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Report Summary: Analysis of Overuse and Potentially Avoidable Use of Health Care Services in Vermont

By: Green Mountain Care Board; **Date:** December 29, 2023
Prepared for: Health Reform Oversight Committee
Frequency: One Time Report; **Statute:** Act 83 of 2022, Budget Adjustment Act

Background:

- A report to the Vermont Health Reform Oversight Committee identified gaps in information related to healthcare cost drivers and opportunities for cost reduction.
- In 2022, The Green Mountain Care Board was given funding and directed by the legislature to analyze overuse and potentially avoidable utilization use trends within Vermont.
- The Green Mountain Care Board assigned Mathematica to conduct analyses to fill the identified gaps.

Report Methods:

- **Data:** claims data from Vermont's all-payer claims database, the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES)
- **Scope:** 10 overuse services and 3 potentially avoidable use services across different regions within Vermont and by payer type.

Key Terms

Overuse Services: clinically unnecessary and potentially harmful procedures that provide little to no benefit (and even may cause harm) to patients receiving such services (d*efined by medical professional societies and entities such as the American Board of Internal Medicine and the United States Preventive Services Task Force*).

Potentially avoidable use services: possibly unnecessary health care services, specifically in this report, avoidable emergency department visits, preventable hospitalizations, and unplanned 30-day hospital readmissions.

Report Highlights:

- Overuse and potentially avoidable use rates generally declined from 2017 to 2021. The COVID-19 pandemic likely influenced the decline in 2020 and 2021.
- Spending on these services did not always decrease to the same extent, and in some cases, it increased due to an offsetting increase in prices.
- Vermont's spending trend on the ten most overused services was minimal compared to the total healthcare spend.
- Potentially avoidable inpatient service use accounted for almost $73 million in spending in 2021 (about 1 percent of total health care spending in Vermont).
- Considerable regional variation existed in both overuse and potentially avoidable use services, with generally higher usage rates in the more rural northern and eastern parts of the state.
- Next steps:
    - Potentially avoidable use and overuse results are being considered in the hospital transformation work under Act 167.
    - Consider rerunning analysis five (5) years post COVID to understand true use and spending trends.

For more information, read the full report.

Analysis of Overuse and Potentially Avoidable Use of Health Care Services in Vermont

Final Report

December 29, 2023

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Acknowledgments

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Executive summary

Use of avoidable and unnecessary health care services is common, and finding ways to reduce spending associated with these services is high-priority health policy goal. In this report, we analyzed two types of avoidable and unnecessary health care in Vermont: (1) overused services, which are procedures that are clinically unnecessary and may even be harmful to patients;[1] and (2) potentially avoidable use, which includes services that could be avoided with better access to high-quality primary care.[2] Using data from the state's all-payer claims database, the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES), we assessed use and spending for 10 overuse services and 3 potentially avoidable use services. Exhibit ES.1 shows total spending for these services in 2021 and spending growth over our study period (2017–2021). We also assessed spending by payer type (Exhibit ES.2) and by hospital service area (HSA) of members' residence (Exhibit ES.3).

The following main patterns and findings emerged from these analyses:

- Rates of overuse and potentially avoidable use generally declined over the study period (2017–2021). Spending on these services did not always go down to the same extent or even increased in some cases because the reduction in use was offset by an increase in prices. This finding shows that Vermont has been able to rein in use of avoidable health care services. However, there are opportunities to cut down on spending by further reducing use of these services or by reducing their price.
- Vermont did not spend a lot on most of the ten overuse services we considered. Exceptions included stress testing and percutaneous coronary intervention for stable coronary disease, on which spending declined from $2 million in 2017 to $1.4 million in 2021 and from $1.6 million in 2017 to $1.2 million in 2021, respectively. Spending on all but two overuse services declined over the study period. Working towards following clinical guidelines for patients with stable coronary disease could yield small savings on these services.
- Spending on ED visits that could have been avoided have generally decreased over time across most HSAs and payers. Certain regions remain outliers, and Medicare fee for service and Medicaid spending on such visits remain higher than spending from commercial and Medicare Advantage.
- Potentially avoidable inpatient service use, consisting of preventable hospitalizations and unplanned readmissions accounted for almost $73 million in spending in 2021 or about 1 percent of total health care spending in Vermont. Although rates of these types of inpatient stays declined over the study period, spending did not change from 2017 to 2021. The state could realize some savings by further reducing use of avoidable inpatient services and by working to lower prices of these services. Overall,

[1] Overuse services include prostate-specific antigen (PSA) testing for men ages 75 and over, cervical cancer screening for women ages 65 and over, colorectal cancer screening for adults over age 85, parathyroid hormone (PTH) measurement for patients with Stages 1–3 chronic kidney disease, total or free T3 level testing for patients with hypothyroidism, preoperative stress testing, stress testing for stable coronary disease, percutaneous coronary intervention with balloon angioplasty or stent replacement for stable coronary disease, arthroscopic surgery for knee osteoarthritis, and laminectomy or spinal fusion.

[2] Potentially avoidable use includes avoidable emergency department (ED) visits, preventable hospitalizations (Prevention Quality Indicator [PQI] 90 composite measure), and unplanned 30-day hospital readmissions.

however, total possible savings would be relatively small compared to total spending even if these services could be eliminated completely.

- There was considerable regional variation in all overuse and potentially avoidable use services we analyzed, and rates of these services were generally higher in the more rural northern and eastern parts of the state (Exhibit ES.2). This finding suggests that Vermont could reduce spending on these services by focusing additional health care resources in these parts of the state.

Exhibit ES.1. Total spending and spending growth for each overuse and PAU measure

Measure	Total spending[a] in 2021	Average annual growth in total spending from 2017 to 2021
Overuse measures		
PSA testing for men ages 75 and older	$85,321	-24%
Colorectal cancer screening for adults over age 85	$12,132	-16%
Cervical cancer screening for women ages 65 and older	$43,071	-18%
PTH measurement for patients with stage 1-3 chronic kidney disease	$119,608	23%
Total or free T3 level testing for patients with hypothyroidism	$212,810	20%
Preoperative stress testing	$95,332	-11%
Stress testing for stable coronary disease	$1,373,728	-14%
PCI with balloon angioplasty or stent placement for stable coronary disease	$1,199,740	-15%
Laminectomy or spinal fusion	$989,612	-14%
Arthroscopic surgery for knee osteoarthritis	n.r.	n.r.
Potentially avoidable use		
Avoidable ED visits	$25,053,091	-2%
Preventable hospitalizations (PQI 90)	$35,309,493	-5%
Unplanned 30-day hospital readmissions	$37,479,394	0%

Source: Mathematica's analysis of VHCURES data.

PSA = prostate-specific antigen; PTH = parathyroid hormone; PCI = percutaneous coronary intervention; ED = emergency department; PQI = Prevention Quality Indicator.

n.r. = not reported. In 2017, there were only 18 claims that met the criteria for an overuse case; for the years 2018–2021, there were less than 11 cases in each year. As such, we are not reporting use and payment data for this measure.

[a] We were unable to identify spending amounts specific to overuse services among line-level data in claims for Medicaid beneficiaries; as such, total overuse spending captured here is slightly lower than actual overuse spending. The average annual growth trends for overuse services, however, would likely be similar if we had specific line-level data for overuse services provided to Medicaid beneficiaries. Among overuse claims for Medicaid beneficiaries, we found that one claim line would often have one large lump sum while not having any associated procedure code in the relevant field. When summing all lines associated with an overuse claim for Medicaid beneficiaries, we found payments similar to overuse claims for beneficiaries with a different insurance or payer type. These amounts can be found in the overuse measure tables in Appendix A (see columns labeled 'total claim payments, all lines').

Exhibit ES.2. Total spending and spending growth for overuse and PAU services, by payer

Payer	Total spending in 2021	Average annual growth in total spending from 2017 to 2021
Overuse measures		
Medicare FFS	$1,576,928	-11%
Medicare Advantage	$489,254	39%
Medicaid[a]	$17,109	-2%
Dual eligible	$362,212	-9%
Commercial	$1,380,260	-16%
Potentially avoidable use[b]		
Medicare FFS[c]	$46,032,467	-8%
Medicaid	$21,375,510	0%
Commercial[d]	$37,182,772	13%

Source: Mathematica's analysis of VHCURES data.

[a] For most measures we were unable to identify spending amounts specific to overuse services among line-level data in claims for Medicaid beneficiaries; as such, total overuse spending captured here is slightly lower than actual overuse spending. The average annual growth trends for overuse services, however, would likely be similar if we had specific line-level data for overuse services provided to Medicaid beneficiaries. Among overuse claims for Medicaid beneficiaries, we found that one claim line would often have one large lump sum while not having any associated procedure code in the relevant field. When summing all lines associated with an overuse claim for Medicaid beneficiaries, we found payments similar to overuse claims for beneficiaries with a different insurance or payer type. These amounts can be found in the overuse measure tables in Appendix A (see columns labeled 'total claim payments, all lines').

[b] There may be some duplication between preventable hospitalizations and 30-day readmissions in this measure.

[c] Includes Dual-eligible beneficiaries

[d] Includes Medicare Advantage

FFS = fee for service.

Exhibit ES.3. Total spending and spending growth for overuse and PAU services, by HSA

	Overuse measures[a]		Potentially avoidable use[b]	
HSA	Total spending in 2021	Average annual growth in total spending from 2017 to 2021	Total spending in 2021	Average annual growth in total spending from 2017 to 2021
Barre	$267,993	-13%	$10,186,778	-7%
Bennington	$129,272	-10%	$5,262,424	-8%
Brattleboro	$262,429	42%	$4,664,267	-1%
Burlington	$934,983	-12%	$23,750,254	-1%
Middlebury	$179,372	-13%	$4,726,841	-3%
Morrisville	$60,649	-6%	$6,658,175	3%
Newport	$191,719	42%	$7,175,824	1%
Randolph	$54,050	-18%	$2,619,506	-4%
Rutland	$330,145	-11%	$12,786,062	-5%
Springfield	$89,436	-7%	$4,741,226	-6%
St. Albans	$189,122	-5%	$11,630,983	1%
St. Johnsbury	$128,786	22%	$7,681,740	8%
White River Junction	$273,480	32%	$2,572,521	-2%

Source: Mathematica's analysis of VHCURES data.

[a] For most measures we were unable to identify spending amounts specific to overuse services among line-level data in claims for Medicaid beneficiaries; as such, total overuse spending captured here is slightly lower than actual overuse spending. The average annual growth trends for overuse services, however, would likely be similar if we had specific line-level data for overuse services provided to Medicaid beneficiaries. Among overuse claims for Medicaid beneficiaries, we found that one claim line would often have one large lump sum while not having any associated procedure code in the relevant field. When summing all lines associated with an overuse claim for Medicaid beneficiaries, we found payments similar to overuse claims for beneficiaries with a different insurance or payer type. These amounts can be found in the overuse measure tables in Appendix A (see columns labeled 'total claim payments, all lines').

[b] There may be some duplication between preventable hospitalizations and 30-day readmissions in this measure.

I. Introduction

The Vermont legislative Task Force on Affordable, Accessible Health Care recommended to the state's Senate Health and Welfare Committee in 2021 that a comparative spending analysis and an analysis of health care overuse were needed to fill gaps in information to facilitate the identification of factors driving health care cost and of opportunities to reduce cost or cost growth. One of the key recommendations from the task force was developing analysis of low-value care to identify opportunities to improve the performance of health care system. The Green Mountain Care Board tasked Mathematica with generating evidence to fill these gaps, which we present in this report.

In this report, we summarize findings from overuse and potentially avoidable use (PAU) analyses of 15 types of health care services that are either considered unnecessary because they are not cost effective and may even be harmful to patients or potentially avoidable with better access to high-quality primary care (for example, emergency department visits for nonemergent conditions). We used data from Vermont's all-payer claims database, the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES), to conduct these analyses.

The goal of the overuse and PAU analyses is to document the level and change over time in health care service use that could be avoided through higher quality or more cost effective health care and spending associated with avoidable services in Vermont. We also show how use of and spending for these services differ by region within Vermont and by payer type. These insights can identify key drivers of spending and present potential solutions to improve the efficiency of health care services in Vermont.

This report is primarily intended to present findings about Vermont's overuse and potentially avoidable use analyses that can serve as a starting point for policy discussions on how to reduce health care costs or cost growth. In addition to this report, Mathematica is delivering a data set with stratified calculations to deepen the analysis and calculate other benchmarks. Although we discuss some takeaways from the analyses, it is not a goal of this report to make comprehensive policy recommendations.

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II. Overuse measures

We analyze use and associated spending of ten health care services which medical professional societies and entities such as the American Board of Internal Medicine and the United States Preventive Services Task Force have concluded provide little to no benefit (and even may cause harm) to patients receiving such services.[3] These measures are often described as measures of overuse, and GMCB selected the ten overuse measures from a set of 31 measures, which were developed by Harvard researchers and recently updated by Mathematica.[4] The ten measures reflect care provided in the clinical domains of cancer screening, diagnostic testing, preoperative testing, cardiovascular testing and procedures, and other invasive procedures. We describe provision of these services to Vermont residents during the years 2017–2021, by hospital service area (HSA) and by payer type. We provide rates per 1,000 beneficiaries qualifying for each measure and total spending for each service.

We calculated spending from line-level payments for specified overuse procedures and from total line payments for all line items on claims with a specified overuse procedure. Line-level payments refer to payments for specific procedure codes identified as overuse services among members who were eligible for and received an overuse service. For example, on a typical claim for a prostate-specific antigen (PSA) test, specific line items on the claim would likely include the PSA test, digital rectal examination, and professional services for associated physician visits. When reporting line-level payments, we include only the lines associated with the PSA test, not the lines associated with other services on the same claim. In contrast, when reporting total claim payments, we sum all lines on a claim having a procedure code indicating an overuse service on any line of the claim.

We included payment amounts from insurers and patients when summing payments at the line level for claims with services identified as overused. The overuse analysis has a limitation for services paid by Medicaid because there often are no insurer line-level payments associated with given procedure codes in Medicaid claims. Therefore, payments among Medicaid beneficiaries for specific overuse services are often missing compared to services given to beneficiaries with different insurance or payer types. Continuing with the PSA measure as an example, we do not observe payments for specific claim line items (that is, codes for PSA tests), so we are unable to report average costs of PSA tests for Medicaid beneficiaries in Vermont. We did find, however, that when summing all lines in a claim containing overuse services, there often is a line with a large payment amount in the associated field. We do not present those amounts in this section, however, because we cannot identify payment amounts for specific services identified as overuse services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among members with different payment types. We report total claim costs for overuse services in Appendix A.

[3] Schwartz A.L., A.B. Jena, A.M. Zaslavsky, and J.M. McWilliams. "Analysis of physician variation in provision of low-value services." *JAMA Internal Medicine*, vol. 179, no. 1, 2019, pp. 16–25.

[4] Fleming, C., E. Shin, R. Powell, et al. "Updating a Claims-Based Measure of Low-Value Services Applicable to Medicare Fee-for-Service Beneficiaries." *Journal of General Internal Medicine*, vol. 37, no. 13, 2022, pp. 3453–3461.

A. Cancer screening measures

1. Prostate-specific antigen (PSA) testing for men ages 75 and over

This measure examines PSA testing among men ages 75 years and older with no indication of prostate cancer in claims data dating two years prior to the observation year of interest.[5] PSA tests for this population are considered overuse because diagnosing prostate cancer at this age range does not yield any clinical benefits and PSA tests may lead to false positives, biopsy complications, and overdiagnosis.[6] Across the state, PSA overuse rates ranged from a low of 208 (2020) to a high of 235 (2021) per 1,000 beneficiaries qualifying for the measure (Exhibit A.1.1). There was a wide regional variation in use rates across Vermont HSAs. St. Albans had the highest use rates for every year except 2021, with rates ranging from 274 (2020) to 344 (2017) per 1,000 qualifying beneficiaries (Exhibit II.1). St. Johnsbury had the lowest use rates for every year except 2021, from 104 per 1,000 beneficiaries in 2017 to 127 per 1,000 beneficiaries in 2020 (Exhibit II.1).[7]

Across the state, spending on claim lines for overused PSA tests were lowest in 2019 at $73,949 and highest in 2017 at $103,723 (Exhibit A.1.1). Spending on all line items on claims with at least one PSA-specific overuse procedure were lowest in 2019 at $381,458 and highest in 2021 at $540,448 (Exhibit A.1.1). The mean payment for PSA-specific procedure codes ranged from $20 (2019) to $29 (2017) (Exhibit A.1.1). Among Vermont HSAs, St. Albans had the lowest line-level expenditures for PSA-specific codes at $2,199 in 2019 (yet it had the highest use rate that year, at 291 per 1,000 qualifying beneficiaries) (Exhibit II.3). Across the observation years, Burlington had the highest line-level expenditures in 2017, at $20,147 (Exhibit II.3).

PSA rates and spending differed by payer type. Dually eligible beneficiaries had the lowest use rates each year, ranging from 126 (2019) to 145 (2021) per 1,000 measure-qualifying beneficiaries (Exhibit II.2). For all years except 2017, Medicare fee-for-service (FFS) beneficiaries had the highest use rates, from 222 (2019) to 255 (2021) per 1,000 qualifying beneficiaries (Exhibit II.2). Use rates for Medicare Advantage (MA) beneficiaries ranged from 205 (2020) to 247 (2017) per 1,000 qualifying beneficiaries (Exhibit II.2).[8] While Medicare FFS beneficiaries accounted for 67 percent of total line-level payments for overused PSA tests across 2017–2021, FFS beneficiaries had the lowest mean line-level payments compared to beneficiaries with different payers or insurance product type. Mean PSA-specific line-level payments among FFS beneficiaries ranged from $16 in 2021 to $28 in 2017 (Exhibit A.1.3). Mean PSA-specific line-level payments were highest among the relatively small numbers of commercial beneficiaries in the dataset, ranging from $37 in 2021 to $44 in 2017 (Exhibit A.1.3). Payments for MA beneficiaries were about $30 to

[5] We can only observe absence of prostate cancer diagnosis for members who resided in Vermont for at least two years before the PSA test and were insured by one of the payers reporting to VHCURES. For members who moved to the state between receiving a prostate cancer diagnosis and receiving the PSA test, the latter would not constitute an overuse service. It is therefore possible that we slightly overestimate the rate of overuse PSA tests.

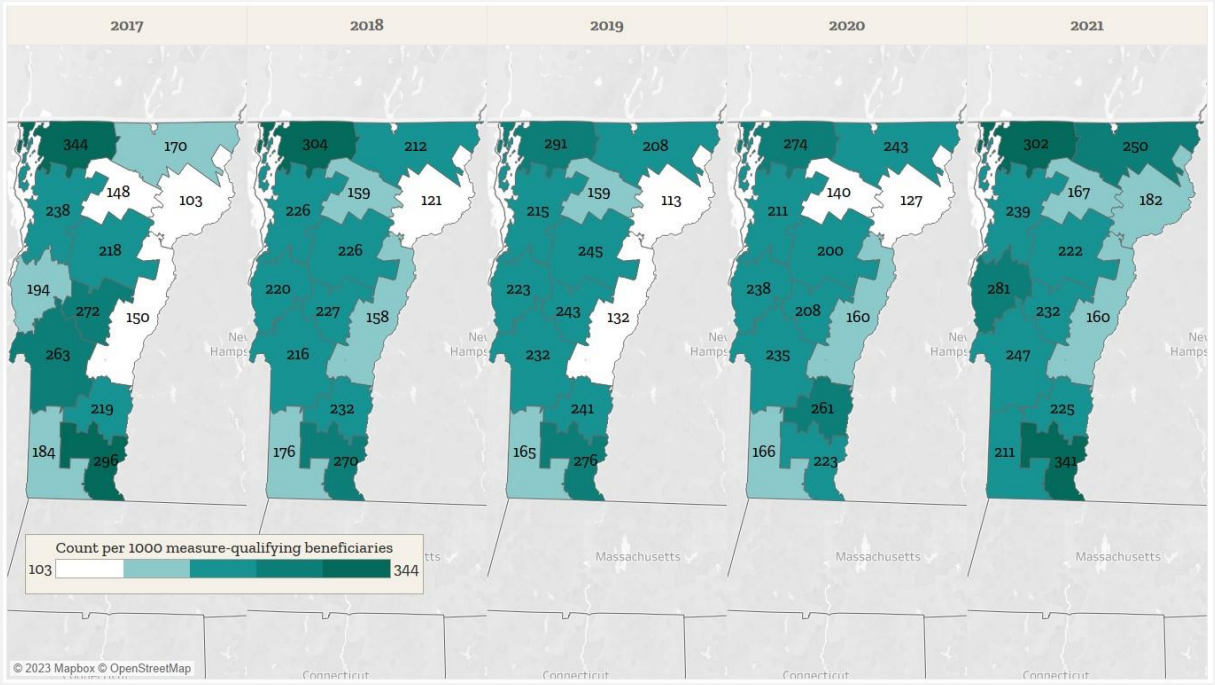
[6] Fenton J.L., M.S. Weyerich, Y. Liu, et al. "Prostate-Specific Antigen-Based Screening for Prostate Cancer, Evidence Report and Systematic Review for the US Preventive Services Task Force." *JAMA*, 319(18):1914-1931.

[7] We note that the COVID pandemic may have resulted in lower amounts of services being provided in 2020 and 2021.

[8] As expected for a measure defined for men ages 75 years and older, the majority of overused PSA tests were given to Medicare beneficiaries, with 88–90 percent of overused PSA tests given to FFS or MA beneficiaries and 95–97 percent provided Medicare, including dually eligible beneficiaries, across 2017–2021.

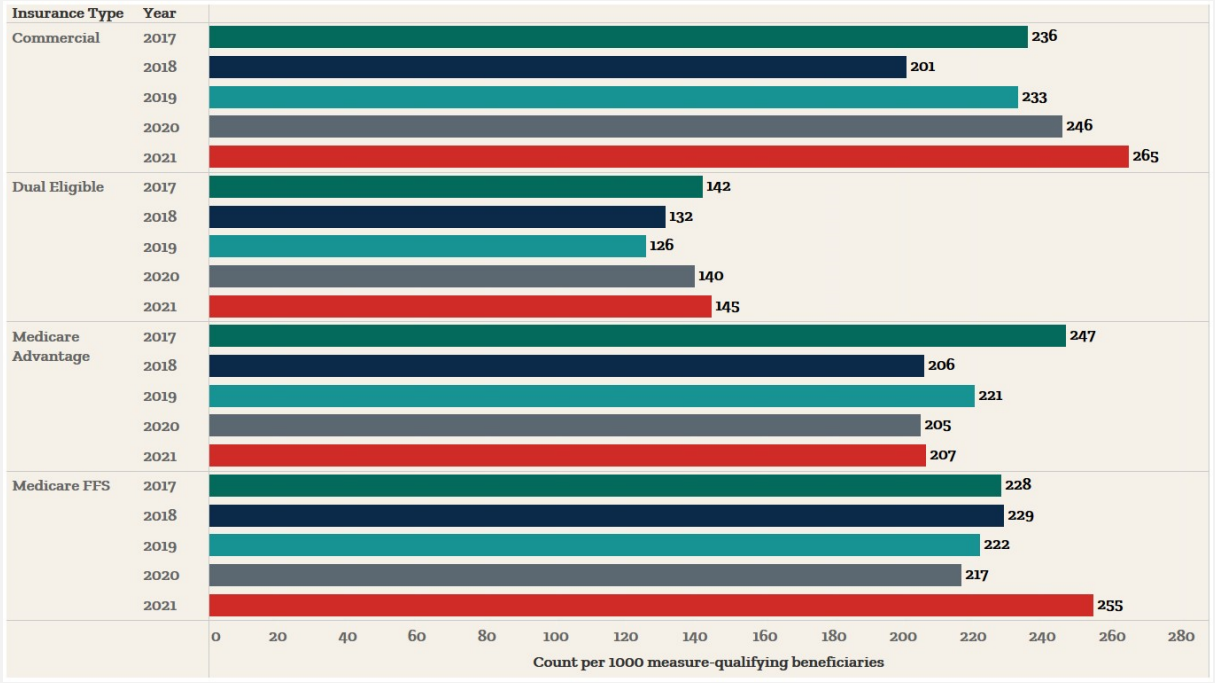
$31 across the study period (Exhibit A.1.3).

Exhibit II.1. PSA tests per 1,000 members qualifying for the measure denominator by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

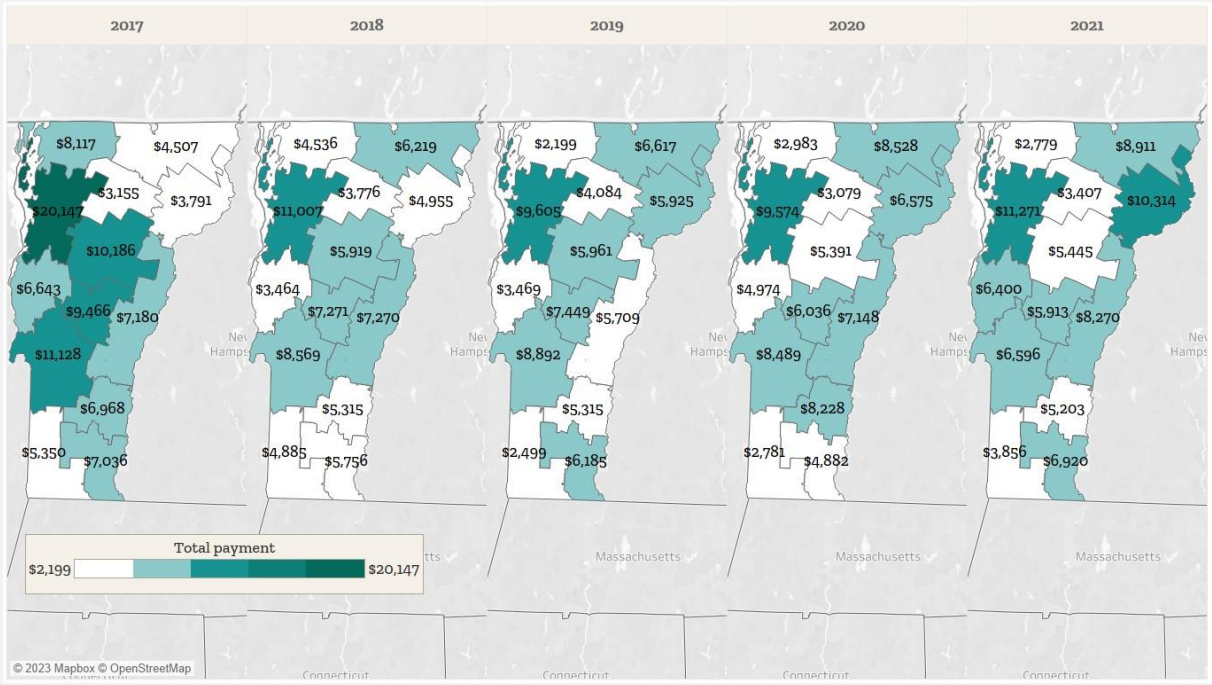
Exhibit II.2. PSA tests per 1,000 members qualifying for the measure denominator by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

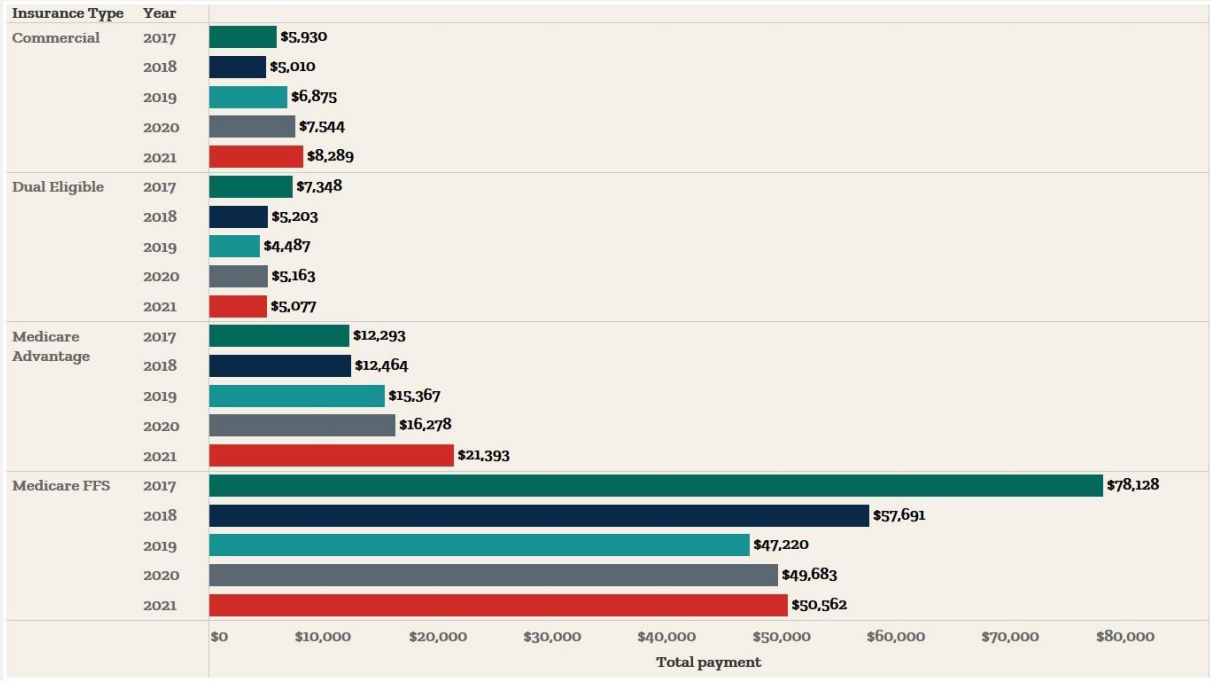
Note: We cannot present payer type categories for years where there were less than 11 cases.

Exhibit II.3. Spending on PSA tests: Line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Exhibit II.4. Spending on PSA tests: Line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

2. Cervical cancer screening for women ages 65 and over

The United States Preventive Services Task Force (USPSTF) recommends against screening of cervical cancer in women older than 65 years who are not at high risk due high false positive rates that could lead to more treatments with potential harms.[9] This measure tracks screening Papanicolaou tests for women ages 65 and over who have (1) no personal history of cancer or dysplasia and (2) no diagnoses of other female genital cancers, abnormal Papanicolaou findings, or human papillomavirus positivity in prior claims. Over the study period, use rates were extremely low for this measure, ranging from 13 per 1,000 qualifying beneficiaries in 2020 to 20 per 1,000 qualifying beneficiaries in 2017 (Exhibit A.1.4). Members in Barre, Bennington, Brattleboro, and Burlington HSAs received the majority of screening procedures, and use rates there were higher, with rates ranging from 17 to 37 per 1,000 qualifying beneficiaries (Exhibit II.5). Interestingly, Barre's rate dropped to 10 per 1,000 qualifying beneficiaries in 2020 and remained low in 2021 at 13 (Exhibit II.5). Bennington's rate remained relatively high in 2020 at 26 per 1,000 and rose to 32 per 1,000 in 2021 (Exhibit II.5).

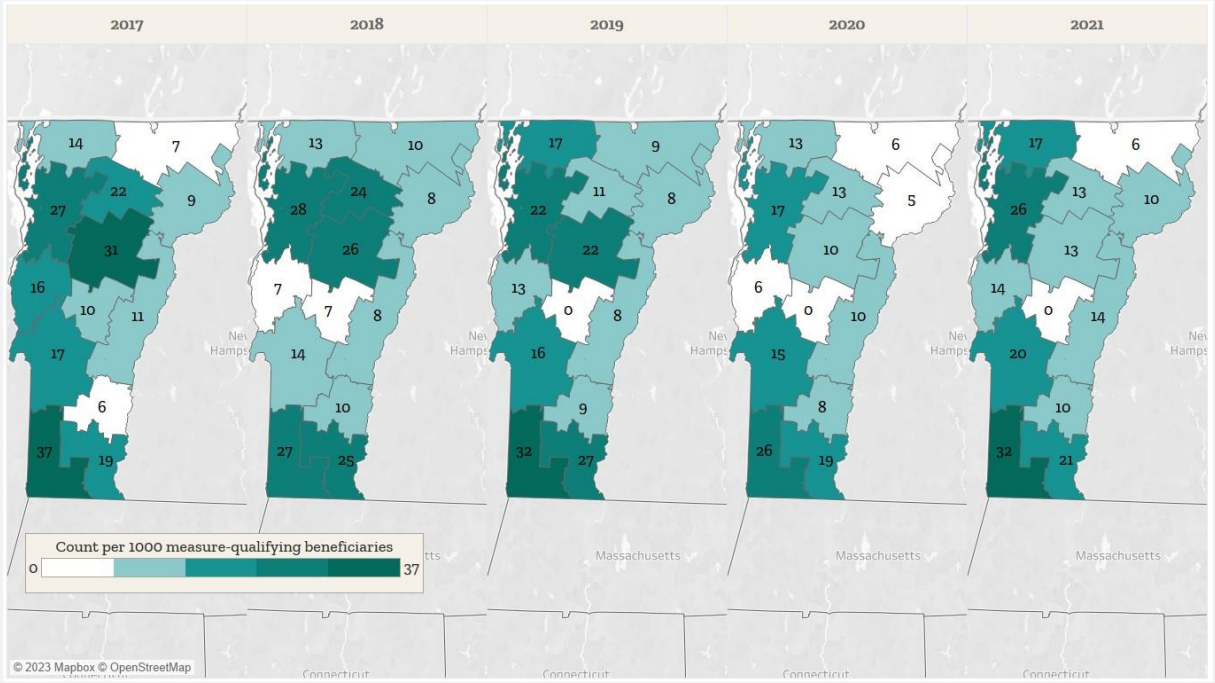
Spending on claim lines for the specified cervical cancer screening procedures were lowest in 2020 at $27,716 and highest in 2017 at $46,776 (Exhibit A.1.4). Payments for all line items on claims with at least one cervical cancer screening overuse procedure were lowest in 2019 at $137,683 and highest in 2017 at $185,919 (Exhibit A.1.4). The mean payment for cervical cancer screening specific procedure codes ranged from $21 (2019) to $30 (2017) (Exhibit A.1.4). Among Vermont HSAs, Randolph had the lowest line-level expenditures for cervical cancer screening codes at $394 in 2018 (Exhibit II.7). Across the observation years, Burlington had the highest line-level expenditures in 2017, at $17,105 (Exhibit II.7).

As this measure tracks services among women ages 65 and older, most overused cervical cancer screens were given to Medicare beneficiaries, with 81–85 percent of eligible screens given to Medicare FFS or MA beneficiaries and 90–93 percent provided to FFS, MA, and dually eligible beneficiaries across 2017–2021 (Exhibit A.1.4). Dually eligible beneficiaries had the lowest use rates each year, ranging from 8 (2020) to 11 (2021) per 1,000 measure-qualifying beneficiaries (Exhibit II.6). For all years except 2020, FFS beneficiaries had the highest use rates, with 24 per 1,000 qualifying beneficiaries in 2017; in 2020, use rates were highest among commercial beneficiaries at 16 per 1,000 qualifying beneficiaries (Exhibit II.6).

Medicare FFS beneficiaries accounted for 74 percent of total line-level payments specific to cervical cancer screens across 2017–2021 Exhibit II.8). Mean line-level payments across payers ranged from $16 among dually eligible beneficiaries in 2019 to $32 among commercial beneficiaries in 2017 (Exhibit A.1.6). Mean cervical cancer screening line-level payments among FFS beneficiaries ranged from $20 in 2019 to $30 in 2017 (Exhibit A.1.6). Payments for MA beneficiaries were about $24 to $30 across the study period (Exhibit A.1.6).

[9] United States Preventive Services Task Force. "Evidence Summary. Cervical Cancer: Screening." Available at https://www.uspreventiveservicestaskforce.org/uspstf/document/evidence-summary/cervical-cancer-screening. Accessed 11/20/23.

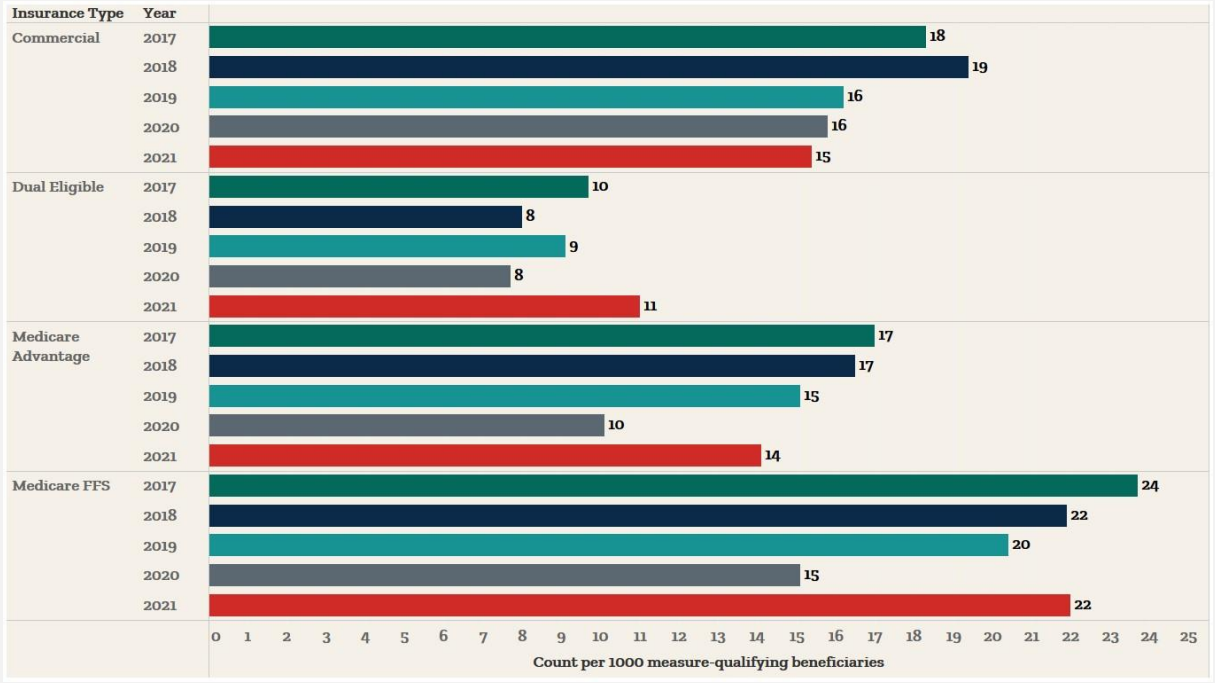
Exhibit II.5. Cervical cancer screening per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

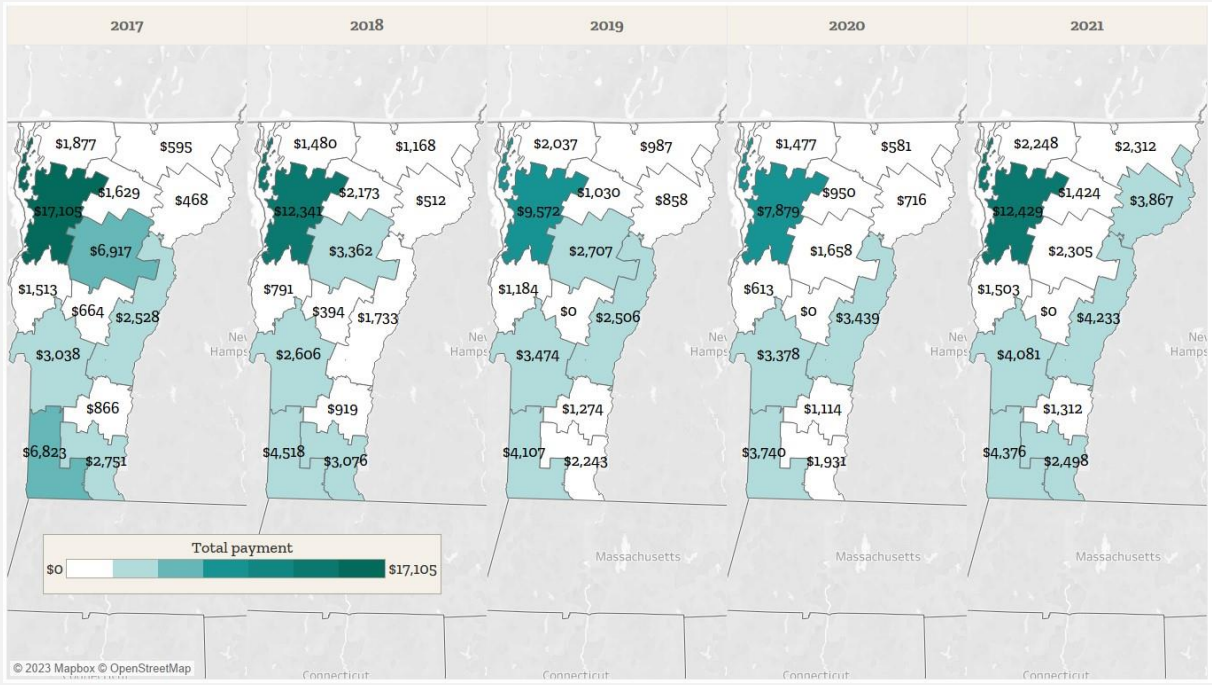
Exhibit II.6. Cervical cancer screening per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

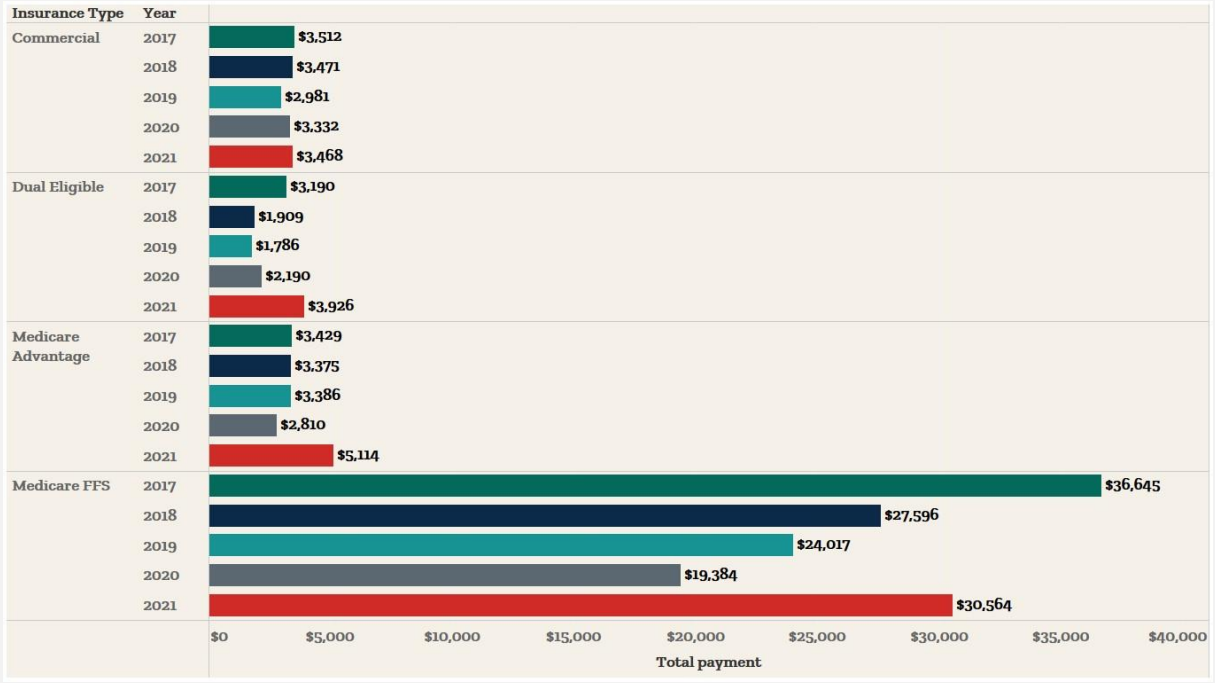
Exhibit II.7. Spending on cervical cancer screening: Line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

Exhibit II.8. Spending on cervical cancer screening: Line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

3. Colorectal cancer screening for adults ages 85 and over

The USPSTF recommends that clinicians selectively offer screening in adults aged 76 to 85 years given net benefits of screening all persons in this age group is small.[10] The potential for harm from colonoscopies is greater among older patients; as such, we adopted the more conservative specification adopted by Schwartz and colleagues employed here.[11] For this measure we observe use and payments associated with colorectal cancer screening (colonoscopy, sigmoidoscopy, barium enema, or fecal occult blood testing) for patients over age 85 with no history of colon cancer. As with the cervical cancer screening measure, use rates for this measure were low, at 8 per 1,000 qualifying beneficiaries in 2020 up to 14 per 1,000 in 2017 (Exhibit A.1.7). Among HSAs, the vast majority of HSA-year observations (40 of 57) had fewer than 11 cases across the study period (see Exhibit A.1.8). As such, we cannot report associated use and payment data. St. Albans was the only HSA with 11 or more Overuse cases each year, and St. Albans had the highest use rates among HSAs with more than 11 cases, ranging from 39 (2021) to 90 (2017) per 1,000 qualifying beneficiaries (Exhibit II.9). Burlington HSA had 11 or more cases from 2017-2020, with rates of 4-8 screens per 1,000 qualifying beneficiaries (Exhibit II.9).

[10] USPSTF. "Final Recommendation Statement. Colorectal Cancer: Screening." Available at https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening. Accessed 11/20/23.

[11] Schwartz A.L., B.E. Landon, A.G. Elshaug, et al. "Measuring Low-Value Care in Medicare." *JAMA Internal Medicine*, 2014;174(7):1067-1076.

Spending on colon screens was low across the study period. Total line payments for colon screen procedures ranged from $7,633 in 2018 to $15,488 in 2017; mean line-level payments for colon screen procedures were lowest in 2018 at $50 and highest in 2020 at $142 (Exhibit A.1.7). Among HSA-year observations with at least 11 cases, total line level payments for colon screen procedures were highest in Rutland HSA in 2019 at $3,207 and lowest in Barre HSA in 2020 at $40 (Exhibit II.11).

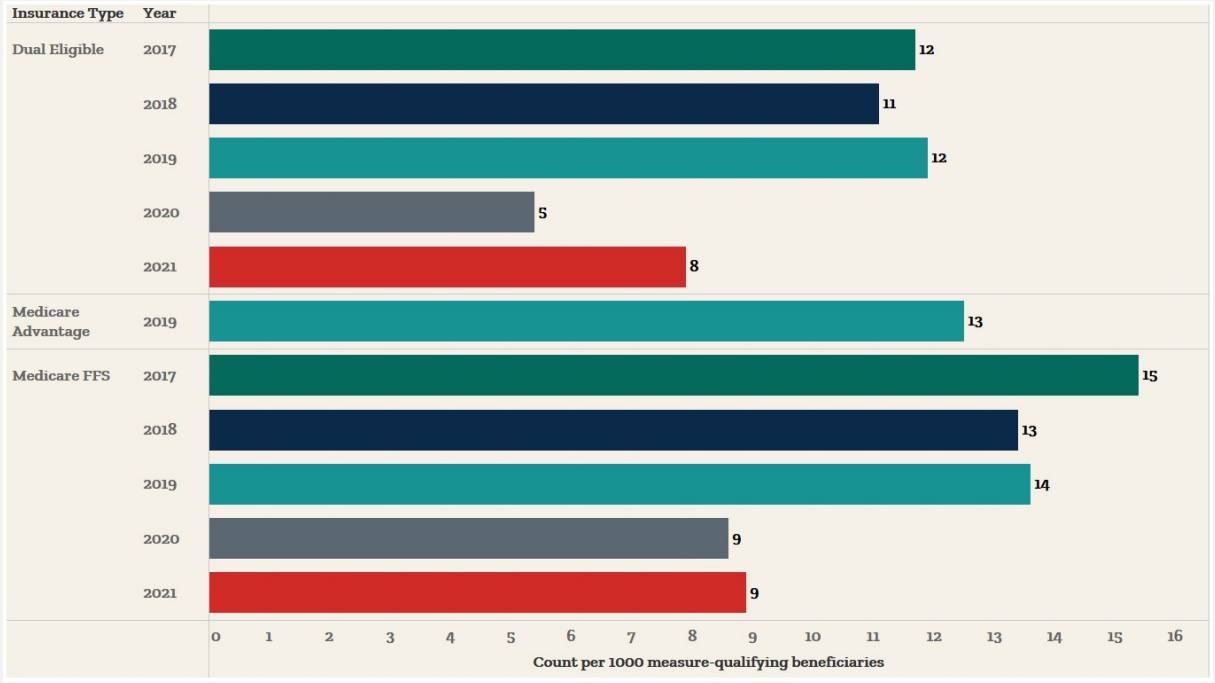
Medicare FFS and dually eligible beneficiaries were the only payer categories with 11 or more cases across 2017–2021, and Medicare FFS beneficiaries accounted for 78 percent of all cases among such categories (Exhibit A.1.9). Dual eligibles and FFS beneficiaries accounted for 98 percent of all cases among payer categories with more than 11 cases across the study period (Exhibit A.1.9). Accordingly, dually eligible and Medicare FFS beneficiaries accounted for 97 percent of colon cancer screening procedures across the study period (Exhibit A.1.9).

Exhibit II.9. Colorectal cancer screenings per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021

Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

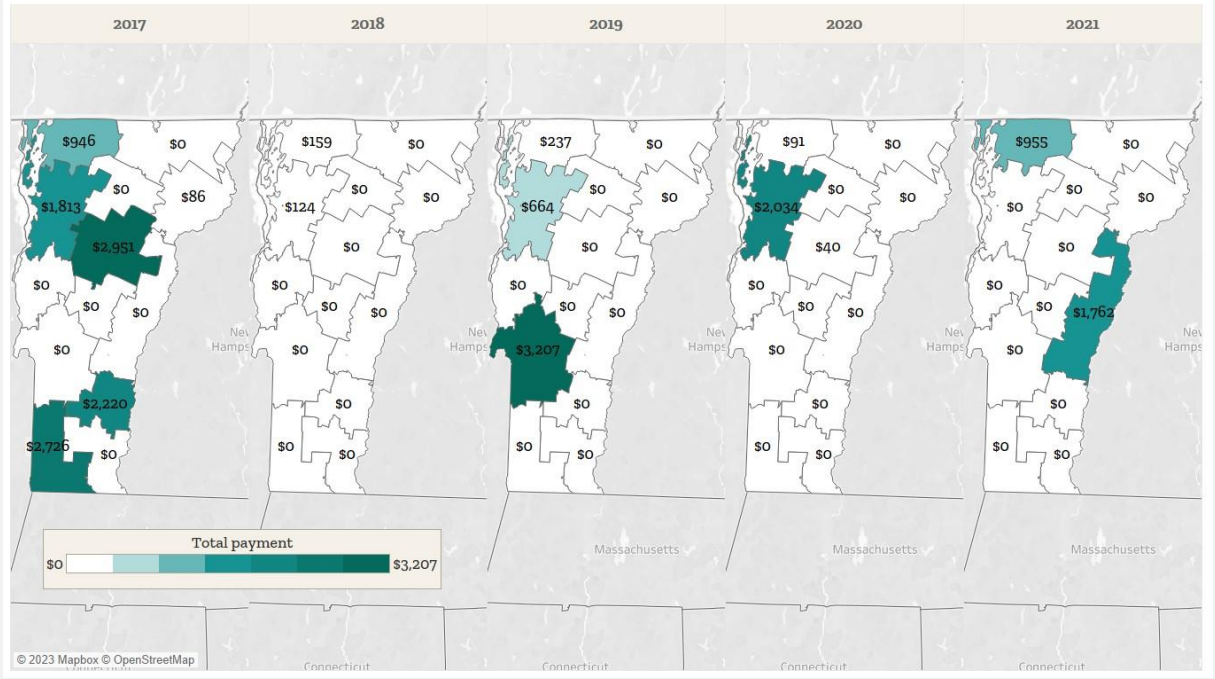
Exhibit II.10. Colorectal cancer screenings per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

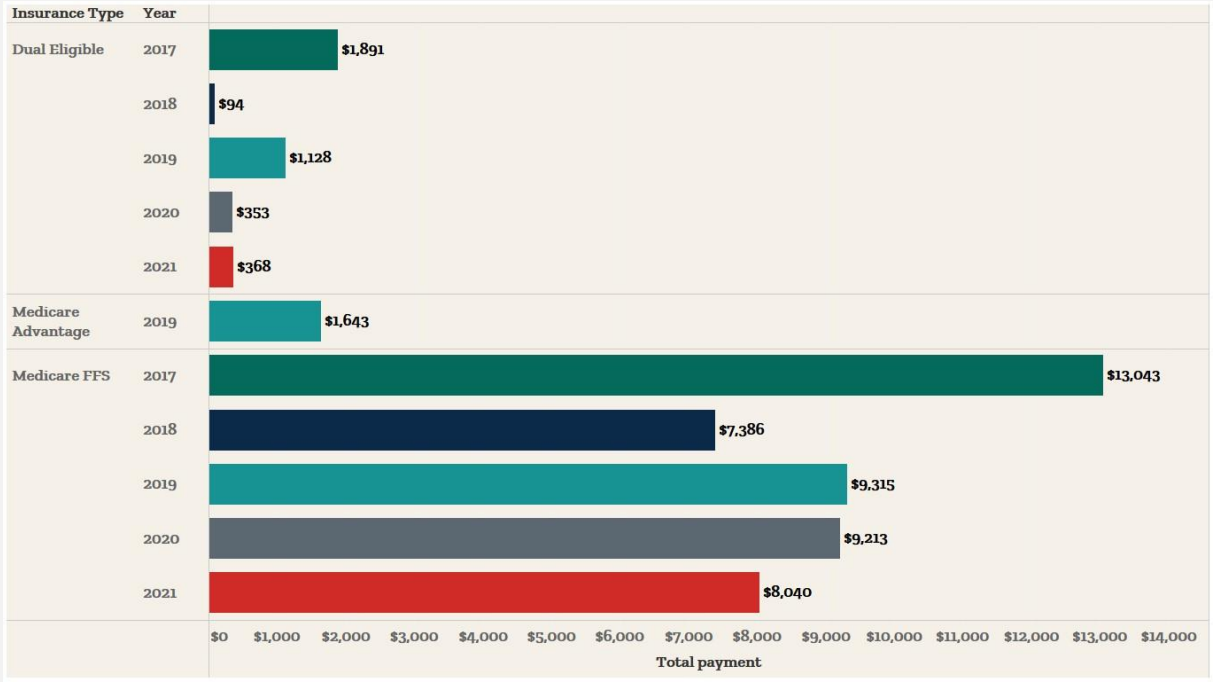
Exhibit II.11. Spending on colorectal cancer screenings: total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

Exhibit II.12. Spending on colorectal cancer screenings: total line-level payments by payer type, 2017–2021.



Source: Mathematica's analysis of VHCURES data.
Note: We cannot present payer type categories for years where there were less than 11 cases.

B. Diagnostic and preventive testing measures

1. Parathyroid hormone (PTH) measurement for patients with stage 1–3 chronic kidney disease

Among patients with chronic kidney disease not requiring dialysis (stages 1-3), there is insufficient evidence regarding clinical benefits associated with PTH measurement; as such we adopted the more conservative specification for this measure as defined by Schwartz et al.[12] For this measure we observe claims associated with PTH measurement for patients who have chronic kidney disease, have had no dialysis services before PTH testing or within 30 days after testing, and have had no hypercalcemia diagnosis during the measurement year. Across the state, the use rate of this measure generally increased over the course of the study period, from 163 per 1,000 qualifying beneficiaries in 2017 to 201 per 1,000 in 2021 (Exhibit A.1.10). Utilization rates were highest in White River Junction HSA in 2017 (248 per 1,000 qualifying beneficiaries); Randolph HSA in 2018 and 2019 (293 and 285, respectively); Rutland HSA in 2020 (274); and Brattleboro HSA in 2021 (349) (Exhibit II.13). Burlington HSA had use rates lower than the yearly mean for each year of the study period.

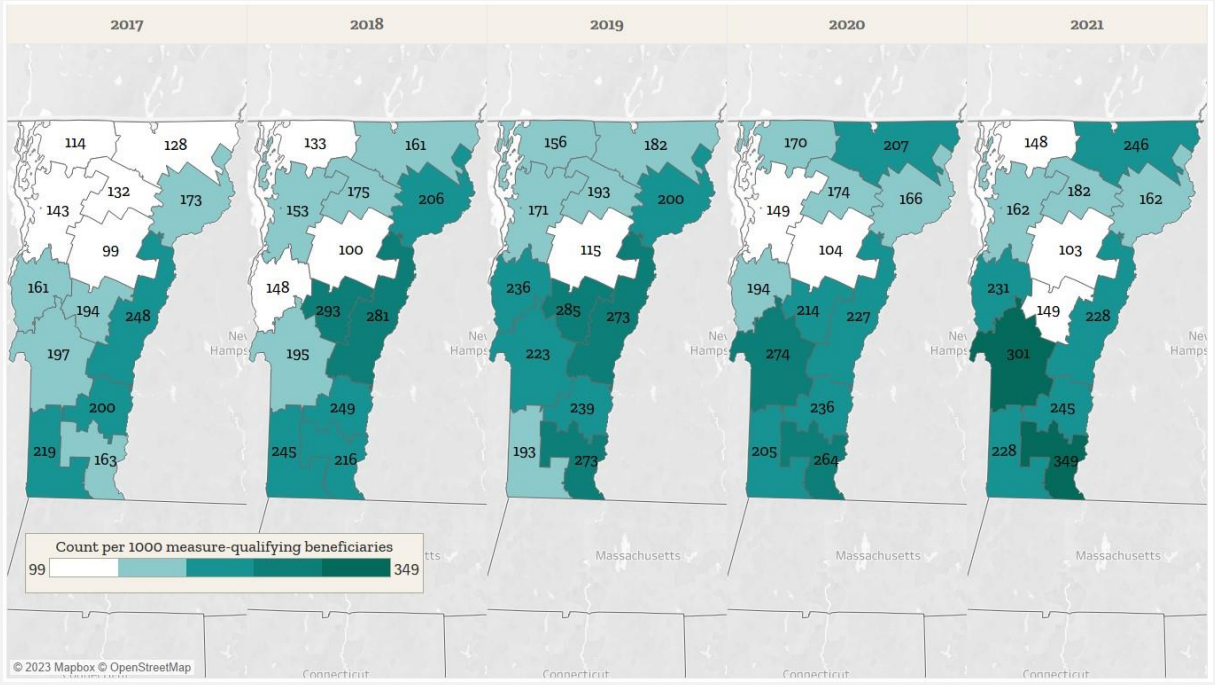
Line payments for the PTH-specific procedure totaled $102,273 in 2017 and $119,608 in 2021; line payments for the PTH assay were lower in 2018 and 2019, at $84,383 and $88,916, respectively (Exhibit A.1.10). While Burlington HSA had relatively high PTH-specific mean total line-level payments due to total

[12] See Schwartz et al. (2014).

number of PTH assays delivered each year, its PTH-specific mean payments were relatively lower compared to other HSAs, e.g., $54 versus $76 in St. Johnsbury in 2017, and $38 versus $51 in Rutland in 2018 (Exhibit A.1.11). Conversely, some HSAs had relatively higher use rates and lower associated mean PTH payments – e.g., White River Junction in 2017 and 2018 ($27 and $30 per PTH assay, respectively) and Randolph HSA in 2018 and 2019 ($19 and $26, respectively) (Exhibit A.1.11).

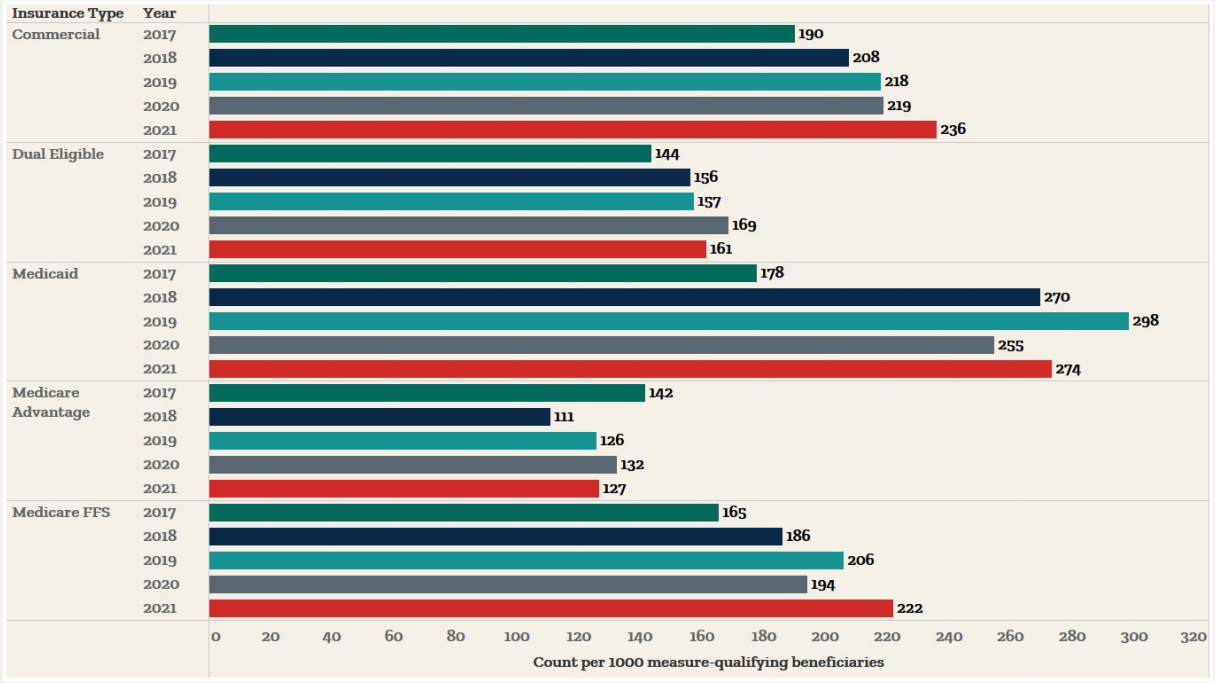
The variance in payments per PTH assay are evident in claims data aggregated at the payer level, as well. Commercial payments per PTH assay were two to four times greater than payments from the other payers for each year of the study period, ranging from $121 in 2018 to $146 in 2020 versus $26 and $29 for Medicare FFS beneficiaries during those years (Exhibit A.1.12). While Medicare FFS beneficiaries accounted for approximately 52 percent of all PTH assays during the study period versus 13 percent for commercial beneficiaries, total PTH-specific line level payments were greatest for commercial beneficiaries for each year 2018-2021 ($34,819 in 2018, $42,909, $50,870, and $52,173 in 2019-2021, respectively, versus $30,469, $28,053, $38,511, and $39,374 across 2018-2021 for FFS beneficiaries) (Exhibits II.16 and A.1.12).

Exhibit II.13. PTH measurement use, per 1,000 beneficiaries qualifying for the measure denominator, by HSA, 2017–2021



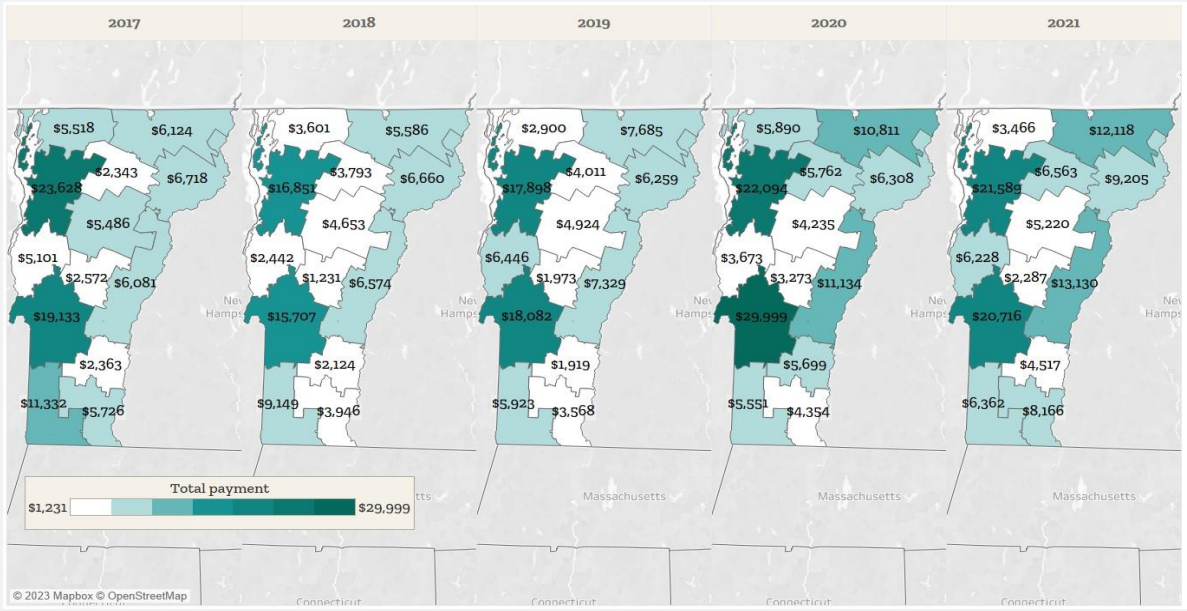
Source: Mathematica's analysis of VHCURES data.

Exhibit II.14. PTH measurement per 1,000 qualifying beneficiaries qualifying for the measure denominator by payer type, 2017–2021



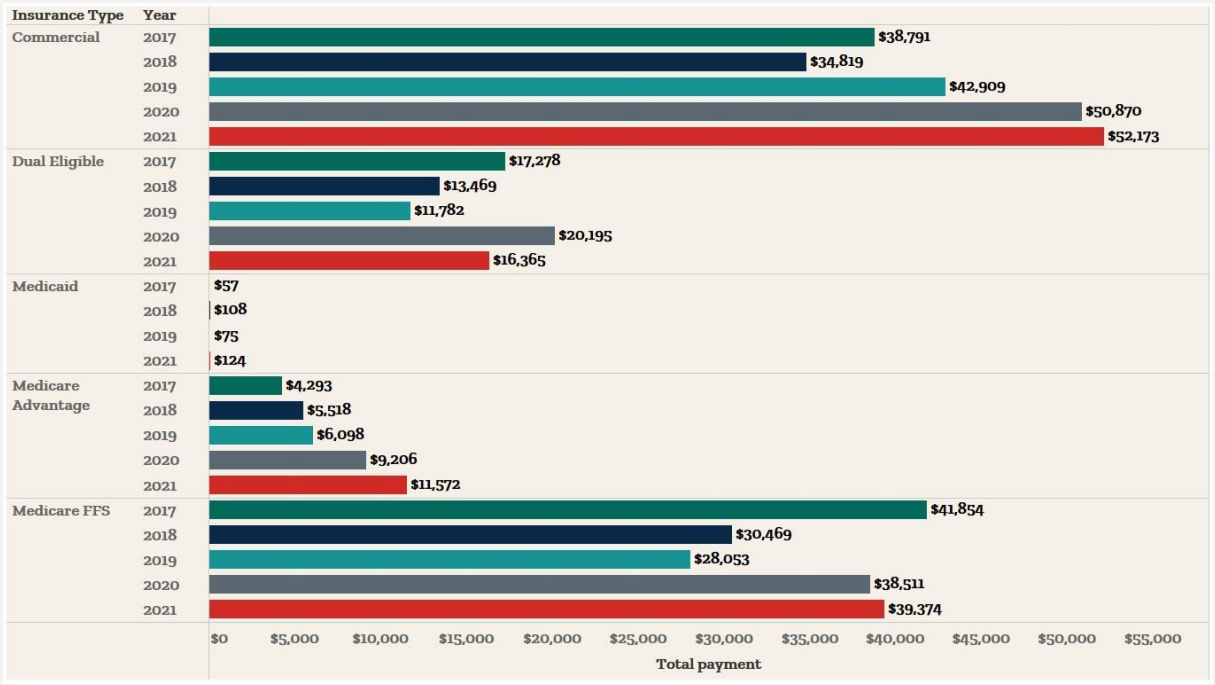
Source: Mathematica's analysis of VHCURES data.

Exhibit II.15. PTH measurement spending: total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Exhibit II.16. PTH measurement spending: total line-level payments by payer/insurance type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see tables in Appendix A with columns named "total claim payments, all lines."

2. Total or free T3 level testing for patients with hypothyroidism

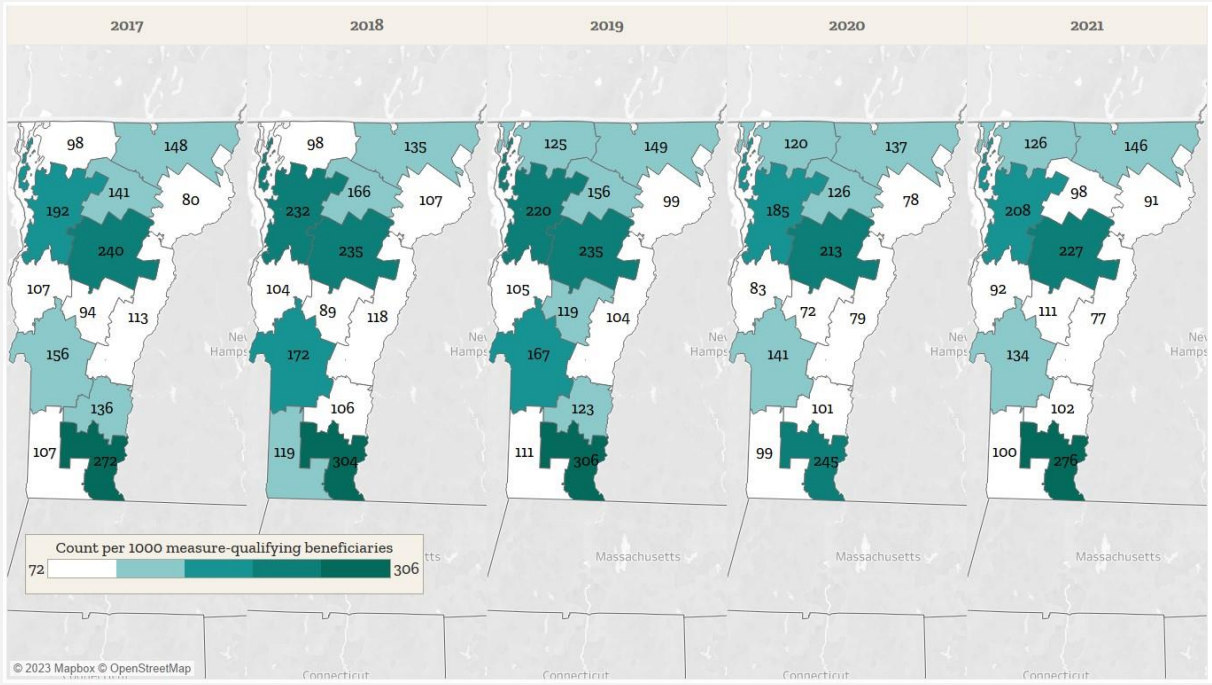
The American Association of Clinical Endocrinologists and the American Thyroid Association advise against ordering T3 tests when assessing treatment for hypothyroid patients due to lack of clinical benefit.[13] This measure tracks total or free T3 measurement in a patient with a hypothyroidism diagnosis during the observation year. Utilization rates for this measure rose from 160 per 1,000 qualifying beneficiaries in 2017 to 173 and 171 in 2018 and 2019, respectively, and then fell to 145 and 154 in 2020 and 2021 (Exhibit A.1.13). Brattleboro HSA had the highest use rates compared to other HSAs for each year of the study period, ranging from 245 per 1,000 qualifying beneficiaries in 2020 to 306 per 1,000 in 2019 (Exhibit II.17). Burlington HSA had use rates higher than the overall mean rate in Vermont for each year and also accounted for the most T3-specific line-level spending each year (from $57,306 in 2017 to $79,545 in 2019) (Exhibits II.17 and II.19). As with other measures, Middlebury HSA had relatively low use rates for the T3 testing measure, ranging from 83 per 1,000 qualifying beneficiaries in 2020 to 107 per 1,000 in 2017 (Exhibit II.17). Utilization rates were highest for commercial and Medicaid beneficiaries

[13] Garber J.R., R.H. Cobin, H. Gharib, et al. "Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association." *Endocrine Practice*, 2012;18(6):988-1028.

across the observation years. Commercial rates ranged from 193 per 1,000 beneficiaries in 2020 to 242 per 1,000 in 2018 (Exhibit II.18). Medicaid rates ranged from 200 per 1,000 in 2020 to 228 per 1,000 in 2017 (Exhibit II.18).

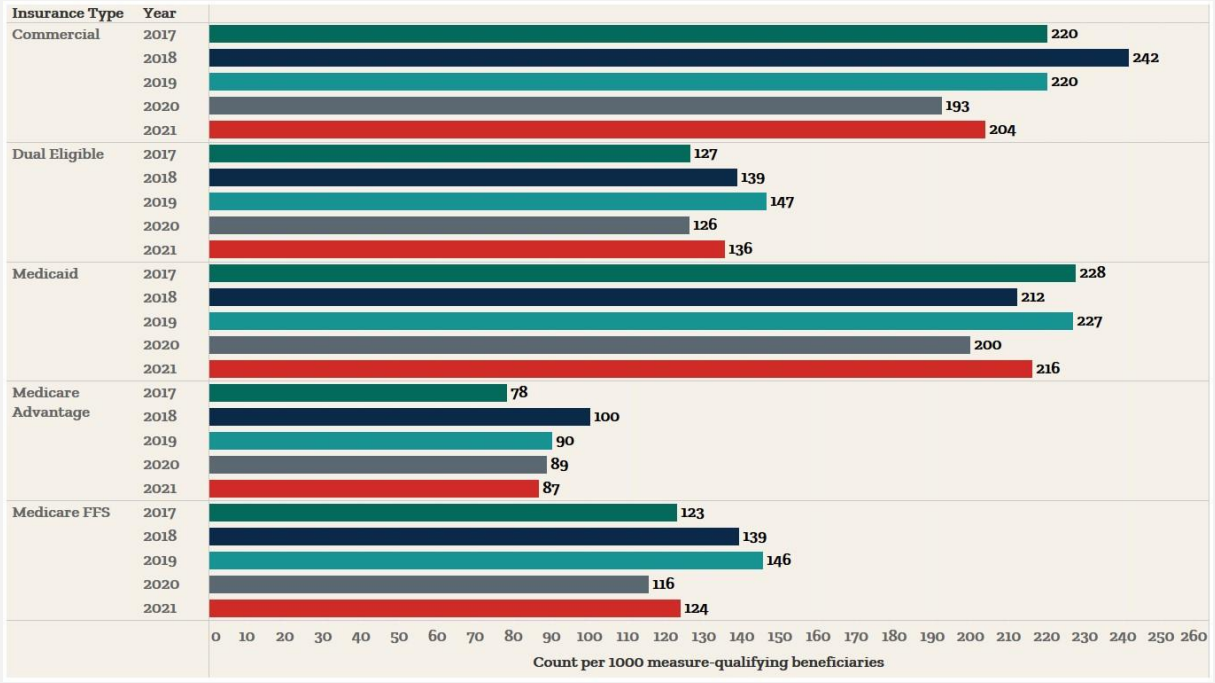
Mean payment for a T3 test varied greatly across HSAs. For example, in 2018, the mean payment for a T3 test in St. Albans HSA was $31 compared to $134 in St. Johnsbury, which had the highest payments for each year among Vermont HSAs (Exhibit A.1.14). The relatively large magnitude of differences in per test payments is evident across claims aggregated by payer, as commercial payments for T3 tests were four to five times greater compared to the other payer categories we tracked. Commercial payments for T3 tests ranged from $94 in 2017 to $107 in 2021, versus $15 in 2021 to $22 in 2017 for Medicare FFS beneficiaries (Exhibit A.1.15). Commercial payers also accounted for the most T3 tests across the study period, and thus accounted for the most T3-specifc line payments across all years, ranging from $160,925 (2020) to $207,090 (2018) (Exhibit II.20).

Exhibit II.17. T3 tests per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021



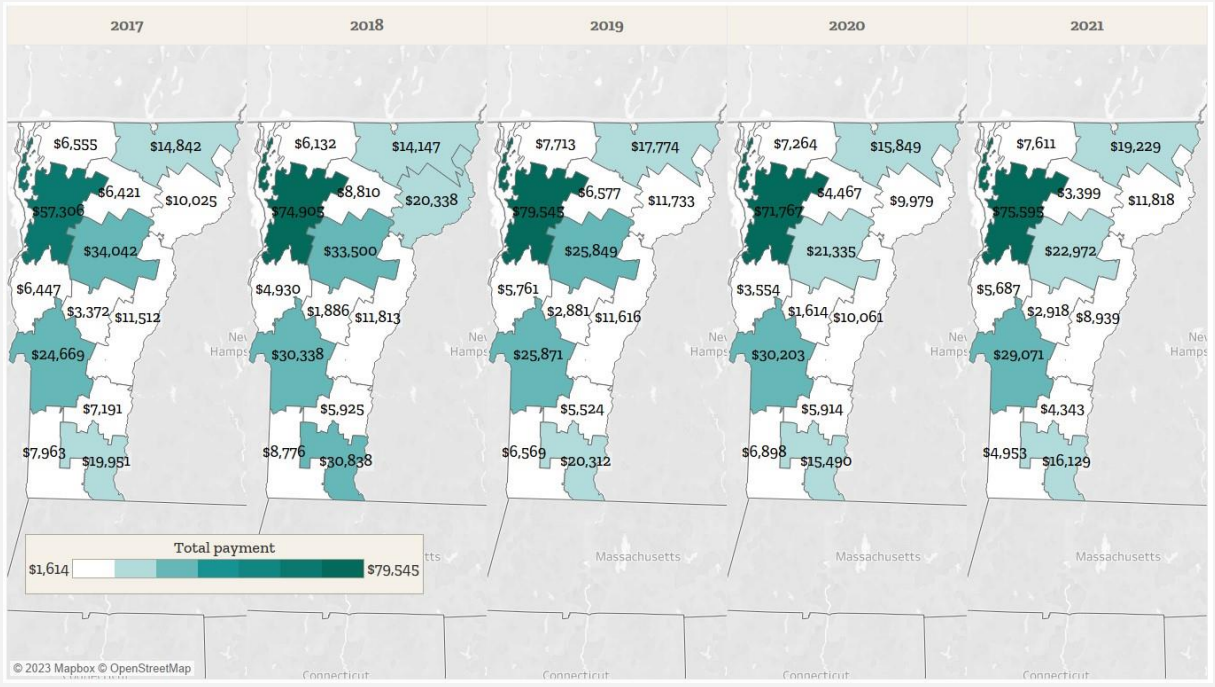
Source: Mathematica's analysis of VHCURES data.

Exhibit II.18. T3 tests per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



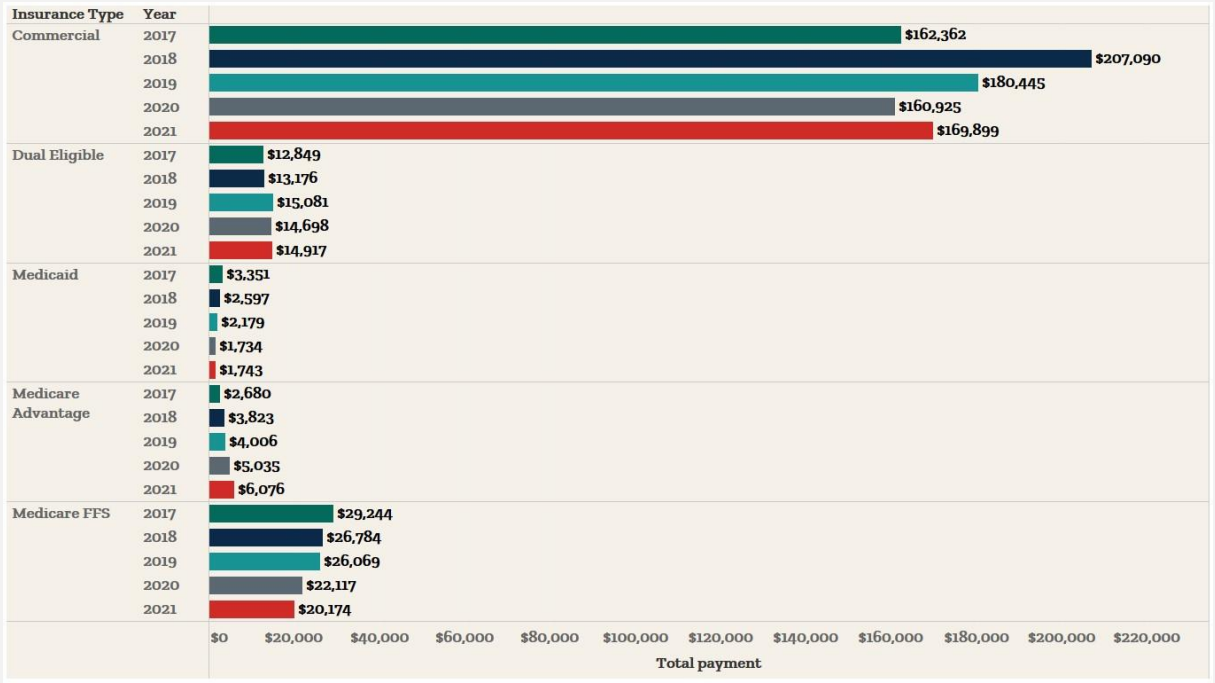
Source: Mathematica's analysis of VHCURES data.

Exhibit II.19. Spending on T3 tests: total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Exhibit II.20. Spending on T3 tests: total line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see tables in Appendix A with columns named "total claim payments, all lines."

C. Preoperative testing measure

1. Preoperative stress testing

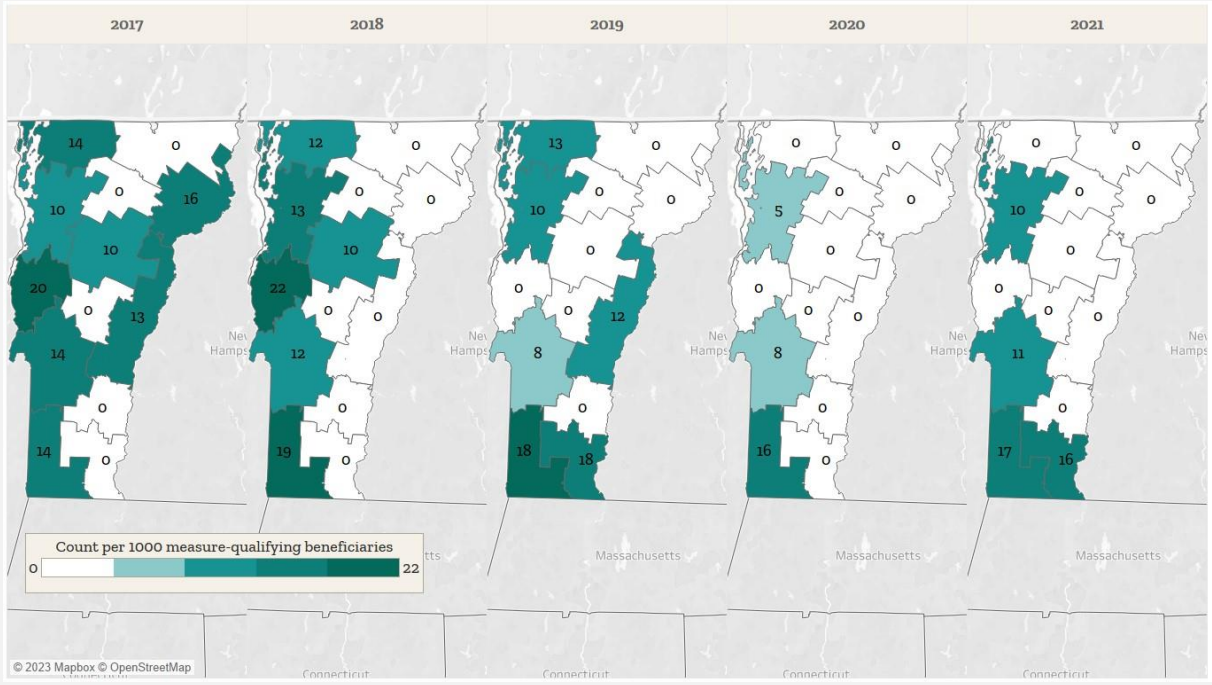
There is insufficient evidence of improved outcomes supporting preoperative stress testing among patients undergoing low-risk, noncardiac surgeries.[14] For this measure we analyzed claims which contained procedure codes indicating a stress electrocardiogram, echocardiogram, nuclear medicine imaging, cardiac magnetic resonance imaging, or computed tomography angiography which did not occur during or within 30 days of an inpatient stay. The measure also excludes from Overuse counts tests that occurred during an emergency department (ED) visit or when an ED visit occurred between the time of the stress test and the surgical procedure. On a per procedure basis, this measure tracks tests relatively more expensive than those associated with the Overuse measures described thus far. That said, use rates for this measure were very low in Vermont during the study period, with a low of 7 per 1,000 qualifying beneficiaries in 2020 and a high of 12 per 1,000 in 2017 and 2018 (Exhibit A.1.16). Accordingly, 38 of 65

[14] Fleisher L.A., K.E. Fleischmann, A.D. Auerbach, et al. "2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines." 2014;130(24):e278-e333.

HSA-year observations had less than 11 cases of Overuse stress tests during the study period (again, data cannot be shown for such observations) (see Exhibit A.1.17). Among HSA-year observations with 11 or greater cases, use rates ranged from approximately 5 per 1,000 qualifying beneficiaries (Burlington, 2020) to 22 per 1,000 (Middlebury, 2018) (Exhibit II.21).

Total claim line level payments for stress tests identified as Overuse tests decreased each year, ranging from $167,213 in 2017 to $95,332 in 2021 (Exhibit A.1.16). Due to having the most stress tests provided, the Burlington HSA had the highest associated payments in each year except 2020 ($8,727), ranging from $36,736 in 2017 to $44,824 in 2019 (Exhibit II.23). Stress test procedure payments are higher than the other services discussed thus far and, as observed with other Overuse services, vary quite a bit, with per procedure payments ranging from $119 (St. Albans, 2019) to $805 (Middlebury, 2017) across the observation years (Exhibit A.1.17). Once again, we observed in claims a wide range in per procedure payments aggregated by payer, from $253 for FFS beneficiaries in 2019 to $1,736 for commercial beneficiaries in 2020 (Exhibit A.1.18). Mean payments for overuse stress tests given to Medicare Advantage beneficiaries were relatively consistent, ranging from $534 in 2019 to $569 in 2021 (Exhibit A.1.18). For dually eligible beneficiaries, mean payments observed in claims data ranged from $162 in 2021 to $535 in 2017 (Exhibit A.1.18).

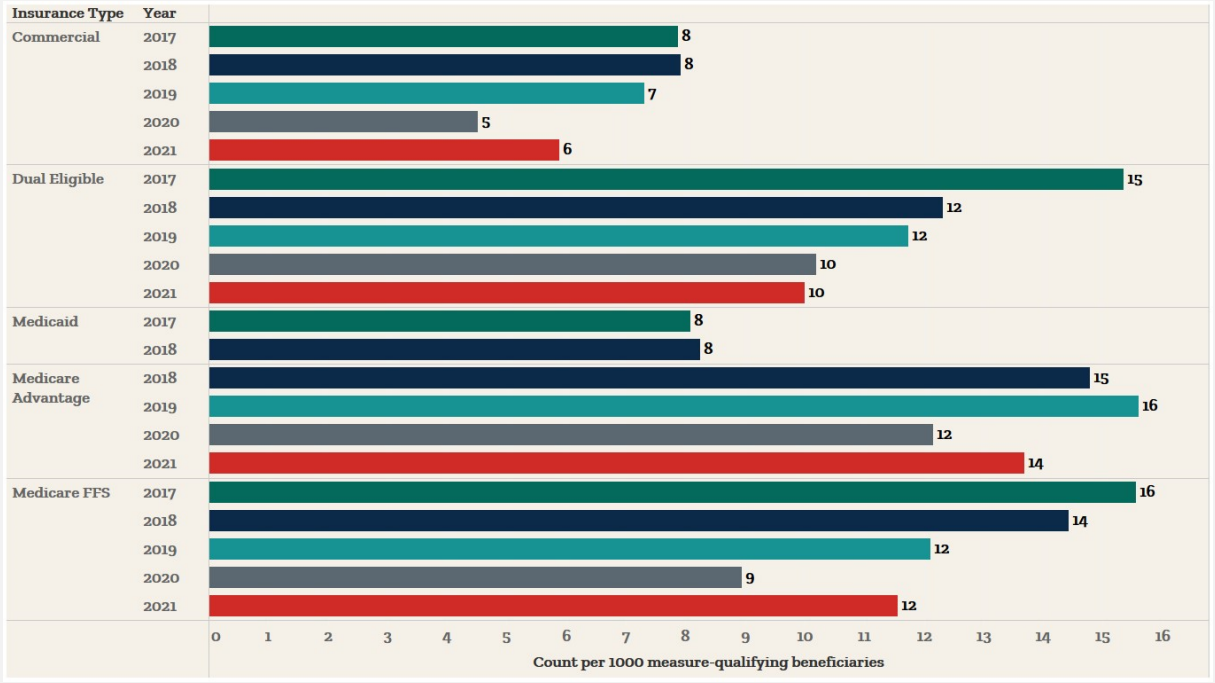
Exhibit II.21. Preoperative stress testing per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

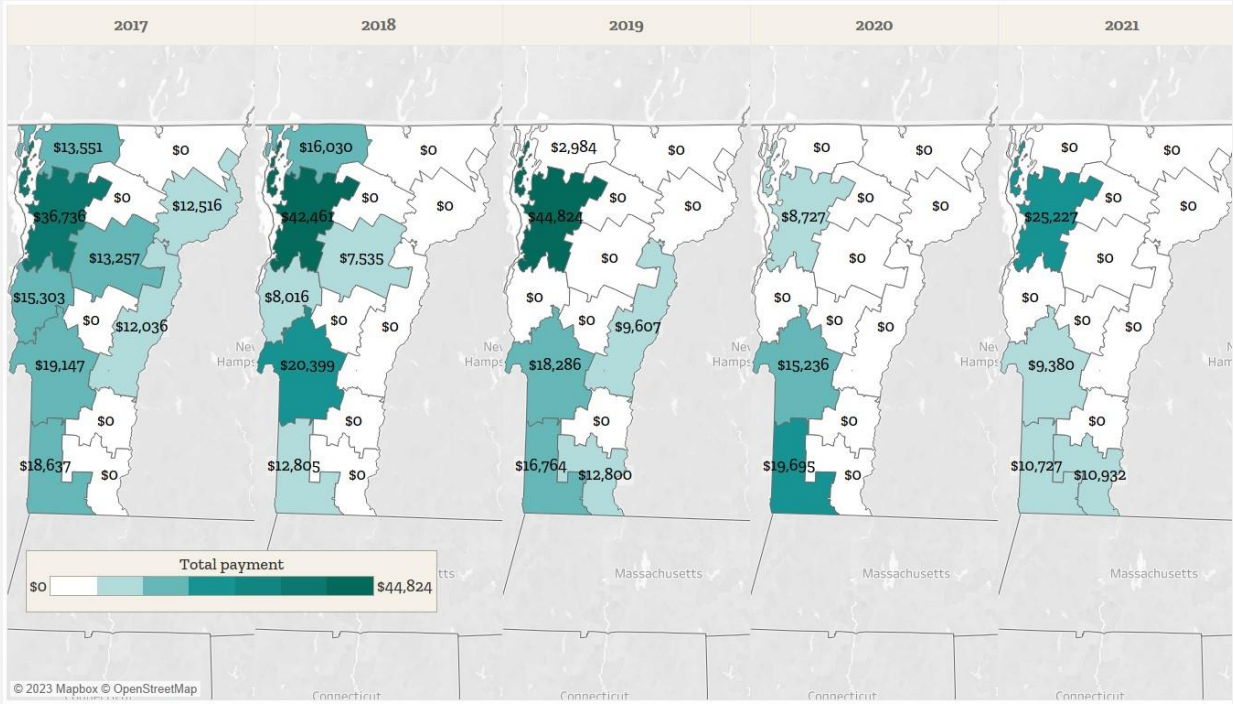
Exhibit II.22. Preoperative stress testing per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

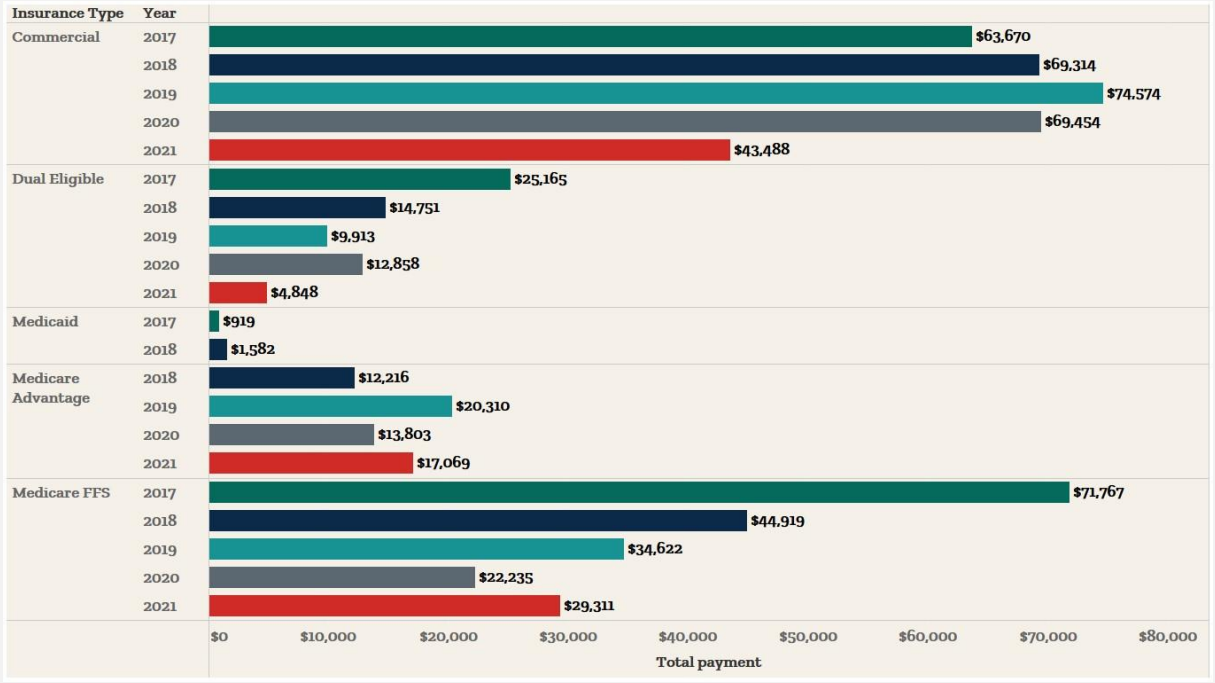
Exhibit II.23. Spending on preoperative stress testing, total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

Exhibit II.24. Spending on preoperative stress testing total line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Notes: We cannot present payer type categories for years where there were less than 11 cases.

For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see tables in Appendix A with columns named "total claim payments, all lines."

D. Cardiovascular testing and procedures

1. Stress testing for stable coronary disease

The American College of Cardiology Foundation Appropriate Use Criteria Task Force found that perioperative testing is inappropriate for lower risk patients, such as those tracked by this measure.[15] For this measure we observed stress testing not associated with inpatient or emergency care for patients with an established diagnosis of acute myocardial infarction or ischemic heart disease (six months or more before testing). Utilization rates for this measure generally decreased over the study period, going from 106 per 1,000 beneficiaries qualifying for receipt of an overuse stress test in 2017 to 83 per 1,000 qualifying beneficiaries in 2021. Utilization rates were lowest in 2020 at 76 per 1,000 qualifying beneficiaries (Exhibit A.1.19). St. Albans HSA had the highest rates 2017-2019 at 150, 145, and 133 per 1,000 qualifying beneficiaries, respectively. In 2020 and 2021, however, the rates in St. Albans dropped to 85 and 84 per 1,000 beneficiaries. Bennington HSA had the highest rate in 2020 at 94 per 1,000

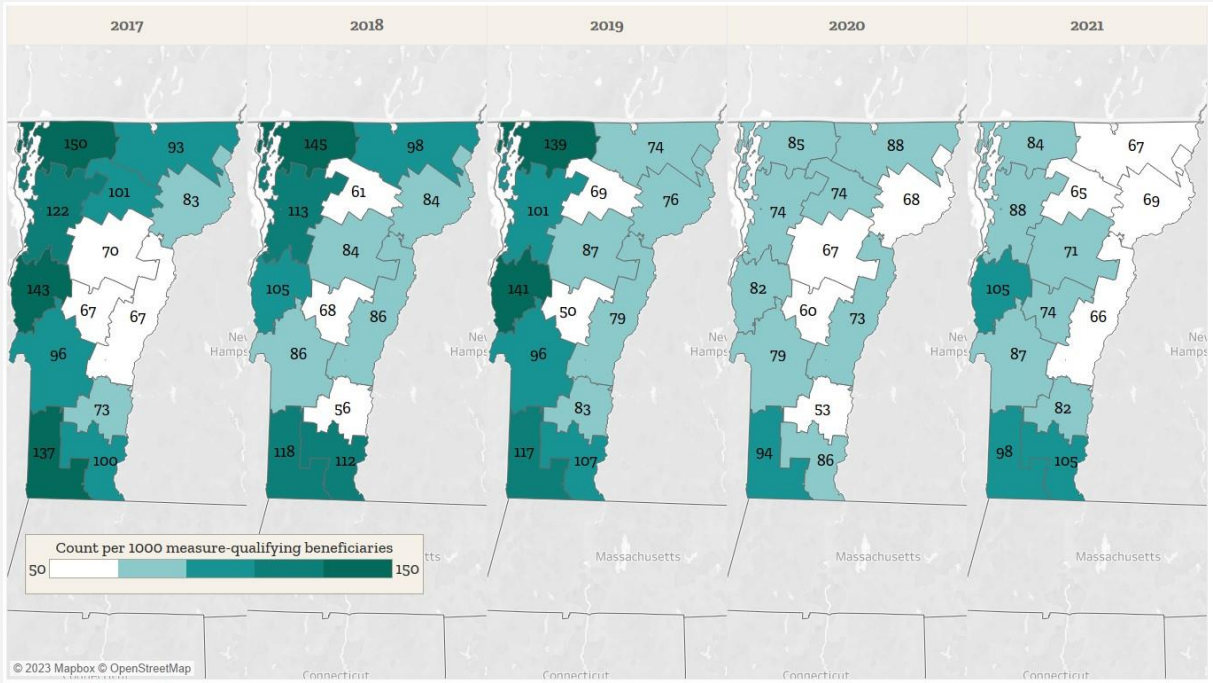
[15] See Fleisher et al. (2014).

beneficiaries, and Brattleboro and Middlebury had the highest rates in 2021 at 105 per 1,000 beneficiaries (Exhibit II.25).

Relative to the other measures described above, line level payments for stress tests were quite high, ranging from $1.37 million in 2021 to $1.99 million in 2017 (Exhibit A.1.19). Mean line-level payments for a stress test procedure ranged from $384 in 2019 to $490 in 2017. Mean line-level payments varied greatly across HSAs, with a low of $250 in St. Albans in 2019 to $1,146 in St. Johnsbury in 2020. St. Johnsbury had the highest mean rates per year, ranging from $650 in 2017 to $1,146 in 2020 (Exhibit A.1.20).

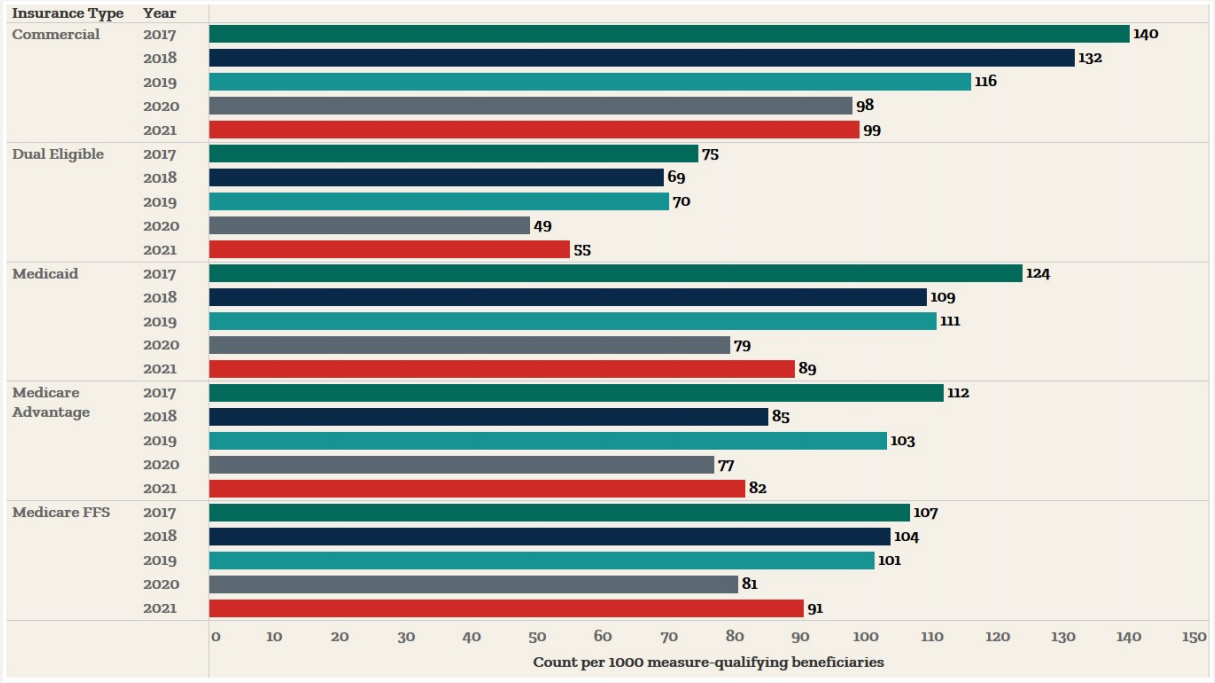
While Medicare FFS beneficiaries accounted for three times the number of overuse stress test compared to commercial beneficiaries (5,410 versus 1,624 stress tests), commercial line level payments for such stress tests totaled $3.1 million versus $2.9 million for stress tests given to FFS beneficiaries across study years (Exhibit A.1.21). Mean line level payments for commercial beneficiaries ranged from $960 in 2021 to $1,025 in 2019, versus $230 in 2019 and $392 in 2017 for stress tests provided to FFS beneficiaries. For Medicare Advantage beneficiaries, mean line level payments ranged from $462 in 2018 to $591 in 2020 (Exhibit A.1.21).

Exhibit II.25. Stress tests per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021



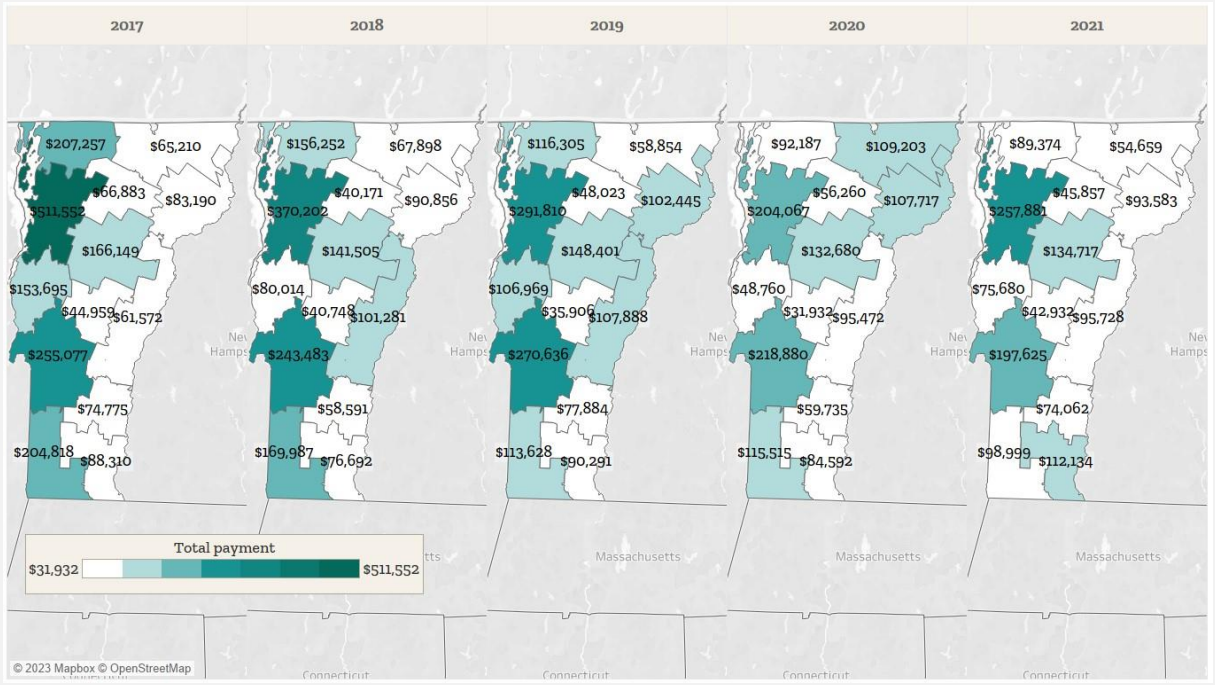
Source: Mathematica's analysis of VHCURES data.

Exhibit II.26. Stress tests per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



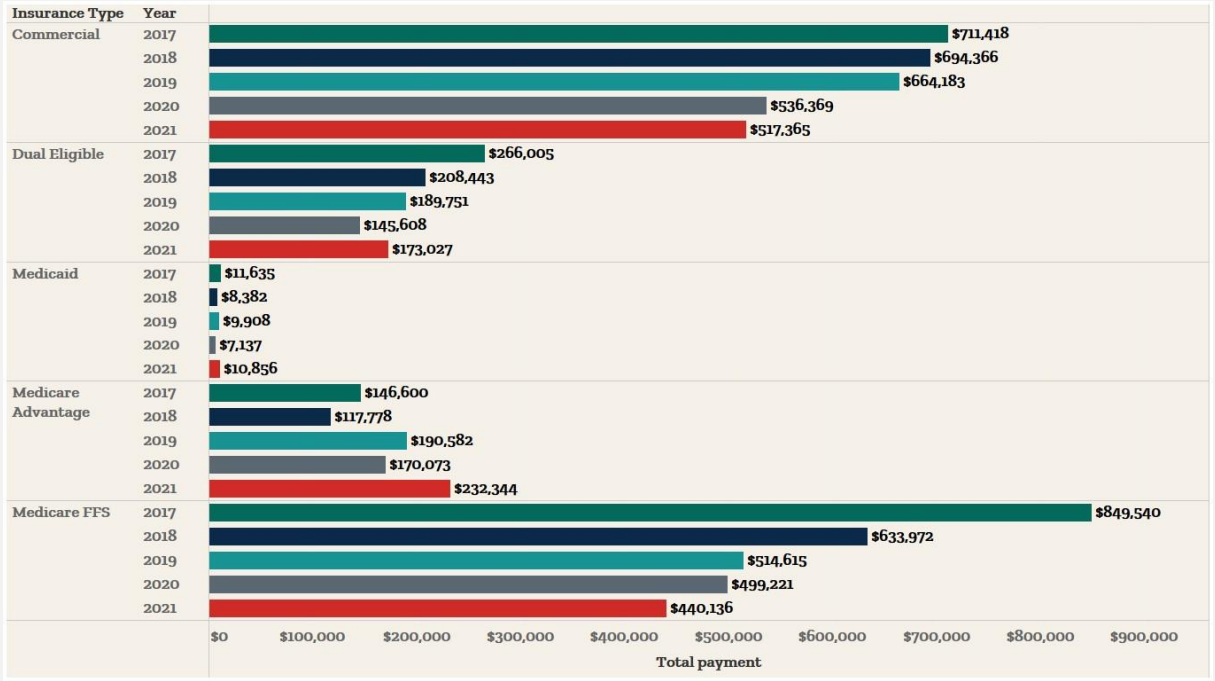
Source: Mathematica's analysis of VHCURES data.

Exhibit II.27. Spending on stress tests: total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Exhibit II.28. Spending on stress tests: total line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see tables in Appendix A with columns named "total claim payments, all lines."

2. Percutaneous coronary intervention (PCI) with balloon angioplasty or stent placement for stable coronary disease

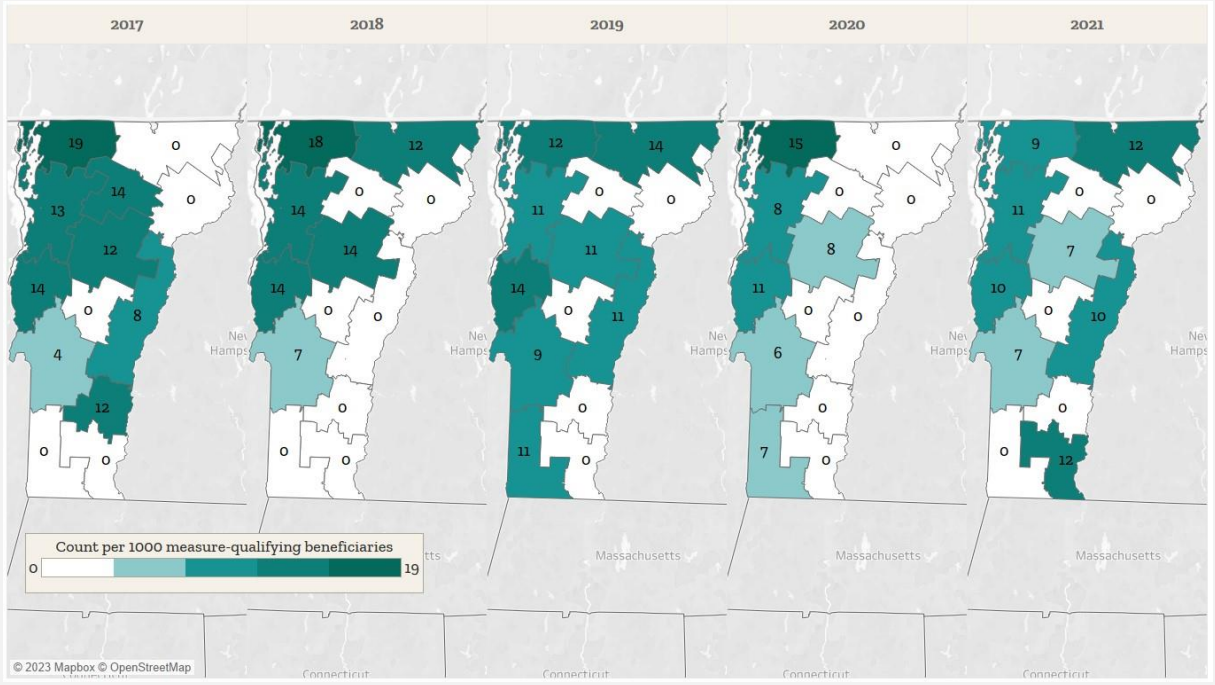
There is insufficient evidence of improved outcomes supporting PCI or stent placement among patients stable coronary disease.[16] This measure tracks coronary stent placement or balloon angioplasty, not associated with an ER visit, for patients with an established diagnosis of acute myocardial infarction or ischemic heart disease (greater than or equal to 6 months before testing). Utilization rates were much lower for this measure compared to the stress test measure for this similarly defined population, ranging from 8-9 per 1,000 qualifying beneficiaries in 2020 and 2021 to 11 per 1,000 qualifying beneficiaries in 2017 and 2018 (Exhibit A.1.22). As such, across study years only 28 of 67 HSA-year observations had more than 10 cases of overuse PCI or stent placements (see Exhibit A.1.23). Among HSAs with 11 or more cases, Rutland had the lowest rates each year and the lowest rate across study years at 4 PCI or stent placement procedures per 1,000 qualifying beneficiaries. St. Albans had the highest rates in 2017 and 2018, at 19 and 18, respectively, per 1,000 qualifying beneficiaries. In 2019, Middlebury and Newport had rates of 14 per 1,000 qualifying beneficiaries, and in 2020 St. Albans again had the highest rate at 15 per 1,000 qualifying

[16] Boden WE, O'Rourke RA, Teo KK, et al. COURAGE Trial Research Group. Optimal medical therapy with or without PCI for stable coronary disease. *N Engl J Med*. 2007;356(15):1503-1516.

beneficiaries. The highest rate in 2021 was 12 per 1,000 qualifying beneficiaries, which occurred in Brattleboro and Newport HSAs (Exhibit II.29). Utilization rates by payer ranged from a low of 5 per 1,000 qualifying beneficiaries among dual eligibles in 2020 to 17 per 1,000 qualifying Medicaid beneficiaries in 2018 (Exhibit II.30).

Total mean line payments for these procedures were $6.35 million across study years (Exhibit A.1.22), compared to $7.95 million for stress tests for a similarly defined population (Exhibit A.1.19) (patients with an established diagnosis of acute myocardial infarction or ischemic heart disease). Mean line payments for a given PCI or stent placement ranged from $3,104 (2019) to $4,101 (2017) (Exhibit A.1.22). Commercial payments were highest across study years, with mean payments for a given PCI or stent placement ranging from $4,702 in 2018 to $6,579 in 2021. Mean payments for the same services for FFS beneficiaries ranged from $2,736 in 2018 to $2,924 in 2021 (Exhibit A.1.22).

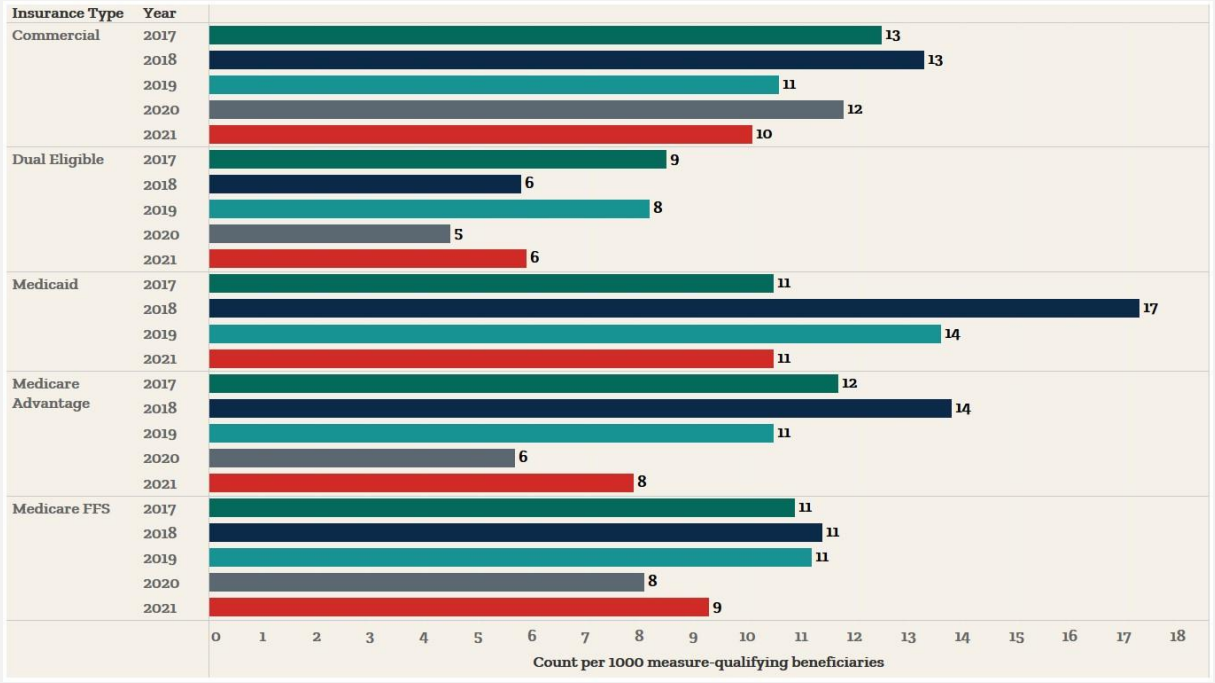
Exhibit II.29. PCIs per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

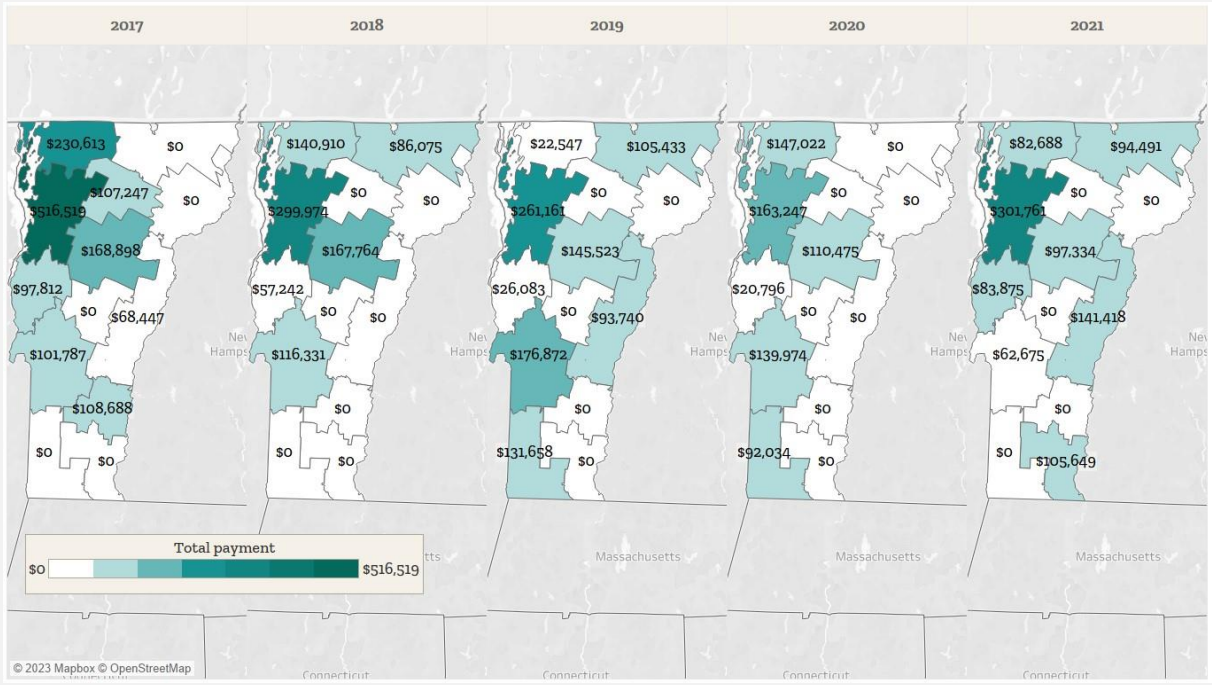
Exhibit II.30. PCIs per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

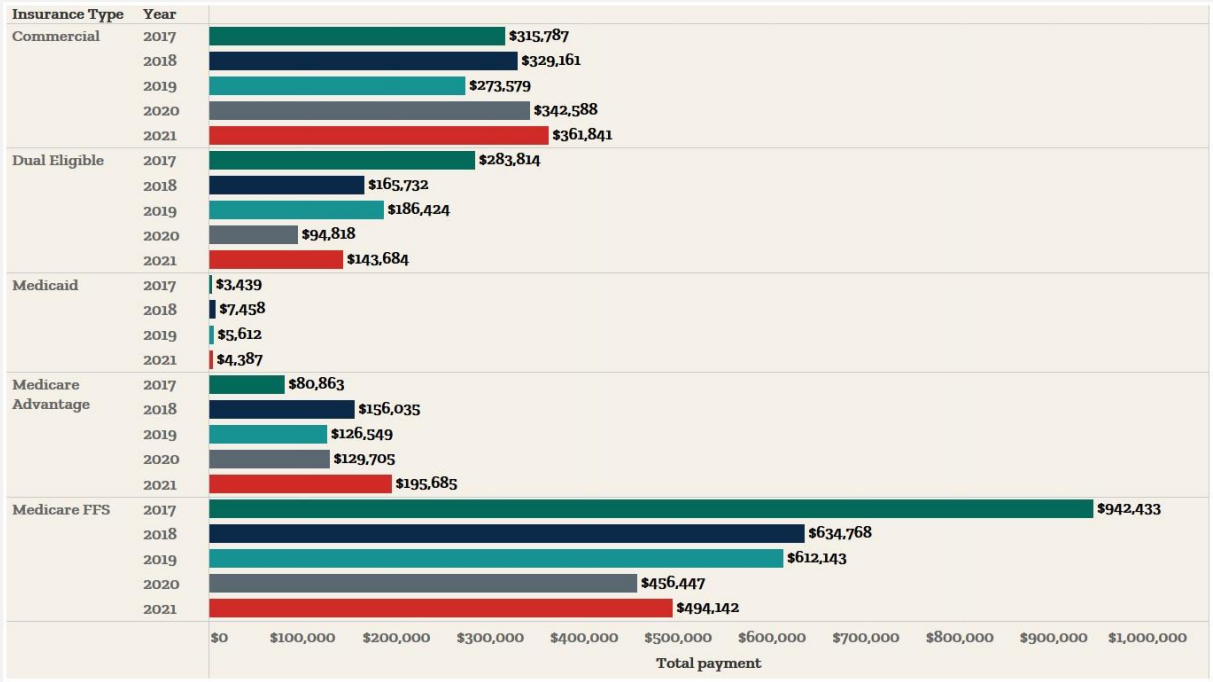
Exhibit II.31. Spending on PCIs: total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

Exhibit II.32. Spending on PCIs: total line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Notes: We cannot present payer type categories for years where there were less than 11 cases.

For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see tables in Appendix A with columns named "total claim payments, all lines."

E. Other invasive procedures

1. Laminectomy or spinal fusion

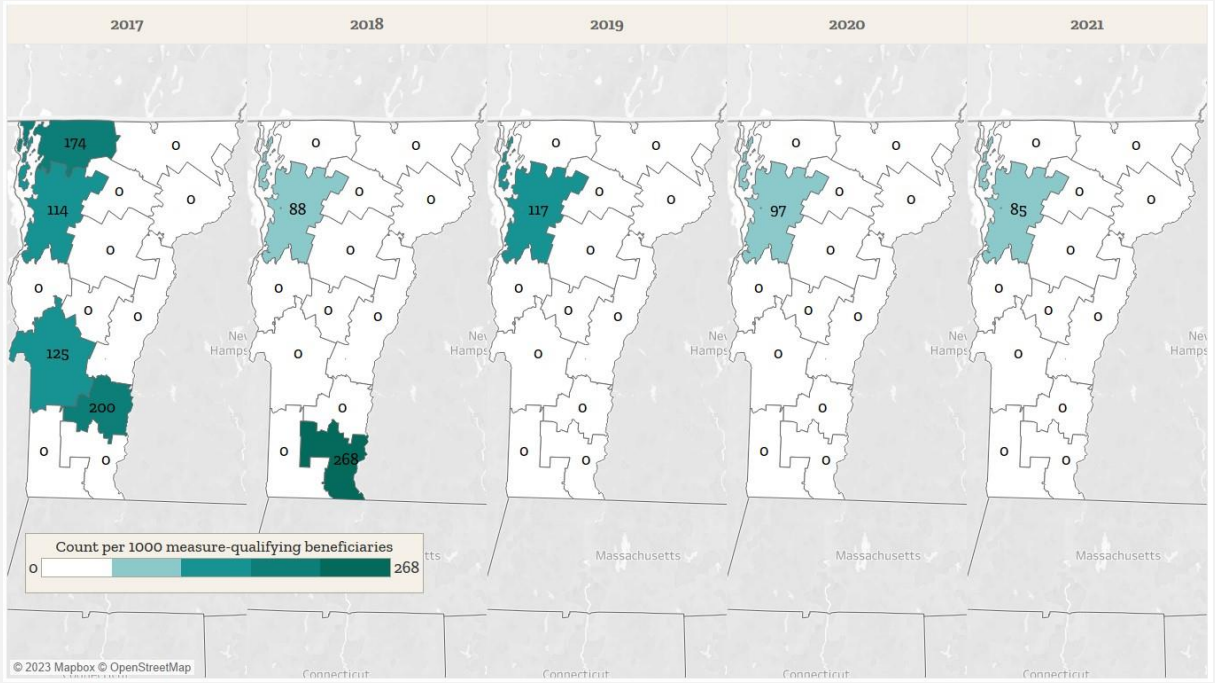
Segal and colleagues identified laminectomy and spinal fusion for individuals without clear indications of radicular pain or of herniated disc as an overused service (i.e., one providing little clinical benefit).[17] As such, for this measure we observed claims among such patients in Vermont. Compared to the other study years, use rates were quite high in 2017, at 132 per 1,000 qualifying beneficiaries; rates were 91, 102, 106, and 97 per 1,000 qualifying beneficiaries in 2018-2021, respectively (Exhibit A.1.25). There were only 9 out of 64 HSA-year observations with 11 or more cases each year, and Burlington was the only HSA that had at least 11 cases each study year (and the only such HSA 2019-2021) (Exhibit A.1.26). Burlington's rates were 114, 88, 117, 97, and 85 per 1,000 beneficiaries from 2017 to 2021 (Exhibit II.33). The highest use rate was 268 per 1,000 qualifying beneficiaries in Brattleboro in 2018, followed by 200, 174, and 125 per 1,000 beneficiaries in Springfield, St. Albans, and Rutland HSAs, respectively, in 2017 (Exhibit II.33).

[17] Segal JB, Bridges JF, Chang HY, et al. Identifying possible indicators of systematic overuse of health care procedures with claims data. *Medical Care*. 2014;52(2):157–163.

Utilization rates for commercial beneficiaries were the lowest compared to beneficiaries in the categories by other insurance type, with rates of 102, 55, 79, and 69 per 1,000 qualifying beneficiaries in the years 2017-2019 and 2021, respectively (there were fewer than 11 cases for commercial beneficiaries in 2020) (Exhibit II.34). The highest rates were among dually eligible and Medicaid beneficiaries. Among dual eligibles, use rates were 153, 143, 124, and 192 for the years 2017-2020 respectively (there were fewer than 11 cases in 2021). Among Medicaid beneficiaries, the rates were 152, 109, and 143 per 1,000 qualifying beneficiaries in the years 2017-2019, respectively (there were fewer than 11 cases in 2020 and 2021) (Exhibit II.34). Rates among Medicare FFS beneficiaries ranged from 90 per 1,000 qualifying beneficiaries in 2018 to 140 per 1,000 in 2017 (Exhibit II.34). We cannot display any data summarizing potential overuse laminectomy procedures among Medicare Advantage beneficiaries, because there never at least 11 cases during each study year.

Mean line-level payments for laminectomy and spinal fusion specific procedure codes ranged from $5,934 among Medicare FFS beneficiaries in 2020 to $15,741 among dual eligibles in 2018 (Exhibit A.1.27). We will note that among Medicaid beneficiaries in 2019, the mean line-level payment was $38,471 (Exhibit A.1.27). As mentioned, it can be difficult to isolate payments for overuse-specific procedure codes among Medicaid beneficiaries due to the nature of Medicaid payment data in VHCURES. That said, this mean payment does reflect associated line-level payments for procedure codes used to identify laminectomy and spinal fusion procedures. This was the only measure we examined that had line-level insurer payment amounts for specific procedure codes among Medicaid beneficiaries. Mean line-level payments among commercial beneficiaries ranged from $5,490 in 2018 to $11,212 in 2017. Among Medicare FFS beneficiaries, the range was from $5,934 in 2020 to $11,616 in 2021 (Exhibit A.1.27).

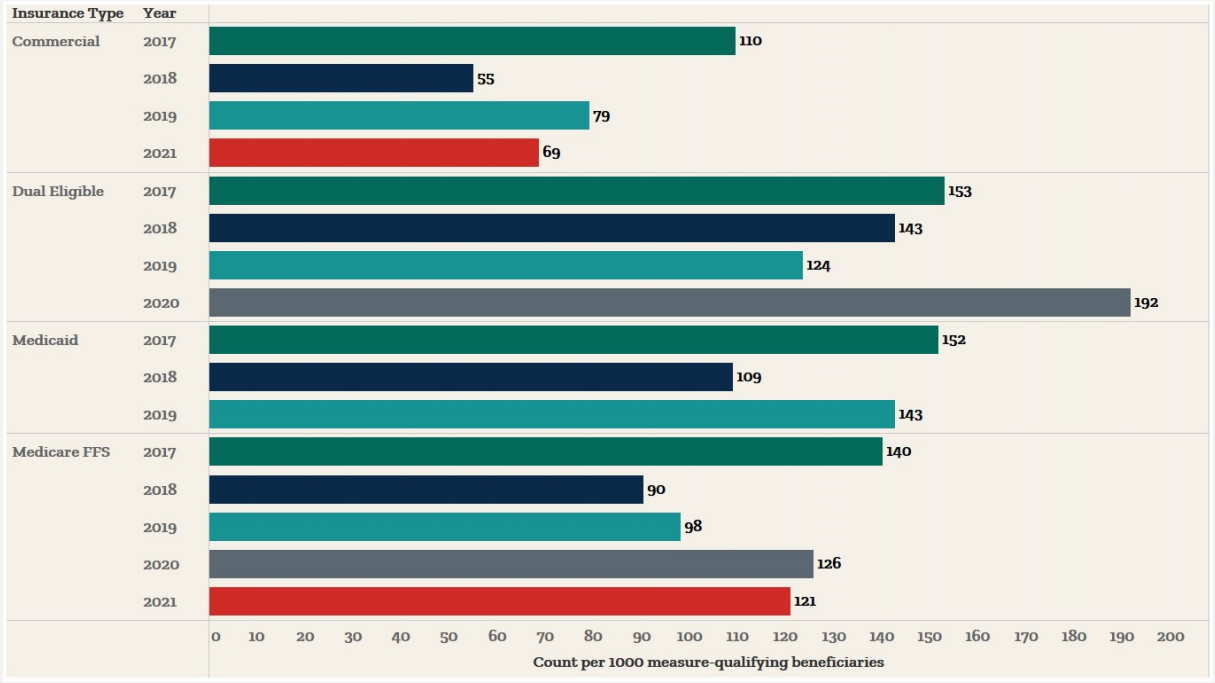
Exhibit II.33. Laminectomies per 1,000 beneficiaries qualifying for the measure denominator by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

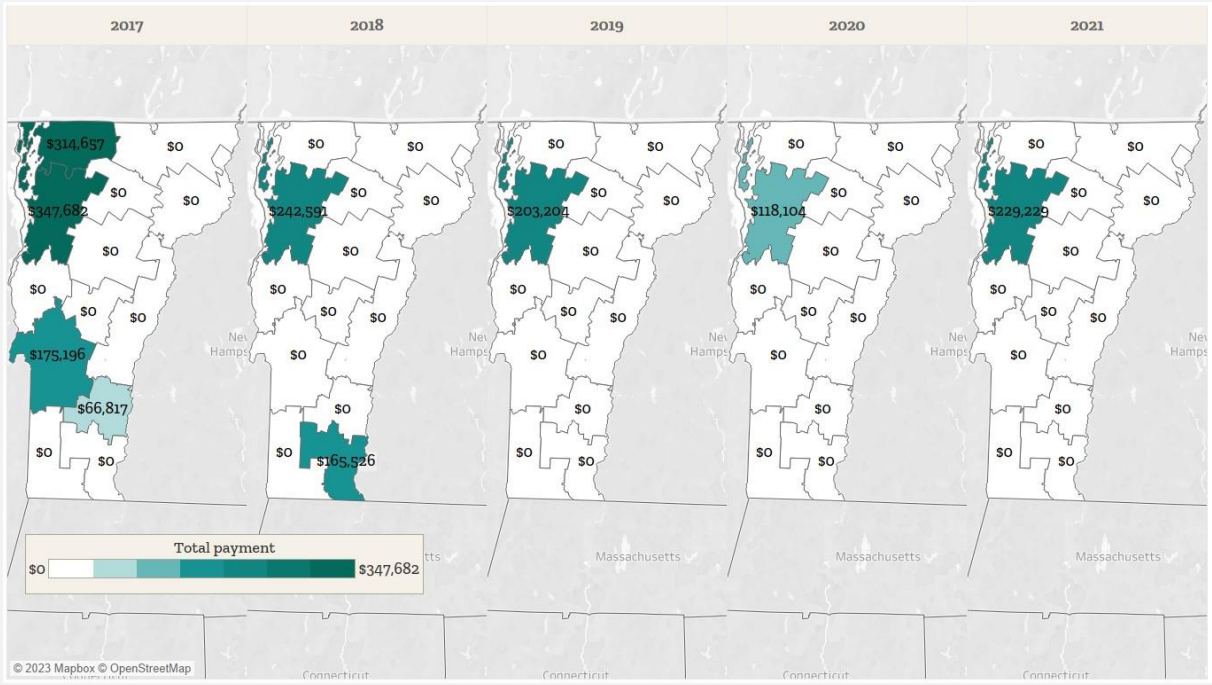
Exhibit II.34. Laminectomies per 1,000 beneficiaries qualifying for the measure denominator by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: We cannot present payer type categories for years where there were less than 11 cases.

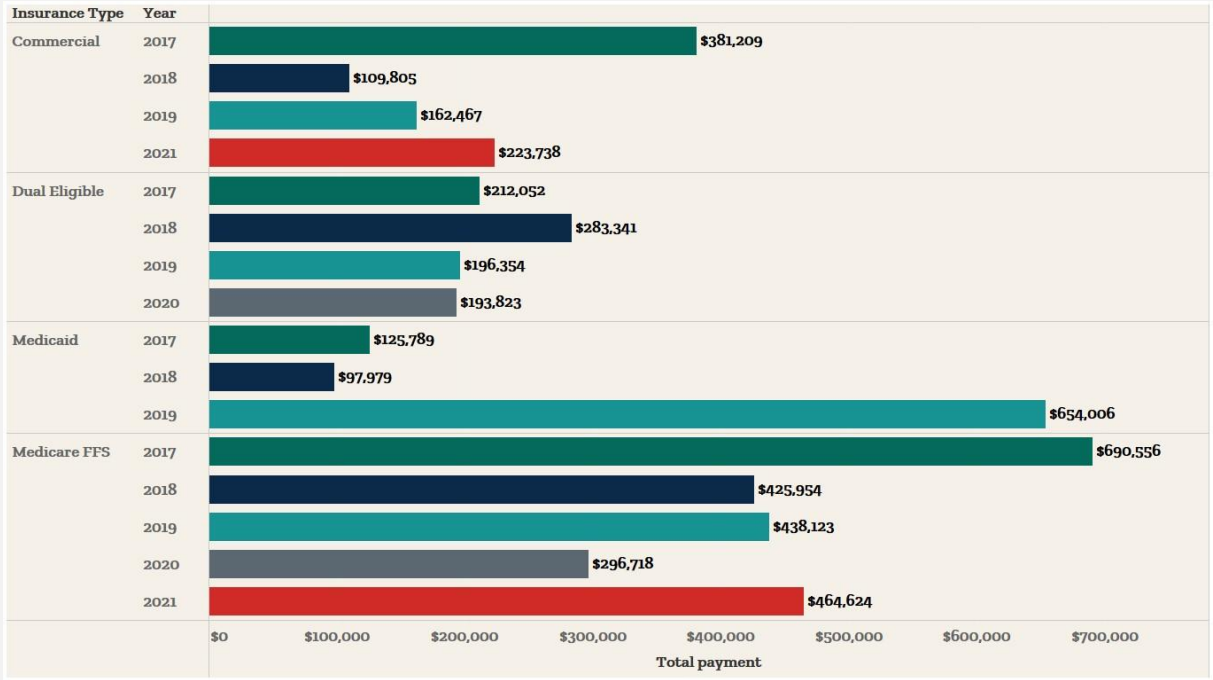
Exhibit II.35. Spending on laminectomies: total line-level payments by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: A zero ('0') indicates there were less than 11 cases, in which case we cannot report the exact number.

Exhibit II.36. Spending on laminectomies: total line-level payments by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Note: This was the only measure we examined that appeared to have line-level insurer payment amounts for specific procedure codes among Medicaid beneficiaries.

2. Arthroscopic surgery for knee osteoarthritis

For this measure we searched for claims indicating arthroscopic debridement/chondroplasty of the knee procedures among individuals with a diagnosis of osteoarthritis or chondromalacia in the procedure claim and no meniscal tears noted in procedure claims. In 2017, there were only 18 claims that met the criteria for an overuse case; for the years 2018-2021, there were less than 11 cases in each year. As such, we are not reporting use and payment data for this measure. The very low and decreasing instances of this overuse scenario tracks with findings from our work updating the overuse measure set from which these overuse measures are derived. As discussed with GMCB, as a result of our prior work, we had removed this measure from the updated overuse measure set.[18]

[18] See Fleming, C., E. Shin, R. Powell, et al. "Updating a Claims-Based Measure of Low-Value Services Applicable to Medicare Fee-for-Service Beneficiaries." *Journal of General Internal Medicine*, vol. 37, no. 13, 2022, pp. 3453–3461.

III. Potentially avoidable use

We analyzed potentially avoidable service use through three measures: avoidable emergency department (ED) visits, preventable hospitalizations, and unplanned readmissions after hospitalization. We describe potentially avoidable use of these services by Vermont residents during the years 2017–2021, by hospital service area (HSA) and by payer type.[19] We provide rates per 1,000 beneficiaries qualifying for each measure and total spending for each service.

A. Avoidable ED visits

ED visits are expensive and account for a sizeable portion of health care spending. For example, in 2021 ED visits accounted for about 7 percent of commercial health care spending in Vermont.[20] However, many ED visits could be avoided with timely and appropriate primary and specialty care. To understand what percentage of ED visits are avoidable, we classified them using the New York University (NYU) ED algorithm,[21] updated with a patch accounting for new International Classification of Diseases (ICD)-9 and ICD-10 codes released since the algorithm's original publication.[22] This algorithm divides ED visits into avoidable and non-avoidable ED visits. We assigned ED visits to one of these categories based on ICD-9 and ICD-10 diagnosis code associated with each visit. We calculated spending associated with ED visits as total spending on each ED claim. We then rolled up ED visits and associated spending to the hospital level, to the HSA level, and to payer types (commercial inclusive of Medicare Advantage, Medicare FFS, and Medicaid). (See Appendix C for details.)

Avoidable ED visit rates decreased from 2017 to 2021 for all payer types, were highest for Medicaid members and lowest for commercially insured members (Exhibit III.1). Specifically, they declined from 32 percent in 2017 to 27 percent in 2021 for the commercially insured, from 38 to 31 percent for Medicaid, and from 34 and 29 percent for Medicare. The noticeable reduction in avoidable ED visits in 2020 and 2021 is likely due to the COVID-19 pandemic when people were reluctant to visit EDs for fear of infection. Total spending declined over the study period for Medicaid and Medicare but increased for commercially insured members despite the decrease in ED visit rates (Exhibit III.2). The reduction in Medicare spending on avoidable ED visits was largest, from $16.7 million to $8.4 million. Medicaid spending declined by 17 percent, and commercial spending (including Medicare Advantage) increased by 14 percent.

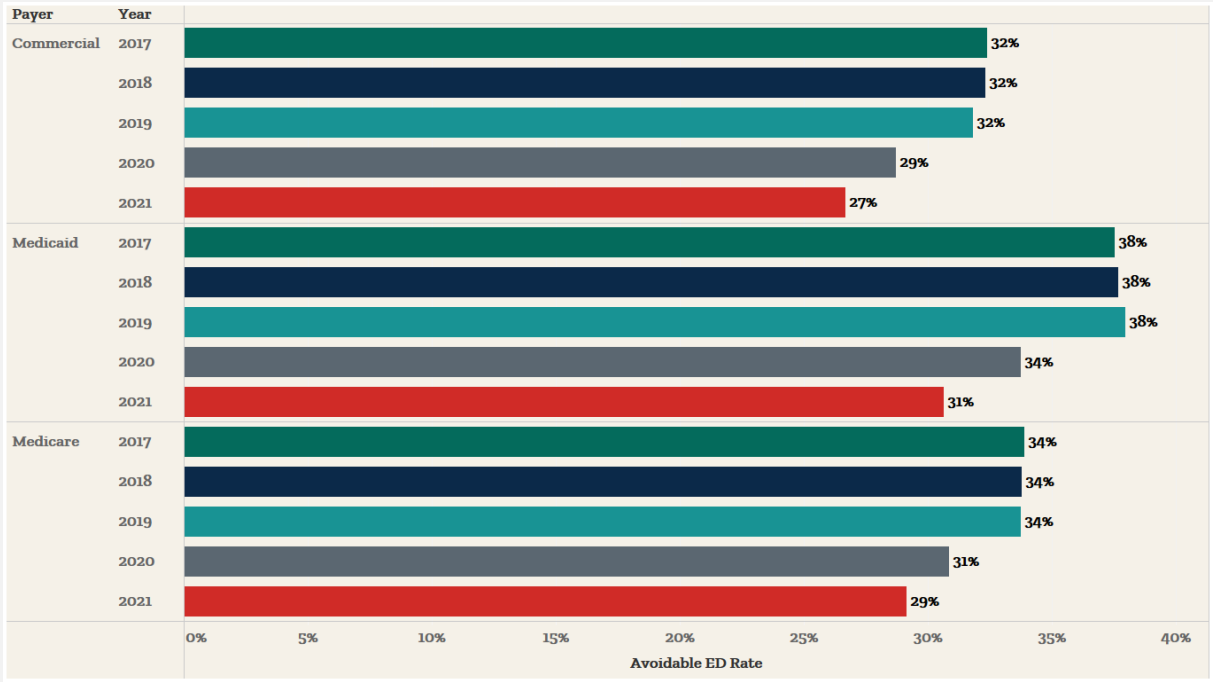
[19] In the potentially avoidable use analyses, we considered three payer types: Medicare, Medicaid, and commercial. Medicare includes Medicare FFS and dual eligible beneficiaries, and commercial includes Medicare Advantage.

[20] Gigliotti, P., Thomas, J., & Pohl, R.V. (2023). Benchmarking Analysis of Vermont Health Care Spending. Final report submitted to the Vermont Green Mountain Care Board. Cambridge, MA: Mathematica.

[21] Billings, J., Parikh, N., & Mijanovich, T. (2000). Emergency department use in New York City: a substitute for primary care? Issue Brief (Commonwealth Fund), (433), 1-5.

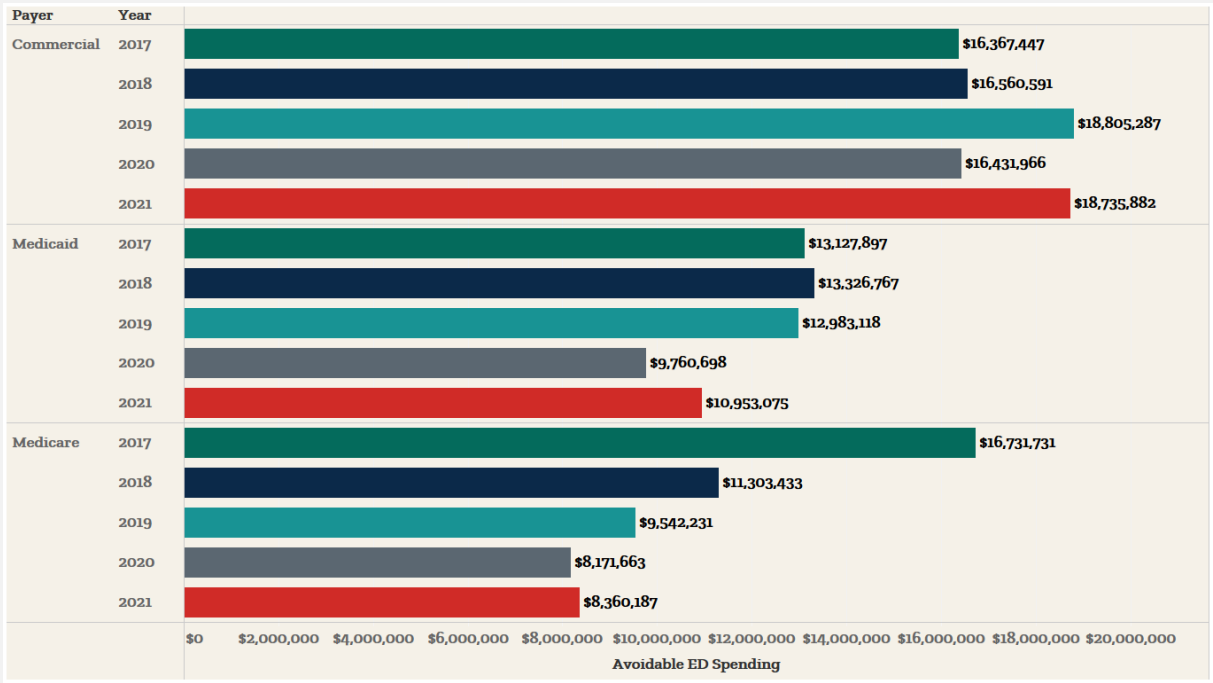
[22] Johnston, K. J., Allen, L., Melanson, T. A., & Pitts, S. R. (2017). A "Patch" to the NYU emergency department visit algorithm. Health services research, 52(4), 1264-1276. See also https://wagner.nyu.edu/faculty/billings/nyued-background.

Exhibit III.1. Avoidable ED visit rates by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

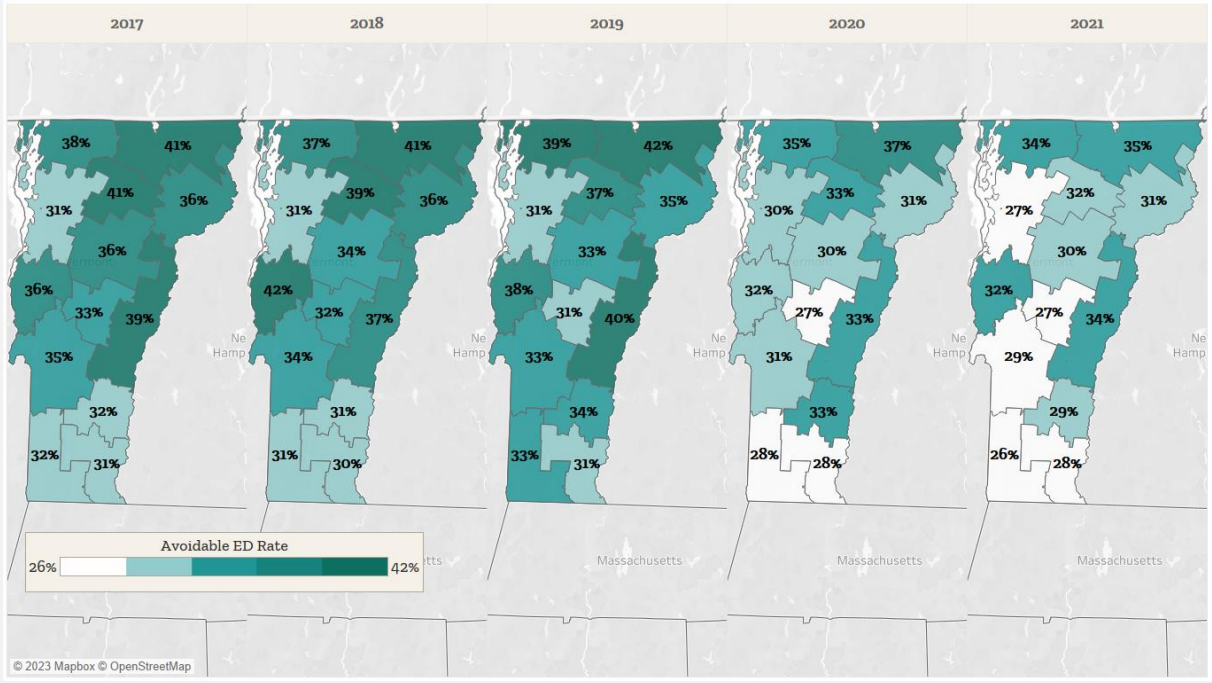
Exhibit III.2. Spending on avoidable ED visits payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

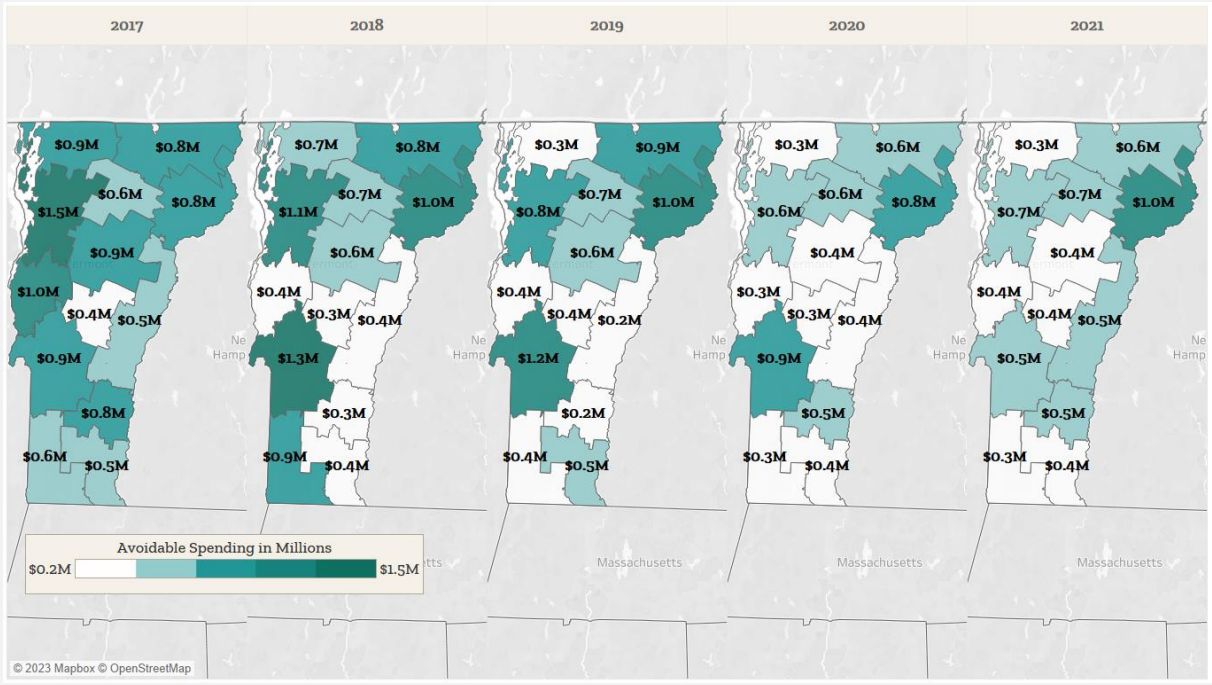
Avoidable ED visit rates varied substantially across the state. Among Medicare FFS beneficiaries, between 26 and 42 percent of ED visits at the HSA level where avoidable over the 2017–2021 period (Exhibit III.3). Newport HSA had the highest rates of avoidable ED visits, at 35 percent in 2021. This accounted for 31 percent ($602,686) of total Medicare FFS ED spending in the HSA (Exhibit III.4). Most HSAs saw a decline in avoidable ED visits over the study period. The statewide rate of avoidable ED visits declined from 33 percent in 2017 to 28 percent in 2021. Avoidable ED visits also declined in every HSA over this period, as did spending on avoidable ED.

Exhibit III.3. Avoidable ED visit rates by HSA for Medicare FFS, 2017–2021



Source: Mathematica's analysis of VHCURES data.

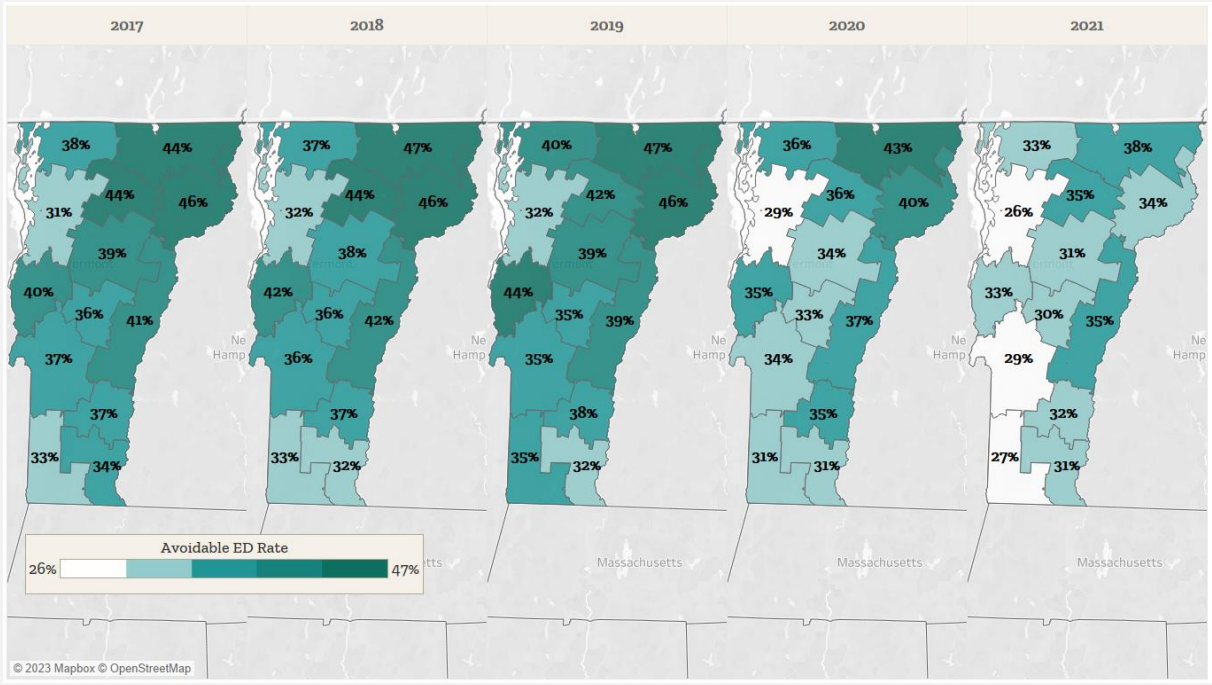
Exhibit III.4. Medicare FFS spending on avoidable ED visits by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

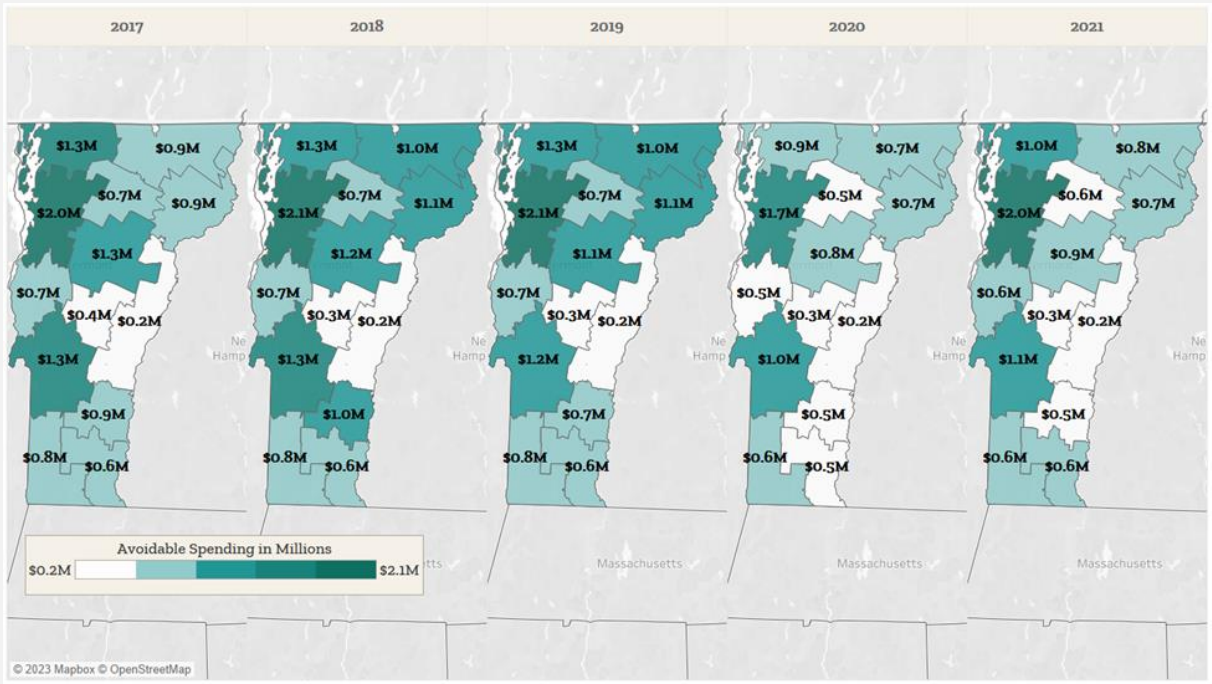
Avoidable ED visits were generally highest for Medicaid beneficiaries compared to other payers, ranging from 26 to 47 percent across HSAs (Exhibit III.5). The HSAs in Vermont's northeastern part (Newport, Morrisville, and St. Johnsbury) consistently had the highest rates of avoidable ED visits, with about 45 percent in 2017 and about 36 percent in 2017. Overall, the rate declined from 42 percent in 2017 to 42 percent in 2021. Avoidable ED visits also declined in every HSA over this period. Medicaid spending for avoidable ED visits was highest in Burlington HSA, at about $2 million per year (Exhibit III.6), although the rate of avoidable ED visits was consistently the lowest in this HSA (but this HSA has a large number of Medicaid beneficiaries). Although rates of avoidable ED visits declined across the state, spending remained constant in most HSAs over the study period (with the exception of 2020 due to the COVID-19 pandemic), reflecting increasing prices of ED care.

Exhibit III.5. Avoidable ED visit rates by HSA for Medicaid, 2017–2021



Source: Mathematica's analysis of VHCURES data.

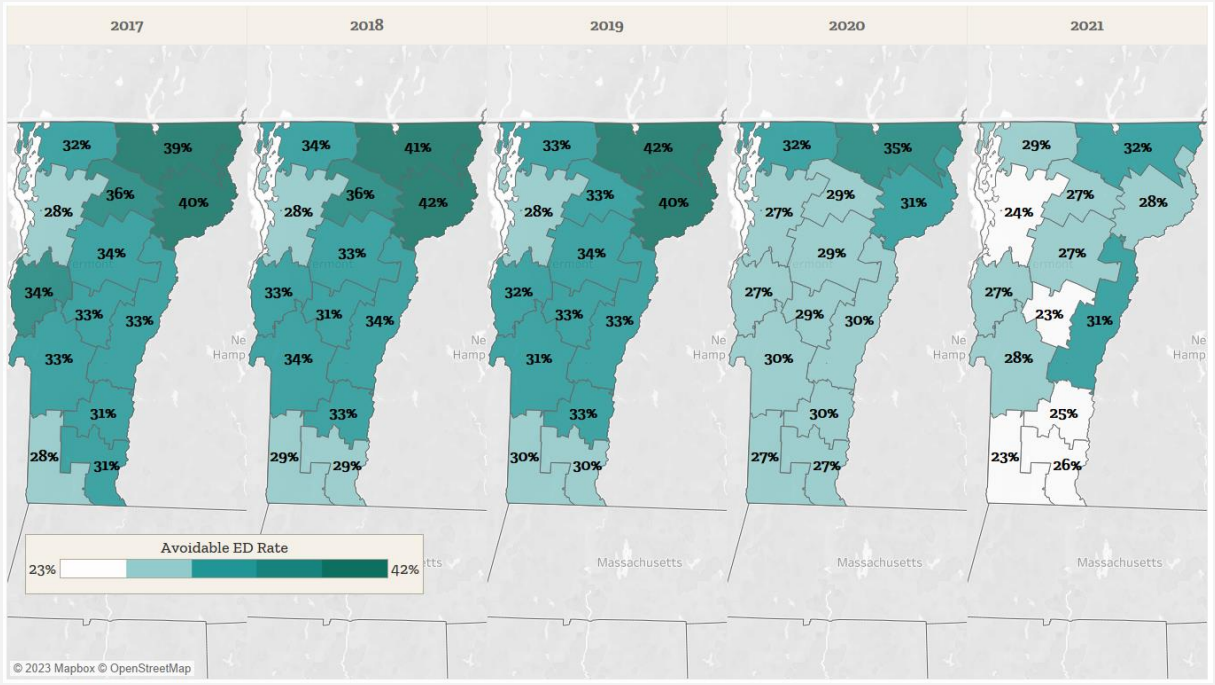
Exhibit III.6. Medicaid spending on avoidable ED visits by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

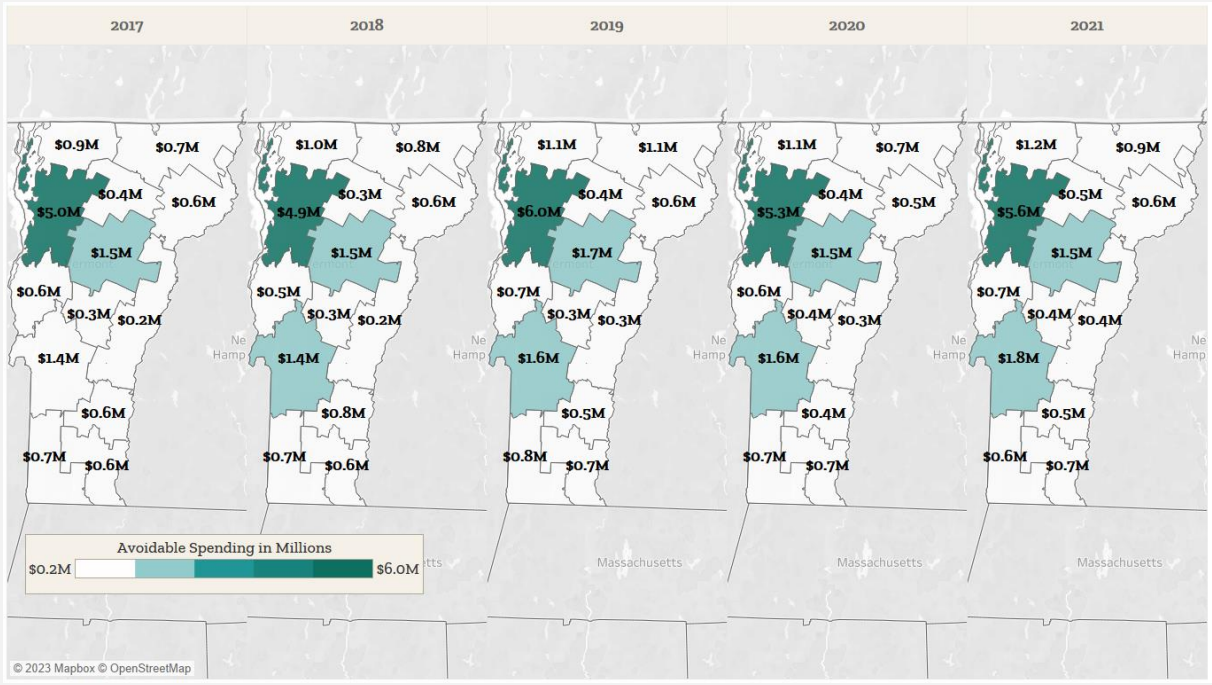
The rate of avoidable ED visits among commercially and Medicare Advantage insured members was generally lower than for Medicare FFS and Medicaid; it ranged from 23 to 42 percent (Exhibit III.7). The geographic distribution and trends over time were similar for commercial as for the other two payer types. The HSAs with the highest avoidable ED visit rates were in the state's northeastern part, and avoidable ED visits declined in all parts of the state from 2017 to 2021. In 2021, a few HSAs had the lowest avoidable ED visit rates among all regions and payers at 23–24 percent. Spending on avoidable ED visits did not decline as much as the visit rates in most HSAs and increased in some HSAs (Exhibit III.8). Burlington HSA had the highest commercial spending on avoidable HSA visits and saw a 12 percent increase in spending although visit rates declined by 14 percent.

Exhibit III.7. Avoidable ED visit rates by HSA for commercial payers, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Exhibit III.8. Commercial spending on avoidable ED visits by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Hospitals have also seen gradual declines across all payers for avoidable ED visits over the 2017–2021 period (Exhibit III.9). In the University of Vermont Medical Center, avoidable ED visit rates for commercial and Medicare Advantage have declined from 28 to 24 percent, Medicaid declined from 31 to 26 percent, and Medicare FFS declined from 31 to 27 percent from 2017–2021. Rates for the three different subcategories have all declined in a similar fashion for the Medical Center, though declines in non-emergent visits and emergent but PC treatable visits account for most of the decline in overall avoidable ED visits. Similar trends can be found in other VT hospitals as well.

Exhibit III.9. Avoidable ED visits and associated spending by hospital in 2021 and average annual growth from 2017 to 2021, all payers

	2021 estimates			Average annual growth 2017–2021		
Hospital	Avoidable ED visit rate	Avoidable ED visits	Total spending for avoidable ED visits (average per visit)	Avoidable ED visit rate	Avoidable ED visits	Total spending for avoidable ED visits (average per visit)
All VT Hospitals	0.29	71,922	$30,796,924 ($428)	-4.9%	-3.3%	-2.4% (2.4%)
Brattleboro	0.29	4,369	$1,239,100 ($284)	-2.4%	2.4%	0.53% (-1.5%)
Central Vermont	0.30	9,218	$2,710,062 ($294)	-5.4%	-0.3%	-7.2% (-4.6%)

Hospital	2021 estimates			Average annual growth 2017–2021		
	Avoidable ED visit rate	Avoidable ED visits	Total spending for avoidable ED visits (average per visit)	Avoidable ED visit rate	Avoidable ED visits	Total spending for avoidable ED visits (average per visit)
Copley	0.32	4,189	$1,690,201.38 ($403)	-6.0%	-8.0%	1.4% (11.2%)
Gifford	0.28	2,045	$1,113,442 ($544)	-5.4%	-6.7%	2.3% (10.6%)
Grace Cottage	0.30	611	$400,799 ($656)	-4.9%	-3.3%	3.0% (7.9%)
Mt. Ascutney	0.34	1,181	$1,024,990 ($868)	-3.1%	2.7%	7.0% (7.9%)
North Country	0.36	5,955	$2,248,703 ($378)	-3.7%	-6.8%	-0.4% (6.9%)
Southwestern	0.26	5,849	$1,460,462 ($250)	-4.9%	1.2%	-6.4% (-7.1%)
Northwestern	0.32	4,776	$2,121,621 ($444)	-2.9%	-5.2%	-6.1% (0.9%)
Porter	0.31	4,135	$1,669,666 ($404)	-4.1%	3.9%	-2.0% (-1.8%)
Rutland	0.29	5,352	$3,022,706 ($565)	-5.0%	-7.7%	-1.7% (7.1%)
Northeastern	0.32	4,116	$2,388,955 ($580)	-6.3%	-9.5%	1.7% (14.4%)
Springfield	0.29	2,204	$1,440,232 ($653)	-3.7%	-19.5%	-9.2% (17.5%)
University of Vermont	0.25	17,922	$8,265,982 ($461)	-3.9%	2.9%	-0.1% (-1.2%)

Source: Mathematica's analysis of VHCURES data.

B. Preventable hospitalizations

Hospital stays are another expensive type of health care use, for example, accounting for about 30 percent of Medicare spending in Vermont during our study period. While many inpatient stays are necessary and unavoidable, some hospitalizations could be prevented through effective high-quality primary care. We identified preventable hospitalizations through a composite measure developed by the Agency for Healthcare Research and Quality (PQI 90).[23] This measure identifies acute hospitalizations that could have been avoided with access to high-quality primary care. The measure includes admissions for uncontrolled diabetes, diabetes with short or long-term complications, or with lower-extremity amputation, chronic obstructive pulmonary disease, asthma, hypertension, heart failure, bacterial

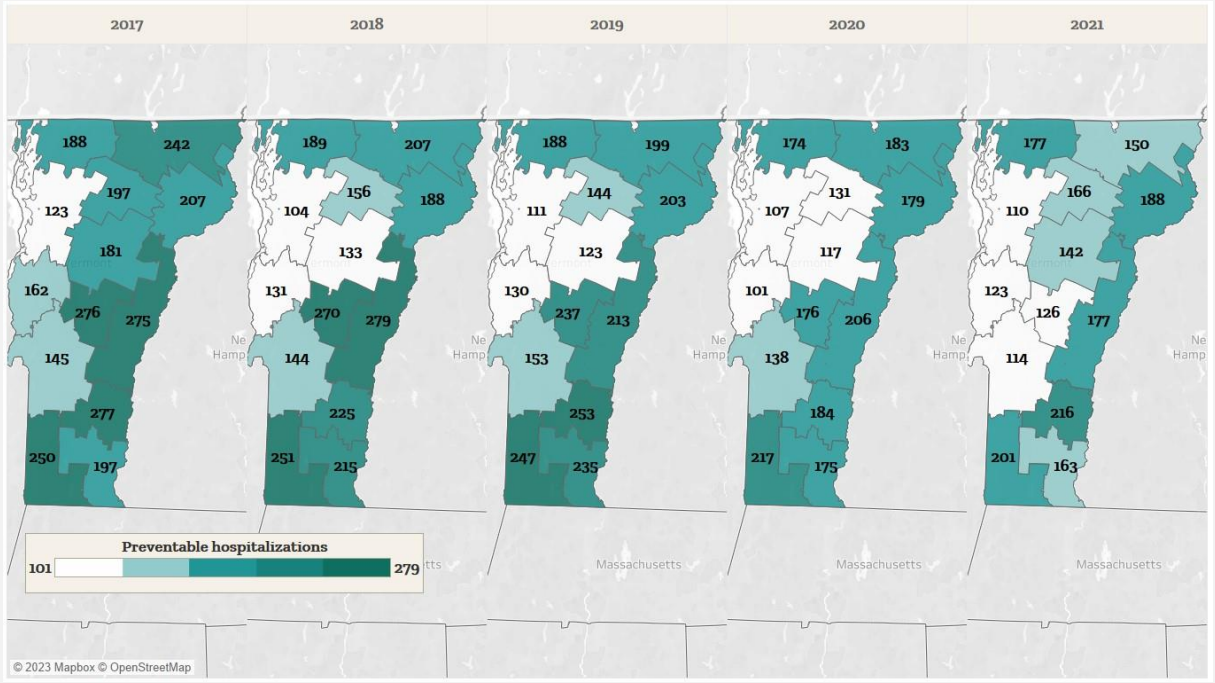
[23] Agency for Healthcare Research and Quality (2022). Prevention Quality Indicator Measures. Available at: qualityindicators.ahrq.gov/measures/pqi_resources.

pneumonia, or urinary tract infection. We report the PQI 90 measure for Vermont residents ages 18 and over by hospital, HSA, and payer type for the 2017–2021 period. We calculated the measure per 1,000 members who had at least one inpatient stay during the observation year. (Hospital, HSA and payer-level estimates were not adjusted for age, sex or race, see Appendix C for details.)

Preventable hospitalizations decreased over the study period, but there was considerable regional variation in this measure. Among all Vermont residents, preventable hospitalizations decreased from 179 (2017) to 137 (2021) admissions per 1,000 qualifying members with any acute inpatient stay. Burlington HSA experienced the lowest rates of preventable hospitalizations in all years, ranging from 101 (2020) to 123 (2017) per 1,000 qualifying members (Exhibit III.10). Springfield HSA had the highest rates of preventable hospitalizations in three of the five analysis years, ranging from 216 (2021) to 277 (2017) admissions per 1,000 qualifying beneficiaries. White River Junction and Bennington HSAs had the highest rates of preventable hospitalizations in the remaining years, at 279 (2018) and 217 (2020) respectively.

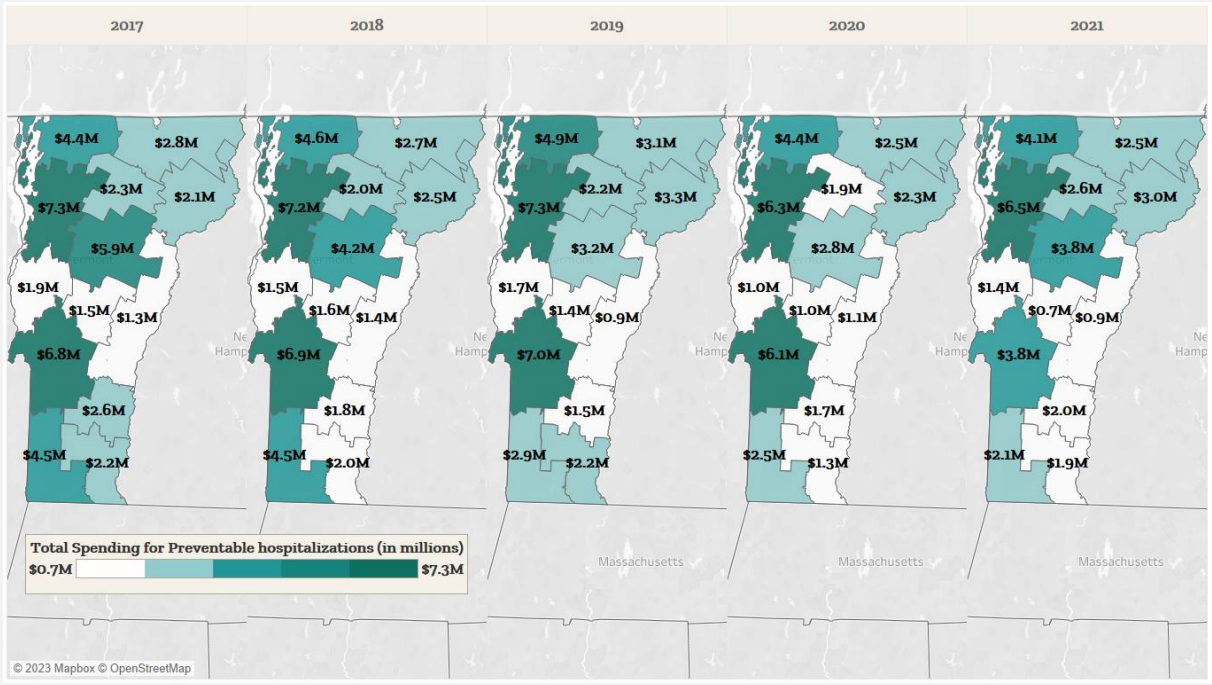
Average spending on preventable hospitalizations did not vary substantially over the analysis period and ranged from $9,481 (2020) to $10,397 (2021) per preventable stay. However, there were considerable differences in spending by HSA (Exhibit III.11). St. Johnsbury HSA had the highest spending per preventable admission in all analysis years, ranging from $12,381 in 2017 to $18,459 in 2021. Springfield and Bennington HSAs had the lowest spending per preventable hospitalization, despite having the highest rates of preventable hospitalizations, ranging from $6,347 (Bennington HSA, 2019) to $8146 (Springfield HSA, 2017).

Exhibit III.10. Preventable hospitalizations per 1,000 beneficiaries with an acute inpatient stay, by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

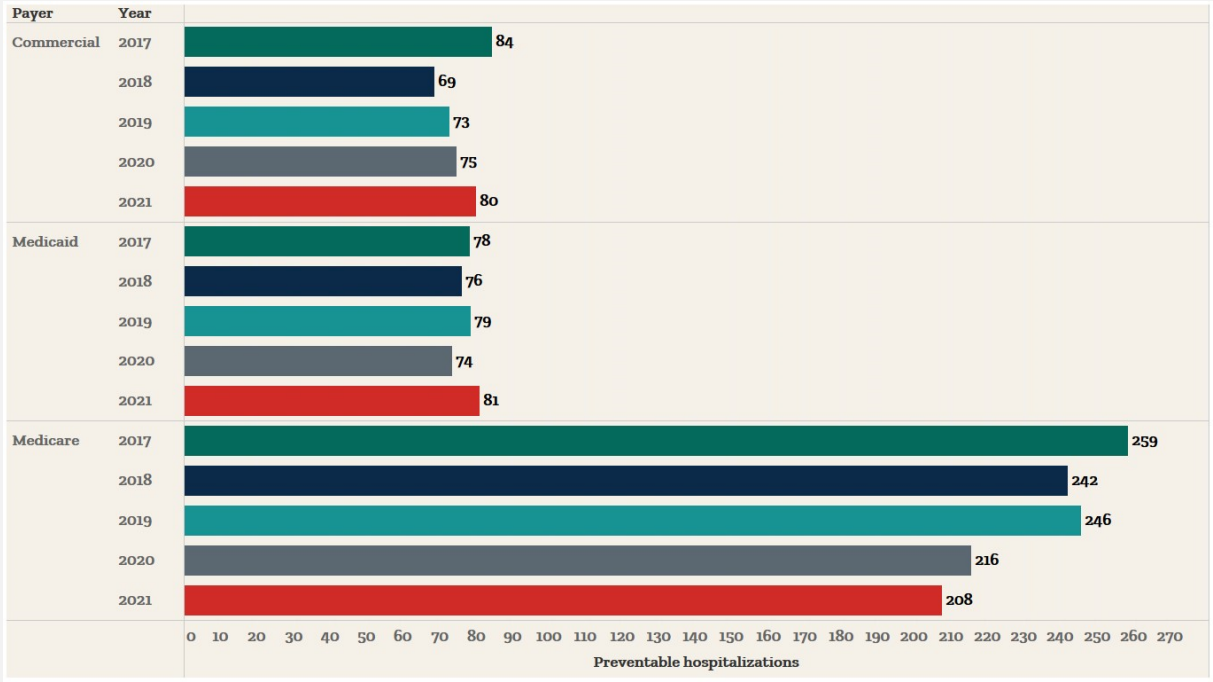
Exhibit III.11. Total spending on preventable hospitalizations, by HSA, 2017–2021



Source: Mathematica's analysis of VHCURES data.

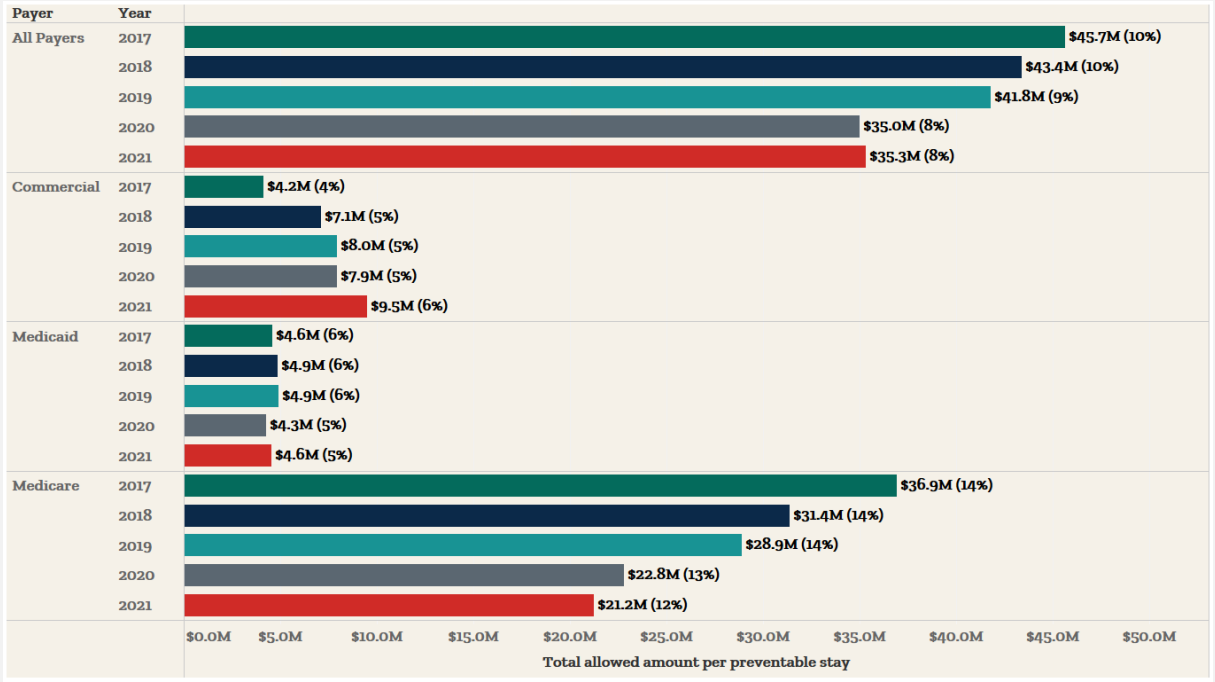
Preventable hospitalizations and associated spending varied by payer type. Preventable hospitalizations were most frequent among Medicare FFS beneficiaries, ranging from 208 (2021) to 259 (2017) per 1,000 qualifying beneficiaries, and were much lower in commercial and Medicaid beneficiaries (average of 76 and 78 preventable hospitalizations per 1,000 qualifying beneficiaries respectively, across all years) (Exhibit III.12). Across all analysis years, 74 percent of preventable hospitalizations were for Medicare FFS beneficiaries while Medicaid and Commercial beneficiaries each accounted for 13 percent of preventable hospitalizations. Spending followed similar trends, with Medicare FFS beneficiaries accounting for 70 percent of total spending on preventable hospitalizations while Medicaid and Commercial beneficiaries accounted for 12 and 18 percent of spending on preventable hospitalizations respectively. Over time however, the Medicare FFS share of preventable hospitalizations decreased from 80 percent (2017) to 67 percent (2021), with similar trends in spending. The Commercial share of preventable hospitalizations increased from 8 percent (2017) to 18 percent (2021) while the Medicaid proportion of preventable hospitalizations had a more modest increase, from 10 percent (2017) to 13 percent (2021). The increase in preventable hospitalizations among commercially insured members may be due to an enrollment shift from Medicare FFS to Medicare Advantage during the study period. Per preventable hospitalization, spending was highest for commercial members, increasing from about $12,000 in 2017 to about $16,000 in 2021. Spending per preventable stay for Medicare and Medicaid was about $8,000 to $10,000 and remained stable over the study period (Exhibit III.13).

Exhibit III.12. Preventable hospitalizations per 1,000 beneficiaries with an acute inpatient stay, by payer/insurance type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Exhibit III.13. Spending on preventable hospitalizations and percentage of total spending on acute hospitalizations, by payer/insurance type, 2017–2021[a]



Source: Mathematica's analysis of VHCURES data.

[a]We assessed spending on preventable hospitalizations as a proportion of spending on all acute hospitalizations that were eligible for this measure's denominator (see Appendix C for details).

Most hospitals that serve Vermont residents experienced declining rates of preventable hospitalizations from 2017 to 2021 among Medicare and commercial members, but the trend was increasing for Medicaid beneficiaries (Exhibit III.14 and Appendix Exhibits A.34–A.35). The highest rates of preventable hospitalizations in 2021 occurred at Grace Cottage Hospital overall (297 admissions per 1,000 qualifying members,[24] 4 percent average annual decrease since 2017) Medicare FFS beneficiaries (347 admissions per 1,000 qualifying beneficiaries, 5 percent average annual decrease since 2017), at Copley Hospital for Medicaid beneficiaries (140 admissions per 1,000 qualifying beneficiaries, 22 percent average annual increase since 2017), and at Mt. Ascutney Hospital and Health Center for commercially insured members (333 admissions per 1,000 qualifying beneficiaries, average annual change not reported due to small numbers in 2017). Southwestern Vermont Medical Center experienced the highest average spending for preventable hospitalizations in 2021 across all payers ($18,921). Average spending for preventable hospitalizations grew the fastest at Copley Hospital overall (14 percent average annual increase) and for Medicare FFS beneficiaries (16 percent average annual increase), at Southwestern for Medicaid beneficiaries (11 percent average annual increase), and at Porter for commercial members (38 percent average annual increase).

[24] The denominator for this measure included all members with an acute hospitalization at a given hospital for a given analysis year (For example. All members with acute hospitalizations at Grace Cottage Hospital in 2021).

Exhibit III.14. Preventable hospitalizations and associated spending by hospital in 2021 and average annual growth from 2017 to 2021

Hospital	Preventable stays per 1000 patients	2021 estimates		Preventable stays per 1000 patients	Average Annual Growth from 2017-2021	
		Number of preventable stays (percent of eligible stays)	Total spending for preventable stays (average spending per stay, proportion of acute inpatient spending[a])		Total number of preventable stays	Average spending for preventable stays
All Payers						
All VT Hospitals	137	3,396 (14%)	$35,309,493 ($10,397, 10%)	-5%	-5%	0%
Albany, NY	27	12 (7%)	$121,368 ($10,114, 4%)	n.r.	n.r.	n.r.
Brattleboro	145	153 (17%)	$1,804,089 ($11,791, 15%)	-3%	-6%	5%
Central Vermont	161	367 (14%)	$2,973,861 ($8,103, 11%)	-5%	-5%	-6%
Copley	161	171 (16%)	$2,906,054 ($16,994, 16%)	-4%	-7%	14%
Dartmouth-Hitchcock, NH	75	350 (9%)	$5,823,503 ($16,639, 6%)	2%	3%	5%
Gifford	130	108 (16%)	$1,133,913 ($10,499, 13%)	-10%	-11%	3%
Grace Cottage	297	19 (25%)	$201,192 ($10,589, 29%)	-4%	-10%	10%
Mt. Ascutney	303	56 (24%)	$766,204 ($13,682, 25%)	-4%	-6%	9%
North Country	171	170 (18%)	$2,207,327 ($12,984, 15%)	-8%	-9%	9%
Southwestern	179	176 (18%)	$3,330,028 ($18,921, 19%)	-2%	0%	9%
Northwestern	229	338 (23%)	$4,277,046 ($12,654, 17%)	0%	-3%	3%
Porter	127	112 (15%)	$922,333 ($8,235, 13%)	-7%	-6%	-5%
Rutland	113	394 (10%)	$3,822,832 ($9,703, 8%)	-3%	-6%	-3%
Southwestern	214	297 (20%)	$2,080,529 ($7,005, 14%)	-5%	-7%	-5%
Springfield	238	143 (20%)	$1,587,975 ($11,105, 17%)	-3%	-10%	8%
University of Vermont	87	892 (10%)	$7,296,110 ($8,179, 5%)	-2%	3%	-4%

Source: Mathematica's analysis of VHCURES data.

[a]We assessed spending on preventable hospitalizations as a proportion of spending on all acute hospitalizations that were eligible for this measure's denominator (see Appendix C for details).

n.r. = Numbers were suppressed as they fell below the threshold permissible for reporting.

C. Hospital readmissions

Hospital readmissions are a leading concern in quality of hospital care as they are expensive and adversely impact patient health. Some readmissions, such as for cancer treatment or rehabilitation, are planned, but other readmissions are unplanned and are often preventable with appropriate discharge instructions and transitional care. Nationally, 14 percent of hospitalizations were followed by an unplanned readmission within 30 days of discharge in 2018.[25] We estimated unplanned readmissions using the plan 30-day all-cause readmissions developed by the National Committee for Quality Assurance.[26]

The average readmission rate across Vermont hospitals did not change substantially over the study period (12 percent of index discharges were followed by a readmission in all analysis years), but there was significant variation in readmission levels and growth by hospital (Exhibit III.15). The highest readmission rates in 2021 across all payer types were observed at Central Vermont Medical Center (14 percent) and the lowest readmission rates at Brattleboro Memorial Hospital, Copley Hospital and at Porter Medical Center (9 percent). Over the study period, readmission rates grew the fastest at Brattleboro Memorial Hospital and at Southwestern Vermont Medical Center (5 percent average annual increase,) while Springfield Hospital had the largest decline in readmissions (12 percent average annual decrease).[27]

Exhibit III.15. Unplanned 30-day readmissions and associated spending by hospital in 2021 and average annual growth from 2017 to 2021, all payers

Hospital	2021 estimates			Average annual growth 2017–2021		
	Readmissions per 1,000 patients	Index stays followed by readmissions (percent of index stays)	Total spending for readmissions (average per stay)	Readmissions per 1,000 patients	Index stays followed by readmissions	Average spending for readmissions
All VT Hospitals	112	2,776 (12%)	$37,479,394 ($13,501)	0%	0%	0%
Albany, NY	60	63 (16%)	$1,258,650 ($19,979)	12%	6%	1%
Brattleboro	35	79 (9%)	$1,069,647 ($13,540)	5%	9%	-2%
Central Vermont	296	315 (14%)	$3,045,834 ($9,669)	2%	1%	-6%
Copley	105	87 (9%)	$1,603,493 ($18,431)	-5%	-1%	8%
Dartmouth-Hitchcock, NH	9,703	621 (13%)	$10,977,710 ($17,677)	0%	1%	1%
Gifford	346	64 (10%)	$920,834 ($14,388)	-3%	-1%	2%

[25] Weiss, A. J., & Jiang, H. J. (2021). Overview of clinical conditions with frequent and costly hospital readmissions by payer, 2018. Agency for Healthcare Research and Quality statistical brief #278.

[26] National Committee for Quality Assurance (2022). Available at: https://www.ncqa.org/hedis/measures/plan-all-cause-readmissions/.

[27] We calculated readmission rates by hospital based on the hospital where the patient had the initial (index) stay.

Hospital	2021 estimates			Average annual growth 2017–2021		
	Readmissions per 1,000 patients	Index stays followed by readmissions (percent of index stays)	Total spending for readmissions (average per stay)	Readmissions per 1,000 patients	Index stays followed by readmissions	Average spending for readmissions
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	17	17 (10%)	$309,627 ($18,213)	0%	0%	-1%
North Country	66	97 (12%)	$2,012,270 ($20,745)	-2%	0%	16%
Southwestern	115	102 (12%)	$2,221,537 ($21,780)	5%	4%	10%
Northwestern	39	135 (11%)	$2,052,983 ($15,207)	-5%	0%	4%
Porter	44	61 (9%)	$436,365 ($7,154)	3%	3%	-9%
Rutland	772	465 (13%)	$5,557,143 ($11,951)	-2%	2%	-3%
Southwestern	13	131 (10%)	$1,492,706 ($11,395)	-4%	-1%	-1%
Springfield	128	57 (10%)	$894,060 ($15,685)	-12%	-4%	7%
University of Vermont	248	1,156 (12%)	$15,448,732 ($13,364)	3%	-1%	0%

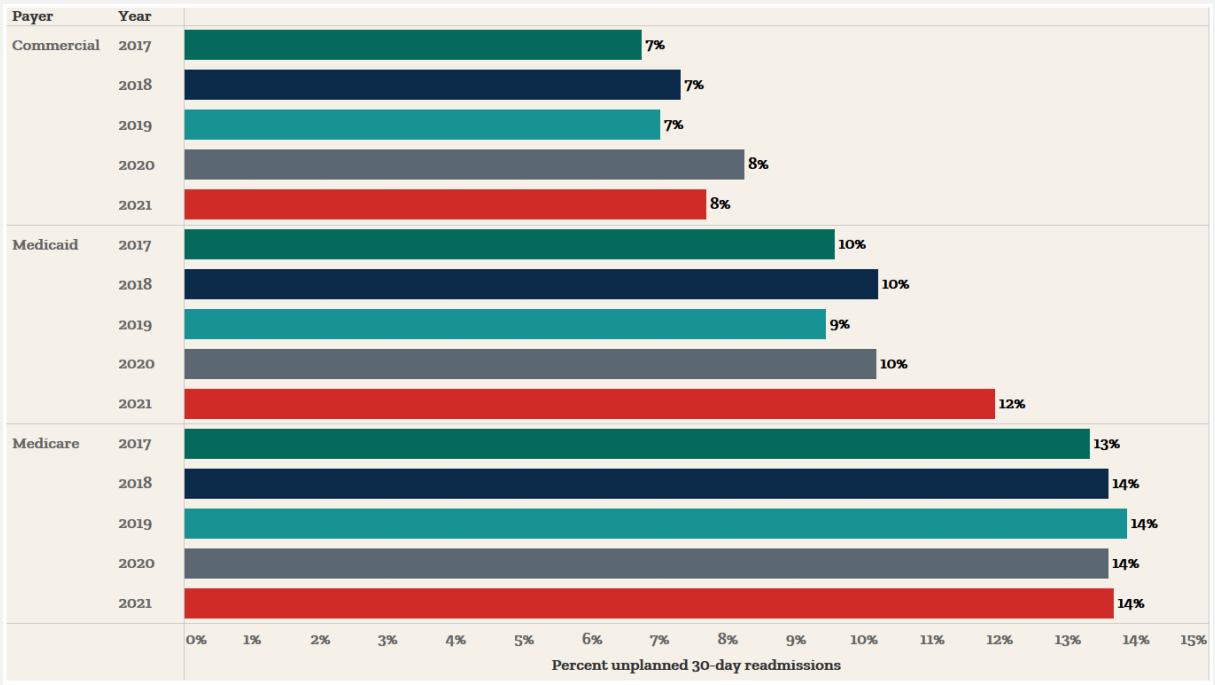
Source: Mathematica's analysis of VHCURES data.

Note: We counted readmissions regardless of whether they occurred at the same hospital as the index stay.

n.r. = Numbers were suppressed as they fell below the threshold permissible for reporting.

Readmission rates also varied significantly by payer type. Medicaid beneficiaries experienced the highest readmission rates in 2021 at Central Vermont Medical Center (16 percent), Medicare FFS beneficiaries at North Country Hospital (17 percent), and commercial members at Northeastern Vermont Regional Hospital (12 percent) (Exhibit III.16 and Appendix Exhibit A.36). Medicare FFS beneficiaries experienced the majority of the state's readmissions in 2021 (59 percent of all readmissions) while Medicaid beneficiaries and commercial members accounted for a smaller proportion of readmissions (24 and 17 percent, respectively). Across all Vermont hospitals, readmission rates grew the fastest for Medicaid beneficiaries over the study period (8 percent average annual increase) while commercial members experienced a smaller increase in readmissions (3 percent average annual increase). Readmission rates did not change appreciably over time for Medicare FFS beneficiaries, in line with the overall trend in readmission.

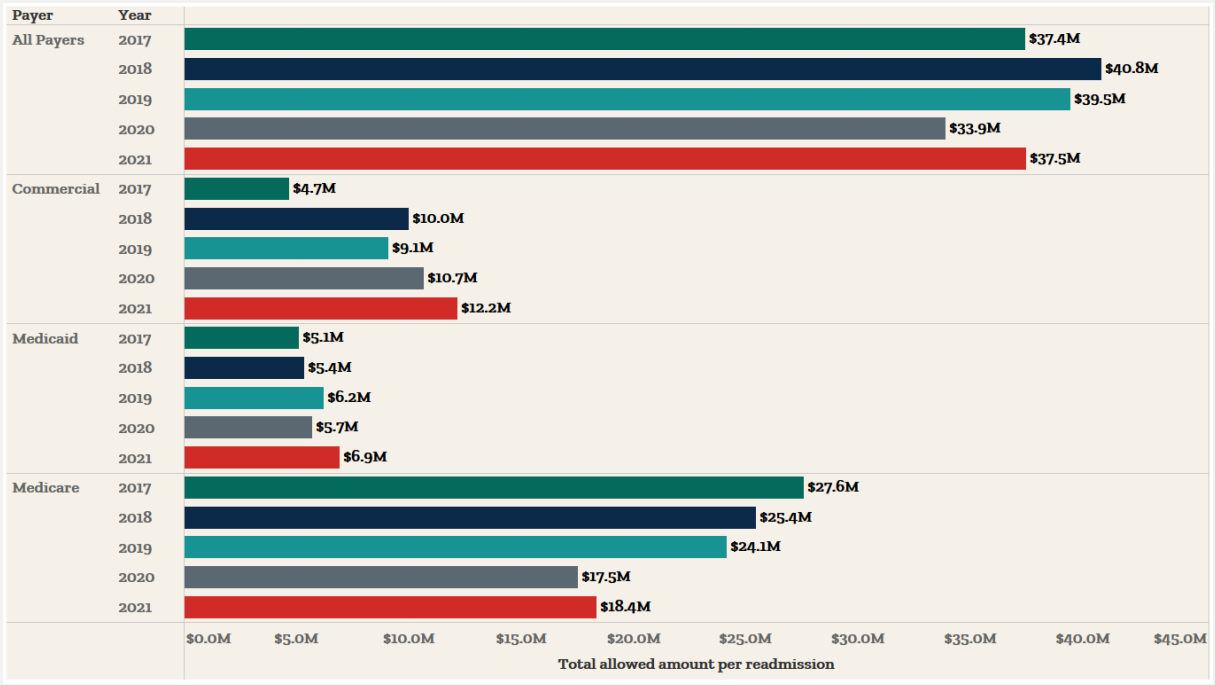
Exhibit III.16. Percentage of acute inpatient discharges followed by an unplanned readmission by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

Overall, spending on readmissions did not change substantially between 2017 and 2021: a decrease in spending for readmissions of Medicare FFS beneficiaries (3 percent average annual decrease) was offset by growth in spending for readmissions of Medicaid beneficiaries and commercial members (2 and 5 percent average annual increase, respectively) (Exhibit III.17). Roughly half of all spending for readmissions was for Medicare FFS beneficiaries, a third for commercial members and 18 percent for Medicaid beneficiaries. Spending for readmissions varied widely by hospital and payer. In 2021, Northeastern Vermont Regional Hospital had the highest average spending on readmissions ($21,780 per stay) while Porter Medical Center had the lowest spending ($7,154) (Exhibit III.19). Spending was highest at Northeastern Vermont Regional Hospital for Medicare FFS beneficiaries ($24,502), at Northwestern Medical Center for Medicaid beneficiaries ($12,575) and at University of Vermont Medical Center for commercial members ($31,706) (Appendix Exhibit A.37).

Exhibit III.17. Total spending on unplanned readmissions by payer type, 2017–2021



Source: Mathematica's analysis of VHCURES data.

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Appendix A

Additional tables and figures

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1. Overuse measures

Exhibit A.1. Overuse PSA tests summary, 2017-2021

Year	PSA tests, total	Beneficiaries with at least one PSA test	Eligible beneficiaries	Count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line payments, PSA-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	3,513	2,947	15,974	220	$103,723	$29	$480,172	$136
2018	3,666	3,072	17,073	215	$80,413	$22	$441,586	$120
2019	3,692	3,091	17,443	212	$73,949	$20	$381,458	$103
2020	3,711	3,164	17,842	208	$78,688	$21	$472,239	$126
2021	4,376	3,641	18,653	235	$85,321	$19	$540,448	$123

Source: Mathematica's analysis of VHCURES data.

Exhibit A.2. Overuse PSA tests summary by HSA, 2017-2021

Health Service Area	Overuse PSA tests, total	PSA count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line-level payments, PSA-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	356	218	$10,186	$28	$42,663	$119
Bennington	226	184	$5,350	$23	$38,422	$169
Brattleboro	254	296	$7,036	$28	$40,810	$160
Burlington	880	238	$20,147	$23	$86,082	$97
Middlebury	151	194	$6,643	$44	$32,969	$217
Morrisville	99	148	$3,155	$32	$12,130	$121
Newport	141	170	$4,507	$32	$21,332	$150
Randolph	116	272	$9,466	$81	$25,389	$217
Rutland	455	263	$11,128	$24	$44,806	$98
Springfield	201	219	$6,968	$34	$43,490	$215
St. Albans	344	344	$8,117	$23	$42,321	$122
St. Johnsbury	80	103	$3,791	$47	$9,670	$119

Health Service Area	Overuse PSA tests, total	PSA count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line-level payments, PSA-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
White River Jct	208	150	$7,180	$35	$39,917	$192
2018						
Barre	388	226	$5,919	$15	$39,397	$101
Bennington	228	176	$4,885	$21	$43,497	$189
Brattleboro	245	270	$5,756	$23	$40,720	$166
Burlington	870	226	$11,007	$13	$44,097	$51
Middlebury	191	220	$3,464	$18	$24,770	$130
Morrisville	113	159	$3,776	$33	$15,967	$140
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	190	212	$6,219	$33	$30,423	$159
Randolph	97	227	$7,271	$75	$18,048	$186
Rutland	397	216	$8,569	$22	$30,610	$77
Springfield	224	232	$5,315	$24	$25,639	$114
St. Albans	320	304	$4,536	$14	$23,657	$74
St. Johnsbury	96	121	$4,955	$52	$42,628	$444
White River Jct	229	158	$7,270	$32	$56,678	$248
2019						
Barre	436	245	$5,961	$14	$28,946	$66
Bennington	215	165	$2,499	$12	$19,895	$92
Brattleboro	260	276	$6,185	$24	$41,819	$159
Burlington	876	215	$9,605	$11	$50,412	$57
Middlebury	205	223	$3,469	$17	$19,387	$95
Morrisville	117	159	$4,084	$34	$14,837	$125
Newport	192	208	$6,617	$34	$30,836	$161
Randolph	106	243	$7,449	$70	$20,212	$189

Health Service Area	Overuse PSA tests, total	PSA count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line-level payments, PSA-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Rutland	441	232	$8,892	$20	$57,022	$129
Springfield	234	241	$5,315	$22	$42,661	$180
St. Albans	317	291	$2,199	$7	$12,085	$38
St. Johnsbury	94	113	$5,925	$62	$14,858	$155
White River Jct	197	132	$5,709	$29	$28,325	$143
2020						
Barre	364	200	$5,391	$15	$32,991	$89
Bennington	220	166	$2,781	$13	$20,291	$92
Brattleboro	216	223	$4,882	$22	$26,362	$120
Burlington	882	211	$9,574	$11	$38,893	$44
Middlebury	225	238	$4,974	$22	$26,040	$116
Morrisville	105	140	$3,079	$29	$15,840	$148
Newport	231	243	$8,528	$37	$48,456	$210
Randolph	95	208	$6,036	$63	$27,340	$285
Rutland	450	235	$8,489	$19	$61,133	$136
Springfield	263	261	$8,228	$31	$52,813	$200
St. Albans	307	274	$2,983	$10	$17,919	$58
St. Johnsbury	107	127	$6,575	$61	$36,139	$335
White River Jct	243	160	$7,148	$29	$67,943	$278
2021						
Barre	420	222	$5,445	$13	$32,268	$76
Bennington	276	211	$3,856	$14	$22,846	$82
Brattleboro	343	341	$6,920	$20	$93,797	$266
Burlington	1,066	239	$11,271	$11	$80,552	$75
Middlebury	273	281	$6,400	$23	$27,580	$101
Morrisville	132	167	$3,407	$25	$10,946	$82

Health Service Area	Overuse PSA tests, total	PSA count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line-level payments, PSA-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Newport	240	250	$8,911	$37	$53,354	$220
Randolph	113	232	$5,913	$52	$31,772	$281
Rutland	505	247	$6,596	$13	$59,999	$119
Springfield	237	225	$5,203	$22	$35,403	$149
St. Albans	356	302	$2,779	$8	$11,492	$32
St. Johnsbury	159	182	$10,314	$65	$36,627	$230
White River Jct	253	160	$8,270	$33	$43,608	$172

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.3. Overuse PSA tests summary by insurance type, 2017-2021

Health service area	Overuse PSA tests, total	PSA count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line-level payments, PSA-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	132	236	$5,930	$44	$26,064	$193
Dual Eligible	253	142	$7,348	$29	$39,572	$156
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	383	247	$12,293	$32	$53,311	$137
Medicare FFS	2,744	228	$78,128	$28	$361,166	$131
2018						
Commercial	117	201	$5,010	$42	$20,740	$176
Dual Eligible	236	132	$5,203	$22	$32,024	$135
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	400	206	$12,464	$31	$40,952	$102

Health service area	Overuse PSA tests, total	PSA count per 1,000 eligible beneficiaries	PSA-specific line payments, total	Mean line-level payments, PSA-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Medicare FFS	2,911	229	$57,691	$20	$347,789	$119
2019						
Commercial	155	233	$6,875	$43	$27,686	$172
Dual Eligible	226	126	$4,487	$20	$21,700	$96
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	508	221	$15,367	$30	$64,432	$126
Medicare FFS	2,803	222	$47,220	$17	$267,640	$95
2020						
Commercial	177	246	$7,544	$41	$34,969	$189
Dual Eligible	251	140	$5,163	$20	$41,533	$165
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	529	205	$16,278	$31	$78,666	$148
Medicare FFS	2,753	217	$49,683	$18	$316,912	$114
2021						
Commercial	222	265	$8,289	$37	$33,659	$150
Dual Eligible	269	145	$5,077	$19	$24,834	$92
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	709	207	$21,393	$30	$92,178	$130
Medicare FFS	3,175	255	$50,562	$16	$389,759	$122

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.4. Overuse cervical cancer screening tests summary, 2017-2021

Year	Cervical screening tests, total	Beneficiaries with at least one cervical screen	Eligible beneficiaries	Count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line payments, cervical screen-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	1,158	1,149	57,262	20	$46,776	$30	$185,919	$117
2018	1,131	1,116	60,127	19	$36,350	$23	$151,065	$94
2019	1,073	1,065	61,089	18	$32,170	$21	$137,683	$88
2020	834	825	62,691	13	$27,716	$23	$140,330	$116
2021	1,183	1,176	64,534	18	$43,071	$26	$164,576	$101

Source: Mathematica's analysis of VHCURES data.

Exhibit A.5. Overuse cervical cancer screening tests summary by HSA, 2017-2021

Health service area	Overuse cervical screens, total	Cervical screen count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line-level payments, cervical screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	187	31	$6,917	$25	$26,113	$94
Bennington	156	37	$6,823	$29	$30,526	$132
Brattleboro	62	19	$2,751	$33	$8,856	$107
Burlington	376	27	$17,105	$32	$54,526	$102
Middlebury	43	16	$1,513	$31	$8,964	$183
Morrisville	48	22	$1,629	$26	$8,166	$130
Newport	19	7	$595	$30	$2,693	$135
Randolph	15	10	$664	$33	$2,452	$123
Rutland	105	17	$3,038	$25	$13,513	$111
Springfield	20	6	$866	$36	$3,003	$125
St. Albans	50	14	$1,877	$33	$6,495	$114
St. Johnsbury	24	9	$468	$17	$5,853	$209
White River Jct	53	11	$2,528	$35	$14,758	$205

Health service area	Overuse cervical screens, total	Cervical screen count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line-level payments, cervical screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2018						
Barre	164	26	$3,362	$14	$18,706	$78
Bennington	117	27	$4,518	$24	$19,170	$100
Brattleboro	83	25	$3,076	$28	$13,111	$119
Burlington	399	28	$12,341	$21	$44,100	$77
Middlebury	21	7	$791	$26	$3,340	$108
Morrisville	54	24	$2,173	$28	$7,530	$98
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	30	10	$1,168	$32	$4,400	$119
Randolph	10	7	$394	$25	$1,134	$71
Rutland	88	14	$2,606	$23	$11,359	$99
Springfield	32	10	$919	$26	$4,021	$115
St. Albans	49	13	$1,480	$26	$6,552	$113
St. Johnsbury	20	8	$512	$22	$3,047	$132
White River Jct	39	8	$1,733	$33	$8,929	$172
2019						
Barre	145	22	$2,707	$13	$13,355	$66
Bennington	143	32	$4,107	$17	$17,972	$76
Brattleboro	93	27	$2,243	$19	$9,601	$80
Burlington	330	22	$9,572	$19	$37,419	$75
Middlebury	41	13	$1,184	$23	$5,292	$102
Morrisville	25	11	$1,030	$27	$3,482	$92
Newport	27	9	$987	$29	$4,510	$133
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	106	16	$3,474	$21	$15,562	$93

Health service area	Overuse cervical screens, total	Cervical screen count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line-level payments, cervical screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Springfield	28	9	$1,274	$31	$5,103	$124
St. Albans	62	17	$2,037	$28	$7,240	$99
St. Johnsbury	22	8	$858	$30	$4,099	$141
White River Jct	44	8	$2,506	$43	$13,425	$231
2020						
Barre	68	10	$1,658	$17	$8,863	$91
Bennington	120	26	$3,740	$18	$23,651	$114
Brattleboro	67	19	$1,931	$22	$22,513	$262
Burlington	255	17	$7,879	$21	$28,577	$76
Middlebury	20	6	$613	$22	$2,413	$86
Morrisville	32	13	$950	$23	$4,839	$115
NY Capital District	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	19	6	$581	$23	$4,414	$177
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	102	15	$3,378	$21	$15,779	$97
Springfield	27	8	$1,114	$29	$5,506	$145
St. Albans	50	13	$1,477	$27	$5,788	$105
St. Johnsbury	14	5	$716	$40	$3,510	$195
White River Jct	54	10	$3,439	$49	$13,314	$190
2021						
Barre	91	13	$2,305	$21	$10,025	$91
Bennington	146	32	$4,376	$18	$18,978	$78
Brattleboro	75	21	$2,498	$24	$12,237	$115
Burlington	416	26	$12,429	$22	$43,470	$78
Middlebury	48	14	$1,503	$25	$8,378	$137

Health service area	Overuse cervical screens, total	Cervical screen count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line-level payments, cervical screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Morrisville	32	13	$1,424	$32	$4,374	$97
Newport	19	6	$2,312	$101	$5,492	$239
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	139	20	$4,081	$19	$18,332	$87
Springfield	34	10	$1,312	$28	$6,122	$130
St. Albans	68	17	$2,248	$31	$6,181	$85
St. Johnsbury	28	10	$3,867	$110	$8,625	$246
White River Jct	76	14	$4,233	$42	$20,724	$205

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.6. Overuse cervical cancer screening tests summary by insurance type, 2017-2021

Insurance type	Overuse cervical screens, total	Cervical screen count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line-level payments, cervical screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	80	18	$3,512	$32	$14,711	$135
Dual Eligible	93	10	$3,190	$26	$15,022	$124
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	88	17	$3,429	$30	$12,875	$114
Medicare FFS	895	24	$36,645	$30	$143,203	$116
2018						
Commercial	92	19	$3,471	$27	$17,710	$139
Dual Eligible	76	8	$1,909	$20	$11,513	$120
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Insurance type	Overuse cervical screens, total	Cervical screen count per 1,000 eligible beneficiaries	Cervical screen-specific line payments, total	Mean line-level payments, cervical screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Medicare Advantage	101	17	$3,375	$26	$12,111	$95
Medicare FFS	862	22	$27,596	$22	$109,731	$88
2019						
Commercial	81	16	$2,981	$24	$13,648	$112
Dual Eligible	86	9	$1,786	$16	$7,658	$67
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	107	15	$3,386	$24	$14,620	$103
Medicare FFS	799	20	$24,017	$20	$101,757	$86
2020						
Commercial	83	16	$3,332	$28	$14,114	$117
Dual Eligible	74	8	$2,190	$22	$11,834	$121
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	82	10	$2,810	$25	$22,990	$202
Medicare FFS	595	15	$19,384	$22	$91,391	$104
2021						
Commercial	84	15	$3,468	$31	$16,341	$145
Dual Eligible	110	11	$3,926	$30	$15,408	$116
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	152	14	$5,114	$26	$19,222	$98
Medicare FFS	834	22	$30,564	$26	$113,420	$96

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.7. Overuse colorectal cancer screening tests summary, 2017-2021

Year	Colon screening tests, total	Beneficiaries with at least one colon screen	Eligible beneficiaries	Cervical screen count per 1,000 eligible beneficiaries	Colon screen-specific line payments, total	Mean line payments, colon screen-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	155	150	10,972	14	$15,488	$94	$42,425	$259
2018	141	134	11,056	13	$7,633	$50	$27,167	$179
2019	140	136	10,885	13	$12,103	$79	$30,391	$197
2020	83	79	10,792	8	$13,073	$142	$36,102	$392
2021	90	87	10,820	8	$12,132	$116	$37,229	$355

Source: Mathematica's analysis of VHCURES data.

Exhibit A.8. Overuse colorectal cancer screening tests summary by HSA, 2017-2021

Health service area	Overuse colon screens, total	Colon screen count per 1,000 eligible beneficiaries	Colon screen-specific line payments, total	Mean line-level payments, colon screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	14	13	$2,951	$197	$3,890	$259
Bennington	11	12	$2,726	$227	$4,505	$375
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	16	6	$1,813	$101	$2,580	$143
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	14	23	$2,220	$159	$2,954	$211
St. Albans	60	90	$946	$16	$6,494	$106
St. Johnsbury	12	24	$86	$7	$5,518	$424
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse colon screens, total	Colon screen count per 1,000 eligible beneficiaries	Colon screen-specific line payments, total	Mean line-level payments, colon screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2018						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	19	7	$124	$7	$3,082	$162
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	43	64	$159	$3	$5,616	$122
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2019						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	21	8	$664	$28	$1,714	$71
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	14	12	$3,207	$189	$5,259	$309
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	48	73	$237	$5	$4,544	$91
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse colon screens, total	Colon screen count per 1,000 eligible beneficiaries	Colon screen-specific line payments, total	Mean line-level payments, colon screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2020						
Barre	11	10	$40	$4	$478	$43
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	11	4	$2,034	$156	$2,199	$169
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	27	41	$91	$3	$2,100	$75
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2021						
Barre	13	12	$0	$0	$72	$5
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	26	39	$955	$32	$4,018	$134
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	13	14	$1,762	$126	$11,459	$818

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.9. Overuse colorectal cancer screening tests summary by insurance type, 2017-2021

Insurance type	Overuse colon screens, total	Colon screen count per 1,000 eligible beneficiaries	Colon screen-specific line payments, total	Mean line-level payments, colon screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Dual Eligible	29	12	$1,891	$61	$9,295	$300
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	115	15	$13,043	$108	$31,975	$264
2018						
Commercial	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Dual Eligible	27	11	$94	$3	$3,726	$128
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	100	13	$7,386	$69	$22,987	$215
2019						
Commercial	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Dual Eligible	28	12	$1,128	$39	$3,127	$108
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	12	13	$1,643	$126	$2,253	$173
Medicare FFS	99	14	$9,315	$84	$24,835	$224
2020						
Commercial	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Dual Eligible	12	5	$353	$29	$554	$46

Insurance type	Overuse colon screens, total	Colon screen count per 1,000 eligible beneficiaries	Colon screen-specific line payments, total	Mean line-level payments, colon screen-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	62	9	$9,213	$132	$27,050	$386
2021						
Commercial	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Dual Eligible	17	8	$368	$20	$7,802	$433
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	62	9	$8,040	$110	$25,323	$347

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.10. Overuse PTH tests summary, 2017-2021

Year	PTH tests, total	Beneficiaries with at least one PTH test	Eligible beneficiaries	PTH test count per 1,000 eligible beneficiaries	PTH test-specific line payments, total	Mean line payments, PTH test-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	2,039	1,429	12,551	163	$102,273	$50	$555,511	$271
2018	2,164	1,488	11,951	181	$84,383	$39	$605,899	$277
2019	2,435	1,645	12,538	194	$88,917	$36	$621,369	$254
2020	2,526	1,614	13,386	189	$118,782	$46	$740,854	$290
2021	2,726	1,764	13,547	201	$119,608	$44	$1,047,216	$381

Source: Mathematica's analysis of VHCURES data.

Exhibit A.11. Overuse PTH tests summary by HSA, 2017-2021

Health service area	Overuse PTH tests, total	PTH test count per 1,000 eligible beneficiaries	PTH test-specific line payments, total	Mean line-level payments, PTH test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	131	99	$5,486	$42	$35,264	$267
Bennington	224	219	$11,332	$51	$49,409	$221
Brattleboro	82	163	$5,726	$69	$42,749	$515
Burlington	437	143	$23,628	$54	$134,971	$307
Middlebury	88	161	$5,101	$58	$22,179	$252
Morrisville	60	132	$2,343	$39	$12,174	$203
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	79	128	$6,124	$78	$28,146	$356
Randolph	48	194	$2,572	$54	$17,718	$369
Rutland	346	197	$19,133	$55	$81,937	$235
Springfield	118	200	$2,363	$20	$35,541	$299
St. Albans	114	114	$5,518	$48	$18,018	$158
St. Johnsbury	88	173	$6,718	$76	$25,925	$295
White River Jct	222	248	$6,081	$27	$51,012	$228
2018						
Barre	133	100	$4,653	$35	$32,824	$247
Bennington	229	245	$9,149	$40	$60,545	$262
Brattleboro	97	216	$3,946	$40	$23,892	$241
Burlington	437	153	$16,851	$38	$140,084	$316
Middlebury	76	148	$2,442	$32	$15,963	$207
Morrisville	74	175	$3,793	$51	$33,147	$442
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	90	161	$5,586	$60	$68,255	$734

Health service area	Overuse PTH tests, total	PTH test count per 1,000 eligible beneficiaries	PTH test-specific line payments, total	Mean line-level payments, PTH test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Randolph	65	293	$1,231	$19	$11,846	$182
Rutland	308	195	$15,707	$51	$64,070	$206
Springfield	133	249	$2,124	$16	$33,547	$250
St. Albans	126	133	$3,601	$28	$16,527	$129
St. Johnsbury	110	206	$6,660	$61	$32,042	$291
White River Jct	240	281	$6,574	$27	$65,325	$270
2019						
Barre	158	115	$4,924	$31	$47,518	$301
Bennington	182	193	$5,923	$32	$25,718	$141
Brattleboro	124	273	$3,568	$29	$23,427	$187
Burlington	514	171	$17,898	$35	$135,492	$264
Middlebury	134	236	$6,446	$47	$31,273	$230
Morrisville	91	193	$4,011	$44	$34,346	$377
Newport	107	182	$7,685	$72	$43,582	$407
Randolph	77	285	$1,973	$26	$23,030	$299
Rutland	382	223	$18,082	$47	$80,934	$211
Springfield	141	239	$1,919	$13	$21,971	$154
St. Albans	161	156	$2,900	$17	$52,597	$317
St. Johnsbury	118	200	$6,259	$53	$32,683	$275
White River Jct	246	273	$7,329	$30	$68,797	$279
2020						
Barre	149	104	$4,235	$28	$41,763	$278
Bennington	195	205	$5,551	$28	$34,920	$178
Brattleboro	136	264	$4,354	$32	$23,492	$170
Burlington	488	149	$22,094	$44	$188,253	$378
Middlebury	125	194	$3,673	$29	$20,710	$164
Morrisville	91	174	$5,762	$63	$37,524	$408

Health service area	Overuse PTH tests, total	PTH test count per 1,000 eligible beneficiaries	PTH test-specific line payments, total	Mean line-level payments, PTH test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Newport	121	207	$10,811	$89	$70,935	$581
Randolph	62	214	$3,273	$52	$30,049	$477
Rutland	503	274	$29,999	$59	$111,032	$219
Springfield	153	236	$5,699	$37	$49,765	$321
St. Albans	190	170	$5,890	$30	$34,759	$177
St. Johnsbury	101	166	$6,308	$61	$31,774	$308
White River Jct	212	227	$11,134	$52	$65,878	$309
2021						
Barre	152	103	$5,220	$34	$43,160	$282
Bennington	206	228	$6,362	$31	$33,502	$161
Brattleboro	201	349	$8,166	$41	$46,711	$232
Burlington	533	162	$21,589	$40	$454,263	$844
Middlebury	162	231	$6,228	$38	$32,142	$198
Morrisville	105	182	$6,563	$61	$36,789	$344
Newport	130	246	$12,118	$91	$67,505	$508
Randolph	43	149	$2,287	$53	$13,876	$323
Rutland	547	301	$20,716	$38	$107,896	$196
Springfield	158	245	$4,517	$29	$34,266	$217
St. Albans	166	148	$3,466	$21	$34,144	$203
St. Johnsbury	102	162	$9,205	$89	$66,197	$643
White River Jct	220	228	$13,130	$59	$76,689	$344

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.12. Overuse PTH tests summary by insurance type, 2017-2021

Insurance type	Overuse PTH tests, total	PTH test count per 1,000 eligible beneficiaries	PTH test-specific line payments, total	Mean line-level payments, PTH test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	287	190	$38,791	$132	$194,391	$663
Dual Eligible	440	144	$17,278	$39	$86,428	$196
Medicaid	159	178	$57	$0	$35,146	$220
Medicare Advantage	106	142	$4,293	$41	$25,810	$243
Medicare FFS	1,047	165	$41,854	$40	$213,736	$204
2018						
Commercial	281	208	$34,819	$121	$243,963	$850
Dual Eligible	446	156	$13,469	$30	$127,319	$283
Medicaid	186	270	$108	$1	$32,477	$172
Medicare Advantage	90	111	$5,518	$61	$17,958	$200
Medicare FFS	1,161	186	$30,469	$26	$184,183	$157
2019						
Commercial	316	218	$42,909	$135	$254,410	$800
Dual Eligible	477	157	$11,782	$25	$79,890	$166
Medicaid	202	298	$75	$0	$73,255	$357
Medicare Advantage	125	126	$6,098	$49	$20,988	$168
Medicare FFS	1,315	206	$28,053	$21	$192,826	$146
2020						
Commercial	339	219	$50,870	$146	$299,752	$859
Dual Eligible	532	169	$20,195	$37	$130,920	$243
Medicaid	196	255	$0	$0	$57,871	$292
Medicare Advantage	161	132	$9,206	$57	$29,669	$183
Medicare FFS	1,298	194	$38,511	$29	$222,642	$170
2021						
Commercial	361	236	$52,173	$142	$591,024	$1,606

Insurance type	Overuse PTH tests, total	PTH test count per 1,000 eligible beneficiaries	PTH test-specific line payments, total	Mean line-level payments, PTH test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Dual Eligible	522	161	$16,365	$31	$135,853	$259
Medicaid	230	274	$124	$1	$56,427	$240
Medicare Advantage	199	127	$11,572	$58	$46,279	$233
Medicare FFS	1,414	222	$39,374	$28	$217,633	$153

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.
Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see columns named "total claim payments, all lines."

Exhibit A.13. Overuse T3 tests summary, 2017-2021

Year	T3 tests, total	Beneficiaries with at least one T3 test	Eligible beneficiaries	T3 test count per 1,000 eligible beneficiaries	T3 test-specific line payments, total	Mean line payments, T3 test-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	4,433	2,812	27,679	160	$210,486	$47	$2,022,192	$452
2018	5,013	3,093	28,904	173	$253,471	$50	$2,395,017	$473
2019	4,973	3,100	29,030	171	$227,780	$45	$1,975,190	$393
2020	4,300	2,810	29,631	145	$204,509	$47	$1,878,482	$430
2021	4,555	2,889	29,558	154	$212,810	$46	$1,851,585	$401

Source: Mathematica's analysis of VHCURES data.

Exhibit A.14. Overuse T3 tests summary by HSA, 2017-2021

Health service area	Overuse T3 tests, total	T3 test count per 1,000 eligible beneficiaries	T3 test-specific line payments, total	Mean line-level payments, T3 test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	712	240	$34,042	$48	$306,536	$429
Bennington	211	107	$7,963	$38	$83,747	$397
Brattleboro	458	272	$19,951	$43	$168,916	$368
Burlington	1,164	192	$57,306	$49	$529,200	$449
Middlebury	130	107	$6,447	$49	$57,479	$435
Morrisville	126	141	$6,421	$50	$57,289	$444
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	185	148	$14,842	$80	$150,850	$811
Randolph	51	94	$3,372	$62	$83,029	$1,538
Rutland	620	156	$24,669	$40	$199,232	$319
Springfield	205	136	$7,191	$35	$53,889	$259
St. Albans	187	98	$6,555	$35	$109,268	$581
St. Johnsbury	107	80	$10,025	$92	$94,100	$863
White River Jct	262	113	$11,512	$44	$126,623	$480
2018						
Barre	710	235	$33,500	$47	$239,353	$335
Bennington	237	119	$8,776	$37	$87,572	$370
Brattleboro	532	304	$30,838	$58	$221,567	$413
Burlington	1,458	232	$74,905	$50	$806,291	$543
Middlebury	130	104	$4,930	$38	$57,049	$435
Morrisville	160	166	$8,810	$54	$91,468	$561
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NY Capital District	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	171	135	$14,147	$82	$59,599	$347
Randolph	47	89	$1,886	$39	$19,013	$396

Health service area	Overuse T3 tests, total	T3 test count per 1,000 eligible beneficiaries	T3 test-specific line payments, total	Mean line-level payments, T3 test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Rutland	697	172	$30,338	$43	$253,818	$362
Springfield	166	106	$5,925	$35	$53,092	$318
St. Albans	199	98	$6,132	$31	$264,300	$1,315
St. Johnsbury	149	107	$20,338	$134	$116,710	$768
White River Jct	283	118	$11,813	$41	$109,040	$383
2019						
Barre	706	235	$25,849	$36	$187,442	$261
Bennington	222	111	$6,569	$29	$68,247	$303
Brattleboro	539	306	$20,312	$37	$166,744	$305
Burlington	1,423	220	$79,545	$55	$807,583	$562
Middlebury	141	105	$5,761	$41	$86,967	$617
Morrisville	160	156	$6,577	$40	$79,695	$483
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	195	149	$17,774	$91	$74,058	$378
Randolph	65	119	$2,881	$43	$28,821	$430
Rutland	675	167	$25,871	$38	$189,867	$279
Springfield	192	123	$5,524	$29	$36,831	$192
St. Albans	260	125	$7,713	$29	$100,373	$383
St. Johnsbury	135	99	$11,733	$87	$68,086	$504
White River Jct	255	104	$11,616	$45	$79,924	$310
2020						
Barre	644	213	$21,335	$33	$147,385	$227
Bennington	204	99	$6,898	$33	$82,885	$400
Brattleboro	438	245	$15,490	$35	$116,039	$260
Burlington	1,223	185	$71,767	$57	$760,656	$607
Middlebury	113	83	$3,554	$31	$32,252	$285
Morrisville	129	126	$4,467	$35	$32,183	$249

Health service area	Overuse T3 tests, total	T3 test count per 1,000 eligible beneficiaries	T3 test-specific line payments, total	Mean line-level payments, T3 test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NY Capital District	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	187	137	$15,849	$83	$80,446	$421
Randolph	41	72	$1,614	$39	$15,653	$382
Rutland	588	141	$30,203	$51	$225,348	$381
Springfield	159	101	$5,914	$37	$96,770	$605
St. Albans	258	120	$7,264	$28	$99,412	$379
St. Johnsbury	109	78	$9,979	$92	$75,546	$693
White River Jct	195	79	$10,061	$50	$111,239	$556
2021						
Barre	671	227	$22,972	$34	$168,480	$249
Bennington	207	100	$4,953	$24	$55,964	$269
Brattleboro	495	276	$16,129	$33	$134,026	$271
Burlington	1,380	208	$75,595	$54	$822,377	$583
Middlebury	125	92	$5,687	$45	$42,844	$340
Morrisville	100	98	$3,399	$34	$24,277	$243
NY Capital District	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	195	146	$19,229	$98	$82,483	$419
Randolph	66	111	$2,918	$42	$23,715	$344
Rutland	563	134	$29,071	$51	$202,293	$356
Springfield	156	102	$4,343	$28	$41,523	$264
St. Albans	264	126	$7,611	$28	$75,023	$280
St. Johnsbury	128	91	$11,818	$92	$81,681	$633
White River Jct	191	77	$8,939	$46	$95,322	$491

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.15. Overuse T3 tests summary by insurance type, 2017-2021

Insurance type	Overuse T3 tests, total	T3 test count per 1,000 eligible beneficiaries	T3 test-specific line payments, total	Mean line-level payments, T3 test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	1,716	220	$162,362	$94	$1,276,784	$740
Dual Eligible	574	127	$12,849	$22	$213,040	$359
Medicaid	686	228	$3,351	$5	$118,085	$172
Medicare Advantage	107	78	$2,680	$25	$15,683	$147
Medicare FFS	1,350	123	$29,244	$22	$398,600	$294
2018						
Commercial	1,955	242	$207,090	$105	$1,627,894	$823
Dual Eligible	632	139	$13,176	$20	$181,253	$278
Medicaid	650	212	$2,597	$4	$84,339	$130
Medicare Advantage	162	100	$3,823	$24	$26,840	$166
Medicare FFS	1,614	139	$26,784	$16	$474,691	$292
2019						
Commercial	1,812	220	$180,445	$99	$1,287,526	$704
Dual Eligible	662	147	$15,081	$22	$132,142	$193
Medicaid	647	227	$2,179	$3	$169,336	$260
Medicare Advantage	171	90	$4,006	$23	$31,815	$185
Medicare FFS	1,681	146	$26,069	$15	$354,370	$209
2020						
Commercial	1,563	193	$160,925	$102	$1,276,771	$808
Dual Eligible	583	126	$14,698	$24	$121,068	$202
Medicaid	612	200	$1,734	$3	$154,425	$251
Medicare Advantage	195	89	$5,035	$25	$36,724	$184
Medicare FFS	1,347	116	$22,117	$16	$289,494	$212
2021						
Commercial	1,576	204	$169,899	$107	$1,353,358	$851

Insurance type	Overuse T3 tests, total	T3 test count per 1,000 eligible beneficiaries	T3 test-specific line payments, total	Mean line-level payments, T3 test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Dual Eligible	632	136	$14,917	$23	$138,677	$211
Medicaid	756	216	$1,743	$2	$118,962	$156
Medicare Advantage	241	87	$6,076	$25	$36,823	$151
Medicare FFS	1,350	124	$20,174	$15	$203,765	$150

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.
Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see columns named "total claim payments, all lines."

Exhibit A.16. Overuse preoperative stress tests summary, 2017-2021

Year	Preop stress tests, total	Beneficiaries with at least one preop stress test	Eligible beneficiaries	Preop stress test count per 1,000 eligible beneficiaries	Preop stress test-specific line payments, total	Mean line payments, preop stress test-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	174	172	14,585	12	$167,213	$519	$255,629	$794
2018	172	171	14,922	12	$142,781	$438	$228,574	$701
2019	148	146	14,698	10	$140,014	$476	$216,696	$737
2020	93	92	12,712	7	$119,202	$644	$166,014	$897
2021	126	123	14,045	9	$95,332	$402	$161,297	$681

Source: Mathematica's analysis of VHCURES data.

Exhibit A.17. Overuse preoperative stress tests summary by HSA, 2017-2021

Health service area	Overuse preop stress tests, total	Preop stress test count per 1,000 eligible beneficiaries	Preop stress test-specific line payments, total	Mean line-level payments, preop stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	17	10	$13,257	$442	$19,688	$656
Bennington	14	14	$18,637	$601	$24,607	$794
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	35	10	$36,736	$623	$51,351	$870
Middlebury	12	20	$15,303	$805	$25,695	$1,352
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	22	14	$19,147	$445	$28,362	$660
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	14	14	$13,551	$502	$18,597	$689
St. Johnsbury	12	16	$12,516	$659	$25,559	$1,345
White River Jct	15	13	$12,036	$376	$20,693	$647
2018						
Barre	16	10	$7,535	$260	$14,500	$500
Bennington	20	19	$12,805	$291	$21,831	$496
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	49	13	$42,461	$488	$62,744	$721
Middlebury	15	22	$8,016	$308	$17,090	$657
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	20	12	$20,399	$551	$31,659	$856

Health service area	Overuse preop stress tests, total	Preop stress test count per 1,000 eligible beneficiaries	Preop stress test-specific line payments, total	Mean line-level payments, preop stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	13	12	$16,030	$641	$22,231	$889
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2019						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	18	18	$16,764	$399	$21,847	$520
Brattleboro	14	18	$12,800	$400	$15,879	$496
Burlington	39	10	$44,824	$623	$63,595	$883
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	13	8	$18,286	$610	$22,412	$747
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	13	13	$2,984	$119	$6,735	$269
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	13	12	$9,607	$418	$16,118	$701
2020						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	14	16	$19,695	$597	$24,860	$753
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	14	5	$8,727	$336	$14,985	$576
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse preop stress tests, total	Preop stress test count per 1,000 eligible beneficiaries	Preop stress test-specific line payments, total	Mean line-level payments, preop stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	11	8	$15,236	$762	$22,430	$1,121
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2021						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	16	17	$10,727	$346	$14,811	$478
Brattleboro	12	16	$10,932	$405	$13,445	$498
Burlington	35	10	$25,227	$443	$57,923	$1,016
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	17	11	$9,380	$293	$15,385	$481
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.18. Overuse preoperative stress tests summary by insurance type, 2017-2021

Insurance type	Overuse preop stress tests, total	Preop stress test count per 1,000 eligible beneficiaries	Preop stress test-specific line payments, total	Mean line-level payments, preop stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	35	8	$63,670	$936	$81,912	$1,205
Dual Eligible	26	15	$25,165	$535	$37,335	$794
Medicaid	15	8	$919	$32	$13,796	$476
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	91	16	$71,767	$438	$116,437	$710
2018						
Commercial	35	8	$69,314	$1,035	$93,488	$1,395
Dual Eligible	21	12	$14,751	$378	$21,894	$561
Medicaid	15	8	$1,582	$51	$15,179	$490
Medicare Advantage	13	15	$12,216	$555	$15,804	$718
Medicare FFS	88	14	$44,919	$269	$82,209	$492
2019						
Commercial	32	7	$74,574	$1,147	$111,382	$1,714
Dual Eligible	19	12	$9,913	$275	$17,675	$491
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	17	16	$20,310	$534	$24,736	$651
Medicare FFS	72	12	$34,622	$253	$58,834	$429
2020						
Commercial	17	5	$69,454	$1,736	$84,659	$2,116
Dual Eligible	14	10	$12,858	$443	$19,763	$681
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	12	12	$13,803	$552	$15,654	$626
Medicare FFS	45	9	$22,235	$275	$40,227	$497
2021						
Commercial	24	6	$43,488	$925	$74,053	$1,576

Insurance type	Overuse preop stress tests, total	Preop stress test count per 1,000 eligible beneficiaries	Preop stress test-specific line payments, total	Mean line-level payments, preop stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Dual Eligible	16	10	$4,848	$162	$8,361	$279
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	16	14	$17,069	$569	$19,138	$638
Medicare FFS	61	12	$29,311	$264	$52,270	$471

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.
Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see columns named "total claim payments, all lines."

Exhibit A.19. Overuse stress tests summary, 2017-2021

Year	Stress tests, total	Beneficiaries with at least one stress test	Eligible beneficiaries	Stress count per 1,000 eligible beneficiaries	Stress test-specific line payments, total	Mean line payments, stress test-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	2,185	2,059	20,666	106	$1,985,198	$490	$2,930,214	$723
2018	2,107	2,007	21,189	99	$1,662,942	$409	$2,587,612	$636
2019	2,088	1,967	21,341	98	$1,569,039	$384	$2,419,114	$592
2020	1,648	1,575	21,651	76	$1,358,407	$440	$2,074,545	$672
2021	1,779	1,695	21,343	83	$1,373,728	$403	$2,190,561	$643

Source: Mathematica's analysis of VHCURES data.

Exhibit A.20. Overuse stress tests summary by HSA, 2017-2021

Health service area	Overuse stress tests, total	Stress test count per 1,000 eligible beneficiaries	Stress test-specific line payments, total	Mean line-level payments, stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	151	70	$166,149	$587	$235,406	$832
Bennington	243	137	$204,818	$432	$266,891	$563
Brattleboro	97	100	$88,310	$467	$136,516	$722
Burlington	615	122	$511,552	$477	$685,140	$639
Middlebury	146	143	$153,695	$603	$255,427	$1,002
Morrisville	78	101	$66,883	$507	$116,239	$881
Newport	85	93	$65,210	$413	$127,940	$810
Randolph	34	67	$44,959	$642	$75,924	$1,085
Rutland	242	96	$255,077	$540	$363,024	$769
Springfield	77	73	$74,775	$495	$124,327	$823
St. Albans	253	150	$207,257	$430	$275,015	$571
St. Johnsbury	70	83	$83,190	$650	$160,090	$1,251
White River Jct	92	67	$61,572	$338	$106,023	$583
2018						
Barre	187	84	$141,505	$392	$214,946	$595
Bennington	202	118	$169,987	$420	$228,162	$563
Brattleboro	109	112	$76,692	$281	$121,308	$444
Burlington	573	113	$370,202	$347	$562,011	$527
Middlebury	112	105	$80,014	$435	$151,116	$821
Morrisville	47	61	$40,171	$508	$64,653	$818
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NY Capital District	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	92	98	$67,898	$397	$141,527	$828

Health service area	Overuse stress tests, total	Stress test count per 1,000 eligible beneficiaries	Stress test-specific line payments, total	Mean line-level payments, stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Randolph	34	68	$40,748	$536	$96,744	$1,273
Rutland	218	86	$243,483	$572	$324,794	$762
Springfield	61	56	$58,591	$458	$85,876	$671
St. Albans	241	145	$156,252	$332	$224,227	$477
St. Johnsbury	73	84	$90,856	$654	$166,492	$1,198
White River Jct	121	86	$101,281	$429	$164,871	$699
2019						
Barre	201	87	$148,401	$373	$229,552	$577
Bennington	199	117	$113,628	$286	$176,847	$445
Brattleboro	112	107	$90,291	$331	$129,825	$476
Burlington	524	101	$291,810	$287	$456,647	$449
Middlebury	153	141	$106,969	$437	$177,604	$725
Morrisville	53	69	$48,023	$552	$79,416	$913
Newport	71	74	$58,854	$449	$112,791	$861
Randolph	26	50	$35,906	$619	$56,162	$968
Rutland	247	96	$270,636	$573	$365,891	$775
Springfield	89	83	$77,884	$428	$121,792	$669
St. Albans	229	139	$116,305	$250	$176,441	$379
St. Johnsbury	67	76	$102,445	$776	$166,751	$1,263
White River Jct	117	79	$107,888	$475	$169,395	$746
2020						
Barre	159	67	$132,680	$432	$193,689	$631
Bennington	164	94	$115,515	$340	$155,726	$458
Brattleboro	91	86	$84,592	$425	$111,103	$558
Burlington	396	74	$204,067	$294	$320,266	$462
Middlebury	89	82	$48,760	$384	$98,526	$776
Morrisville	58	74	$56,260	$563	$95,942	$959

Health service area	Overuse stress tests, total	Stress test count per 1,000 eligible beneficiaries	Stress test-specific line payments, total	Mean line-level payments, stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Newport	82	88	$109,203	$764	$193,169	$1,351
Randolph	33	60	$31,932	$470	$60,231	$886
Rutland	201	79	$218,880	$553	$301,429	$761
Springfield	58	53	$59,735	$515	$89,410	$771
St. Albans	139	85	$92,187	$332	$131,170	$472
St. Johnsbury	62	68	$107,717	$1,146	$173,695	$1,848
White River Jct	112	73	$95,472	$442	$144,688	$670
2021						
Barre	164	71	$134,717	$424	$218,182	$686
Bennington	168	98	$98,999	$289	$148,793	$435
Brattleboro	113	105	$112,134	$420	$175,699	$658
Burlington	465	88	$257,881	$302	$400,922	$469
Middlebury	115	105	$75,680	$428	$131,687	$744
Morrisville	51	65	$45,857	$546	$72,536	$864
Newport	61	67	$54,659	$430	$109,821	$865
Randolph	41	74	$42,932	$472	$83,318	$916
Rutland	217	87	$197,625	$473	$294,117	$704
Springfield	83	82	$74,062	$421	$112,821	$641
St. Albans	137	84	$89,374	$339	$128,315	$486
St. Johnsbury	61	69	$93,583	$945	$152,822	$1,544
White River Jct	102	66	$95,728	$504	$160,907	$847

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.21. Overuse stress tests summary by insurance type, 2017-2021

Insurance type	Overuse stress tests, total	Stress test count per 1,000 eligible beneficiaries	Stress test-specific line payments, total	Mean line-level payments, stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	380	140	$711,418	$973	$927,068	$1,268
Dual Eligible	317	75	$266,005	$450	$403,761	$683
Medicaid	141	124	$11,635	$42	$133,694	$488
Medicare Advantage	153	112	$146,600	$507	$170,576	$590
Medicare FFS	1194	107	$849,540	$392	$1,295,116	$598
2018						
Commercial	367	132	$694,366	$996	$919,959	$1,320
Dual Eligible	289	69	$208,443	$356	$328,919	$562
Medicaid	120	109	$8,382	$33	$103,419	$412
Medicare Advantage	136	85	$117,778	$462	$130,425	$511
Medicare FFS	1195	104	$633,972	$278	$1,104,890	$484
2019						
Commercial	329	116	$664,183	$1,025	$875,163	$1,351
Dual Eligible	291	70	$189,751	$321	$307,368	$520
Medicaid	122	111	$9,908	$39	$115,689	$455
Medicare Advantage	186	103	$190,582	$532	$205,744	$575
Medicare FFS	1160	101	$514,615	$230	$915,151	$410
2020						
Commercial	274	98	$536,369	$977	$693,525	$1,263
Dual Eligible	208	49	$145,608	$369	$237,026	$600
Medicaid	88	79	$7,137	$40	$84,688	$470

Insurance type	Overuse stress tests, total	Stress test count per 1,000 eligible beneficiaries	Stress test-specific line payments, total	Mean line-level payments, stress test-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Medicare Advantage	163	77	$170,073	$591	$184,279	$640
Medicare FFS	915	81	$499,221	$298	$875,028	$523
2021						
Commercial	274	99	$517,365	$960	$667,392	$1,238
Dual Eligible	233	55	$173,027	$366	$289,300	$612
Medicaid	110	89	$10,856	$49	$111,720	$506
Medicare Advantage	216	82	$232,344	$588	$261,905	$663
Medicare FFS	946	91	$440,136	$247	$860,245	$483

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.
Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see columns named "total claim payments, all lines."

Exhibit A.22. Overuse PCI, stent placement summary, 2017-2021

Year	PCI/stents, total	Beneficiaries with at least one PCI/stent	Eligible beneficiaries	PCI/stent count per 1,000 eligible beneficiaries	PCI/stent-specific line payments, total	Mean line payments, PCI/stent-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	220	214	20,666	11	$1,626,336	$4,107	$2,544,423	$6,425
2018	233	225	21,189	11	$1,293,153	$3,139	$2,211,669	$5,368
2019	226	214	21,341	11	$1,204,306	$3,104	$1,817,824	$4,685
2020	166	158	21,651	8	$1,027,548	$3,507	$1,598,617	$5,456
2021	184	173	21,343	9	$1,199,740	$3,680	$1,905,018	$5,844

Source: Mathematica's analysis of VHCURES data.

Exhibit A.23. Overuse PCI, stent placement summary by HSA, 2017-2021

Health service area	Overuse PCI/stents, total	PCI/stent count per 1,000 eligible beneficiaries	PCI/stent-specific line payments, total	Mean line-level payments, PCI/stent-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	27	12	$168,898	$3,519	$329,688	$6,869
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	65	13	$516,519	$4,304	$771,520	$6,429
Middlebury	14	14	$97,812	$3,762	$165,223	$6,355
Morrisville	11	14	$107,247	$5,362	$137,085	$6,854
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	11	4	$101,787	$4,847	$164,817	$7,848
Springfield	13	12	$108,688	$4,529	$129,367	$5,390
St. Albans	32	19	$230,613	$4,046	$402,248	$7,057
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	11	8	$68,447	$3,602	$118,600	$6,242
2018						
Barre	31	14	$167,764	$3,107	$330,078	$6,113
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	70	14	$299,974	$2,381	$681,883	$5,412
Middlebury	15	14	$57,242	$2,290	$110,282	$4,411
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
NH Upper Valley Region	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	11	12	$86,075	$3,912	$128,299	$5,832
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	18	7	$116,331	$3,635	$178,380	$5,574

Health service area	Overuse PCI/stents, total	PCI/stent count per 1,000 eligible beneficiaries	PCI/stent-specific line payments, total	Mean line-level payments, PCI/stent-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	30	18	$140,910	$2,763	$245,329	$4,810
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2019						
Barre	26	11	$145,523	$3,164	$188,707	$4,102
Bennington	19	11	$131,658	$3,872	$172,548	$5,075
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	57	11	$261,161	$2,638	$413,159	$4,173
Middlebury	15	14	$26,083	$966	$67,219	$2,490
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	13	14	$105,433	$4,792	$131,421	$5,974
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	22	9	$176,872	$4,422	$264,049	$6,601
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	20	12	$22,547	$663	$82,499	$2,426
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	16	11	$93,740	$3,750	$117,106	$4,684
2020						
Barre	18	8	$110,475	$3,249	$154,268	$4,537
Bennington	13	7	$92,034	$3,835	$132,221	$5,509
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	41	8	$163,247	$2,401	$345,805	$5,085
Middlebury	12	11	$20,796	$1,040	$42,323	$2,116
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse PCI/stents, total	PCI/stent count per 1,000 eligible beneficiaries	PCI/stent-specific line payments, total	Mean line-level payments, PCI/stent-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Rutland	15	6	$139,974	$5,184	$161,815	$5,993
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	25	15	$147,022	$3,341	$287,200	$6,527
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2021						
Barre	17	7	$97,334	$3,140	$160,326	$5,172
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	13	12	$105,649	$4,802	$170,388	$7,745
Burlington	57	11	$301,761	$3,143	$504,688	$5,257
Middlebury	11	10	$83,875	$4,414	$165,134	$8,691
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	11	12	$94,491	$4,725	$159,584	$7,979
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	17	7	$62,675	$2,022	$119,249	$3,847
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	14	9	$82,688	$3,308	$146,276	$5,851
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	16	10	$141,418	$4,876	$196,044	$6,760

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.24. Overuse PCI, stent placement summary by insurance type, 2017-2021

Insurance type	Overuse PCI/stents, total	PCI/stent count per 1,000 eligible beneficiaries	PCI/stent-specific line payments, total	Mean line-level payments, PCI/stent-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	34	13	$315,787	$5,093	$755,757	$12,190
Dual Eligible	36	9	$283,814	$4,505	$341,175	$5,415
Medicaid	12	11	$3,439	$143	$131,418	$5,476
Medicare Advantage	16	12	$80,863	$2,995	$149,200	$5,526
Medicare FFS	122	11	$942,433	$4,284	$1,166,873	$5,304
2018						
Commercial	37	13	$329,161	$4,702	$875,898	$12,513
Dual Eligible	24	6	$165,732	$4,143	$194,217	$4,855
Medicaid	19	17	$7,458	$213	$167,970	$4,799
Medicare Advantage	22	14	$156,035	$4,458	$161,844	$4,624
Medicare FFS	131	11	$634,768	$2,736	$811,740	$3,499
2019						
Commercial	30	11	$273,579	$4,885	$554,147	$9,895
Dual Eligible	34	8	$186,424	$3,160	$240,292	$4,073
Medicaid	15	14	$5,612	$216	$128,322	$4,935
Medicare Advantage	19	11	$126,549	$4,082	$132,304	$4,268
Medicare FFS	128	11	$612,143	$2,834	$762,758	$3,531
2020						
Commercial	33	12	$342,588	$5,526	$680,028	$10,968
Dual Eligible	19	5	$94,818	$2,789	$118,553	$3,487
Medicaid	<11					
Medicare Advantage	12	6	$129,705	$5,896	$132,198	$6,009

Insurance type	Overuse PCI/stents, total	PCI/stent count per 1,000 eligible beneficiaries	PCI/stent-specific line payments, total	Mean line-level payments, PCI/stent-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Medicare FFS	92	8	$456,447	$2,853	$611,056	$3,819
2021						
Commercial	28	10	$361,841	$6,579	$764,444	$13,899
Dual Eligible	25	6	$143,684	$3,266	$203,467	$4,624
Medicaid	13	11	$4,387	$244	$62,596	$3,478
Medicare Advantage	21	8	$195,685	$4,892	$222,898	$5,572
Medicare FFS	97	9	$494,142	$2,924	$651,613	$3,856

Source: Mathematica's analysis of VHCURES data.

n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. When summing all lines on claims identified as overuse, however, Medicaid payments are often similar to payments in claims among beneficiaries with different payment types. For these payment amounts, see columns named "total claim payments, all lines."

Exhibit A.25. Overuse laminectomy, spinal fusion summary, 2017-2021

Year	PCI/stents, total	Beneficiaries with at least one laminectomy or spinal fusion	Eligible beneficiaries	Laminectomy, spinal fusion count per 1,000 eligible beneficiaries	Laminectomy, fusion-specific line payments, total	Mean line payments, laminectomy, fusion-specific services	Total claim payments, all lines	Mean claim payments, all lines
2017	105	102	798	132	$1,410,365	$10,525	$1,739,876	$12,984
2018	75	75	820	91	$933,782	$8,979	$1,207,346	$11,609
2019	81	81	798	102	$1,524,068	$13,608	$1,715,268	$15,315
2020	68	68	644	106	$607,610	$6,677	$955,886	$10,504
2021	65	64	668	97	$989,612	$11,642	$1,452,359	$17,087

Source: Mathematica's analysis of VHCURES data.

Exhibit A.26. Overuse laminectomy, spinal fusion summary by HSA, 2017-2021

Health service area	Overuse laminectomy, spinal fusion, total	Laminectomy, fusion count per 1,000 eligible beneficiaries	Laminectomy fusion-specific line payments, total	Mean line-level payments, laminectomy, fusion-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	19	114	$347,682	$15,804	$381,755	$17,352
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	11	125	$175,196	$12,514	$231,790	$16,556
Springfield	11	200	$66,817	$4,176	$100,231	$6,264
St. Albans	16	174	$314,657	$18,509	$329,035	$19,355
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse laminectomy, spinal fusion, total	Laminectomy, fusion count per 1,000 eligible beneficiaries	Laminectomy fusion-specific line payments, total	Mean line-level payments, laminectomy, fusion-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2018						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	11	268	$165,526	$9,196	$209,075	$11,615
Burlington	15	88	$242,591	$12,768	$267,556	$14,082
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2019						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	21	117	$203,204	$7,816	$239,316	$9,204
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse laminectomy, spinal fusion, total	Laminectomy, fusion count per 1,000 eligible beneficiaries	Laminectomy fusion-specific line payments, total	Mean line-level payments, laminectomy, fusion-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
St. Albans	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2020						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	13	97	$118,104	$7,874	$150,302	$10,020
Middlebury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
2021						
Barre	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bennington	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Burlington	11	85	$229,229	$16,373	$264,466	$18,890
Morrisville	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Newport	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Randolph	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Health service area	Overuse laminectomy, spinal fusion, total	Laminectomy, fusion count per 1,000 eligible beneficiaries	Laminectomy fusion-specific line payments, total	Mean line-level payments, laminectomy, fusion-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Albans	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
St. Johnsbury	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
White River Jct	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.

Exhibit A.27. Overuse laminectomy, spinal fusion summary by insurance type, 2017-2021

Insurance type	Overuse laminectomy, spinal fusion, total	Laminectomy, spinal fusion count per 1,000 eligible beneficiaries	Laminectomy, fusion-specific line payments, total	Mean line-level payments, laminectomy, fusion-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2017						
Commercial	26	110	$381,209	$11,212	$548,529	$16,133
Dual Eligible	15	153	$212,052	$11,161	$247,951	$13,050
Medicaid	17	152	$125,789	$6,988	$141,242	$7,847
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	45	140	$690,556	$11,321	$795,519	$13,041
2018						
Commercial	13	55	$109,805	$5,490	$270,717	$13,536
Dual Eligible	14	143	$283,341	$15,741	$306,730	$17,041
Medicaid	12	109	$97,979	$7,537	$117,696	$9,054
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	31	90	$425,954	$9,466	$483,830	$10,752

Insurance type	Overuse laminectomy, spinal fusion, total	Laminectomy, spinal fusion count per 1,000 eligible beneficiaries	Laminectomy, fusion-specific line payments, total	Mean line-level payments, laminectomy, fusion-specific procedures	Total claim payments, all lines	Mean claim payments, all lines
2019						
Commercial	16	79	$162,467	$7,737	$237,268	$11,298
Dual Eligible	12	124	$196,354	$12,272	$199,467	$12,467
Medicaid	14	143	$654,006	$38,471	$695,927	$40,937
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	34	98	$438,123	$8,762	$497,610	$9,952
2020						
Commercial	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Dual Eligible	14	192	$193,823	$12,114	$324,568	$20,285
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	35	126	$296,718	$5,934	$389,873	$7,797
2021						
Commercial	13	69	$223,738	$11,187	$277,707	$13,885
Dual Eligible	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicaid	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare Advantage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Medicare FFS	31	121	$464,624	$11,616	$669,038	$16,726

Source: Mathematica's analysis of VHCURES data.
n.r. = not reported. We cannot report data in instances where there are fewer than 11 cases.
Note: For procedures given to Medicaid beneficiaries, there often are no insurer line-level payments associated with given procedure codes; on occasion, there are smaller, likely patient, payments given in claims for overused services. This was the only measure we examined, however, that appeared to have line-level insurer payment amounts for specific procedure codes among Medicaid beneficiaries.

2. Avoidable ED visits

Exhibit A.28. Avoidable ED visit rates by HSA for Medicare FFS, 2017–2021

HSA	2017	2018	2019	2020	2021
Barre	36%	34%	33%	30%	30%
Brattleboro	31%	30%	31%	28%	28%
Burlington	31%	31%	31%	30%	27%
Morrisville	41%	39%	37%	33%	32%
Randolph	33%	32%	31%	27%	27%
Newport	41%	41%	42%	37%	35%
St. Johnsbury	36%	36%	35%	31%	31%
St. Albans	38%	37%	39%	35%	34%
Middlebury	36%	42%	38%	32%	32%
Rutland	35%	34%	33%	31%	29%
Bennington	32%	31%	33%	28%	26%
Springfield	32%	31%	34%	33%	29%
White River Junction	39%	37%	40%	33%	34%

Source: Mathematica's analysis of VHCURES data.

Exhibit A.29. Medicare FFS spending on avoidable ED visits by HSA, 2017–2021

HSA	2017 (in $ millions)	2018 (in $ millions)	2019 (in $ millions)	2020 (in $ millions)	2021 (in $ millions)
Barre	$0.89	$0.64	$0.59	$0.37	$0.37
Burlington	$1.46	$1.15	$0.77	$0.56	$0.65
Morrisville	$0.61	$0.66	$0.68	$0.63	$0.66
Randolph	$0.36	$0.33	$0.37	$0.32	$0.38
Newport	$0.81	$0.78	$0.85	$0.61	$0.60
St. Johnsbury	$0.84	$0.98	$0.97	$0.83	$1.01
St. Albans	$0.87	$0.69	$0.32	$0.29	$0.30
Middlebury	$0.98	$0.37	$0.35	$0.27	$0.39
Rutland	$0.94	$1.28	$1.18	$0.93	$0.48
Bennington	$0.60	$0.91	$0.36	$0.30	$0.26
Springfield	$0.75	$0.29	$0.19	$0.49	$0.49
White River Junction	$0.45	$0.43	$0.20	$0.38	$0.46
Brattleboro	$0.46	$0.43	$0.46	$0.36	$0.37

Source: Mathematica's analysis of VHCURES data.

Exhibit A.30. Avoidable ED visit rates by HSA for Medicaid, 2017–2021

HSA	2017	2018	2019	2020	2021
Barre	39%	38%	39%	34%	31%
Burlington	31%	32%	32%	29%	26%
Morrisville	44%	44%	42%	36%	35%
Randolph	36%	36%	35%	33%	30%
Newport	44%	47%	47%	43%	38%
St. Johnsbury	46%	46%	46%	40%	34%
St. Albans	38%	37%	40%	36%	33%
Middlebury	40%	42%	44%	35%	33%
Rutland	37%	36%	35%	34%	29%
Bennington	33%	33%	35%	31%	27%
Springfield	37%	37%	38%	35%	32%
White River Junction	41%	42%	39%	37%	35%
Brattleboro	34%	32%	32%	31%	31%

Source: Mathematica's analysis of VHCURES data.

Exhibit A.31. Medicaid spending on avoidable ED visits by HSA, 2017–2021

HSA	2017 (in $ millions)	2018 (in $ millions)	2019 (in $ millions)	2020 (in $ millions)	2021 (in $ millions)
Barre	$1.33	$1.17	$1.10	$0.83	$0.87
Burlington	$2.04	$2.12	$2.10	$1.65	$1.99
Morrisville	$0.66	$0.75	$0.67	$0.51	$0.56
Randolph	$0.37	$0.33	$0.30	$0.26	$0.33
Newport	$0.93	$0.96	$1.04	$0.74	$0.77
St. Johnsbury	$0.91	$1.06	$1.07	$0.67	$0.74
St. Albans	$1.34	$1.28	$1.26	$0.94	$1.01
Middlebury	$0.69	$0.69	$0.75	$0.49	$0.61
Rutland	$1.34	$1.35	$1.23	$1.02	$1.13
Bennington	$0.76	$0.83	$0.80	$0.60	$0.57
Springfield	$0.89	$0.98	$0.72	$0.46	$0.49
White River Junction	$0.21	$0.18	$0.20	$0.18	$0.21
Brattleboro	$0.64	$0.63	$0.61	$0.53	$0.62

Source: Mathematica's analysis of VHCURES data.

Exhibit A.32. Avoidable ED visit rates by HSA for commercial payers, 2017–2021

HSA	2017	2018	2019	2020	2021
Barre	34%	33%	34%	29%	27%
Burlington	28%	28%	28%	27%	24%
Morrisville	36%	36%	33%	29%	27%
Randolph	33%	31%	33%	29%	23%
Newport	39%	41%	42%	35%	32%
St. Johnsbury	40%	42%	40%	31%	28%
St. Albans	32%	34%	33%	32%	29%
Middlebury	34%	33%	32%	27%	27%
Rutland	33%	34%	31%	30%	28%
Bennington	28%	29%	30%	27%	23%
Springfield	31%	33%	33%	30%	25%
White River Junction	33%	34%	33%	30%	31%
Brattleboro	31%	29%	30%	27%	26%

Source: Mathematica's analysis of VHCURES data.

Exhibit A.33. Avoidable ED visit rates by HSA for commercial payers, 2017–2021

HSA	2017 (in $ millions)	2018 (in $ millions)	2019 (in $ millions)	2020 (in $ millions)	2021 (in $ millions)
Barre	$1.55	$1.52	$1.69	$1.49	$1.51
Burlington	$4.99	$4.94	$6.05	$5.30	$5.63
Morrisville	$0.37	$0.33	$0.42	$0.36	$0.47
Randolph	$0.30	$0.31	$0.31	$0.38	$0.40
Newport	$0.74	$0.77	$1.09	$0.70	$0.88
St. Johnsbury	$0.64	$0.63	$0.63	$0.47	$0.65
St. Albans	$0.90	$1.00	$1.10	$1.11	$1.18
Middlebury	$0.63	$0.51	$0.70	$0.61	$0.74
Rutland	$1.36	$1.39	$1.63	$1.60	$1.83
Bennington	$0.70	$0.68	$0.82	$0.67	$0.63
Springfield	$0.60	$0.76	$0.47	$0.38	$0.46
White River Junction	$0.24	$0.21	$0.30	$0.29	$0.43
Brattleboro	$0.57	$0.61	$0.69	$0.71	$0.67

Source: Mathematica's analysis of VHCURES data.

3. Preventable hospitalizations

Exhibit A.34. Preventable hospitalizations and associated spending by hospital and payer type in 2021 and average annual growth from 2017 to 2021

Hospital	2021 estimates			Average Annual Growth from 2017–2021		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total spending for preventable stays (average)	Preventable stays per 1000 patients	Total number of preventable stays	Average spending for preventable stays
Medicare						
All VT Hospitals	208	2,286 (16%)	$21,244,918 ($9,293)	-4%	-7%	-2%
Albany, NY	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	224	100 (19%)	$1,075,901 ($10,759)	-5%	-8%	1%
Central Vermont	218	260 (17%)	$1,737,795 ($6,684)	-3%	-6%	-9%
Copley	197	115 (16%)	$2,181,996 ($18,974)	-7%	-9%	16%
Dartmouth-Hitchcock, NH	105	212 (10%)	$3,917,159 ($18,477)	7%	0%	6%
Gifford	205	71 (15%)	$793,734 ($11,179)	-11%	-13%	5%
Grace Cottage	347	17 (29%)	$191,269 ($11,251)	1%	-7%	13%
Mt. Ascutney	315	40 (25%)	$540,912 ($13,523)	-5%	-8%	8%
North Country	293	135 (23%)	$1,771,890 ($13,125)	-7%	-9%	11%
Southwestern	240	114 (19%)	$2,246,365 ($19,705)	-3%	-4%	9%
Northwestern	298	213 (23%)	$2,743,564 ($12,881)	-3%	-7%	2%
Porter	200	74 (16%)	$359,664 ($4,860)	-6%	-9%	-11%
Rutland	157	258 (12%)	$1,872,654 ($7,258)	-4%	-9%	-7%
Southwestern	300	213 (22%)	$1,049,580 ($4,928)	-5%	-8%	-9%
Springfield	313	106 (26%)	$1,216,696 ($11,478)	-3%	-11%	10%
University of Vermont	141	570 (12%)	$3,462,898 ($6,075)	2%	-1%	-9%
Medicaid						
All VT Hospitals	81	507 (10%)	$4,551,048 ($8,976)	1%	-1%	1%
Albany, NY	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Hospital	2021 estimates			Average Annual Growth from 2017–2021		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total spending for preventable stays (average)	Preventable stays per 1000 patients	Total number of preventable stays	Average spending for preventable stays
Brattleboro	82	27 (14%)	$217,629 ($8,060)	3%	-2%	5%
Central Vermont	107	52 (10%)	$412,743 ($7,937)	-4%	-5%	-1%
Copley	140	25 (22%)	$247,631 ($9,905)	22%	5%	8%
Dartmouth-Hitchcock, NH	53	73 (7%)	$751,708 ($10,297)	3%	4%	0%
Gifford	101	24 (21%)	$162,681 ($6,778)	11%	10%	-8%
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	50	16 (12%)	$117,011 ($7,313)	-8%	-10%	-4%
Southwestern	84	24 (11%)	$280,856 ($11,702)	2%	1%	11%
Northwestern	137	51 (20%)	$498,009 ($9,765)	8%	5%	4%
Porter	74	14 (14%)	$116,722 ($8,337)	5%	3%	2%
Rutland	58	63 (6%)	$625,338 ($9,926)	-1%	-1%	-1%
Southwestern	97	33 (16%)	$305,639 ($9,262)	-5%	-10%	2%
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
University of Vermont	66	163 (8%)	$1,448,157 ($8,884)	6%	6%	3%
Commercial						
All VT Hospitals	80	603 (11%)	$9,513,527 ($15,777)	-1%	14%	7%
Albany, NY	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	93	26 (14%)	$510,559 ($19,637)	6%	5%	29%
Central Vermont	91	55 (11%)	$823,324 ($14,970)	-4%	14%	5%
Copley	102	31 (12%)	$476,427 ($15,369)	6%	3%	22%
Dartmouth-Hitchcock, NH	51	65 (7%)	$1,154,636 ($17,764)	-1%	25%	10%
Gifford	52	13 (13%)	$177,498 ($13,654)	-6%	-1%	6%

Hospital	2021 estimates			Average Annual Growth from 2017–2021		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total spending for preventable stays (average)	Preventable stays per 1000 patients	Total number of preventable stays	Average spending for preventable stays
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	333	12 (31%)	$196,831 ($16,403)	n.r.	n.r.	n.r.
North Country	88	19 (9%)	$318,426 ($16,759)	-5%	0%	1%
Southwestern	168	38 (23%)	$802,806 ($21,126)	n.r.	n.r.	n.r.
Northwestern	191	74 (27%)	$1,035,474 ($13,993)	28%	28%	8%
Porter	74	24 (14%)	$445,946 ($18,581)	-7%	14%	38%
Rutland	95	73 (10%)	$1,324,840 ($18,148)	6%	4%	4%
Southwestern	146	51 (17%)	$725,310 ($14,222)	2%	4%	3%
Springfield	206	27 (18%)	$284,912 ($10,552)	-2%	6%	3%
University of Vermont	42	159 (7%)	$2,385,055 ($15,000)	-3%	37%	5%

Source: Mathematica's analysis of VHCURES data.

n.r. = Numbers were suppressed as they fell below the threshold permissible for reporting.

Exhibit A.35. Preventable hospitalizations and associated spending by hospital and payer type, 2017–2021

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
2017									
All VT Hospitals	259	3,544 (20%)	$36,931,066 ($10,421)	78	546 (12%)	$4,585,182 ($8,398)	84	356 (11%)	$4,150,732 ($11,659)
Albany, NY	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	291	162 (24%)	$1,660,912 ($10,253)	71	30 (17%)	$197,202 ($6,573)	73	21 (13%)	$170,001 ($8,095)
Central Vermont	261	378 (21%)	$4,412,677 ($11,674)	134	69 (16%)	$586,443 ($8,499)	112	32 (15%)	$385,240 ($12,039)
Copley	308	218 (24%)	$2,298,470 ($10,543)	66	20 (14%)	$140,037 ($7,002)	79	27 (10%)	$198,432 ($7,349)
Dartmouth-Hitchcock, NH	79	214 (9%)	$3,079,673 ($14,391)	47	60 (5%)	$606,325 ($10,105)	53	29 (7%)	$346,883 ($11,961)
Gifford	453	201 (31%)	$1,776,783 ($8,840)	66	16 (15%)	$184,568 ($11,536)	77	14 (16%)	$145,452 ($10,389)
Grace Cottage	325	27 (29%)	$186,731 ($6,916)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	411	67 (35%)	$635,996 ($9,492)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	446	246 (33%)	$2,063,738 ($8,389)	84	31 (25%)	$283,396 ($9,142)	118	19 (19%)	$300,700 ($15,826)
Southwestern	282	144 (23%)	$1,936,149 ($13,445)	78	23 (13%)	$173,720 ($7,553)	n.r.	n.r.	n.r.

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Northwestern	351	326 (25%)	$3,769,024 ($11,561)	97	41 (15%)	$330,008 ($8,049)	79	31 (13%)	$315,089 ($10,164)
Porter	277	139 (22%)	$1,579,262 ($11,362)	58	12 (17%)	$92,943 ($7,745)	114	14 (13%)	$89,442 ($6,389)
Rutland	197	454 (15%)	$5,219,685 ($11,497)	59	66 (7%)	$681,293 ($10,323)	72	61 (8%)	$927,107 ($15,198)
Southwestern	409	352 (29%)	$3,225,884 ($9,164)	132	64 (23%)	$544,191 ($8,503)	134	42 (19%)	$523,763 ($12,471)
Springfield	378	243 (28%)	$1,890,037 ($7,778)	110	35 (13%)	$309,065 ($8,830)	233	21 (22%)	$190,925 ($9,092)
University of Vermont	128	587 (11%)	$6,275,718 ($10,691)	52	127 (8%)	$966,511 ($7,610)	49	56 (6%)	$665,703 ($11,888)
2018									
All VT Hospitals	242	3,354 (19%)	$31,404,935 ($9,363)	76	528 (11%)	$4,873,266 ($9,230)	69	503 (10%)	$7,127,978 ($14,171)
Albany, NY	<11	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	311	168 (24%)	$1,229,625 ($7,319)	77	26 (17%)	$181,007 ($6,962)	112	27 (18%)	$398,426 ($14,757)
Central Vermont	228	329 (18%)	$3,043,683 ($9,251)	82	45 (9%)	$370,111 ($8,225)	81	50 (12%)	$592,418 ($11,848)
Copley	246	176 (20%)	$2,093,357 ($11,894)	66	19 (15%)	$156,629 ($8,244)	68	24 (9%)	$213,594 ($8,900)
Dartmouth-Hitchcock, NH	96	256 (10%)	$4,113,502 ($16,068)	54	66 (6%)	$682,324 ($10,338)	28	33 (4%)	$586,593 ($17,776)

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Gifford	422	175 (30%)	$1,704,122 ($9,738)	84	21 (17%)	$152,445 ($7,259)	172	31 (29%)	$348,170 ($11,231)
Grace Cottage	351	27 (34%)	$198,366 ($7,347)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	459	67 (38%)	$585,670 ($8,741)	n.r.	n.r.	n.r.	458	11 (44%)	$124,613 ($11,328)
North Country	394	222 (30%)	$2,047,619 ($9,224)	89	37 (25%)	$316,894 ($8,565)	115	21 (18%)	$257,239 ($12,249)
Southwestern	264	142 (20%)	$2,118,097 ($14,916)	141	37 (21%)	$320,861 ($8,672)	65	14 (11%)	$282,172 ($20,155)
Northwestern	370	341 (28%)	$3,806,106 ($11,162)	98	40 (15%)	$363,209 ($9,080)	99	38 (16%)	$383,251 ($10,086)
Porter	243	117 (19%)	$828,184 ($7,078)	n.r.	n.r.	n.r.	92	30 (18%)	$444,339 ($14,811)
Rutland	188	448 (15%)	$4,892,192 ($10,920)	73	82 (8%)	$839,844 ($10,242)	84	74 (9%)	$1,308,314 ($17,680)
Southwestern	379	332 (26%)	$3,155,092 ($9,503)	133	58 (22%)	$517,885 ($8,929)	174	53 (23%)	$621,830 ($11,733)
Springfield	308	187 (23%)	$1,037,238 ($5,547)	92	30 (11%)	$327,784 ($10,926)	155	27 (16%)	$339,852 ($12,587)
University of Vermont	131	623 (12%)	$4,665,586 ($7,489)	47	117 (8%)	$1,173,433 ($10,029)	28	100 (5%)	$1,796,827 ($17,968)
2019									
All VT Hospitals	246	3,298 (19%)	$28,908,798 ($8,766)	79	538 (12%)	$4,919,135 ($9,143)	73	571 (10%)	$7,955,824 ($13,933)

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Albany, NY	n.r.	n.r.	n.r.	78	12 (10%)	$50,743 ($4,229)	#VALUE!	#VALUE!	#VALUE!
Brattleboro	331	184 (26%)	$1,305,952 ($7,098)	96	35 (19%)	$357,675 ($10,219)	104	31 (17%)	$349,915 ($11,288)
Central Vermont	189	274 (15%)	$1,645,640 ($6,006)	123	64 (13%)	$534,522 ($8,352)	43	26 (5%)	$513,202 ($19,739)
Copley	192	136 (16%)	$1,880,300 ($13,826)	76	21 (17%)	$143,716 ($6,844)	43	16 (5%)	$144,805 ($9,050)
Dartmouth-Hitchcock, NH	90	239 (9%)	$3,921,083 ($16,406)	41	53 (5%)	$557,589 ($10,521)	47	59 (6%)	$1,318,187 ($22,342)
Gifford	331	152 (24%)	$1,347,604 ($8,866)	75	18 (17%)	$180,124 ($10,007)	129	30 (25%)	$343,986 ($11,466)
Grace Cottage	457	37 (40%)	$300,043 ($8,109)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	431	78 (34%)	$400,189 ($5,131)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	381	190 (29%)	$2,161,826 ($11,378)	91	33 (25%)	$442,123 ($13,398)	126	26 (20%)	$291,750 ($11,221)
Southwestern	284	162 (22%)	$2,965,578 ($18,306)	87	27 (16%)	$219,178 ($8,118)	148	28 (18%)	$514,795 ($18,386)
Northwestern	362	325 (26%)	$3,970,469 ($12,217)	91	34 (14%)	$314,668 ($9,255)	128	51 (18%)	$524,851 ($10,291)
Porter	254	132 (20%)	$889,324 ($6,737)	n.r.	n.r.	n.r.	74	27 (13%)	$345,171 ($12,784)

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Rutland	220	464 (16%)	$5,393,648 ($11,624)	57	62 (8%)	$539,069 ($8,695)	96	83 (10%)	$1,148,033 ($13,832)
Southwestern	365	315 (25%)	$1,499,485 ($4,760)	158	69 (25%)	$555,404 ($8,049)	180	58 (23%)	$652,492 ($11,250)
Springfield	356	163 (28%)	$829,579 ($5,089)	91	20 (9%)	$168,309 ($8,415)	169	22 (16%)	$259,513 ($11,796)
University of Vermont	146	686 (12%)	$4,319,162 ($6,296)	54	140 (9%)	$1,346,864 ($9,620)	41	160 (7%)	$2,742,455 ($17,140)
2020									
All VT Hospitals	216	2,457 (17%)	$22,807,851 ($9,283)	74	457 (10%)	$4,264,297 ($9,331)	75	554 (11%)	$7,920,437 ($14,297)
Albany, NY	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	241	105 (19%)	$810,452 ($7,719)	55	18 (12%)	$122,347 ($6,797)	106	25 (16%)	$306,773 ($12,271)
Central Vermont	189	231 (15%)	$1,366,861 ($5,917)	64	31 (7%)	$302,756 ($9,766)	75	42 (9%)	$596,828 ($14,210)
Copley	157	100 (13%)	$1,568,058 ($15,681)	47	11 (8%)	$85,066 ($7,733)	56	17 (7%)	$155,953 ($9,174)
Dartmouth-Hitchcock, NH	80	184 (9%)	$3,779,510 ($20,541)	49	62 (7%)	$769,245 ($12,407)	45	51 (6%)	$1,222,252 ($23,966)
Gifford	227	88 (17%)	$956,354 ($10,868)	80	21 (20%)	$180,920 ($8,615)	120	25 (21%)	$301,448 ($12,058)
Grace Cottage	259	15 (23%)	$117,760 ($7,851)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Mt. Ascutney	439	69 (34%)	$868,455 ($12,586)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	355	159 (28%)	$1,573,247 ($9,895)	101	37 (28%)	$413,364 ($11,172)	116	20 (16%)	$193,836 ($9,692)
Southwestern	270	130 (22%)	$2,173,102 ($16,716)	48	13 (8%)	$155,088 ($11,930)	135	27 (18%)	$467,419 ($17,312)
Northwestern	326	244 (24%)	$3,174,733 ($13,011)	148	53 (22%)	$430,255 ($8,118)	126	58 (18%)	$756,377 ($13,041)
Porter	184	84 (15%)	$484,828 ($5,772)	n.r.	n.r.	n.r.	73	23 (12%)	$234,945 ($10,215)
Rutland	192	328 (15%)	$4,106,659 ($12,520)	77	82 (10%)	$788,595 ($9,617)	112	96 (12%)	$1,717,876 ($17,895)
Southwestern	311	226 (23%)	$1,210,359 ($5,356)	113	43 (20%)	$328,718 ($7,645)	171	54 (20%)	$607,171 ($11,244)
Springfield	257	93 (20%)	$1,121,220 ($12,056)	99	11 (9%)	$82,012 ($7,456)	154	12 (13%)	$91,424 ($7,619)
University of Vermont	144	585 (13%)	$3,275,762 ($5,600)	53	121 (7%)	$1,235,273 ($10,209)	37	142 (6%)	$2,354,365 ($16,580)
2021									
All VT Hospitals	208	2,286 (16%)	$21,244,918 ($9,293)	81	507 (10%)	$4,551,048 ($8,976)	80	603 (11%)	$9,513,527 ($15,777)
Albany, NY	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	224	100 (19%)	$1,075,901 ($10,759)	82	27 (14%)	$217,629 ($8,060)	93	26 (14%)	$510,559 ($19,637)

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Central Vermont	218	260 (17%)	$1,737,795 ($6,684)	107	52 (10%)	$412,743 ($7,937)	91	55 (11%)	$823,324 ($14,970)
Copley	197	115 (16%)	$2,181,996 ($18,974)	140	25 (22%)	$247,631 ($9,905)	102	31 (12%)	$476,427 ($15,369)
Dartmouth-Hitchcock, NH	105	212 (10%)	$3,917,159 ($18,477)	53	73 (7%)	$751,708 ($10,297)	51	65 (7%)	$1,154,636 ($17,764)
Gifford	205	71 (15%)	$793,734 ($11,179)	101	24 (21%)	$162,681 ($6,778)	52	13 (13%)	$177,498 ($13,654)
Grace Cottage	347	17 (29%)	$191,269 ($11,251)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	315	40 (25%)	$540,912 ($13,523)	n.r.	n.r.	n.r.	333	12 (31%)	$196,831 ($16,403)
North Country	293	135 (23%)	$1,771,890 ($13,125)	50	16 (12%)	$117,011 ($7,313)	88	19 (9%)	$318,426 ($16,759)
Southwestern	240	114 (19%)	$2,246,365 ($19,705)	84	24 (11%)	$280,856 ($11,702)	168	38 (23%)	$802,806 ($21,126)
Northwestern	298	213 (23%)	$2,743,564 ($12,881)	137	51 (20%)	$498,009 ($9,765)	191	74 (27%)	$1,035,474 ($13,993)
Porter	200	74 (16%)	$359,664 ($4,860)	74	14 (14%)	$116,722 ($8,337)	74	24 (14%)	$445,946 ($18,581)
Rutland	157	258 (12%)	$1,872,654 ($7,258)	58	63 (6%)	$625,338 ($9,926)	95	73 (10%)	$1,324,840 ($18,148)
Southwestern	300	213 (22%)	$1,049,580 ($4,928)	97	33 (16%)	$305,639 ($9,262)	146	51 (17%)	$725,310 ($14,222)

Hospital	Medicare			Medicaid			Commercial		
	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)	Preventable stays per 1000 patients	Number of preventable stays (percent of eligible stays)	Total payment and cost sharing for preventable stays (average)
Springfield	313	106 (26%)	$1,216,696 ($11,478)	n.r.	n.r.	n.r.	206	27 (18%)	$284,912 ($10,552)
University of Vermont	141	570 (12%)	$3,462,898 ($6,075)	66	163 (8%)	$1,448,157 ($8,884)	42	159 (7%)	$2,385,055 ($15,000)

Source: Mathematica's analysis of VHCURES data.

n.r. = Numbers were suppressed as they fell below the threshold permissible for reporting

4. Hospital readmissions

Exhibit A.36. Unplanned 30-day readmissions and associated spending by hospital and payer type in 2021 and average annual growth from 2017 to 2021

Hospital	2021 estimates			Average Annual Growth from 2017–2021		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total spending for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions	Average spending for readmissions stays
Medicare						
All VT Hospitals	148	1,633 (14%)	$18,359,835 ($11,243)	0%	-4%	-3%
Albany, NY	152	37 (17%)	$725,272 ($19,602)	2%	3%	1%
Brattleboro	81	36 (9%)	$429,569 ($11,932)	-1%	-5%	-5%
Central Vermont	166	198 (16%)	$1,494,123 ($7,546)	2%	-2%	-10%
Copley	99	58 (10%)	$1,064,360 ($18,351)	-4%	-7%	10%
Dartmouth-Hitchcock, NH	175	353 (15%)	$6,409,442 ($18,157)	2%	-4%	0%
Gifford	144	50 (15%)	$800,660 ($16,013)	1%	-4%	6%
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	94	12 (11%)	$239,191 ($19,933)	2%	-3%	0%
North Country	163	75 (17%)	$1,489,357 ($19,858)	1%	-3%	17%
Southwestern	116	55 (14%)	$1,347,599 ($24,502)	3%	2%	10%
Northwestern	106	76 (12%)	$1,198,870 ($15,775)	-5%	-9%	6%
Porter	114	42 (13%)	$267,879 ($6,378)	8%	0%	-11%
Rutland	159	262 (15%)	$2,645,185 ($10,096)	1%	-5%	-5%
Southwestern	144	102 (14%)	$910,488 ($8,926)	0%	-3%	-6%
Springfield	115	39 (13%)	$534,756 ($13,712)	-5%	-12%	1%
University of Vermont	153	621 (13%)	$5,545,238 ($8,930)	-1%	-3%	-7%

Hospital	2021 estimates			Average Annual Growth from 2017–2021		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total spending for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions	Average spending for readmissions stays
Medicaid						
All VT Hospitals	109	679 (12%)	$6,928,515 ($10,204)	8%	5%	2%
Albany, NY	111	14 (15%)	$203,269 ($14,519)	n.r.	n.r.	n.r.
Brattleboro	66	22 (9%)	$220,876 ($10,040)	23%	14%	3%
Central Vermont	150	73 (15%)	$696,740 ($9,544)	6%	5%	0%
Copley	73	13 (9%)	$144,854 ($11,143)	14%	0%	3%
Dartmouth-Hitchcock, NH	104	144 (12%)	$1,643,695 ($11,415)	-1%	0%	4%
Gifford	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Southwestern	95	27 (11%)	$279,100 ($10,337)	8%	7%	2%
Northwestern	107	40 (12%)	$502,994 ($12,575)	11%	8%	4%
Porter	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	125	137 (14%)	$1,523,375 ($11,120)	7%	6%	4%
Southwestern	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
University of Vermont	129	317 (14%)	$3,128,981 ($9,871)	9%	9%	0%
Commercial*						
All VT Hospitals	62	464 (8%)	$12,191,044 ($26,274)	3%	21%	5%
Albany, NY	156	12 (16%)	$330,109 ($27,509)	n.r.	n.r.	n.r.
Brattleboro	75	21 (10%)	$419,202 ($19,962)	n.r.	n.r.	n.r.

Hospital	2021 estimates			Average Annual Growth from 2017–2021		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total spending for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions	Average spending for readmissions stays
Central Vermont	73	44 (9%)	$854,971 ($19,431)	n.r.	n.r.	n.r.
Copley	52	16 (6%)	$394,279 ($24,642)	13%	9%	2%
Dartmouth-Hitchcock, NH	97	124 (10%)	$2,924,574 ($23,585)	6%	40%	-7%
Gifford	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	69	15 (9%)	$452,729 ($30,182)	n.r.	n.r.	n.r.
Southwestern	88	20 (12%)	$594,837 ($29,742)	-7%	13%	22%
Northwestern	49	19 (7%)	$351,119 ($18,480)	9%	9%	-4%
Porter	34	11 (6%)	$123,068 ($11,188)	n.r.	n.r.	n.r.
Rutland	86	66 (9%)	$1,388,584 ($21,039)	8%	5%	-4%
Southwestern	54	19 (7%)	$501,107 ($26,374)	6%	9%	12%
Springfield	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
University of Vermont	58	218 (7%)	$6,774,512 ($31,076)	-3%	37%	11%

Source: Mathematica's analysis of VHCURES data.

n.r. = Numbers were suppressed as they fell below the threshold permissible for reporting

* - In the VHCURES database, 40% of Commercial claims from 2017 were missing revenue code information and were dropped from the sample since they could not be classified as acute or nonacute inpatient claims.

Exhibit A.37. Unplanned 30-day readmissions after hospitalization and associated spending by hospital and payer type, 2017–2021

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
2017									
All VT Hospitals	149	2,046 (13%)	$27,602,893 ($13,491)	78	547 (10%)	$5,141,029 ($9,399)	54	227 (7%)	$4,682,931 ($20,630)
Albany, NY	142	32 (15%)	$601,314 ($18,791)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Brattleboro	86	48 (9%)	$740,912 ($15,436)	31	13 (5%)	$113,644 ($8,742)	n.r.	n.r.	n.r.
Central Vermont	150	217 (14%)	$3,251,358 ($14,983)	115	59 (13%)	$561,108 ($9,510)	n.r.	n.r.	n.r.
Copley	126	89 (12%)	$1,089,570 ($12,242)	43	13 (6%)	$127,119 ($9,778)	32	11 (4%)	$249,802 ($22,709)
Dartmouth-Hitchcock, NH	160	432 (14%)	$7,677,220 ($17,771)	112	144 (12%)	$1,366,100 ($9,487)	74	41 (8%)	$1,502,398 ($36,644)
Gifford	140	62 (14%)	$775,655 ($12,511)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	86	14 (11%)	$275,775 ($19,698)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	156	86 (14%)	$932,476 ($10,843)	38	14 (8%)	$133,080 ($9,506)	n.r.	n.r.	n.r.
Southwestern	100	51 (11%)	$837,145 ($16,415)	68	20 (8%)	$187,707 ($9,385)	135	12 (15%)	$169,670 ($14,139)
Northwestern	145	135 (14%)	$1,637,927 ($12,133)	69	29 (8%)	$303,440 ($10,463)	33	13 (5%)	$308,651 ($23,742)

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
Porter	82	41 (9%)	$576,970 ($14,072)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Rutland	152	351 (14%)	$4,603,310 ($13,115)	94	104 (11%)	$981,697 ($9,439)	62	53 (7%)	$1,402,539 ($26,463)
Southwestern	143	123 (13%)	$1,584,562 ($12,883)	66	32 (8%)	$249,811 ($7,807)	41	13 (5%)	$211,044 ($16,234)
Springfield	151	97 (14%)	$1,257,671 ($12,966)	88	28 (10%)	$214,362 ($7,656)	144	13 (16%)	$150,605 ($11,585)
University of Vermont	158	727 (14%)	$9,998,952 ($13,754)	89	220 (11%)	$2,163,116 ($9,832)	67	77 (8%)	$1,559,578 ($20,254)
2018									
All VT Hospitals	154	2,127 (14%)	$25,441,331 ($11,961)	85	590 (10%)	$5,364,882 ($9,093)	58	423 (7%)	$10,028,779 ($23,709)
Albany, NY	181	53 (19%)	$862,045 ($16,265)	91	14 (13%)	$88,092 ($6,292)	n.r.	n.r.	n.r.
Brattleboro	107	58 (11%)	$896,510 ($15,457)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Central Vermont	146	210 (14%)	$2,669,139 ($12,710)	124	68 (13%)	$568,167 ($8,355)	52	32 (7%)	$492,612 ($15,394)
Copley	82	59 (8%)	$899,184 ($15,240)	49	14 (8%)	$124,490 ($8,892)	n.r.	n.r.	n.r.
Dartmouth-Hitchcock, NH	165	440 (15%)	$7,272,334 ($16,528)	117	142 (12%)	$1,561,018 ($10,993)	95	114 (10%)	$2,348,911 ($20,604)
Gifford	147	61 (14%)	$843,374 ($13,826)	48	12 (7%)	$90,800 ($7,567)	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
Mt. Ascutney	137	20 (14%)	$224,908 ($11,245)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	152	86 (14%)	$1,285,107 ($14,943)	34	14 (7%)	$90,943 ($6,496)	n.r.	n.r.	n.r.
Southwestern	149	80 (15%)	$1,547,017 ($19,338)	53	14 (7%)	$210,718 ($15,051)	n.r.	n.r.	n.r.
Northwestern	104	96 (11%)	$1,233,862 ($12,853)	69	28 (8%)	$227,781 ($8,135)	n.r.	n.r.	n.r.
Porter	89	43 (10%)	$169,810 ($3,949)	n.r.	n.r.	n.r.	40	13 (7%)	$240,165 ($18,474)
Rutland	158	377 (14%)	$4,938,910 ($13,101)	126	141 (14%)	$1,483,452 ($10,521)	78	69 (9%)	$1,419,854 ($20,578)
Southwestern	171	150 (16%)	$2,407,657 ($16,051)	94	41 (11%)	$360,489 ($8,792)	59	18 (7%)	$299,490 ($16,638)
Springfield	145	88 (13%)	$695,259 ($7,901)	101	33 (11%)	$332,310 ($10,070)	75	13 (8%)	$160,938 ($12,380)
University of Vermont	168	798 (15%)	$7,617,213 ($9,545)	83	206 (10%)	$1,731,313 ($8,404)	63	224 (8%)	$5,767,788 ($25,749)
2019									
All VT Hospitals	158	2,125 (14%)	$24,147,073 ($11,363)	75	515 (9%)	$6,230,517 ($12,098)	57	447 (7%)	$9,085,663 ($20,326)
Albany, NY	185	50 (19%)	$452,698 ($9,054)	123	19 (16%)	$208,280 ($10,962)	n.r.	n.r.	n.r.
Brattleboro	140	78 (13%)	$895,704 ($11,483)	49	18 (7%)	$408,137 ($22,674)	60	18 (8%)	$593,776 ($32,988)

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
Central Vermont	141	204 (13%)	$2,021,140 ($9,908)	115	60 (12%)	$543,902 ($9,065)	43	26 (5%)	$552,641 ($21,255)
Copley	78	55 (8%)	$861,755 ($15,668)	58	16 (9%)	$160,698 ($10,044)	n.r.	n.r.	n.r.
Dartmouth-Hitchcock, NH	181	483 (16%)	$7,317,595 ($15,150)	99	127 (11%)	$1,784,598 ($14,052)	130	163 (13%)	$3,440,904 ($21,110)
Gifford	150	69 (15%)	$885,009 ($12,826)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	138	25 (15%)	$326,401 ($13,056)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	162	81 (16%)	$1,408,816 ($17,393)	41	15 (7%)	$387,237 ($25,816)	n.r.	n.r.	n.r.
Southwestern	123	70 (13%)	$1,447,350 ($20,676)	45	14 (6%)	$145,487 ($10,392)	74	14 (9%)	$249,403 ($17,814)
Northwestern	155	139 (16%)	$1,854,319 ($13,340)	48	18 (5%)	$166,441 ($9,247)	35	14 (5%)	$224,275 ($16,020)
Porter	91	47 (10%)	$459,280 ($9,772)	56	11 (7%)	$114,025 ($10,366)	n.r.	n.r.	n.r.
Rutland	165	349 (15%)	$5,413,444 ($15,511)	84	92 (11%)	$969,660 ($10,540)	76	66 (8%)	$1,091,187 ($16,533)
Southwestern	173	149 (16%)	$1,184,792 ($7,952)	73	32 (9%)	$361,806 ($11,306)	56	18 (7%)	$245,859 ($13,659)
Springfield	103	47 (11%)	$609,553 ($12,969)	77	17 (8%)	$160,521 ($9,442)	n.r.	n.r.	n.r.

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
University of Vermont	171	805 (14%)	$6,694,073 ($8,316)	81	212 (11%)	$2,692,290 ($12,699)	63	249 (8%)	$5,471,720 ($21,975)
2020									
All VT Hospitals	145	1,652 (14%)	$17,519,650 ($10,605)	87	538 (10%)	$5,712,106 ($10,617)	65	486 (8%)	$10,677,828 ($21,971)
Albany, NY	171	44 (17%)	$627,690 ($14,266)	115	16 (18%)	$111,159 ($6,947)	212	14 (23%)	$214,144 ($15,296)
Brattleboro	136	59 (14%)	$538,965 ($9,135)	43	14 (7%)	$126,062 ($9,004)	n.r.	n.r.	n.r.
Central Vermont	159	195 (16%)	$1,344,018 ($6,892)	120	58 (12%)	$853,777 ($14,720)	92	51 (11%)	$946,690 ($18,563)
Copley	99	63 (11%)	$938,446 ($14,896)	106	25 (14%)	$165,836 ($6,633)	40	12 (5%)	$200,088 ($16,674)
Dartmouth-Hitchcock, NH	160	368 (14%)	$7,525,401 ($20,449)	99	125 (12%)	$1,211,068 ($9,689)	109	125 (11%)	$2,728,208 ($21,826)
Gifford	147	57 (15%)	$771,404 ($13,533)	61	16 (10%)	$124,273 ($7,767)	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Mt. Ascutney	146	23 (17%)	$384,371 ($16,712)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	167	75 (17%)	$1,209,542 ($16,127)	n.r.	n.r.	n.r.	76	13 (10%)	$160,657 ($12,358)
Southwestern	112	54 (12%)	$1,115,364 ($20,655)	41	11 (5%)	$101,595 ($9,236)	n.r.	n.r.	n.r.
Northwestern	140	105 (14%)	$1,352,096 ($12,877)	72	26 (8%)	$292,426 ($11,247)	50	23 (7%)	$611,597 ($26,591)

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
Porter	96	44 (11%)	$279,260 ($6,347)	86	19 (11%)	$297,032 ($15,633)	54	17 (8%)	$390,316 ($22,960)
Rutland	141	241 (14%)	$3,205,211 ($13,300)	95	101 (11%)	$917,840 ($9,088)	71	61 (8%)	$1,081,226 ($17,725)
Southwestern	134	97 (13%)	$637,302 ($6,570)	50	19 (6%)	$158,643 ($8,350)	60	19 (8%)	$386,250 ($20,329)
Springfield	99	36 (11%)	$468,202 ($13,006)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
University of Vermont	147	597 (13%)	$5,110,026 ($8,560)	101	231 (11%)	$2,543,264 ($11,010)	66	253 (9%)	$6,101,424 ($24,116)
2021									
All VT Hospitals	148	1,633 (14%)	$18,359,835 ($11,243)	109	679 (12%)	$6,928,515 ($10,204)	62	464 (8%)	$12,191,044 ($26,274)
Albany, NY	152	37 (17%)	$725,272 ($19,602)	111	14 (15%)	$203,269 ($14,519)	156	12 (16%)	$330,109 ($27,509)
Brattleboro	81	36 (9%)	$429,569 ($11,932)	66	22 (9%)	$220,876 ($10,040)	75	21 (10%)	$419,202 ($19,962)
Central Vermont	166	198 (16%)	$1,494,123 ($7,546)	150	73 (15%)	$696,740 ($9,544)	73	44 (9%)	$854,971 ($19,431)
Copley	99	58 (10%)	$1,064,360 ($18,351)	73	13 (9%)	$144,854 ($11,143)	52	16 (6%)	$394,279 ($24,642)
Dartmouth-Hitchcock, NH	175	353 (15%)	$6,409,442 ($18,157)	104	144 (12%)	$1,643,695 ($11,415)	97	124 (10%)	$2,924,574 ($23,585)
Gifford	144	50 (15%)	$800,660 ($16,013)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Grace Cottage	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

Hospital	Medicare			Medicaid			Commercial*		
	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)	Readmissions per 1000 patients	Index stays followed by readmissions (percent of index stays)	Total payment and cost sharing for readmissions (average)
Mt. Ascutney	94	12 (11%)	$239,191 ($19,933)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
North Country	163	75 (17%)	$1,489,357 ($19,858)	n.r.	n.r.	n.r.	69	15 (9%)	$452,729 ($30,182)
Southwestern	116	55 (14%)	$1,347,599 ($24,502)	95	27 (11%)	$279,100 ($10,337)	88	20 (12%)	$594,837 ($29,742)
Northwestern	106	76 (12%)	$1,198,870 ($15,775)	107	40 (12%)	$502,994 ($12,575)	49	19 (7%)	$351,119 ($18,480)
Porter	114	42 (13%)	$267,879 ($6,378)	n.r.	n.r.	n.r.	34	11 (6%)	$123,068 ($11,188)
Rutland	159	262 (15%)	$2,645,185 ($10,096)	125	137 (14%)	$1,523,375 ($11,120)	86	66 (9%)	$1,388,584 ($21,039)
Southwestern	144	102 (14%)	$910,488 ($8,926)	n.r.	n.r.	n.r.	54	19 (7%)	$501,107 ($26,374)
Springfield	115	39 (13%)	$534,756 ($13,712)	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
University of Vermont	153	621 (13%)	$5,545,238 ($8,930)	129	317 (14%)	$3,128,981 ($9,871)	58	218 (7%)	$6,774,512 ($31,076)

Source: Mathematica's analysis of VHCURES data.

n.r. = Numbers were suppressed as they fell below the threshold permissible for reporting

* - In the VHCURES database, 40% of Commercial claims from 2017 were missing revenue code information and were dropped from the sample since they could not be classified as acute or nonacute inpatient claims.

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Appendix B

VHCURES Data

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VHCURES is the Vermont APCD. It contains enrollment and medical use data (claims and encounters) for all Vermont residents enrolled in Medicare fee-for-service (FFS) and managed care and in Medicaid, as well as for 80 to 90 percent of commercially insured Vermont residents, including for services received in other states. VHCURES does not include Vermont residents who are enrolled in (1) the Federal Employee Health Benefit Plan, (2) TRICARE (formerly known as Champus), (3) some self-insured commercial plans, (4) plans with a commercial insurer that covers very few Vermont residents, and (5) procedures covered by Veteran Affairs. It also excludes uninsured and self-pay patients and in-state procedures performed on out-of-state residents.

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Appendix C

Methods

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Overview

We tracked 10 overuse measures and five measures of potentially avoidable use (PAU) among insured Vermont residents with claims in VHCURES from 2017 to 2021. We constructed beneficiary-level monthly data sets for associated 2017–2021 beneficiary, provider, and claims data from VHCURES and analyzed the expenditure and volume outcomes (see below) for each overuse and PAU measure.

Measures

GMCB selected 10 overuse measures described in Exhibit C.1 from a set of 31 measures, which were developed by Harvard researchers and recently updated by Mathematica.[28] The 10 measures reflect care provided in the clinical domains of cancer screening, diagnostic testing, preoperative testing, cardiovascular testing and procedures, and other invasive procedures. Unless otherwise directed by GMCB, we adhered to the intent of the existing measure specifications and programming code in observing provision of overuse falling under each of the measures.[29] In addition, GMCB selected five PAU measures, also listed in Exhibit C.1.

Exhibit C.1. Overuse and PAU measures and descriptions

Measure	Description
Overuse measures	
Cervical cancer screening for women ages 65 and over	Screening Papanicolaou test for women ages 65 and over who have (1) no personal history of cancer or dysplasia noted in claim or in prior claims and (2) no diagnoses of other female genital cancers, abnormal Papanicolaou findings, or human papillomavirus positivity in prior claims
Colorectal cancer screening for adults over age 85	Colorectal cancer screening (colonoscopy, sigmoidoscopy, barium enema, or fecal occult blood testing) for patients over age 85 with no history of colon cancer
Prostate-specific antigen (PSA) testing for men ages 75 and over	PSA testing for patients ages 75 and over with no history of prostate cancer
Parathyroid hormone (PTH) measurement for patients with Stages 1–3 chronic kidney disease	PTH measurement for patients who have chronic kidney disease, have had no dialysis services before PTH testing or within 30 days after testing, and have had no hypercalcemia diagnosis during the year
Total or free T3 level testing for patients with hypothyroidism	Total or free T3 measurement in a patient with hypothyroidism diagnosis during the year
Preoperative stress testing	Stress electrocardiogram, echocardiogram, nuclear medicine imaging, cardiac magnetic resonance imaging, or computed tomography angiography not associated with inpatient or emergency care, occurring within 30 days before a low- or intermediate-risk surgical procedure

[28] See Fleming, C., E. Shin, R. Powell, et al. "Updating a Claims-Based Measure of Low-Value Services Applicable to Medicare Fee-for-Service Beneficiaries." *Journal of General Internal Medicine*, vol. 37, no. 13, 2022, pp. 3453–3461.

[29] The existing programming code, for example, excludes overuse services that occur within seven days of the same service. For example, if a Vermont patient received a PSA-specific procedure within seven days of another PSA-specific procedure, the second procedure would not be counted as a separate instance of overuse under current programming code.

Measure	Description
Stress testing for stable coronary disease	Stress testing not associated with inpatient or emergency care for patients with an established diagnosis of acute myocardial infarction (six months or more before testing)
Percutaneous coronary intervention with balloon angioplasty or stent replacement for stable coronary disease	Coronary stent placement or balloon angioplasty not associated with an ED visit, or an established diagnosis of acute myocardial infarction (greater than or equal to six months before testing)
Arthroscopic surgery for knee osteoarthritis	Arthroscopic debridement/chondroplasty of the knee with a diagnosis of osteoarthritis or chondromalacia in the procedure claim and no meniscal tears noted in procedure claims
Laminectomy or spinal fusion	Individuals without clear indications of radicular pain or of herniated disc who receive a laminectomy and/or spinal fusion
PAU measures	
Hospital readmission	Discharges followed by an unplanned hospital admission within 30 days, regardless of whether the readmission occurred at the same or a different hospital
PQI 90: Overall composite	PQI overall composite, ages 18 years and older; includes admissions for one of the following conditions: diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes without complications, diabetes with lower-extremity amputation, chronic obstructive pulmonary disease, asthma, hypertension, heart failure, bacterial pneumonia, or urinary tract infection
Rate of non-emergent ED visits	ED visits in which the patient's initial complaint, vital signs, medical history, and age indicated that immediate medical care was not required within 12 hours
Rate of emergent/primary care treatable ED visits	ED visits that required treatment within 12 hours, but care could have been provided in a primary care setting
Rate of emergent/ED care required but preventable or avoidable ED visits	ED visits that required emergency care based on the complaint or procedures or resources used, but the emergent nature of the condition was potentially preventable or avoidable if timely and effective primary care had been provided

Outcomes

For each of the overuse and PAU measures described in Exhibit C.1, we reported the following expenditure and volume summary outcomes:

Expenditures:

- Total expenditures
- Stratification by geography (health service areas)
- Stratification by type of payer
- Longitudinal trends (2017–2021)

Volume summary:

- Total number of services considered overuse or potentially avoidable
- Stratification by payer type
- Stratification by geography (health service areas)
- Longitudinal trends (2017–2021)

Beneficiary sample

To be included in the data set for each observation year (2017–2021), Vermont residents had to have been continuously enrolled in an insurance product for the 12 months prior to and the 12 months during an observation year. For reporting purposes, we identified Vermont residents by insurance product (payer type). We used the Member Month Detail and Eligibility Tables in VHCURES to attribute insurance types for beneficiaries. We did this based on the month in which a beneficiary received an overuse or potentially avoidable use service, based on the claim service date. For the overuse analysis, we grouped beneficiaries into five payer categories (or insurance types):

1. Private (commercial)
2. Medicare FFS only
3. Medicare Advantage only
4. Medicaid only
5. Medicare and Medicaid (dually eligible beneficiaries)

For the potentially avoidable use analysis, we grouped beneficiaries into three payer categories:

1. Private (including Medicare Advantage)
2. Medicare FFS (including dual eligible)
3. Medicaid only

Chronic condition indicators for overuse measures. We used claims data to identify specific chronic conditions among observed beneficiaries because the overuse measures have criteria that include or exclude a beneficiary from measure denominators and numerators based on chronic conditions. For example, the prostate-specific antigen (PSA) testing measure excludes beneficiaries (and associated PSA tests) from the measure numerator if they have a history of prostate cancer. We followed Chronic Condition Warehouse specifications to identify beneficiaries with the chronic conditions of interest (prostate cancer, colorectal cancer, chronic kidney disease, hypothyroidism, ischemic heart disease, and acute myocardial infarction). To identify beneficiaries with these conditions, the Chronic Condition Warehouse specifications require two years of claims data before the measurement year of interest. For example, for observation year 2017, we observed claims for 2015 and 2016 to identify Vermont beneficiaries who had the chronic conditions relevant to the overuse measures.

Overuse measure reporting. We constructed the 10 overuse measures (Exhibit C.1) and reported measure counts and rates by the expenditure and volume outcomes specified previously. We reported use rates and payments associated with Overuse services. To calculate Overuse counts, we used the original

programming, which de-duplicates claims for Overuse measure procedure codes that occur within seven days of one another. Because claims occurring within seven days of one another most likely represent one instance (or episode) of Overuse, this approach ensures we do not double count use for the Overuse measures. GMCB agreed we should continue this approach for calculating Overuse use.

To capture costs associated with Overuse services, we did not implement the 7-day de-duplication rule, as was the case for calculating use. We reported two values for costs associated with Overuse services: (1) the sum of line-level payer and beneficiary payments from only claim lines with specified Overuse measure procedure codes; and (2) the sum of all line-level payments from claims with specified Overuse measure procedure codes. We reported total and mean line- and claim-level payments for the Overuse measures.

In addition to reporting absolute counts of overuse services, we reported overuse measure rates per 1,000 beneficiaries who qualified for a given measure (for example, for the PSA testing measure, men ages 75 years and older without a history of prostate cancer). We note here that in the peer-reviewed literature overuse measure rates have often been reported over beneficiaries who are included in the overall data set (that is, all beneficiaries) rather than over beneficiaries qualifying for a given measure. We asked GMCB which rate they preferred we report, and GMCB preferred we report overuse rates over beneficiaries qualifying for a given overuse measure, where applicable. For each Overuse measure, the table below includes definitions of measure numerators and denominators.

Exhibit C.2. Overuse measures: Denominator and numerator descriptions

Measure	Denominator	Numerator
Cervical cancer screening for women ages 65 and over	Women aged 65+ with no personal history of cancer or dysplasia noted in claim or in prior claims, and no diagnoses of other female genital cancers, abnormal Papanicolaou findings, or human papillomavirus positivity in prior claims	Any cervical cancer screening among women aged 65+
Colorectal cancer screening for adults over age 85	Beneficiaries aged 86+ with no history of colon cancer	Any screening procedures among benes aged 86+ with no history of colon cancer
Prostate-specific antigen (PSA) testing for men ages 75 and over	Men aged 75+ without a history of prostate cancer	Any PSA procedure among men aged 75+ without history of prostate cancer
Parathyroid hormone (PTH) measurement for patients with Stages 1–3 chronic kidney disease	Beneficiaries with chronic kidney disease (stages 1-3)	Any procedure among benes with chronic kidney disease. Excludes any procedure that took place within 1 year after or 30 days before a dialysis service.

Measure	Denominator	Numerator
Preoperative stress testing	Beneficiaries with a low or intermediate risk surgical procedure that took place during the year of measure	Any preoperative stress test that occurred 30 days before a low or intermediate risk surgical procedure. Excludes tests that occurred during or within 30 days of an inpatient stay. Also excludes tests that occurred during an ED visit or when an ED visit occurred between the stress test and the surgical procedure
Stress testing for stable coronary disease	Beneficiaries with a diagnosis of AMI or IHD.	Any stress test, cardiac MRI, or CT angiography among benes diagnosed with AMI or IHD at least 180 days prior to the procedure. Excludes procedures that took place within the 14 days following an ED visit, during an inpatient stay, or within the 14 days following an inpatient stay.
Percutaneous coronary intervention with balloon angioplasty or stent replacement for stable coronary disease	Benes with a diagnosis of AMI or IHD	Any procedure that occurs at least 180 days after a diagnosis of AMI or IHD. Any procedure that took place within 14 days of an ED visit is excluded
Laminectomy or spinal fusion	All beneficiaries with at least one laminectomy or spinal fusion during the year	Any procedure during the year of measurement, excluding those that occurred within one year of a herniated disc diagnosis or within 30 days of a sciatica diagnosis
Arthroscopic surgery for knee osteoarthritis	Not coded due to the small number of procedures that fit the numerator definition.	Any procedure that takes place with a diagnosis of osteoarthritis or chondromalacia and no meniscal tear

PAU measure reporting. We limited our analysis for preventable hospitalizations, readmissions and avoidable ED visits to facilities within Vermont for Vermont residents. For preventable hospitalizations and readmissions, we merged overlapping claims and claims including transfers to other hospitals into inpatient stays. We limited the sample to acute inpatient stays using the HEDIS 2022 definitions for acute inpatient care.[30] For preventable hospitalizations, the denominator comprised all acute hospitalizations of members 18 years of age or older that did not originate as transfers from another healthcare facility and were not obstetric admissions. The numerator included hospitalizations for one of the following conditions: diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes without complications, diabetes with lower-extremity amputation, chronic obstructive pulmonary disease, asthma, hypertension, heart failure, bacterial pneumonia, or urinary tract infection. For 30-day readmissions, the denominator comprised acute hospitalizations of members 18 years of age or older that were not for obstetric or perinatal diagnoses, and that were not for planned or potentially planned procedures. The numerator was defined as any hospitalization at the same or different hospital that occurred within 30 days of discharge from an index hospitalization. Index stays were defined as acute hospitalizations of members 18 years of age or older that did not receive hospice services in the year, that were not obstetric or perinatal admissions, that did not terminate in death and ended before December 1 on the calendar year. For preventable hospitalizations and avoidable readmissions, we reported use rates as well as total spending. For ED visits, we reported both avoidable and unavoidable use and spending.

[30] National Committee for Quality Assurance (2022). Available at: www.ncqa.org/hedis/measures/acute-hospital-use/

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