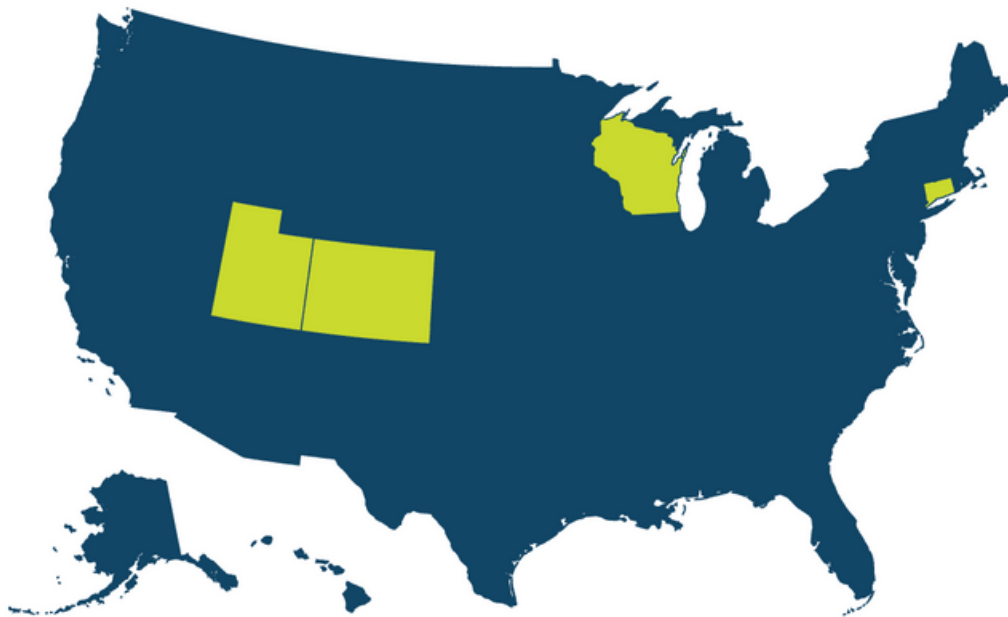


# Utilization and Spending on Low-Value Medical Care Across Four States

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## About VBID Health:

VBID Health specializes in designing and promoting health benefit plans and payment strategies that get more health out of every health care dollar spent. VBID Health provides streamlined, value-based insurance design consulting services to facilitate creation and adoption of V-BID plans and payment policies that increase patient, employee, and enrollee health. VBID Health facilitates the Low-Value Care Task Force, comprised of public and private employers, business coalitions, consumer advocates, health plans, and life science companies, all focused on accelerating concerted action to reduce low-value medical care, thereby reducing pressure on payers and consumers. For more information, visit [vbidhealth.com](http://vbidhealth.com).



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# EXECUTIVE SUMMARY

Estimates of spending on medical services that offer no clinical benefit in specific clinical scenarios range in the hundreds of billions of dollars in the United States each year. While this low-value care (LVC) - at best - does not improve the health of Americans, it often leads to patient harm and worsens health disparities. Moreover, this unnecessary spending likely substitutes for investments in high-value care. Although multiple efforts to identify and measure LVC have been successful, decreasing its use has proven challenging. For public and private purchasers to better target efforts to reduce these unnecessary expenditures, information from all payer claims databases (APCDs) from four states – Colorado, Connecticut, Utah, and Wisconsin – was used to quantify the utilization and spending on 48 specific low-value services by commercial payers in 2019. Most of these services have been identified as low-value by the U.S. Preventative Services Task Force and physician-led initiatives such as the *Choosing Wisely*® campaign. When data were available, LVC spending was broken down into plan payment and beneficiary out-of-pocket spending. In 2019, commercial payers in the four states paid more than \$630 Million on the 48 low-value services measured, of which nearly \$100 Million was directly paid by patients. Total spending on specified LVC services varied across states. A substantial proportion of LVC expenditures were concentrated in high-volume LVC services and in services that were frequently used in low-value clinical settings. Given these findings, data from APCDs can be used to target unnecessary medical services and can inform promising state-wide interventions to potentially reduce harm, enhance equity, and lower health care costs.

# INTRODUCTION

The COVID-19 pandemic has greatly elevated the urgency to create a more efficient and equitable health care system. Low-value care (LVC) (i.e., medical care whose expected clinical benefit is outweighed by clinical risk), represents one such area to address. LVC can lead to patient harm and unnecessary health care spending. Thus, improving the efficiency and equity of health care delivery in the United States necessitates a strategic response to reduce the utilization of LVC.

To support the goal of reducing harmful or unnecessary health care use, multi-stakeholder initiatives like the American Board of Internal Medicine Foundation's *Choosing Wisely*® campaign continue to identify specific services that should not be delivered in certain clinical situations. (1) The *Choosing Wisely*® campaign includes some 600 recommendations chosen by clinicians from over 80 specialty societies. In the federal policymaking community, there is a growing recognition that the clinical benefit of any given service depends on the context in which that service is delivered, to whom, and when.

For example, federal policy to address the COVID-19 pandemic eliminated cost-sharing for COVID-19 tests and vaccines, exemplifying the strategic application of “value-based” care to benefit population health. (2) However, policies to mitigate multiple financial incentives encouraging the provision of low-value care do not exist.

A major barrier to reducing low-value care has been a lack of analytic tools to understand the value of patient care in large datasets. Until recently, available tools have been unable to distinguish when a medical service (e.g., screening colonoscopy) is clinically indicated in certain clinical circumstances (e.g., colonoscopy for average risk person above 45 years) and not in others (e.g., colonoscopy for average risk person below 40 years).

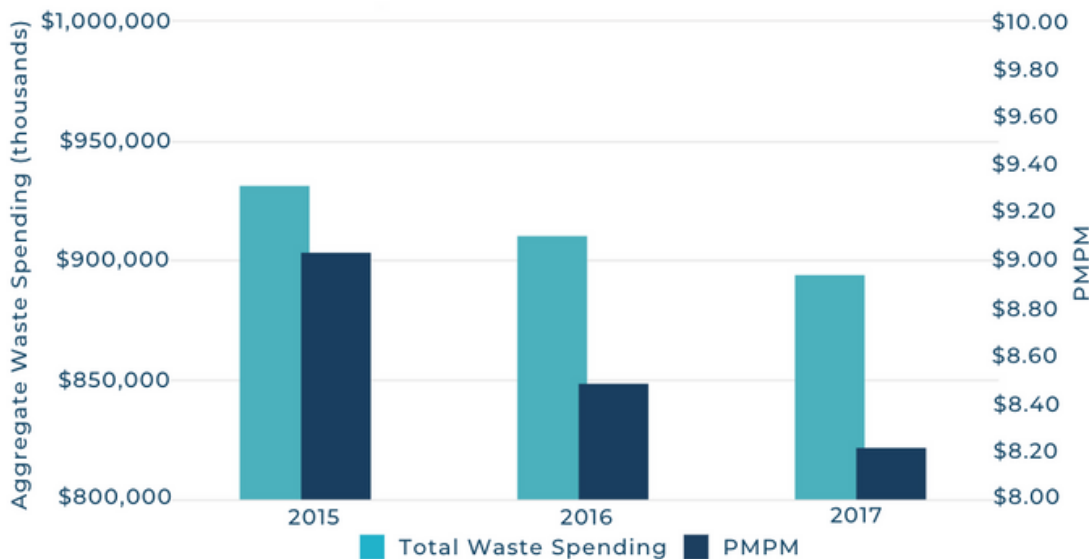
**There is a growing recognition that the clinical benefit of any given service depends on the context in which that service is delivered, to whom, and when**

# INTRODUCTION CONT.

Translating services identified as potentially low-value by clinical experts into actionable information for payers, health systems, governments, or individual providers necessitates incorporating this “clinical nuance” into data analysis. (3)

In May 2020, leveraging the Milliman Health Waste Calculator (software designed to incorporate clinical nuance into measures of low-value care), VBID Health released a novel quantification of low-value care spending using data from all payer claims databases (APCDs) in four states - Maine, Virginia, Colorado and Washington. (4) The 2020 report found that LVC spending by commercial payers and Medicaid plans in these four states was \$2.7 billion from 2015-2017 (Figure below).

*Figure 1. Total and PMPM Waste Spending by 4 States on 47 Services, 2015-2017*



SOURCE: Utilization and Spending on Low-Value Medical Care Across Four States (2020) - <https://vbidhealth.com/docs/APCD-LVC-Final.pdf>

Each year, patients spent approximately \$90 million out-of-pocket on services that provided no net clinical benefit. The report was cited in a Commonwealth Fund review of APCD use cases and benefits. (5)

In a continuation of that effort to leverage APCD data to quantify low-value care, we conducted a similar analysis, updating the results from Colorado and examining three additional states.

# PROJECT AIM

The specific aim of this analysis was to quantify the utilization and spending on pre-specified low-value care services using APCDs in four states: Colorado, Connecticut, Utah and Wisconsin. This paper follows a previous iteration using similar methods to measure LVC in another set of states. (6) LVC was quantified by analyzing 48 clinical services deemed as low-value by such sources as the United States Preventive Services Task Force (USPSTF) and the *Choosing Wisely*® campaign (see Appendix 1). Claims from each APCD were run through the Milliman MedInsight Health Waste Calculator, a proprietary, algorithm-based software program designed to quantify LVC use and spending by differentiating whether the use of a specific medical service was clinically necessary, likely low-value, or low-value. (7)



**COLORADO**



**CONNECTICUT**



**UTAH**



**WISCONSIN**

# MOTIVATION

In the United States, annual spending on health care waste is estimated in the hundreds of billions of dollars. Specifically, spending projections on LVC range from approximately \$100 to \$450 billion per year, a significant portion of the total estimated waste. (8,9,10) Given the sheer magnitude of spending, LVC mitigation represents an important opportunity through which governments, consumers, and other health care stakeholders can simultaneously improve population health and address health care spending growth. As we describe in the previous paper and elsewhere, the increasing pressure that health spending imparts on state budgets makes states highly motivated and uniquely positioned to act on low-value care. (11)

A major factor that contributes to a shortage of broad LVC policy strategies is a lack of data that can allow stakeholders to identify low-value clinical services that are amenable to interventions aimed at reducing their use. Most of the published LVC studies evaluate small-scale initiatives designed to reduce use of a single medical service in a particular clinical circumstance. (12) Although evidence continues to grow around what specific interventions may work at the clinician level, public and private purchasers have been slow to initiate measurement programs, particularly given the lack of evidence establishing which intervention strategies deliver the greatest LVC reduction with the lowest administrative burden. (13,14)

More targeted approaches by states and other stakeholders, informed by direct measurement of low-value care across payers, should motivate action.

Therefore, to further support efforts to measure and reduce spending on low-value care, this analysis adds to the existing work in this area by quantifying and comparing LVC utilization and spending across four states – three of which are unique from our previous analysis.



# METHODS

**APCDs** from Colorado, Connecticut, Utah, and Wisconsin contributed available claims data for 2019. Table 1 summarizes the total data available from each APCD. All four APCDs provided medical and pharmacy claims from commercially insured enrollees, and LVC spending was aggregated across the states. While some states provided other data, we only use 2019 total spending from commercial payers in this analysis.

*Table 1. Claims Data Sources by Payer and State*

	Commercial	Medicaid	Medicare FFS	Medicare Advantage
Colorado	X	X	X	X
Connecticut	X			X
Utah	X	X		X
Wisconsin	X	X		X

Representatives from each APCD collaborated with Milliman personnel to run APCD claims through the Health Waste Calculator (HWC, version 7.1) to produce standardized output tables. The HWC algorithms are based on logic designed from evidence-based recommendations and clinical guidelines. Version 7.1 of the Health Waste Calculator includes 48 measures of low-value care. "Likely low-value" and "low-value" claims as determined by the HWC were included in the LVC utilization and spending estimates.

Allowed costs – plan spending plus patient spending – used in the analyses were calculated for Colorado, Connecticut, and Utah using a “case rate” methodology, defined as total claims cost associated with an instance when the specified service was used in a low-value setting. Specifically, the case rate methodology counts costs from claims where at least one claim line was flagged as wasteful in the HWC. The HWC and case rate was used previously to quantify low-value care spending using APCD data. (15)

# METHODS CONT.

We also estimate a case rate - patient and plan spending - for each state. For Wisconsin, we multiplied a standard unit cost by the frequency of likely low-value or low-value services as identified by the HWC to calculate spending (because the state did not report allowed amounts directly like the other states). For Colorado, we estimate total plan spending based on subtracting reported patient spending by the total allowed amount. For Connecticut, we estimated patient spending by subtracting plan spending from total allowed amount. Utah reported allowed, patient, and plan spending separately.

As done in the previous VBID Health analysis of low-value care in state APCD data, the case rate methodology was chosen for simplicity, with a mixed effect on measurement specificity. Overall, our analysis may underestimate the total cost impact of low-value care, because it does not capture the clinical and financial impact of resultant care cascades - the subsequent unnecessary services that result from an initial low-value care service or claim. Use of the case methods may

offset, to some extent, the failure to capture the full cost of care cascades. Although care cascades are more prevalent and costlier for certain low-value services than others, the cascades can be extremely costly when they do occur. For example, unnecessary antibiotics may have fewer next-order low-value consequences, while a low-value diagnostic test could have incidental findings, leading to unnecessary procedures.

That said, the case rate methodology may overestimate the cost of certain services, such as annual resting EKGs, by including the cost of both the low-value procedure and other services or procedures in the claim. Use of the 'line method' to capture LVC, which only measures the cost of the specific claims line that is flagged as low-value, will generally result in considerably underestimated low-value spending when compared to the case methods. Appendix 2 provides more information on methods used to estimate LVC costs in the HWC and the impact of this decision. The case and line approaches do not affect estimates of utilization.

## METHODS CONT.

Further, some amount of low-value care reported by the HWC is “likely low-value,” meaning there is less certainty that the services reported is low-value in the clinical circumstance it was delivered, based on the insurance claim.

*This tends to be a very small percentage of total low-value care captured by the HWC, because the services selected were chosen to minimize misclassification.*

For example, in previous uses of the HWC by Washington state to assess LVC, “likely low-value” care was reported in only 4% of instances of low-value care. In the rare cases when the HWC did not have the adequate patient history to determine whether a service was “wasteful” or “likely wasteful” or “necessary,” they were still included in the low-value estimates.

A “waste index” was also measured for each specific low-value service. Because the value of any service depends on who receives it, there are few services that are always high- or low-value. The HWC computes a waste index for each service that measures the proportion of times that the service is low-value by how often it is provided. Specifically, the waste index is calculated by dividing the number of low-value instances for a specific service by the total number of times that service is delivered. In other words, the wasteful and likely wasteful N divided by the total N (total N includes both low-value and clinically necessary instances). For example, if a service in a state was provided a total of 100 times in one year, and 80 of them were deemed low-value, or likely low-value, then the waste index would be 80% (80 divided by 100).

The higher the waste index, the more likely a service will be low-value, regardless of clinical circumstance. A high-waste index can highlight which services are commonly wasteful when provided, but we recognize some of the high-waste index services are quite rarely provided (e.g., bleeding time testing). We therefore limited the waste index analysis to only services that were also provided greater than 50 times in 2019 to patients (i.e.,  $N > 50$ ). A low frequency service, albeit commonly wasteful, may be of less interest to decision-makers.

# RESULTS

## Commercial Plans' Spending on 48 Low-Value Services by State in 2019

In 2019, commercial payers that contributed data to the four APCDs spent \$630 million combined on the 48 specific LVC measures (Table 2). This amount represents 2.22% of all commercial spending in that year for the four states. The estimated proportion of LVC spending ranged from 1.93% in Connecticut to 2.66% in Utah. The PMPM (per member per month) estimates of spending on LVC ranged from \$9.45 to \$10.73.

*Table 2. Detailed LVC Spending on Utilization for Commercial Plans, 2019*

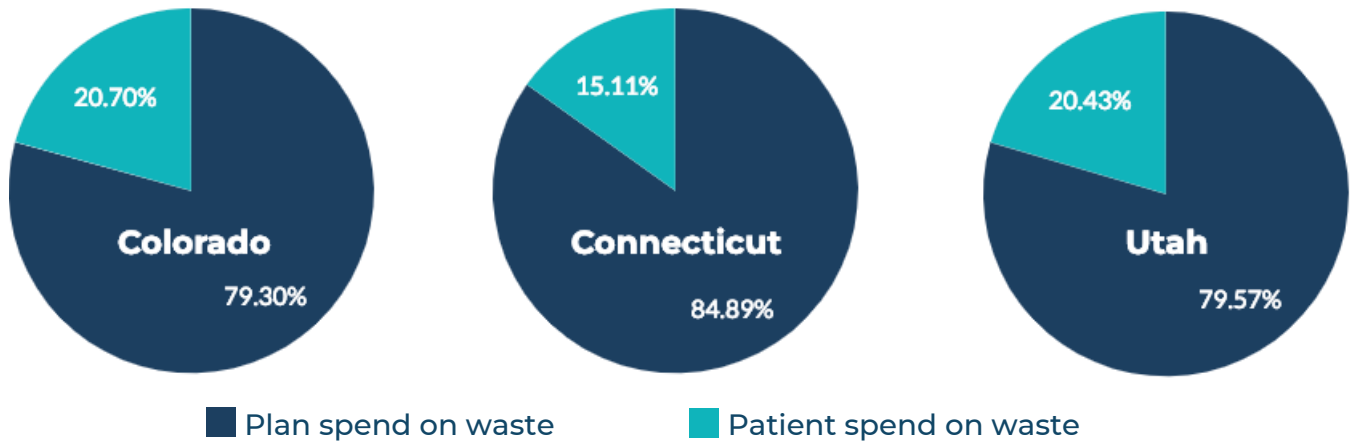
	Patient Waste Spend (in thousands \$)	Plan Waste Spend (in thousands \$)	Total Waste Spend (in thousands \$)	Total PMPM	Waste as % of Total Health Spending
Colorado	\$35,530	\$136,080	\$171,610	\$10.73	2.10%
Connecticut	\$24,466	\$137,456	\$161,922	\$9.45	1.93%
Utah	\$34,370	\$133,832	\$168,202	\$10.14	2.66%
Wisconsin*	N/A	N/A	\$129,197	\$9.77	2.36%
Total	\$94,366	\$536,565	\$630,931	\$10.02	2.22%

*Notes: Percent total health spending is Total Waste Spend divided by Total Health Dollars (waste + non-waste) in commercial. \*Wisconsin estimated total spending based on standard pricing for commercial plans.*

## Commercial Plans' Spending on 48 Low-Value Services by Patients and Plans in 2019

Figure 2 shows how the total LVC spend was distributed into plan and patient out-of-pocket spending for the three states that provided this information. Patient out-of-pocket costs contributed substantially to total LVC expenditures, ranging from 15.11% to 20.70%.

Figure 2. Distribution of Plan and Patient Spending on 48 LVC Services



Notes: These figures only represent Colorado, Connecticut, and Utah. Wisconsin did not separately report patient and plan spending.

## Spending on "Top 10" Commercial Low-Value Services by Volume in 2019

For each of the four states, the ten most frequently provided LVC services by volume in the commercial sector were identified, and related spending was calculated (Table 3).

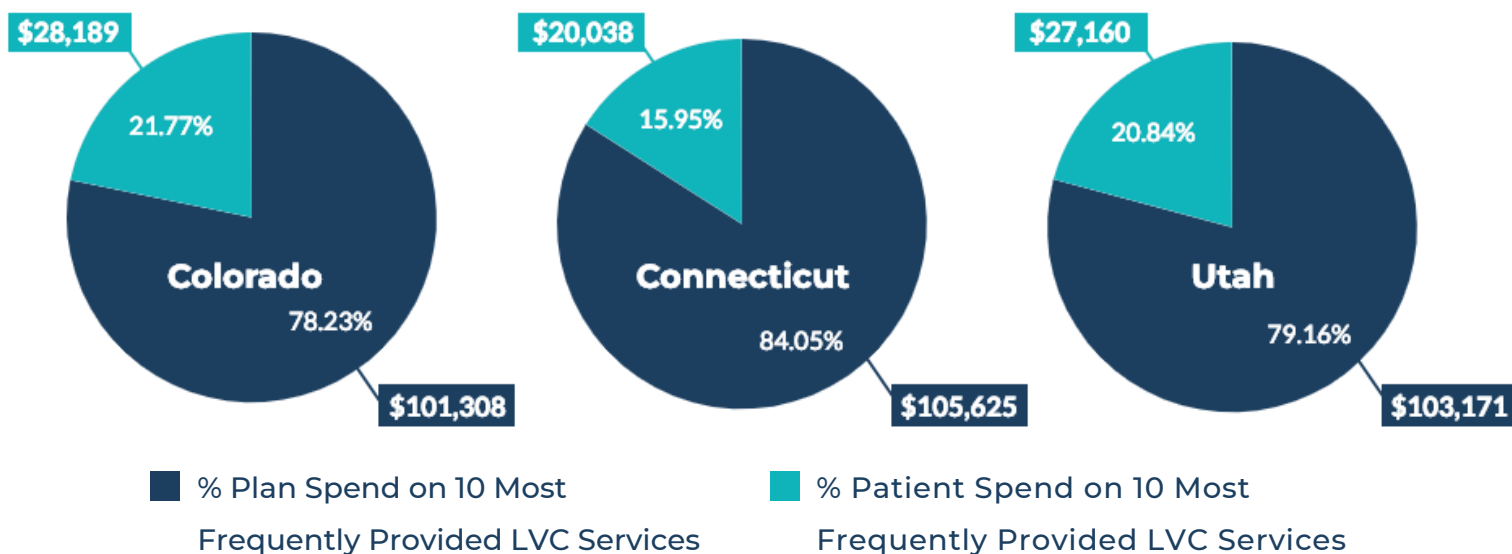
Table 3. Low-Value Spending on Top 10 Services by Volume, 2019

	Total Spend on "Top 10" LVC Services (in thousands \$)	PMPM	$\frac{\text{"Top 10" LVC Services, \$}}{\text{Spend on 48 LVC Services, \$}} = \%$
Colorado	\$129,497	\$8.09	75%
Connecticut	\$125,664	\$7.33	78%
Utah	\$130,332	\$5.49	77%
Wisconsin*	\$104,980	\$7.93	81%
Total	\$490,472	\$7.79	78%

Notes: PMPM = total spending on the top 10 services divided by total member months provided by states in 2019. These data only include commercial spending. \*Wisconsin estimated total spending based on standard pricing for Commercial plans.

In all states, the 10 most frequently provided low-value services accounted for nearly three-quarters of LVC spending identified in this analysis (range 74-81%). Appendix 4 lists the specific top 10 low-value services by volume for each state in 2019. There was significant overlap of the top 10 low-value services in these states, including annual resting EKGs, preoperative baseline laboratory studies, PSA (prostate specific antigen), cervical cancer screening in women, 25-OH-Vitamin D deficiency, opiates in acute disabling low-back pain, routine general health checks, and imaging tests for eye disease. The PMPM spend on the top 10 ranged from \$7.33-\$8.09. Patients paid a substantial portion (range 15.95-21.77%) of total LVC spend out-of-pocket for the top 10 most frequently provided LVC services (Figure 3).

*Figure 3. Plan and Patient Spending on Top 10 Most Frequently Provided LVC Services*



*Notes: Spending in thousands \$. These figures represent only Colorado, Connecticut, and Utah; Wisconsin did not separately report patient and plan spending.*

## Commercial Spending on Low-Value Services with Waste Index >80% in 2019

Commercial plan spending on services with a waste index greater than 80% was measured. To ensure the results are relevant, we removed any high-waste index services that were provided in a state less than 50 times in 2019. For example, Table 4 illustrates the services with a waste index greater than 80% in Connecticut. Appendix 5 includes the high-waste index services used over 50 times for all four states.

**Table 4. Connecticut Services Measured with Waste Index >80%, N>50**

Notes: \*indicates services that also appear on the states' top 10 list of low-value services by volume. Waste index is measured by dividing the total number of "wasteful" and "likely wasteful" services by the total number of those services provided. These data include commercial data only.

Service	Waste Index
Routine General Health Checks	100%
Cough and Cold Medicines in Children <4 years	100%
Diagnostics Chronic Urticaria	100%
Arthroscopic Lavage and Debridement for Knee OA	100%
Renal Artery Revascularization	99%
Antibiotics for Adenoviral Conjunctivitis	92%
Vertebroplasty	89%
Opiates in Acute Disabling Low Back Pain*	89%
PICC stage III–V CKD	84%
Preoperative Baseline Laboratory Studies*	84%
NSAIDs for Hypertension, Heart Failure or CKD*	83%
PSA*	82%

The amount the four states paid for services (N>50) with a waste index >80% is displayed in Table 5. Each state spent between \$4.28 and \$5.23 PMPM (average \$4.74) on services that were almost always low-value. Similar to our previous work, about half of the LVC measured in commercial plans (~\$300M) can be attributed to frequently used services that are almost always low-value.

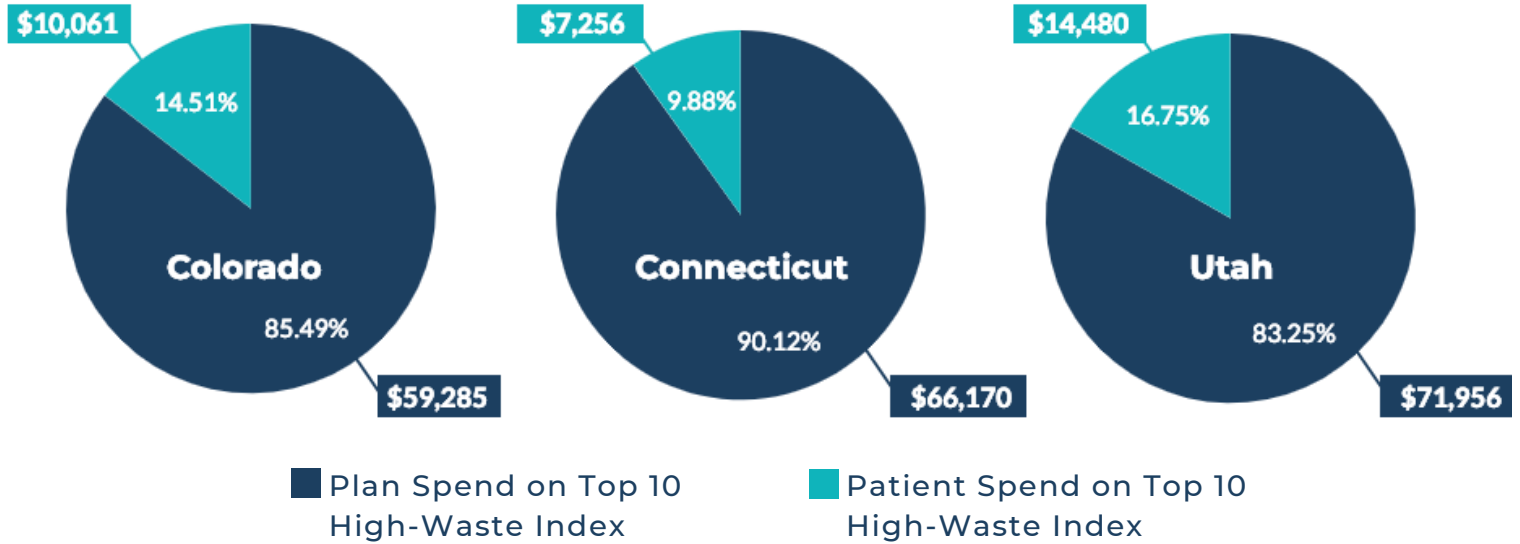
**Table 5. Total Spending on High-Waste Index Services in 2019, N>50**

	Spending on High-Waste Index Services (in thousands \$)	Total Spending PMPM	$\frac{\text{High-Waste Index Services, \$}}{\text{Spend on 48 LVC Services, \$}} = \%$
Colorado	\$69,347	\$4.34	40%
Connecticut	\$73,426	\$4.28	45%
Utah	\$86,436	\$5.21	51%
Wisconsin*	\$69,113	\$5.23	53%
TOTAL	\$298,322	\$4.74	47%

Notes: Includes services with >50 uses per state. Total spending = plan + patient spending on LVC in commercial plans. Waste index means the number of wasteful services provided divided by the total number of those services provided. PMPM = total spending divided by total member months. % waste spending = total spending on only high-waste index services divided by total waste spending in Commercial for that state. \*Wisconsin estimated total spending based on standard pricing.

Notably, a substantial portion of spending on high-waste index, low-value services was paid out-of-pocket by patients.

Figure 4. Plan and Patient Spend on Top 10 High-Waste Index Services



Notes: Spending in thousands \$. These figures only represent Colorado, Connecticut, and Utah. Wisconsin did not separately report patient and plan spending.

In addition, we identified certain services that were not only high-waste index, but also high-spend. Table 6 highlights services with greater than 80% waste index and greater than \$1 million total spend, in at least 3 of the 4 states.

Table 6. Services That Are Both High-Spend And High-Waste Index, N>50

Routine General Health Checks
Opiates in Acute Disabling Low Back Pain
PSA
Preoperative Baseline Laboratory Studies
PICC Line in Stage III-V CKD Patients



# DISCUSSION

The aim of this study was to expand on state specific LVC research by quantifying LVC spending, along with proportions paid by patients. The current analysis examined APCDs in 2019 across four states using available commercial data. In total, commercial payers spent over \$630 million in the one year period on the 48 pre-specified low-value services. There was variation in the proportion of total health care spending on the low-value services (range 1.93-2.66%).

As was the case in our previous work, a select number of services in these analyses accounted for a large portion of total waste spending. In this analysis, we found that the top 10 services by volume account for nearly three-quarters of LVC spending. We also found that there was significant overlap in the top 10 services; 8 of the 10 were the same across all four states. Together, these produced an average per member per month cost of \$7.79 (range \$5.49- \$8.09). Low-value care spending may be efficiently reduced in commercial spending by focusing on these services.

Special attention could focus on those services that were identified as both

high-volume and high-waste index – therefore, both commonly provided and commonly low-value. Similar to our previous analysis, we found that several services were both high-waste index and high-spend across the four states we examined. Table 6 highlights these services that had a waste index of 80% or higher and a high absolute spend approaching or exceeding \$1 million dollars. Though not adjusted for population, these findings again point to services that could be well-suited for intervention. It is worth noting that many of the services identified in Table 6 fall into the category of “Screening Tests.” Services identified in this category, like PSA tests, are more likely to be associated with subsequent cascades of wasteful or unnecessary services for patients – further compounding the total waste created by these services that may not be captured here.

Patients paid for a substantial portion of total waste spending in the three states for which we could breakdown plan and patient spending. People in commercial plans paid between 15.11% and 20.7% on the 48 LVC services in these three states, totaling \$94.4M in spending. In Colorado and

## DISCUSSION CONT.

Utah, specifically, patients paid out-of-pocket for one-fifth of the total waste spending in commercial markets. For high-volume services, patients paid a similar portion – 15.95%-21.77% of commercial spending on these services in their states. For services that had the highest waste index, we found that the proportion of patient spending was slightly less, though still a significant percentage (range 9.88% - 16.75%). In addition to the negative clinical effects associated with a higher receipt of LVC by underserved populations, low-income and minority patients are particularly vulnerable to financial harm from unnecessary care.

# LIMITATIONS

The most notable limitations of this analysis relate to the fact that population demographics, disease burden, and clinical practice patterns differ among states. These expected and important differences limit the ability to make true ‘apples to apples’ comparisons among states, even when comparing the same low-value services in the same time period.

In addition, the aggregate cost to states (and all health care purchasers) of low-value care is invariably greater than the reported spending estimates on the specified services. First, the 48 services measured in Colorado, Connecticut, Utah, and Wisconsin represent only a small sample of health care services with the potential to be low-value; the full scope of spending on care that is not clinically indicated would be much higher but impossible to identify and measure using currently existing tools. Second, classifying a service as low-value relies on the accuracy of the measurement tool. Third, while reasonably comprehensive and representative of the majority of claims for the majority of people in the state, most APCDs do not include all payers or people (e.g., data from the uninsured, self-insured employers, and some federal programs, such as the Department of Veterans Affairs, may not be included, which would understate results).

Finally, costs measured in this analysis do not capture the potential downstream care that was a direct result of the original low-value service (e.g., a prostate biopsy following a false positive on an unnecessary PSA). [\(16\)](#) Recent studies have attempted to estimate the costs of these care cascades as a result of low-value care, such as pre-operative tests before cataract surgeries. [\(17\)](#) These studies indicate that when care cascades occur from low-value pre-operative testing, even if rare, they may compound the costs of the original unnecessary service by as much as 10-fold.

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## Additional limitations of these analyses include:

- Although the analysis above focuses on commercial only, states reported slightly different data (e.g., Wisconsin used standard costs to estimate spending).
- The data in each of the four APCDs represent a different percentage of the total population in that state (e.g., commercial data may not include the full scope of self-employed data in that state).
- Comparisons of spending by payer type will be potentially skewed by the selection of LVC measures and payment rates, rather than by how efficient that payer type is.
- For some claims there were insufficient patient history data for the HWC to adequately assess whether a service was “Wasteful” or “Likely Wasteful” or “Necessary” – which could have varied effects on the amount of reported waste.
- Some services determined as wasteful might be clinically appropriate based on information not included on a claim.
- Out-of-pocket estimates do not include time wasted receiving unnecessary care (i.e., opportunity cost), out-of-pocket spending on downstream unnecessary services, lost productivity, or potential mental health harm (e.g., worry) as a result of time away to seek care or the impacts of harmful care, all of which would add significantly to both the patients’ and purchasers’ total cost of low-value care.
- Other data omissions are likely. Pharmacy claims, for example, could include the insurer’s allowed cost for the drug and patient out-of-pocket costs, but they may not include the pharmacy dispensing fee, and would be marginally understated.

# MOVING FORWARD

Low-value care imparts a substantial physical, emotional, and economic toll on consumers and health care payers. The identification, measurement, and reduction of specific low-value services represent a rare opportunity for states to improve individual and population health, enhance equity, and reduce medical expenditures. While some low-value care services may be perceived as relatively innocuous (e.g., a complete blood count for a healthy person before a low-risk surgery), some instances of low-value care are associated with cascading iatrogenic harm to patients (e.g. unnecessary colonoscopy resulting in a perforated colon), in addition to significant financial risk.

The immediate future of actions and policies to reduce low-value care may lie in multi-dimensional implementation models that involve deep (often regional) collaboration between providers, payers, and patients/consumers – potentially leveraging datasets, such as those found in state-based APCDs. These partnerships will allow for robust priority-setting and a community-driven philosophy of change, which may lead to more sustainable cultural changes, in addition to aligned financial incentives to drive higher value for everyone.

The future of actions and policies to reduce low-value care may lie in multi-dimensional implementation models that involve deep collaboration between providers, payers, and patients/consumers

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# APPENDICES

## Appendix 1 – Services included in the HWC V7.1

### Common Treatments

Antibiotics for Adenoviral Conjunctivitis  
Oral Antibiotics for Uncomplicated Acute TTO  
Cough and Cold Medicines in Children <4 Years  
Antibiotics for Acute Upper Respiratory and Ear Infections  
Opiates in Acute Disabling Low Back Pain

### Diagnostic Testing

Lower Back Pain Image  
Headache Image  
Syncope Image  
Immunoglobulin G / Immunoglobulin E Testing  
Diagnostics Chronic Urticaria  
Electroencephalography (EEG) for Headaches  
Imaging of the Carotid Arteries for Simple Syncope  
CT Head/Brain for Sudden Hearing Loss  
Imaging for Uncomplicated Acute Rhinosinusitis  
Coronary Artery Calcium Scoring for Known CAD  
ED CT Scans for Dizziness  
Sperm Function Testing  
Postcoital Test for Infertility  
Repeat CT for Kidney Stones  
Imaging Tests for Eye Disease  
Voiding Cystourethrogram for Urinary Tract Infection  
Pediatric Head Computed Tomography Scans  
Cardiac Stress Testing  
Bleeding Time Testing

### Disease Approach

NSAIDs for Hypertension, Heart Failure or CKD  
Inductions of Labor or Cesarean Deliveries  
Arthroscopic Lavage and Debridement for Knee OA  
Antidepressants Monotherapy in Bipolar Disorder  
CT Scans for Abdominal Pain in Children  
Renal Artery Revascularization  
Vertebroplasty  
PICC Stage III-V CKD Patients  
Multiple Palliative Radiation Treatments in Bone Metastases  
Two or More Antipsychotic Medications  
Vision Therapy for Patients with Dyslexia

### Preoperative Evaluation

Preoperative Baseline Laboratory Studies  
Preop Cardiac Echocardiography or Stress Testing  
Preoperative EKG, Chest X-Ray and PFT  
PFT Prior to Cardiac Surgery  
MRI for Rheumatoid Arthritis

### Screening Tests

Prostate Specific Antigen Screening (PSA)  
Colorectal Cancer Screening in Adults 50 Years and Older  
Dexa Scan  
Annual Resting EKGs  
25-OH-Vitamin D Deficiency  
Coronary Angiography  
Cervical Cancer Screening in Women  
Routine General Health Checks for Asymptomatic Adults

*Notes: Each table is in order of volume*

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## *Appendix 2 - Methodology for Counting Costs in the Health Waste Calculator*

The Health Waste Calculator includes two methodologies for counting wasteful costs – “case rate” and “Line Itemization”. In this report, we have only included estimates associated with the "case rate" method. The case rate cost counting methodology counts costs from all claim IDs where at least one line has a Waste Cost Count (WCC) Flag value of ‘Yes’ in the Health Waste Calculator (i.e., any part of a claim is wasteful). By contrast, the Line Itemization methodology counts costs from only the claim lines where the Waste Cost Count Flag value is Yes, and likely underestimates wasteful spending.

The Calculator offers two ways to count costs for a number of reasons related to the nuance of claims reimbursement:

- As services occur at a mix of settings (inpatient, outpatient, systems and independent clinics, etc.) and under varying contract considerations, assigning claim cost at the line level is challenging. For example, if an outpatient service is paid as an APC and only part of it is wasteful, this is difficult to decipher with raw claim data.
- Some claims have inconsistent cost assignment resulting in \$0 claim lines. In this case, counting costs from only the claim lines with a WCC Flag value of Yes will grossly underestimate cost and opportunity.
- In some cases, counting only the cost of the service in question will miss harmful associated iatrogenic effects of wasteful care decisions.

The tables below compare spending estimates between the "case rate" method and a “blended” method that uses both the "line itemization” method for some services and “case rate” method for other services. The blended method attempts to assign case rate or line itemization based on what could be most appropriate for each service in terms of over-estimating costs. The decision to use line itemization or case rate for any given service is not an exact science. Appendix 3 shows case rate only and blended for 2019.



### Appendix 3

Commercial Only, 2019		
	Case	Blend
Colorado	\$171,610,000	\$59,525,000
Connecticut	\$161,922,000	\$51,766,000
Utah	\$168,202,000	\$46,315,000
Wisconsin	\$129,197,000	\$29,813,000
TOTAL	\$630,931,000	\$187,419,000

### Appendix 4 - Member Months and Total Health Care Spending Reported by Each APCD in 2019

	Total Health Care Spending	Total Member Months	Total PMPM
Colorado	\$8,181,330,000	15,990,114	\$511.65
Connecticut	\$8,408,171,000	17,142,734	\$490.48
Utah	\$6,333,038,000	16,590,439	\$381.79
Wisconsin	\$5,476,279,000	13,223,025	\$414.15

Notes: 2019 Commercial spending only

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## Appendix 5 – Commercial Top 10 Services by Volume for Each State in 2019

### COLORADO

1. Annual Resting EKGs
2. Antibiotics for Acute Upper Respiratory and Ear Infections
3. Preoperative Baseline Laboratory Studies
4. PSA
5. Cervical Cancer Screening in Women
6. 25-OH-Vitamin D Deficiency
7. Opiates in Acute Disabling Low Back Pain
8. Routine General Health Checks
9. Imaging Tests for Eye Disease
10. Lower Back Pain Image

### CONNECTICUT

1. Annual Resting EKGs
2. Preoperative Baseline Laboratory Studies
3. PSA
4. Cervical Cancer Screening in Women
5. 25-OH-Vitamin D Deficiency
6. Opiates in Acute Disabling Low Back Pain
7. Routine General Health Checks
8. Imaging Tests for Eye Disease
9. NSAIDs for Hypertension, Heart Failure or CKD
10. Preoperative EKG, Chest X-ray and PFT

### UTAH

1. Annual Resting EKGs
2. Preoperative Baseline Laboratory Studies
3. Antibiotics for Acute Upper Respiratory and Ear Infection
4. PSA
5. Opiates in Acute Disabling Low Back Pain
6. Cervical Cancer Screening in Women
7. 25-OH-Vitamin D Deficiency
8. Routine General Health Checks
9. Imaging Tests for Eye Disease
10. Lower Back Pain Image

### WISCONSIN

1. Annual Resting EKGs
2. Preoperative Baseline Laboratory Studies
3. Antibiotics for Upper Respiratory and Ear Infections
4. PSA
5. Imaging Tests for Eye Disease
6. Opiates in Acute Disabling Low Back Pain
7. 25-OH-Vitamin D Deficiency
8. Routine General Health Checks
9. Cervical Cancer Screening in Women
10. Lower Back Pain Image

**Appendix 6 - Commercial High-Waste Index Services >80% for All States, With N>50, 2019 Only**

**CONNECTICUT**

Service	Waste Index
Routine General Health Checks*	100%
Cough and Cold Medicines in Children <4 Years	100%
Diagnostic Chronic Urticaria	100%
Arthroscopic Lavage and Debridement for Knee OA	100%
Renal Artery Revascularization	99%
Antibiotics for Adenoviral Conjunctivitis	92%
Vertebroplasty	89%
Opiates in Acute Disabling Low Back Pain*	89%
PICC Stage III-V CKD	84%
Preoperative Baseline Laboratory Studies*	84%
NSAIDs for hypertension, heart failure, or CKD*	83%
PSA*	82%

**COLORADO**

Service	Waste Index
Routine General Health Checks*	100%
Cough and Cold Medicines in Children <4 Years	100%
Arthroscopic Lavage and Debridement for Knee OA	100%
Diagnostics Chronic Urticaria	100%
Renal Artery Revascularization	100%
Antibiotics for Acute Upper Respiratory and Ear Infections*	100%
Antibiotics for Adenoviral Conjunctivitis	91%
Opiates in Acute Disabling Low Back Pain*	91%
PSA*	89%
Preoperative Baseline Laboratory Studies*	86%
PICC Stage III-V CKD	83%
CT Head/Brain for Sudden Hearing Loss	81%

**WISCONSIN**

Service	Waste Index
Routine General Health Checks	100%
Cough and Cold Medicines in Children <4 Years	100%
Diagnostic Chronic Urticaria	100%
Antibiotics for Acute Upper Respiratory and Ear Infections	100%
PICC Stage III-V CKD	97%
Opiates in Acute Disabling Low Back Pain*	92%
PSA*	90%
Antibiotics for Adenoviral Conjunctivitis	90%
Preoperative Baseline Laboratory Studies*	87%
Pediatric Head Computed Tomography Scans	83%

**UTAH**

Service	Waste Index
Routine General Health Checks*	100%
Cough and Cold Medicines in Children <4 years	100%
Arthroscopic Lavage and Debridement for Knee OA	100%
Diagnostics Chronic Urticaria	100%
Postcoital Test for Infertility	100%
Renal Artery Revascularization	100%
Antibiotics for Acute Upper Respiratory and Ear Infections*	100%
Opiates in Acute Disabling Low Back Pain*	93%
PICC Stage III-V CKD	91%
PSA*	90%
Antibiotics for Adenoviral Conjunctivitis	89%
NSAIDs for Hypertension, Heart Failure, or CKD	88%
Pediatric Head Computed Tomography Scans	88%
Syncope Image	87%
Preoperative Baseline Laboratory Studies*	84%

*Notes: \*indicates services that also appear on the states' top 10 list of low-value service by volume. Waste index is measured by dividing the total number of "wasteful" and "likely wasteful" services by the total number of those services provided. These data include commercial data only.*

## Appendix 7 - Top 10 Waste Services by Spending in Each State

### CONNECTICUT

Service	Total Waste Spend
Preoperative Baseline Laboratory Studies	\$41,205,000
Annual Resting EKGs	\$37,394,000
Imaging Tests for Eye Disease	\$10,264,000
PICC Stage III-V CKD	\$9,765,000
Cervical Cancer Screening in Women	\$8,645,000
PSA	\$7,454,000
25-OH-Vitamin D Deficiency	\$7,203,000
Routine General Health Checks	\$6,089,000
Opiates in Acute Disabling Low Back Pain	\$4,414,000
Headache Image	\$3,839,000
<b>Total</b>	<b>\$136,272,000</b>

### COLORADO

Service	Total Waste Spend
Routine General Health Checks	\$48,543,000
Annual Resting EKGs	\$47,526,000
Imaging Tests for Eye Disease	\$8,096,000
Headache Image	\$7,350,000
PICC Stage III-V CKD	\$5,857,000
25-OH-Vitamin D Deficiency	\$5,715,000
Coronary Angiography	\$5,048,000
PSA	\$4,358,000
Pediatric Head Computed Tomography Scans	\$4,333,000
Routine General Health Checks	\$4,141,000
<b>Total</b>	<b>\$140,967,000</b>

### WISCONSIN

Service	Total Waste Spend
Preoperative Baseline Laboratory Studies	\$47,305,000
Annual Resting EKGs	\$23,198,000
Imaging Tests for Eye Disease	\$13,717,000
PICC Stage III-V CKD	\$6,685,000
PSA	\$5,837,000
25-OH-Vitamin D Deficiency	\$3,732,000
Routine General Health Checks	\$2,910,000
Coronary Angiography	\$2,831,000
Opiates in Acute Disabling Low Back Pain	\$2,705,000
Cervical Cancer Screening in Women	\$2,697,000
<b>Total</b>	<b>\$111,617,000</b>

### UTAH

Service	Total Waste Spend
Preoperative Baseline Laboratory Studies	\$61,768,000
Annual Resting EKGs	\$39,321,000
Imaging Tests for Eye Disease	\$9,004,000
Headache Image	\$6,259,000
Pediatric Head Computed Tomography Scans	\$5,477,000
PSA	\$5,177,000
Preoperative EKG, Chest X-ray, and PFT	\$4,657,000
PICC Stage III-V CKD	\$4,633,000
CT Scans for Abdominal Pain in Children	\$4,192,000
25-OH-Vitamin D Deficiency	\$3,590,000
<b>Total</b>	<b>\$144,078,000</b>