objectives of study/Policy questions

The specific objectives of this study were to address the following policy questions:

- 1) Between 2008 and 2012, for the state and for each region, for Medicare beneficiaries, what is the relative contribution of changes in price, enrollment, utilization, and intensity in Vermont to the increase in:
 - a) Hospital inpatient spending?
 - b) Outpatient facility services spending?
 - c) Physician and other professional services spending?
- 2) What are the relative changes over time in utilization and prices for acute inpatient admission for selected hospitals (i.e., DHMC or UVMHC)?
- 3) How do the Medicare health spending drivers compare to other payers in Vermont, and what is the best metrics for comparison?

3. Methods

The methods used in this study are borrowed from a large base of research on this topic. The basic idea is to examine spending growth related to one factor while holding other factors constant. Using a common set of services, how much do prices rise over time? Holding prices at a baseline level, how much does the mix of services or the conditions change over time in ways that explain overall spending growth?

In examining payment or price changes over time, it is critical to distinguish between payment increases due to a changing set of services within the same nominal categories (sometimes also measured as “intensity”), from that of pure price increases for the same service. For example, the amount spent for an emergency department visit could change if either the payer allows or negotiates a higher price for an identical service, which is pure price, or if the emergency department provides more technically intensive services within a visit. This study uses two complementary methods to identify pure price increases. For inpatient hospital care, national diagnostic related group (DRG) weights were used to decompose a change in resource use over time from that of pure price increase over time. For outpatient and professional services, where standard DRGs are not used, a market basket approach was

used to identify a consistent set of services over time, and price changes were measured for this basket of services. This analysis was conducted differently from that of inpatient care, because there is nothing equivalent to a DRG weight available for all outpatient or professional services. The RVU weight is similar and was suggested as a possible candidate, but it could not be assigned to numerous services within the data. As an alternative, decomposition analyses were conducted by classifying outpatient services into categories and examining how the total number of services grew (the volume component), and how the distribution across categories and the average price per service within category changed over time (the service mix and price components).

3.1 Data

The primary data source for these analyses is VHCURES, which includes most of the healthcare claims paid on behalf of Vermont residents. VHCURES does not contain claims for the uninsured, estimated during the study years at less than seven percent of the population.¹⁸ These files provided essential data elements identifying service settings, services, dates, diagnoses, procedures, payment information, provider identification and characteristics, and commercial plan member enrollment and characteristic information. The current study examines Medicare spending. It should be noted that the process for identifying claims in VHCURES where Medicare was a primary payer differs from that of Medicaid and commercial claims. For Medicaid and commercial, a VHCURES variable “useflag” identifies claims for the population age <65, and primary payer for analyses. For Medicare, we used the VHCURES field “line primary payer paid amt.” If this field was greater than \$0, it indicated a primary payer other than Medicare. Such claims were excluded from the Medicare analysis. (See **Appendix A2** for other details about coding).

3.2 Population included

This study focuses on health spending for Vermont Medicare beneficiaries, as derived from VHCURES monthly enrollment data.¹⁹ The population in this study includes those individuals enrolled at any month in Medicare coverage, excluding individuals enrolled in Medicare Advantage. While this study does include claims-based payments to provider, it does not include those payments to providers associated with enrollment and care management, and not linked to specific health care service claims or Medicare primary care practice payments. Population is further divided into five market regions, based on utilization patterns (see **Appendix A1**).

3.3 Defining service categories

The following definitions were used to allocate claims to service settings for this analysis:

- Inpatient services: Acute care hospital facility charges that were associated with dates identified from hospital inpatient room and board service charge dates. Inpatient services include all institutional claims submitted for dates within the service dates with UB-04 revenue codes from:

¹⁸ Vermont Department of Financial Regulation and Market Decisions. *2012 Vermont Household Health Insurance Survey: Comprehensive Results*. (http://www.dfr.vermont.gov/sites/default/files/VHHIS_2012_Final_Report.pdf).

¹⁹ As of the date of this analysis, Medicare data were not available.

hospital inpatient facilities, rehabilitation facilities, freestanding birth centers, and critical access hospitals. This is comparable to Medicare Part A, with the difference that the current analysis category excludes skilled nursing facilities, home health, and hospice.

- Outpatient facility services: Institutional claims submitted with UB-04 revenue codes, including: hospital outpatient, hospital lab services to non-patients, skilled nursing outpatient, rural clinics, renal dialysis centers, freestanding clinics, outpatient rehab facilities, community mental health centers, federally qualified health centers, clinic/other, outpatient hospice, ambulatory surgery centers, freestanding birthing centers, and critical access hospitals. Home health is not included in this analysis. This is comparable to Medicare Part B outpatient service files.
- Professional services: Professional bills, CMS 1500 form professional services procedure codes with no facility charges. This includes all professional physician and non-MD services (e.g., physical therapy, occupational therapy) that are billed directly, not through a hospital or other facility. This is comparable to Medicare Part B carrier files for professional services.

(See **Appendix A2** for detailed definitions and coding.)

3.4 Measuring expenditures

Expenditures and spending growth were measured using a payment variable constructed from VHCURES reflecting the total allowed amount for a service, including payer portion and patient out-of-pocket portion. This measure includes both the portion of the service paid by Medicare, secondary insurer (in the case of dually eligible beneficiaries, Medicaid amount), and the portion paid by the patient. This variable is the “allowed amount” in Medicare research analytic files.

3.6 Analysis

General approach

The analysis examined the following components of health spending growth:

1. *Spending growth due to changes in “price” per unit for the same service over time*: The change in total spending while holding the other factors constant. The controls for inpatient price growth calculations include utilization/volume, case-mix, and intensity. The controls for outpatient and professional services price growth include utilization/volume and service-mix. In other words, we allow relevant payment amounts to vary over time for a standard service or set of services.
2. *Spending growth due to a change in the number of services per enrolled member (e.g., number of admissions in the case of inpatient hospital, or discrete services in the case of outpatient and professional)*: The change in total spending for the observed number of services, holding prices, case-mix, and intensity constant for inpatient services, and holding prices and mix of services constant for outpatient and physician services.

3. *Spending growth due to a change in the mix of services provided:*
 - a. *the case mix of care:* The change in total spending for services, holding prices, intensity and the number of services per visit constant, but allowing the distribution of services to change in order to reflect observed usage patterns during the year. This analysis was done only for inpatient services
 - b. *intensity of care:* The change in total spending for services, holding prices, case-mix, and the number of services per visit constant, but allowing the distribution of services to change in order to reflect observed usage patterns during the year. This analysis was done only for inpatient services.
 - c. *the service mix of care:* The change in total spending for services, holding prices and the number of services per person constant, but allowing the distribution of services to change in order to reflect observed usage patterns during the year. This analysis was done only for outpatient and professional services.
4. *Spending growth due to a change in enrollment.* Annual change in enrollment for the Medicare population was included as a driver in measures of total spending, but were not used in the calculation of per member spending.

Total health spending growth is the sum of these four components, with a small portion that is not attributable arithmetically to one particular factor (the “interaction” of all factors). Additional detail on the methodology is provided in the technical appendix (**Appendix B**).

4. Results: Overview of health spending levels and growth by category for Vermont Medicare beneficiary residents

Table 1 provides an overview of Medicare-allowed health spending per member per year growth for Medicare-insured Vermonters between 2008 and 2012. Medicare allowed spending on non-prescription drug services per member per year has increased an average of two percent annually between 2008 and 2012, from \$7,524 to \$8,148. However, annual spending has slowed every year, from 3.3 percent in 2008-2009 to 0.6 percent by 2012. Inpatient acute hospital facility spending per member per year, as reflected in VHCURES, has remained relatively stable at -0.2% annually, with outpatient spending per member per year increasing at five percent annually, and professional services increasing at one percent per year. Outpatient spending has grown from 26.7 percent of total non-drug spending for Medicare allowed to 30 percent during this time.

Descriptives for the full dually eligible beneficiaries are shown in the bottom half of **Table 1**. Per member per year, Medicare allowed spending for duals is about 30 percent higher than total Medicare. When all Medicare and Medicaid payments are included, spending on full duals averaged \$28,959 in 2008 and \$30,015 in 2012. According to this VHCURES analysis, the full dually eligible in Vermont account for 16 percent of all Medicare member years, and 25 percent of all Medicare allowed spending.

Table 1: OVERVIEW OF HEALTH SPENDING LEVELS AND GROWTH FOR THE INSURED POPULATION. Vermont Medicare allowed spending per member per year (PMPY) resident non-prescription drug spending by category, Medicare beneficiaries, 2008-2012 (Source: VHCURES, Truven extract 201403)

MEDICARE (ALL RESIDENT BENEFICIARIES)	2008	2009	2010	2011	2012	Ave annual growth
Total member years (mm/12)	101,207	103189	106,101	107,491	110,623	2.2%
Total Medicare allowed non-drug \$\$ (x000)	\$761,805	\$802,456	\$845,789	\$870,690	\$901,753	4.3%
Medicare allowed PMPY all non-drug services	\$7,524	\$7,776	\$7,968	\$8,100	\$8,148	2.0%
Percent change PMPY from prior yr		3.3%	2.5%	1.7%	0.6%	2.0%
Medicare allowed PMPY all non-drug services, age 65+	\$7,935	\$8,074	\$8,245	\$8,416	\$8,441	1.6%
Medicare allowed PMPY all non-drug services, age <65	\$6,023	\$6,675	\$6,978	\$6,985	\$7,132	4.3%
Hospital Medicare allowed acute inpatient facility spending PMPY	\$2,894	\$2,859	\$2,919	\$2,896	\$2,873	-0.2%
Other inpatient (e.g., skilled nsg, misc room and board)	\$753	\$816	\$840	\$912	\$877	3.9%
Outpatient facility spending PMPY	\$2,007	\$2,160	\$2,268	\$2,340	\$2,440	5.0%
Professional services spending PMPY	\$1,870	\$1,941	\$1,941	\$1,952	\$1,958	1.2%
FULL DUALLY ELIGIBLE ONLY						
Total member years (mm/12)	16,398	16,908	17,471	17,858	18,252	2.7%
Total Medicare allowed non-drug \$\$ (x000)	\$193,684	\$212,169	\$223,916	\$235,652	\$240,768	5.6%
Medicare allowed PMPY all non-drug services	\$11,811	\$12,548	\$12,816	\$13,196	\$13,191	2.8%
Percent change PMPY all non-drug services from prior yr		6.2%	2.1%	3.0%	0.0%	2.8%
Total Medicare non-drug + Medicaid pay \$\$ (x000) ^a	\$474,870	\$496,852	\$516,475	\$534,189	\$549,168	3.7%
Medicare non-drug + Medicaid pay PMPY	\$28,959	\$29,386	\$29,561	\$29,912	\$30,015	1.0%
Percent change Medicare non-drug + Medicaid pay PMPY from prior yr		1.5%	0.6%	1.2%	0.6%	1.0%

^a Total Medicare + Medicaid for duals includes all Medicaid covered services that are Medicaid-specific and not covered by Medicare (e.g., transportation).

Note: Medicare allowed amount spending includes all patient and insurer cost sharing, and for duals, includes the Medicaid cost sharing.

5. Drivers of health spending growth: Acute inpatient stays

5.1 Approach and definitions

Inpatient spending includes the spending on facility services provided to patients, while admitted to acute hospitals (including bill type codes 11, 12, and 85). The inpatient analysis excludes spending on services performed and separately billed by physicians and other professionals, which is included in the professional component of spending drivers. This analysis is comparable to Medicare Part A spending,

but it excludes skilled nursing facilities, home health, and hospice. Inpatient admissions in all years of the study were assigned by Truven Health Analytics to consistent diagnosis related groups across years.²⁰ DRGs for inpatient admissions were then assigned weights provided by Centers for Medicare and Medicaid services, which are based on standard resource use for each DRG calculated at a national level. This allows for standardization of resource use, and calculation of intensity-adjusted price changes over time. This is further described in the technical appendix (**Appendix B**).

5.2 Context: Hospital acute inpatient care spending levels and admission types

Between 2008 and 2012, the inpatient admission rate for Vermont Medicare beneficiaries decreased from 234 to 205 per 1000 members per year (**Table 2**), which is lower than Dartmouth Atlas national estimates of 333 to 290 per 1000.²¹ Actual allowed average payments per admission increased from \$12,362 to \$14,001 (3.2% annual growth). Average pure price per admission (payments for similar resource use levels, adjusting for changes in case mix and resource use over time, or intensity adjusted) increased 3.0 percent per year.

Table 2: OVERVIEW OF INPATIENT HOSPITAL FACILITY SPENDING, VERMONT INSURED RESIDENTS. Hospital acute inpatient facility utilization and spending (bill type 11/12/85), Vermont resident all Medicare beneficiaries, 2008-2012 (source: VHCURES, Truven extract 201403, primary payer claims)

MEDICARE ALL BENEFICIARIES	2008	2009	2010	2011	2012	Ave annual growth
Total member years (mm/12)	101,207	103,189	106,101	107,491	110,623	2.2%
Total allowed (x000)	\$292,861	\$295,012	\$309,694	\$311,275	\$317,809	2.1%
Per member per year	\$2,894	\$2,859	\$2,919	\$2,896	\$2,873	-0.2%
Total # of admissions	23,691	23,097	23,172	23,008	22,699	-1.1%
Admissions per 1000 members per year	234.1	223.8	218.4	214.0	205.2	-3.2%
Average DRG weight	1.49	1.52	1.53	1.52	1.58	1.4%
Allowed unadjusted \$ per admission	\$12,362	\$12,773	\$13,365	\$13,529	14,001	3.2%
DRG adjusted \$ per admission ^a	\$8,297	\$8,403	\$8,735	\$8,901	\$8,861	1.7%

^a DRG adjusted admission: Spending per admission standardized to a unit DRG weight for each year to assess standardized price growth. Version of DRG is based on year being analyzed (e.g. v26 for 2008, ..., v30 for 2012).

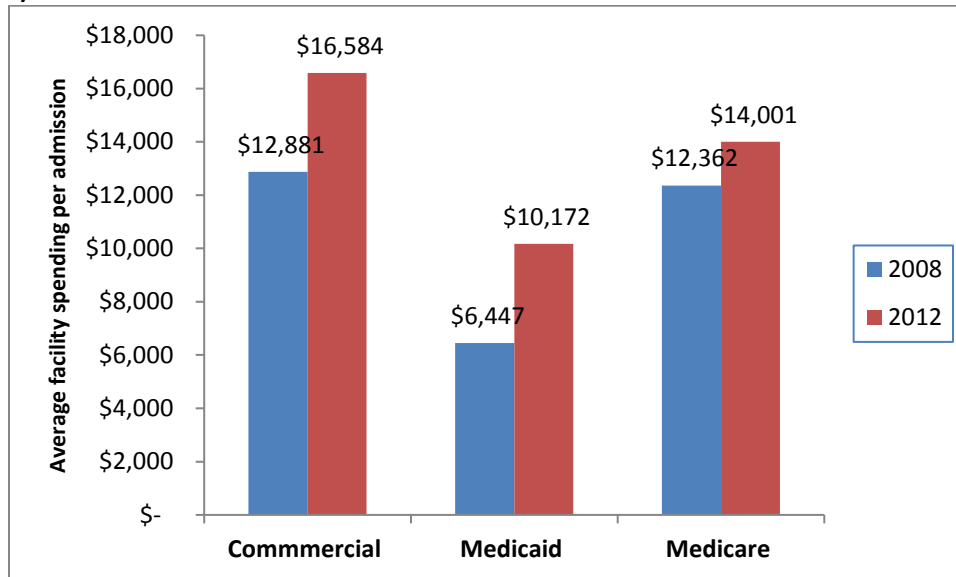
Comparison of Medicare with Medicaid and commercial spending per admission (**Figure 1**), reveals that in 2008, average Medicare spending per admission was 96 percent that of commercial (unadjusted for case mix). By 2012, however, Medicare was only 84 percent of commercial (\$14,001 vs. \$16,584), as commercial spending grew more rapidly. Medicaid spending per admission grew fastest, but is still only 61 percent that of commercial (see Medicaid and commercial health spending drivers for more detail.)

²⁰ Truven Health Analytics Disease Staging Software v 5.26

²¹ The Dartmouth Atlas of Health Care

(<http://www.dartmouthatlas.org/data/table.aspx?ind=65&tf=34&ch=32,125&loc=47&loct=2&rus=1&fmt=90>)

Figure 1: 2008-2012 VERMONT RESIDENT AVERAGE SPENDING PER ADMISSION, COMMERCIAL, MEDICAID and MEDICARE. Vermont Residents (Source: VHCURES, Truven extract 201403, primary payer claims)

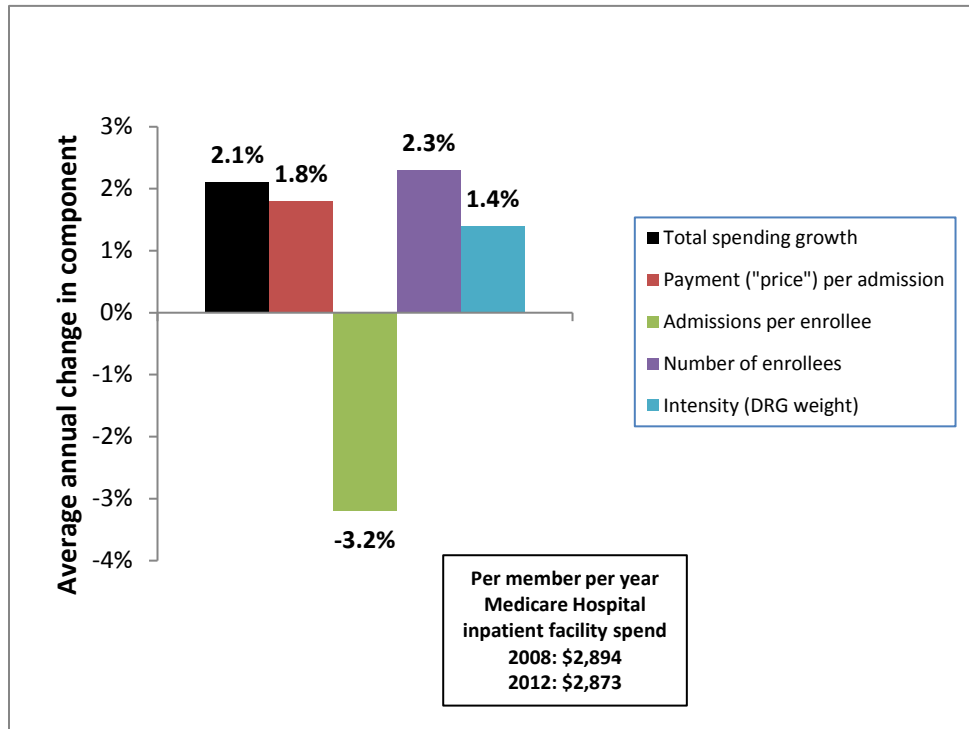


5.3 Hospital inpatient facility spending growth drivers for Vermont residents

For Medicare, total spending per admission grew 2.1 percent annually, with prices increasing 1.8 percent, intensity of care increasing by 1.4 percent, offset by a decrease in admissions per enrollee of 3.2 percent, following a national utilization trend²² (Figure 2). Per member per year spending was close to flat (\$2,894 to \$2873).

²² MedPAC Report to Congress, March 2014.

Figure 2: MEDICARE INSURED VERMONT RESIDENTS INPATIENT ACUTE CARE SPENDING GROWTH DRIVERS. Hospital acute inpatient facility spending growth drivers, Vermont residents, Medicare covered (source: VHCURES, Truven extract 201403, primary payer claims)



5.4 Inpatient hospital spending growth drivers by resident location

Table 3 combines hospitals based on geography, grouping residents into five regional market areas, defined in the table.²³ Due to the fact that Medicare has standard rates for DRGs, adjusted marginally by hospital type, variation in admission costs, and price per growth in price by residence is small, compared to differences across region for commercial admissions. Average inpatient spending per Medicare admission ranged in 2012 from \$13,094 for Rutland residents to 14,633 for Burlington. Growth in spending for inpatient hospital care for all regions was less than one percent annually. Differences in price growth across regions reflect a difference in the mix or types of services provided, for which reimbursement may grow at different rates. In all regions, admission rates declined. However, St. Johnsbury/Newport area residents experienced nearly twice the price growth than average for Vermonters (3.3% annually vs 1.8), with a greater volume decrease than average for the state.

Table 4 replicates Table 3 but includes only the dually eligible population (approximately 20,000 individuals per year). Inpatient stays for duals show a different pattern than overall Medicare, with

²³ Work is currently under way under this contract (Task 2, Health analysis populations) that has defined reduced market areas, combining Vermont's health service areas into five regions. The regions (RRs) included here are draft groupings. See Health Analysis Populations Report, January 2015. See Appendix A1 for definitions and populations.

lower average cost per admission, and admission rates almost twice that of Medicare overall, resulting in higher Medicare per member per year spending on inpatient stays. Although lower costs per admission for the dually eligible may be counterintuitive due to their greater disease complexity, the types of admissions for duals have lower DRG resource weights on average than non-duals (as an example, for non-duals, the highest volume admission DRG is 470, major joint replacement, [average DRG weight of 2.1] and for duals, simple pneumonia, 194 [DRG weight 1.0]).

As expected, because rates are standardized, prices increased similarly for duals as for Medicare overall. However, because volume was relatively stable for the dually eligible population overall spending for inpatient stays increased at a greater rate than for overall Medicare (3.1% for duals vs -0.2% overall).

5.5 Inpatient hospital spending growth drivers by state and major hospitals

Table 4 shows Medicare inpatient acute spending for all Vermont residents (duals and non-duals total), by the state where care was received, and by the major hospitals used (University of Vermont Medical Center [UVMMC], and Dartmouth-Hitchcock). Not all hospital business is reflected here, as out of state residents seeking care in Vermont are not included in the data. As might be expected due to its complex case mix, Dartmouth-Hitchcock had the most expensive average admission price in each year, followed by University of Vermont Medical Center (UVMMC). However, its case mix (resource use) was also the greatest, as reflected in the average DRG weight in the table. It is noteworthy that the volume of admissions to Dartmouth-Hitchcock for Vermont Medicare beneficiaries decreased at over four percent annually during this period.

Table 3: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, MEDICARE. Hospital acute inpatient facility spending growth drivers, Vermont residents, total Medicare covered (including dual eligibles), by market region (RR)²⁴ (source: VHCURES, Truven extract 201403, primary payer claims)

Resident region	2008 unadjusted \$ per adm (# adm) Admits/1000 PMPY	2012 unadjusted \$ per adm (# adm) Admits/1000 PMPY	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction=change in total program spending)					Total program inpt.acute spending	Total Inpatient acute spending/ resident
			Payment ("price") per stay	Volume (adm/ enrollee)	Intensity (DRG weight)	Enrollment	Total program inpt.acute spending		
Vermont all Medicare insured residents	\$12,362 (23,691) 234 \$2,894	\$14,001 (22,699) 205 \$2,873	1.8%	-3.2%	1.4%	2.3%	2.1%	-0.2%	
RR1: Greater Burlington	\$13,431 (7,157) 215 \$2,893	\$14,633 (7,169) 196 \$2,867	0.6%	-2.3%	1.6%	2.4%	2.2%	-0.2%	
RR2: Barre area	\$12,960 (3,084) 214 \$2,760	\$14,469 (3,039) 191 \$2,760	1.6%	-2.8%	1.3%	2.5%	2.5%	0.0%	
RR3: St Johnsbury /Newport	\$11,964 (2,436) 227 \$2,709	\$14,017 (2,117) 184 \$2,575	3.3%	-5.1%	0.7%	1.7%	0.5%	-1.3%	
RR4: Upper Valley	\$12,040 (5,432) 239 \$2,874	\$13,762 (5,104) 204 \$2,813	2.2%	-3.8%	1.2%	2.4%	1.8%	-0.5%	
RR5: Rutland area	\$11,180 (5,582) 278 \$3,113	\$13,094 (5,270) 244 \$3,194	2.6%	-3.3%	1.4%	1.9%	2.5%	0.7%	

²⁴ Region 1: Burlington, Middlebury, St. Albans
 Region 2: Barre, Morrisville
 Region 3: St. Johnsbury, Newport
 Region 4: WRJ, Randolph, Brattleboro, Springfield
 Region 5: Rutland, Bennington

Table 4: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, MEDICARE FULL DUALY ELIGIBLES ONLY. Hospital acute inpatient facility spending growth drivers, Vermont residents, Medicare full dual eligibles), by market region (RR)²⁵ (source: VHCURES, Truven extract 201403, primary payer claims)

Resident region	2008 unadjusted \$ per adm (# adm) Admits/1000 PMPY	2012 unadjusted \$ per adm (# adm) Admits/1000 PMPY	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction=change in total program spending)					Total program inpt.acute spending	Total Inpatient acute spending/ resident
			Payment ("price") per stay	Volume (adm/ enrollee)	Intensity (DRG weight)	Enrollment	Total program inpt.acute spending		
Vermont all Medicare insured residents	\$10,667 (6,690) 408 \$4,352	\$12,330 (7,287) 399 \$4,923	2.1%	-0.5%	1.6%	2.7%	5.9%	3.1%	
RR1: Greater Burlington	\$11,681 (1,917) 365 \$4,268	\$12,313 (2,157) 370 \$4,550	0.5%	0.3%	0.8%	2.7%	4.4%	1.6%	
RR2: Barre area	\$11,787 (971) 382 \$4,498	\$13,495 (1,055) 380 \$5,134	2.4%	-0.1%	1.0%	2.2%	5.6%	3.4%	
RR3: St Johnsbury /Newport	\$10,577 (761) 367 \$3,883	\$12,852 (768) 338 \$4,346	3.5%	-2.0%	1.4%	2.3%	5.2%	2.9%	
RR4: Upper Valley	\$9,989 (1,468) 489 \$4,882	\$12,133 (1,527) 438 \$5,318	2.4%	-2.7%	2.5%	3.8%	6.0%	2.2%	
RR5: Rutland area	\$9,415 (1,573) 446 \$4,196	\$11,602 (1,780) 458 \$5,314	3.1%	0.7%	2.2%	2.4%	8.7%	6.1%	

Table 5: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY STATE AND MAJOR HOSPITALS, MEDICARE ALL RESIDENT BENEFICIARIES. Hospital acute inpatient facility spending growth drivers, Vermont Medicare beneficiary residents (including dual eligible beneficiaries), by location of service (source: VHCURES, Truven extract 201403)

²⁵ Region 1: Burlington, Middlebury, St. Albans

MEDICARE ALL VERMONT RESIDENTS								
Resident region	2008 unadjusted \$ per adm (n adm) Total \$ (x000)	2012 unadjusted \$ per adm (n adm) Total \$ (x000)	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction= change in total program spending)					
			Payment ("price") per stay	Volume (adm/enrollee)	Intensity (average 2012 DRG weight)	Enrollment	Total program inpatient acute fac spending	Total Inpatient acute fac spending/resident
Vermont all residents	\$12,362 (23,691) \$292,861	\$14,001 (22,699) \$317,809	1.8%	-3.2%	1.4% (1.6)	2.2%	2.1%	-0.2%
Vermont residents to all acute care Vermont hospitals (incl. UVMHC)	\$11,421 (17,820) \$203,523	\$13,137 (17,288) \$227,111	1.9%	2.9%	1.6% (1.5)	2.2%	2.8%	0.5%
Vermont residents to Dartmouth-Hitchcock Medical Center	\$18,037 (3,155) \$56,907	\$18,537 (2,921) \$54,147	0.1%	-4.1%	0.5% (2.0)	2.2%	-1.2%	-3.4%
Vermont residents to UVMHC	\$16,106 (5,974) \$96,217	\$16,245 (5,895) \$95,764	-1.0%	-2.5%	1.2% (1.8)	2.2%	-0.1%	-2.3%
Vermont residents to all other non-Vermont hospitals	\$11,941 (2,716) \$32,431	\$14,679 (2,490) \$36,556	3.8%	-4.3%	1.4% (1.7)	2.2%	3.0%	0.8%

Region 2: Barre, Morrisville
 Region 3: St. Johnsbury, Newport
 Region 4: WRJ, Randolph, Brattleboro, Springfield
 Region 5: Rutland, Bennington

6. Drivers of health spending growth: Outpatient facility care

6.1 Approach and definition

The outpatient facility analyses measured the spending for facility services provided outside of inpatient stays. It also includes all services not included in acute hospitalization facility, or inpatient nursing facility bills. This analysis was conducted differently from that of inpatient care, because there is nothing equivalent to a DRG weight available for all outpatient or professional services. As an alternative, decomposition analyses were conducted by classifying outpatient services into categories and examining how the total number of charged services grew (the volume component), and how the distribution across categories and the average price per service within category changed over time (the service mix and price components). It should be noted that calculation of the price growth component was derived from a “market basket” approach, whereby a fixed distribution across service categories²⁶ were used to determine the growth in allowed payments over time. Category definitions, utilization, and spending for outpatient facility service categories are detailed in the technical appendix (**Appendix B**). As a check on VHCURES reported charges for Medicare, Medicare spending by CPT code was consistent with that of posted Medicare allowed charges for a sample of the highest prevalence CPT codes.²⁷

6.2 Context: Outpatient facility services spending levels and growth

Outpatient facility services per covered resident per year grew faster than inpatient care, at 5.0 percent annually, from \$2,007 in 2008 to \$2,440 in 2012 (**Table 6**). While the number of services per member per year was relatively stable, the average price per service increased almost five percent annually.

Table 6: OUTPATIENT FACILITY SERVICES SPENDING OVERVIEW, MEDICARE. Outpatient facility utilization and spending, Vermont residents, 2008-2012 (source: VHCURES, Truven extract 201403)

MEDICARE ALL RESIDENTS	2008	2012	Ave. annual growth
Total member years (mm/12)	101,207	110,623	2.2%
Total allowed (x000)	\$203,088	\$269,954	7.4%
Per member per year	\$2,007	\$2,440	5.0%
Total number of charged services ^a (x000)	2,557	2,851	2.8%
Services per member per year	25.3	25.8	0.5%
Allowed \$ per charged service	\$79	\$95	4.5%

^a Services = individual service lines within a paid claim, not aggregated into “visits”

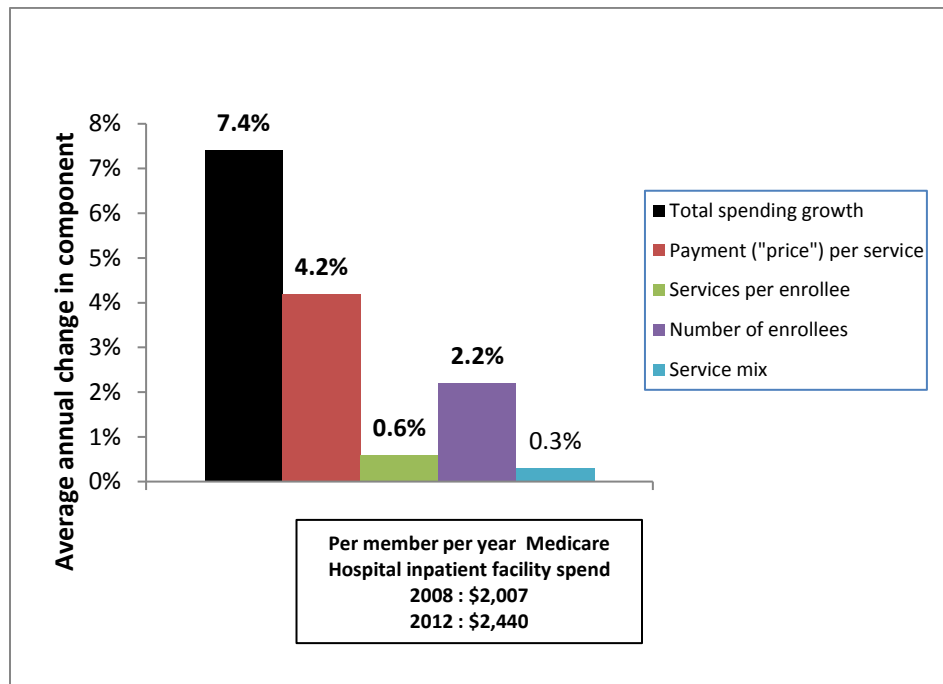
²⁶ An obvious feature of this method is that it takes into account a more expensive service substituting for a less expensive service over time (e.g., an MRI, or an even more expensive 3-D MRI, substituting for a scan) as a price effect. Some providers would want this broken out as a separate ‘intensity’ (technology) effect. Our use of broad service categories in the calculation of price and service mix growth rates will equate services that many providers would not want to see made equivalent.

²⁷ As an example, see <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ClinicalLabFeeSched/clinlab.html>

6.3 Outpatient facility spending growth drivers

As **Figure 3** shows, of the 7.2 percent annual growth in total overall Medicare spending by Vermonters on outpatient facility services, over half (4.2 percent) was due to increased prices, and 2.2 percent due to enrollment growth.

Figure 3: OUTPATIENT FACILITY SPENDING GROWTH DRIVERS, MEDICARE. Outpatient facility spending growth drivers, Vermont residents (source: VHCURES, Truven extract 201403)



6.4 Vermont outpatient facility spending growth drivers by resident location

Spending growth patterns for outpatient services by resident location differed from that of inpatient (**Table 7**), with greater variation in spending and price growth (again, largely due to differences in the mix of services used by residents of each region). Outpatient facility spending per resident by 2012 was greatest for residents of the St. Johnsbury/Newport region, at \$2,701 compared to the state average of \$2,440. As well, price growth was greatest for St. Johnsbury/Newport and Upper Valley residents. Total spending per resident growth was highest for the Rutland area, at 6.8 percent, compared to the state average of 5.0 percent.

Table 7: OUTPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, MEDICARE. Outpatient facility spending growth drivers, Vermont residents, by market region (RR)²⁸ (source: VHCURES, Truven extract 201403, primary payer claims)

ALL MEDICARE										
Resident region	outpatient facility spending per enrollee		\$ per charged service ^a		2008-2012 average annual PMPY change in: (Allowed + volume + service mix + interaction = total PMPY change)				Average annual total program change (PMPY + enrollment+ interaction)	
	2008	2012	2008	2012	PMPY allowed payments ("price"/ service)	PMPY volume (services/ enrollee)	PMPY service mix	Total spending/ resident on facility svc	Enrollment	Total outpatient facility program spending
Vermont all residents	\$2,007	\$2,440	\$79	\$95	4.2%	0.6%	0.3%	5.0%	2.2%	7.4%
RR1: Greater Burlington	\$1,958	\$2,241	\$79	\$91	3.0%	-0.2%	0.7%	3.4%	2.4%	6.0%
RR2: Barre area	\$1,973	\$2,412	\$83	\$97	2.9%	1.2%	1.3%	5.2%	2.5%	7.8%
RR3: St Johnsbury/ Newport	\$2,220	\$2,701	\$74	\$91	6.0%	-0.4%	-0.8%	5.0%	1.7%	6.8%
RR4: Upper Valley	\$2,142	\$2,400	\$84	\$98	6.4%	-0.4%	-0.5%	5.6%	2.4%	8.1%
RR5: Rutland area	\$1,843	\$2,400	\$84	\$98	2.6%	3.3%	1.4%	6.8%	1.9%	8.8%

^a Services = individual service lines within a paid claim, not aggregated into "visits." Definitions and coding practices for charged services may differ across payers.

²⁸ Region 1: Burlington, Middlebury, St. Albans
 Region 2: Barre, Morrisville
 Region 3: St. Johnsbury, Newport
 Region 4: WRJ, Randolph, Brattleboro, Springfield
 Region 5: Rutland, Bennington

6.5 Outpatient facility spending by service category

Categories of services within outpatient facilities were classified according to revenue code type, to provide clinically relevant analytic groupings for the decomposition analysis. The contribution of each category to overall spending growth was calculated (**Table 8**). In addition to the “other outpatient services” category (mental health, rehabilitation, etc.), outpatient surgery and pharmacy and supplies were the greatest contributors to spending growth.

Table 8: OUTPATIENT FACILITY SPENDING BY SERVICE CATEGORY, MEDICARE 2008 and 2012.
Outpatient facility spending, Vermont residents, (source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL					
Service Category ^a	Spending on service category per resident per year		Charged services per member per year		Percent Contribution to 2008-2012 PMPY outpatient facility spending increase
	2008	2012	2008	2012	
Dialysis	\$123	\$170	0.5	0.5	3.5%
Durable medical equipment (facility-only charge)	\$6	\$5	0.0	0.0	0.0%
Lab/Pathology	\$197	\$226	13	13	6.8%
Other Ancillary	\$19	\$23	0.2	0.3	0.7%
Other outpatient services ^b	\$901	\$1,056	5.6	6.2	35.8%
Outpatient surgery	\$283	\$360	0.5	0.5	17.9%
Pharmacy and med/surg supply; packaged services	\$216	\$311	1.5	1.2	22.0%
Professional fees on facility bill ^c	\$36	\$53	0.7	0.9	3.8%
Radiology services ^d	\$248	\$277	2.1	2.1	6.7%
Therapeutic Services	\$45	\$57	1.3	1.3	2.7%
TOTAL All outpatient facility services	\$2,007	\$2,440	25.3	25.8	100%

^a Services = individual service lines within a paid claim, not aggregated into “visits”. Categories based on revenue codes, and may differ across payers due to coding practices.

^b Other outpatient services: e.g., mental health, rehab, unclassified.

^c Professional fees on a facility bill: bills submitted on a UB-04 facility bill, with service diagnosis of professional services.

^d Radiology services: Includes services identified as radiology: all imaging that occurs in a facility submitted with UB-04 revenue codes.

7. Drivers of health spending growth: Physician and other professional services

7.1 Approach and definitions

Generally, professional services that are reported using healthcare common procedure coding system codes (HCPCs) were categorized using the Berenson-Eggers Type of Service (BETOS) coding system, which was developed primarily for analyzing the growth in Medicare spending.²⁹ For Medicaid and commercial services, payment categories are used somewhat differently from Medicare, so the distribution of services and definitions differ and limit comparability to earlier analyses of Medicaid and commercial professional service spending growth. For this analysis as well as that of the earlier analysis of commercial and Medicaid, professional services include those provided both in and outside of a hospital admission.

7.2 Context: physician and other professional services spending

Table 9 shows Medicare professional services utilization and unadjusted spending per service for 2008 and 2012. In terms of growth, Medicare spending growth per member per year has remained relatively flat, at 1.2 percent on average. This compares to about two percent annually for commercial professional services.

Table 9: PROFESSIONAL SERVICES UTILIZATION AND SPENDING OVERVIEW MEDICARE. Professional services utilization and spending, Vermont residents 2008-2012 (source: VHCURES, Truven extract 201403)

MEDICARE ALL RESIDENTS	2008	2012	Ave annual growth
Total member years (mm/12)	101,207	110,623	2.2%
Total allowed (x000)	189,228	216,607	3.4%
Spending per member per year	\$1,870	\$1,958	1.2%
Services per member per year ^a	25.6	24.4	-1.2%
Allowed \$ per charged service	\$73	\$80	2.4%

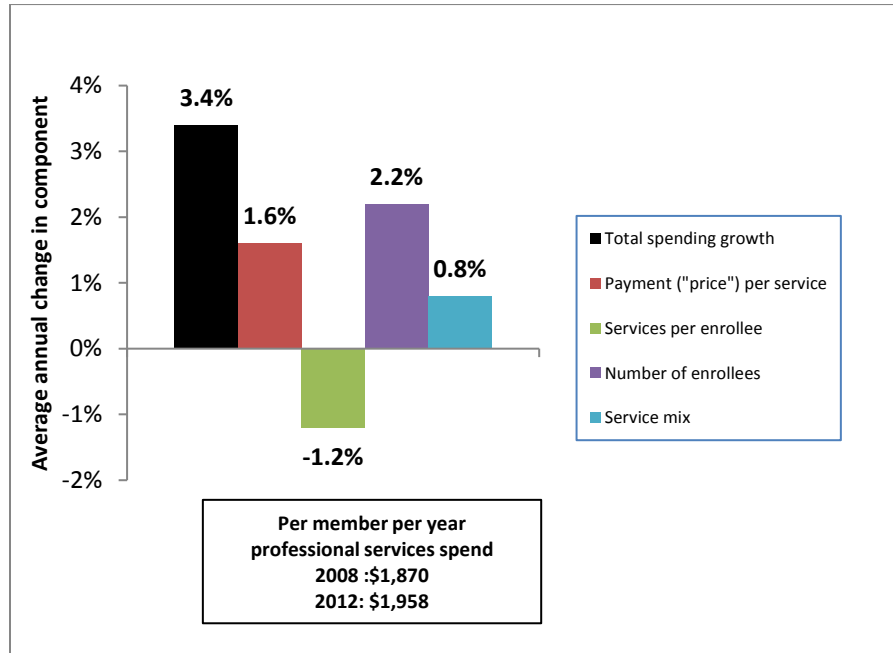
^a Services = individual service lines within a claim, not aggregated into “visits”

7.3 Vermont physician and other professional services spending growth drivers

For physician and other professional services, Medicare spending grew only slightly, from \$1,870 to \$1,958 annually. Growth in price per service was largely offset by a decrease in the volume of services per beneficiary (Figure 4).

²⁹ <http://www.cms.gov/Medicare/Coding/HCPCSReleaseCodeSets/BETOS.html>

Figure 4: PROFESSIONAL SERVICES SPENDING GROWTH DRIVERS, MEDICARE. Professional spending growth drivers, Vermont residents (source: VHCURES, Truven extract 201403)



7.4 Vermont physician and other professional services spending growth drivers by resident location

Table 10 shows Medicare professional services spending by resident location. There is considerable variation by region in per member spending, from \$1,493 in the St. Johnsbury/Newport area to \$2,193 in Burlington in 2012. This variation is due to the number and types of services used by residents, as the Medicare fee schedule specific services is standard within the state. Growth in spending per resident spending, and in price was highest for Burlington residents, but limited to two percent annually. It is interesting to note that St. Johnsbury / Newport had the highest outpatient facility spending per resident, but lowest spending on professional/physician services.

Table 10: PROFESSIONAL SERVICES GROWTH DRIVERS BY RESIDENT LOCATION, MEDICARE. Professional services (inpatient and outpatient, billed through physicians) spending growth drivers, Vermont residents, by market region (RR)³⁰ (source: VHCURES, Truven extract 201403).

MEDICARE ALL RESIDENTS										
Resident region	Professional services spending per enrollee		\$ per service ^a		2008-2012 average annual PMPY change in: (Allowed + volume/enr + service mix + interaction = total PMPY change)				Average annual total program change (PMPY + enrollment+ interaction)	
	2008	2012	2008	2012	Allowed payments ("price") per service	Volume (services/enrollee)	Service mix	Total spending per resident	Enrollment	Total prof program spending
Vermont all residents	\$1,870	\$1,958	\$73	\$80	1.6%	-1.2%	0.8%	1.2%	2.2%	3.4%
RR1: Greater Burlington	\$2,062	\$2,193	\$73	\$80	2.2%	-0.9%	0.2%	1.6%	2.4%	3.4%
RR2: Barre area	\$1,746	\$1,792	\$75	\$81	0.6%	-1.1%	1.1%	0.6%	2.5%	3.2%
RR3: St Johnsbury/ Newport	\$1,434	\$1,493	\$75	\$89	1.8%	-3.1%	2.1%	1.0%	1.7%	2.8%
RR4: Upper Valley	\$1,582	\$1,678	\$70	\$78	1.8%	-1.3%	1.0%	1.5%	2.4%	3.9%
RR5: Rutland area	\$2,201	\$2,255	\$73	\$79	0.9%	-1.1%	0.7%	0.6%	1.9%	2.5%

^a Services = individual service lines within a claim, not aggregated into "visits"

³⁰ Region 1: Burlington, Middlebury, St. Albans
 Region 2: Barre, Morrisville
 Region 3: St. Johnsbury, Newport
 Region 4: WRJ, Randolph, Brattleboro, Springfield
 Region 5: Rutland, Bennington

7.5 Vermont physician and other professional services spending by type of service

Similar to the analysis of outpatient services, professional services were classified into service categories based on BETOS codes, and then examined to determine the relative contribution of each to overall per member per year spending growth (**Table 11**). For Medicare beneficiaries in total, the greatest contributors to spending growth were evaluation and management, and procedures. Imaging decreased in spending over time for physicians not billing through hospitals, similar to patterns with other payers.

Table 11: PROFESSIONAL SERVICES SPENDING BY SERVICE CATEGORY, MEDICARE: Medicare professional services spending growth drivers, Vermont residents, (Source: VHCURES, Truven extract 201403)

MEDICARE PROFESSIONAL SERVICES SPENDING (INPATIENT AND OUTPATIENT), ALL VERMONT BENEFICIARIES					
Service type ^a	Spending PMPY on service type		Services per member per year		Percent Contribution to 2008-2012 PMPY professional spending increase
	2008	2012	2008	2012	
Durable medical equipment	\$222	\$219	2.2	2.2	-3.7%
Imaging	\$151	\$111	3.8	3.0	-45.8%
Evaluation and management	\$648	\$716	9.2	9.0	76.5%
Other outpatient services ^b	\$313	\$307	2.4	2.3	-6.1%
Procedures	\$441	\$505	3.7	4.1	72.7%
Tests	\$91	\$96	4.1	3.8	6.0%
Other (Y) ^c	\$5	\$5	0.1	0.1	0.1%
Other (Z) ^d	<\$1	<\$1	0.0	0.0	0.1%
Total all professional services	\$1,870	\$1,958	25.6	24.4	100.0%

^a Categories based on Berenson-Eggers Type of Service (BETOS) codes. Services = individual service lines within a paid claim, not aggregated into “visits”

^b Other outpatient services: e.g., vision, hearing, speech services, ambulance, chemotherapy

^c Other Y: Additional fee schedules, for various services, and categorized as BETOS CODE Y.

^d Other Z: Local or undefined codes.

8. Comparison of Medicare to other payers

Because of differences in outpatient and professional billing services across payers, it is challenging to compare price growth across payers for non-inpatient services. Measures of hospital admissions are more standardized across payers. While spending per acute stay can be compared, the population for each payer differs considerably, with Medicaid beneficiaries having different demographics than commercial enrollees, and Medicare beneficiaries either disabled or aged, precluding direct comparison, even with current techniques of case mix and severity adjustment, and considering other non-health patient characteristics.

Because analytic measures and billing practices are, for the most part, consistent across time within each payer, a useful policy application is to compare the rate of growth in spending, and isolate intensity-adjusted price changes across payers. Health spending growth rates are generally considered to be interrelated across payers: as public payers (i.e., Medicare and Medicaid) control rates of growth, providers are believed to charge commercial payers increasing rates, in order to maintain acceptable margins.³¹

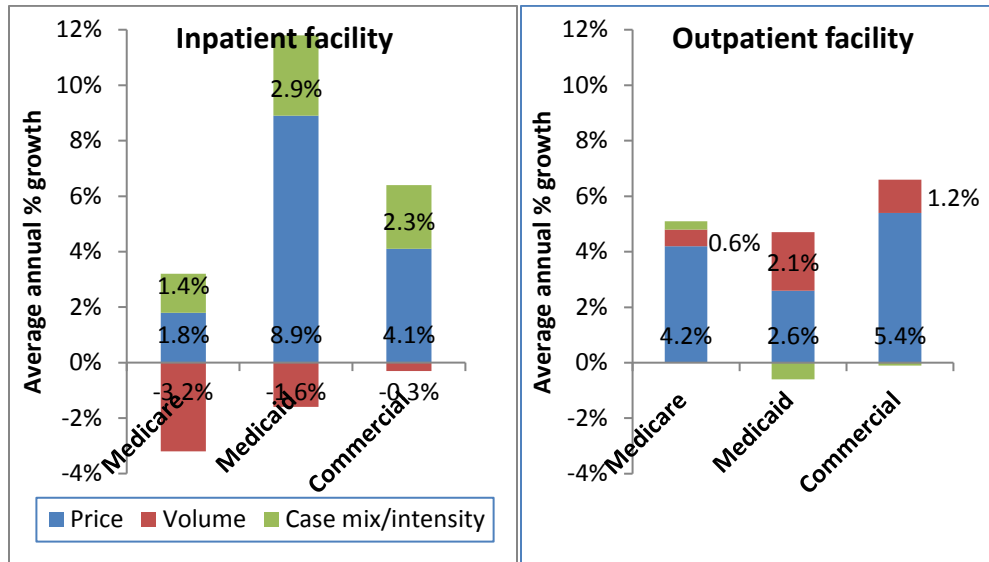
Between 2008 and 2012, annual Medicare non-drug spending in growth in Vermont per beneficiary per year averaged 2.2 percent, compared to two percent for Medicaid non-duals, and five percent for commercially insured Vermonters. Because of differences in populations (i.e., health and socioeconomic risk factors that cannot be fully measured in VHCURES or any other administrative data), the level of spending is not directly comparable across payers.

For inpatient care, annual Medicare growth per beneficiary per year was relatively stable (1.8%), compared to over ten percent for Medicaid non-duals, and six percent for the commercial population. While this is a considerable variation in growth, by 2012, Medicare unadjusted spending per admission was 82 percent of commercial, and Medicaid still just 62 percent of commercial spending per admission. Over this time, as price growth (adjusting for changes in the intensity of care) remained low for Medicare, it increased 4.1% annually for commercial, and 8.9% for Medicaid (still lower level than the other two payers).

Figure 5 compares health spending growth drivers for inpatient and outpatient facility services per member per month by payer. For inpatient services, Medicaid and commercial spending growth were dominated by increases in price. Medicare adjusted price growth was slower than either of the other payers, and contributed equally with case mix to spending growth. Volume (admissions per member) decreased in all cases, but more significantly for Medicare. For outpatient services, price growth dominated spending growth for all payers, with Medicare increasing more rapidly than Medicaid, from a somewhat higher baseline at the service line level.

³¹ Health Care Financing and Organization. A Review of the Evidence on Hospital Cost Shifting. May 2011. (<http://www.academyhealth.org/files/HCFH/HCFHBriefMay2011FINAL.pdf>)

Figure 5: Average annual health spending growth drivers, by type of service and by payer, Vermont insured residents, Medicare, Medicaid and commercial (source: VHCURES, Truven extract 201403, primary payer claims)



The inpatient care decomposition analysis results can be used to compare spending differences across payer. **Table 12** shows the average DRG resource weight for admissions across payer (defined nationally for each DRG by CMS), and the spending for a standard resource unit, the DRG weight of 1.0. In **Table 12**, the dollars represent the average cost per admission for an average inpatient stay of DRG weight of 1.0 for each payer, for all Vermont residents. As shown, Medicaid rates started lowest in 2008, and remain lowest, but by 2012 have come to nearly 90 percent of Medicare, adjusting for differences in resource use. Commercial is highest in all years, which may represent cost shifting as Medicare had very slow growth. As noted earlier, Medicaid prices for inpatient stays increased the most rapidly over this period, but remain lowest.

Table 12: Comparison of unadjusted and adjusted spending per admission by payer, all Vermont residents, 2008-2012. (Source: VHCURES Truven extract 201403)

Medicare all beneficiaries	2008	2009	2010	2011	2012	Ave. annual growth
Average DRG weight	1.49	1.52	1.53	1.52	1.58	1.4%
DRG resource use adjusted \$ per admission*	\$8,297	\$8,403	\$8,735	\$8,901	\$8,861	1.7%
Medicaid non-duals	2008	2009	2010	2011	2012	Ave. annual growth
Average DRG weight	1.13	1.18	1.19	1.24	1.27	2.9%
DRG resource use adjusted \$ per admission	\$5,723	\$6,822	\$7,530	\$8,079	\$8,039	8.9%
Commercial	2008	2009	2010	2011	2012	Ave. annual growth
Average DRG weight	1.22	1.25	1.27	1.28	1.34	2.3%
DRG resource use adjusted \$ per admission	\$10,558	\$11,575	\$12,102	\$12,297	\$12,376	4.1%

*This is calculated as unadjusted \$ per admission/average DRG weight.

For outpatient facility services, Medicare spending per member per year, started out higher than commercial (\$2,007 compared to \$1,511)³² and grew at a rate between that of the other payers, at 5.0 percent annually, compared to four percent for Medicaid and 6.4 percent for commercial. Medicare price growth per beneficiary per year (adjusting for service mix) was 4.2 percent annually, compared to 2.6 percent for Medicaid, and 5.4 percent for commercial services. Medicare charges per service for outpatient services as reported in VHCURES were in some cases less than half that of commercial, at the level of individual service. However, the number of services was higher. This suggests that there may be inconsistent billing practices across payer, or that commercial charges can be up to twice that of Medicare for certain services at the CPT code level.

For physician and other professional services, Medicare spending growth was minimal and half that of commercial spending, at 1.2 percent annually. By 2012, Medicare professional services spending was \$1,958 compared to commercial professional service spending, at \$1,453. Again, comparisons of levels of spending across payer are complicated by differences in billing patterns and case mix. However, adjusted price growth per service, though small, was less than two percent for Medicare and Medicaid, while at three percent for commercial, drove commercial spending growth.

³² Outpatient facility spending per member per year levels for Medicare and commercial cannot be directly compared to Medicaid in VHCURES data, due to the Medicaid category of Government Health Care Activities, which includes both institutional and professional services.

9. Summary/Conclusions/Recommendations

During the years 2008-2012, Medicare allowed spending per beneficiary grew relatively slowly, as did national Medicare spending, and much slower than commercial and Medicaid. For Medicare, per member per year spending growth of two percent per year over this time was driven by a combination of increasing prices and severity, with overall program spending growth driven higher by increases in the number of beneficiaries. This is in contrast to commercial health care spending growth, for which price grew more rapidly, and was a clear driver of spending increases for most services.

Medicare inpatient spending grew much more slowly than outpatient care, which increased by five percent annually during this time, and more slowly than commercial and Medicaid inpatient spending. For Medicaid and commercial coverage, price drove rapid inpatient and outpatient facility growth, more than offsetting any decrease in admission or service use rates. Professional service spending (physician and other professional services) was relatively stable for Medicare, similar to findings for Medicaid and commercial.

Moving toward an all-payer model

Estimating the impact of transitioning to a new payment system on expenditures is a complex activity that must take into account the baseline levels of reimbursement across payers, number of services, recent trends, quality of care, and the behavioral impact on providers and patients of changing reimbursement. Understanding the reporting differences across payers and payer types, is critical to any standardizing of payments. VHCURES, as currently structured, has several limitations in comparing and standardizing payments. The primary limitation is that it is a multi-payer data set, and merging across payers to build a full payment for a particular claim presents challenges, even for inpatient data.³³ Additional challenges present for comparing outpatient claims across payer, as provider identifiers and grouping methods differ. However, the results from the Medicare, commercial, and Medicaid decomposition studies can be used as building blocks for simulating the impact of moving to an all-payer model for inpatient care.

For instance, the following questions must be addressed in order to leverage the VHCURES data to begin to build a model and simulate the impact of an all payer payment methodology:

1. What is the basis for payment? For example, will payment be per stay, per unit DRG, DRG resource unit, or on some other criteria? Presumably, payments will continue to be hospital specific, but whether annual increases will be constant across hospitals, or match Medicare methodology (bringing in wage index, indirect medical education, and capital replacement factor) or even reflect issues unique to Vermont must be determined.

³³ For instance, an inpatient stay, covered by a combination of payers, is not identified as a single stay in VHCURES. As a result, to identify a unified, “all payer” stay in such cases, we need to match by patient ID and stay dates. Moreover, the diagnoses for such unified stays could be different from those showing on the claims for that stay for a single payer, resulting in a DRG assignment that is different from the DRG assignment for a “single payer” stay.

2. Is there a discount for government payers? While a pure all-payer system might pay exactly the same regardless of payer, it is likely that the two government payers might be given a modest discount (for example, in Maryland Medicare and Medicaid pay 15% less than private carriers).
3. What is the base year for payment analyses, and what is an appropriate level of growth? Growth could be based on update factors dependent on empirical evidence, or they could be prescribed (e.g., based on the corresponding national update factors).
4. How do simulated payments for categories of interest (by payer type, by hospital, by region) and compare with actual payments to determine winners and losers under an all-payer system?
5. What is the impact of the proposed changes on providers, and on original estimated growth in spending by payer?

Once these questions are addressed, the impact of payment reform on providers, on the health system environment, and on Vermonters, can be more accurately assessed, and a pathway informed.

Finally, the data presented in this report should be considered within the context of other recent health spending analyses conducted recently by this team and by others for the Green Mountain Care Board. The information included in this report, in particular, complements our health accounts reports, and our companion studies of the inpatient care market, and the population and health service analyses by Vermont region. Together these studies present both a baseline for understanding the health care environment, and guiding and monitoring health system transformation, as data are updated.

Health Spending Growth Drivers in Vermont, Medicare beneficiaries, 2008-2012

Appendix A: Supplemental Tables

- 1. Population table: Specifications for selection of the population for analysis**
- 2. Definitions and coding**

1. Population table: Specifications for selection of the population for analysis

Population	Specifications	2008 enrollment, member months/12	2012 enrollment, member months/12
Total all medicare	at least one month having MED_MDCR_ELIG_FLAG=1 and MED_MDCR_ADVANTAGE_FLAG not in ('1','2','4','9','A','B','C') and ZipST = 'VT'	101,207 (107,312 unique individuals)	110,623 (120,202 unique individuals)
Medicaid full coverage dual eligible	at least one month having MED_MDCR_ELIG_FLAG=1 and MED_MDCR_ADVANTAGE_FLAG not in ('1','2','4','9','A','B','C') and MED_MDCD_FULL_COV_FLAG=1 and MED_MDCD_DUAL_COV_FLAG=1 and and ZipST = 'VT'	16,398 (19,150 unique individuals)	18,252 (21,510 unique individuals)
Revised Market Region (RR) definitions and populations		Total Medicare enrollment, Member months/12 2008 / 2012	Dual eligible enrollment, Member months/12 2008 / 2012
RR1:Greater Burlington	Burlington, Middlebury, St. Albans	33,232 / 36,595	5,248 / 5,837
RR2: Barre area	Barre, Morrisville	14,413 / 15,929	2,545 / 2,773
RR3: St.Johnsbury/Newport	St/ Johnsbury/Newport	10,77 / 11,522	2,073 / 2,271
RR4: Upper Valley	White River Junction, Randolph, Brattleboro, Springfield	22,755 / 24,971	3,004 / 3,484
RR5: Rutland area	Rutland, Bennington	20,050 / 21,605	3,530 / 3,886

2. Definitions and coding

Service	Definition																						
Inpatient acute stay	Institutional inpatient hospital claims (bill type 11, 12, 85). The admission and discharge dates were assigned by Truven from the claim's room and board revenue code (0100-0179, 020-0219, 0721-0724) service dates.																						
Inpatient other stay	Institutional inpatient hospital or facility claims including room and board, that are not acute as defined above. Includes skilled nursing and other non-acute settings.																						
Professional services	Professional bills, CMS 1500 form professional services procedure codes, no facility charges. Includes all professional physician and non-MD services (e.g., physical therapy, occupational therapy).																						
Outpatient facility	Outpatient Detail institutional claims submitted by rural clinics (bill type 71) , renal dialysis centers (72), outpatient rehab facilities (74), CORFs (75), CMHCs (76), FQHcs (77), hospice facilities (81-82), and critical access hospitals (85). Note: Inpatient Service (VTS) claims were summarized as IP, LTC, PAC, or Home Health.																						
Outpatient service categories	<table border="0"> <tr> <td colspan="2"><u>UB-04 form rev codes</u></td> </tr> <tr> <td>Dialysis</td> <td>820-859</td> </tr> <tr> <td>DME</td> <td>290-299</td> </tr> <tr> <td>Lab/Pathology</td> <td>300-319</td> </tr> <tr> <td>Other ancillary</td> <td>900-929</td> </tr> <tr> <td>Other outpatient services</td> <td>All other</td> </tr> <tr> <td>Outpatient surgery</td> <td>360-369; 481;490;499;790</td> </tr> <tr> <td>Pharmacy and medical supply</td> <td>250-259;262;270-279;343-344;621-633;636-637;</td> </tr> <tr> <td>Professional fees</td> <td>960-988</td> </tr> <tr> <td>Radiology services</td> <td>320-342;349-359;400-409;610-619;</td> </tr> <tr> <td>Therapeutic services</td> <td>420-449;940-952</td> </tr> </table>	<u>UB-04 form rev codes</u>		Dialysis	820-859	DME	290-299	Lab/Pathology	300-319	Other ancillary	900-929	Other outpatient services	All other	Outpatient surgery	360-369; 481;490;499;790	Pharmacy and medical supply	250-259;262;270-279;343-344;621-633;636-637;	Professional fees	960-988	Radiology services	320-342;349-359;400-409;610-619;	Therapeutic services	420-449;940-952
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Government Health Care Activities (GHCA) (Medicaid only)	Category of service = GHCA																						

For identifying Medicare primary claims, we used the VHCURES field “line primary payer paid amt”. If this field was greater than \$0 it indicated a primary payer other than Medicare. Such claims were excluded from the Medicare analyses.

Health Spending Growth Drivers in Vermont, Medicare beneficiaries, 2008-2012

Appendix B: Technical Notes

1. Hospital inpatient care

Inpatient spending includes the spending on facility services provided to patients, while admitted to acute hospitals (including bill type codes 11, 12, and 85). The inpatient analysis excludes spending on services performed and separately billed by physicians and other professionals, which is included in the professional component of spending drivers. In order to standardize service classification and appropriately measure case mix, all inpatient admissions in all years of the study were assigned by Truven Health Analytics to a diagnosis related group based on diagnoses and procedures.³⁴

Defining change in resource mix: Admission counts, total spending, and DRG resource weights were calculated for each year and hospital. Such DRG resource weights are assigned to inpatient diagnostic related groups (DRGs) based on a consistent algorithm in order to denote average appropriate resource use. These weights are useful for adjustment in making comparisons to national norms, or to measure changes in average appropriate resource use across time. A hospital’s appropriate resource use per patient is sometimes referred to as its ‘intensity’ of services and is one of the three major components of a spending decomposition. A change in a hospital’s average intensity of service from year to year may be due to either a change in case mix (e.g., more severe patients) or a change in the anticipated resource use to treat similar patients in different years (e.g., between 1985 and 1986 cataract replacement changed from a surgery requiring up to a 3-day stay to a same-day procedure). The analyses of Vermont’s hospital inpatient spending decompose the growth rate from 2008 to 2012 into price, intensity, and volume components. The analyses are based on VHCURES hospital facility claims (excluding professional services that occur during the stay). Claims provide variables for allowed payment, diagnoses and procedures, hospital identity, and patient characteristics. The components of growth are calculated by type (e.g., commercial, Medicaid, etc.) and per category (e.g., per region, per critical access status, etc.) after summarizing allowed payments, DRG weights, and number of stays. As the formulas below show (with 2008 as base year b and 2012 as target year t), the volume growth component uses only total inpatient stays for its calculation, while price growth and intensity growth are based on divided totals in each year. The four-year volume growth total is the ratio of 2012 number of stays to 2008. The four-year price growth rate is the ratio of allowed payment per DRG in 2012 to allowed payment per DRG in 2008, and the four-year intensity growth rate is the ratio of average DRG weight per stay in 2012 to the same measure in 2008.

$$\begin{aligned}
 \text{Four Year Price Growth Rate (2008 to 2012)} &= \text{Price}_t / \text{Price}_b - 1 \\
 &= \frac{(\text{Total Allowed Payment}_t / \text{Total DRG weights}_t)}{(\text{Total Allowed Payment}_b / \text{Total DRG weights}_b)} - 1
 \end{aligned}$$

³⁴ Truven Health Analytics Disease Staging Software v 5.26

$$\begin{aligned} \text{Four Year Intensity Growth Rate (2008 to 2012)} &= \text{Average DRG weight}_t / \text{Average DRG weight}_b - 1 \\ &= \frac{(\text{Total DRG weight}_t / \text{Total Stays}_t)}{(\text{Total DRG weight}_b / \text{Total Stays}_b)} - 1 \end{aligned}$$

$$\text{Four Year Volume Growth Rate (2008 to 2012)} = \text{Total Stays}_t / \text{Total Stays}_b - 1$$

Each four year growth rate, p_{4yr} , can be annualized as follows: $p_{\text{annual}} = (1 + p_{4yr})^{1/4} - 1$

The total growth rate p associated with price growth rate p_1 , intensity growth rate p_2 , and volume growth rate p_3 is given by: $(1 + p) = (1 + p_1) * (1 + p_2) * (1 + p_3)$. By expanding and subtracting 1 from both sides, p is found to be the sum of the growth components, $p_1 + p_2 + p_3$, plus interaction terms (e.g., $p_1 p_2$). The existence of interaction terms in a decomposition analysis is inevitable, but is usually small. Interactions may be allocated proportionally among the decomposition components, but we did not choose to do so. Instead each calculated decomposition component derives from an exact formula without further adjustment. During the study period, there were revisions and additions to the set of DRGs and modifications of existing DRG weights. While no method of adjusting for all of these changes would be perfect, we felt that in light of these changes, the fairest approach to decomposing growth into price and intensity components would be to classify the DRGs of hospital stays based on the algorithm consistent with the year in question. Thus, DRGs for 2008 were based on version 25 of the MS-DRGs and DRGs for 2012 were based on version 30. Our concept of change in intensity therefore is really the combination of two changes – a change in patient mix (which would be determined by using the same DRG version across years) and a change in appropriate resource use (which would be determined by applying version 25 and version 30 to the same set of patients).

2. Outpatient facility and professional services

Outpatient facility and professional services growth drivers of price, volume and service mix were also analyzed. Because in the outpatient setting a standard service such as a hospital admission is not available, a different method was used to measure these drivers over time. Calculation of the price growth component was derived from a “market basket” approach, whereby standardized quantities and mixes of items from defined service categories³⁵ were used to determine the growth in allowed payments over time. For the years 2008 and 2012, claims data on allowed payments for a market basket of services were used to calculate average unit prices within service categories, and corresponding total allowed payments.

For each setting (outpatient services or professional services), the ratio of 2012 to 2008 allowed payments for the market basket represents Vermont’s four-year price growth. The component of growth due to volume is based on the weighted change in total units of service, with the weights based

³⁵ An obvious feature of this method is that it takes into account a more expensive service substituting for a less expensive service over time (e.g., an MRI, or an even more expensive 3-D MRI, substituting for a scan) as a price effect. Some providers would want this classified as a service mix (technology) effect. Our use of broad service categories in the calculation of price and service mix growth rates will equate services that many providers would not want to see made equivalent.

on average price per service category unit across target and baseline years. Finally, the service category mix growth component is the residual change not attributable to these first two components. The service category mix component reflects changes in the proportional use of categories of services that differ from overall change. For example, it would reflect the degree to which outpatient pharmacy and radiological services have disproportionately grown during the period. Formulas and further details of the methodology used for decomposition of growth are provided at the end of this section. For outpatient facility services, in order to assemble a market basket of services, we classified services into homogenous service categories based on Revenue Codes. These were aggregated into ten Revenue Center service categories: dialysis; durable medical equipment; lab/pathology; other ancillary; outpatient surgery; pharmacy/supplies; professional fees within facilities; radiological services; and therapeutic services.

For professional services, HCPC procedure codes were available, and were used to create standard Berenson-Eggers type of services (BETOS) categories. Within the standard BETOS categories there are three categories specific to Medicaid claims for special services, including vendor services and some specific to behavioral health. The proportion of special codes in Medicaid claims limits the direct comparison of professional services between Medicare, Medicaid and commercial payers.

Details of the decomposition methodology for facility and professional service spending:

This section explains how the total expenditure growth over the study period is decomposed into price, service category mix, and utilization change. We formulate expenditure growth as:

$$\text{Expenditure Growth} = \text{Total Expenditure in Target Year} - \text{Total Expenditure in Baseline Year}$$

Using notations of N_{t_j} and N_{b_j} for number of services within service category “j” in Target Year and Baseline Year respectively, and P_{t_j} and P_{b_j} for average price per service in Target Year and Baseline Year for the same service category of “j”, we can symbolize the expenditure growth formula as following:

$$\text{Expenditure Growth} = \sum_{i=1}^n N_{t_i} * P_{t_i} - \sum_{i=1}^n N_{b_i} * P_{b_i}$$

Expenditure growth was then mathematically divided into its components:

$$\begin{aligned} &= \sum_{i=1}^n (P_{t_i} - P_{b_i}) * \frac{1}{2} * (N_{b_i} + N_{t_i}) \quad (\text{Price increase portion}) \\ &+ \sum_{i=1}^n [(N_{t_i} - N_{b_i} * \frac{\sum_{i=1}^n N_{t_i}}{\sum_{i=1}^n N_{b_i}})] * \frac{1}{2} * (P_{b_i} + P_{t_i}) \quad (\text{Contribution of Service Category Mix change}) \\ &+ \sum_{i=1}^n [(N_{b_i} * \frac{\sum_{i=1}^n N_{t_i}}{\sum_{i=1}^n N_{b_i}}) - N_{b_i}] * \frac{1}{2} * (P_{b_i} + P_{t_i}) \quad (\text{Contribution of Service Volume Increase}) \end{aligned}$$

Multiplied by the appropriate prices and summed, the contribution of each to spending growth can be calculated. For example, if the volume of the imaging services in base year was 1,000 and the overall rate of utilization increase for entire market basket has been 15% then the proportional (expected)

utilization of imaging services in target year should have been equal to $1,150 = 1,000 \cdot (1 + 0.15)$. If the actual (observed) utilization in the target year is 1,300 then the imaging services have increased disproportionately and in a pace faster than the overall pace for entire basket. So, any disproportionate change in volume is multiplied by the mid-point price to provide an estimate of the “Contribution of Service Mix Change.” The resulting contribution of the various changes in service category mix would be positive, if the change in mix moves toward high price service categories, and negative if the change in mix moves toward lower price services. In other words, if a health system adopts more inexpensive technologies (pharmacy), while reducing use of alternative expensive ones (outpatient surgeries), the contribution from the service category mix component could be negative. Finally, the component of spending change attributed to utilization is a weighted sum of utilization across all service categories, with the weights being mean unit prices averaged across target and baseline years. This component reflects how much spending would change, if use within service categories all changed at the same rate.