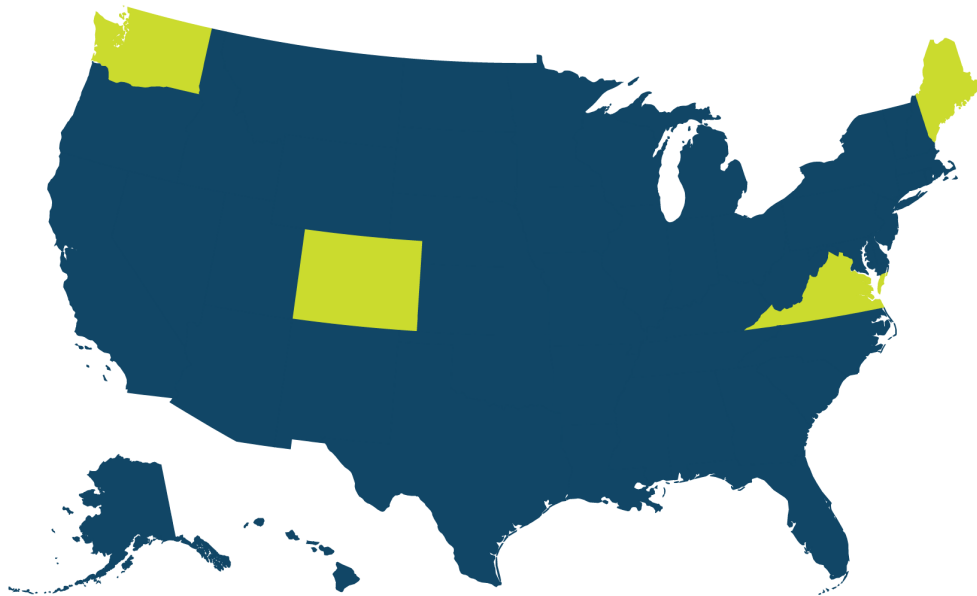


Utilization and Spending on Low-Value Medical Care Across Four States



VBIDHEALTH

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Acknowledgments

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About V-BID Health:

Value Based Insurance Design Health specializes in designing and promoting health benefit plans and payment strategies that get more health out of every healthcare dollar spent. VBID Health provides streamlined, value-based insurance design consulting services to facilitate creation and adoption of VBID plans and payment policies that increase patient, employee, and enrollee health. VBID Health facilitates the Task Force on Low-Value Care, 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 and thereby reduce pressure on payers and consumers. For more information, visit vbidhealth.com.



TABLE OF CONTENTS

01	EXECUTIVE SUMMARY
02	INTRODUCTION
07	METHODS
10	RESULTS
17	DISCUSSION
20	LIMITATIONS
22	MOVING FORWARD
24	REFERENCES
25	APPENDICES

EXECUTIVE SUMMARY

National estimates of low-value care (LVC) spending in the United States range from \$100 Billion to \$450 Billion annually. LVC is defined as patient care that offers no net benefit in specific clinical scenarios, which can lead to patient harm and unnecessary spending. For public and private purchasers to better target efforts to reduce these unnecessary expenditures, information from all payer claims databases (APCDs) from four states – Virginia, Washington, Colorado, and Maine – was used to quantify the utilization and spending on 47 specific low-value services over a three-year period. When data were available, LVC spending was calculated by payer type and broken down into plan payment and beneficiary out-of-pocket spending.

From 2015 to 2017, commercial payers and Medicaid plans in the four states paid \$2.7 Billion on the 47 low-value services measured.

There was no significant decline in aggregate LVC spending on these services over the three-year period, although many were previously identified as likely unnecessary by physician-led initiatives such as the *Choosing Wisely*® campaign. Each year, payers and patients spent nearly \$900 Million on the selected LVC services, of which approximately \$90 Million was directly paid by patients.

Total spending on specified LVC services varied across states and by payer type. 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 and lower health care costs.

Each year, payers and patients spend about \$900 MILLION on the selected LVC services, of which about \$90 MILLION was directly paid by patients.

INTRODUCTION

LOW-VALUE CARE (LVC), or patient medical care that offers no net benefit in specific clinical scenarios, can lead to patient harm and unnecessary unnecessary spending. The undesirable results of LVC utilization may include physical, emotional, and financial harm to patients. Improving the efficiency of health care delivery necessitates a strategic response to reduce the utilization of LVC services. To support this goal, multi-stakeholder initiatives, such as the American Board of Internal Medicine Foundation's *Choosing Wisely*® campaign, identify specific services that should not be delivered in certain clinical situations. (1) The *Choosing Wisely*® campaign includes some 500 recommendations chosen by clinicians from over 50 specialty societies, highlighting the scope of LVC.

Health care waste from a variety of sources is estimated in the hundreds of billions of dollars annually in the United States. Specifically, spending projections on LVC range from approximately \$100 to \$450 Billion per year, a significant portion of the total estimated waste. (2, 3, 4, 5)

Given the sheer magnitude of this problem, LVC mitigation represents an important opportunity through which

states and health care stakeholders can simultaneously improve population health and address ongoing fiscal challenges.

State government officials and constituents from across the health care sector are increasingly attracted to the possibility of improving patient-reported outcomes and slowing the rate of medical spending growth. These efforts can be guided by measuring the frequency of use, and calculating spending on specific low-value services. A targeted approach can motivate collaborative efforts, as exemplified by the ongoing multi-stakeholder “Smarter Care Virginia” initiative, the goal of which is to reduce LVC overuse across the Commonwealth. (6)

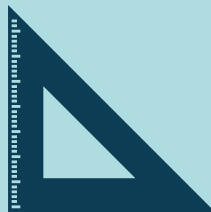
Low-Value Care is defined as patient medical care that offers no net benefit in specific clinical scenarios, which can lead to patient harm and unnecessary spending.

PROJECT AIM

The specific aim of this analysis was to quantify the utilization and spending on pre-specified low-value care services using all payer claims databases (APCDs) in four states: Virginia, Washington, Colorado, and Maine. LVC was quantified by analyzing 47 clinical services deemed as low-value by sources such as the United States Preventive Services Task Force (USPSTF) and the *Choosing Wisely*® campaign (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)



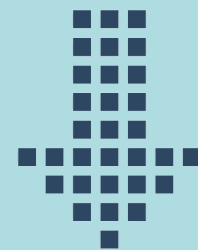
IDENTIFY



MEASURE



REPORT



REDUCE

MOTIVATION

As increasing health care spending imparts significant budgetary pressure, states are highly motivated and uniquely positioned to act on low-value care. (8) However, numerous barriers inhibit states from implementing wide-ranging policies to directly measure low-value care. The development of All Payer Claims Databases (APCD) and complementary analytic tools has established a productive environment to move this agenda forward and overcome barriers with data.

APCDs are large-scale databases that systematically collect health insurance claims data from a variety of payer and purchaser sources, that typically include claims from most health care providers. APCDs may be either state-mandated through legislation (e.g., Colorado, Maine and Virginia) or voluntarily developed and maintained through collaboration with data submitters (e.g., Washington). The comprehensiveness of APCDs and broad analytic opportunities enable state governments and additional organizations focused on health care improvement the ability to enact an aggressive agenda to measure, report, and reduce low-value care. For example, the Washington Health Alliance APCD - in existence since 2007 - has over ten years of data, and 35 data submitters (including payers and self-funded purchasers).

By assembling claims from multiple public and private payers and self-funded purchasers, APCD outputs can be paired with new analytic tools (e.g., the HWC) designed to differentiate claims into clinically indicated and low-value categories. Until recently, analytic 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 50 years) and not in others (e.g., colonoscopy for average risk person below 40 years). We must recognize that incorporating this 'clinical nuance' is an important challenge when measuring low-value care or designing tools to reduce its provision. (10) This is particularly true given the strong preference for purchasers to not disrupt the clinician-patient relationship, as well as the need for providers to trust and accept the analytic findings as credible.

Another factor contributing to a lack of broad LVC policy strategies is a deficiency of research that would assist states and other organizations in identifying low-value clinical services that are accurately measured and amenable to interventions aimed at reducing their use. Most of the published LVC studies evaluate small-scale initiatives designed to reduce a single medical service in a particular clinical circumstance. (9) Thus, for these and other reasons, public and private purchasers have been slow to initiate measurement programs, particularly given the dearth of evidence establishing which intervention strategies deliver the greatest LVC reduction with the lowest administrative burden.

To date, a small number of APCDs have used their data to quantify the magnitude of low-value care spending by tracking a small fraction of potentially wasteful services.

Examples include:



In **Washington**, the Washington Health Alliance analyzed 9.5 million services across 47 measures in the Health Waste Calculator for a four-year period (2014-2017); **slightly more than one-half (51%) of the services were found to be low-value**, impacting an average of approximately 847,000 individuals per year at an estimated cost of **\$703 Million in wasted spending**. [\(11\)](#)



In **Virginia**, 44 low-value care services were delivered 1.7 million times in 2014 at a cost of **\$586 Million**. [\(12\)](#) A Health Affairs article reported that a majority of LVC spending was on low-cost services (<\$600), rather than higher-cost and highly visible services. For example, over \$20 million was expended on unnecessary vitamin D screenings that do not provide any clinical benefit. [\(12\)](#)



In **Colorado**, **\$385 Million** was spent on 48 low-value care services in 2017. The Center for Improving Value in Health Care recently published an analysis of the incidence and spending for low value services in Colorado, which identified thirteen services that accounted for 81% of total low value care spending. Eight of the thirteen services had the potential to impart substantial physical, financial and emotional harm to patients. [\(13\)](#)

Virginia and the Washington Health Alliance identified similar services that were top contributors to low-value care spending.¹ These “low-hanging fruit” include screening for Vitamin D deficiency, opioid medications for acute low back pain during the first four weeks of symptoms, antibiotics for upper respiratory and ear infections, and pre-operative testing for low-risk patients undergoing low-risk surgeries, among others. [\(14\)](#) Many of these services overlap with a “Top Five” list of services endorsed by the National Task Force on Low-Value Care. [\(15\)](#) These services selected by the Task Force were purposely designated for purchaser action, such that interventions to reduce their use could be easily implemented, and create minimal administrative requirements.

¹ Note: although this report standardizes data and methods much as possible across all sources, other publications by different states and organizations may have used different methods to count costs or filter out uncertainty. Therefore, results in different publications on low-value care for the same APCD or year may differ.

For a number of reasons 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 services measured above by Washington, Virginia, and Colorado 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. **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**, to the extent that payers and self-funded purchasers respond to higher overall spending with reductions in benefit generosity to reduce use (e.g. high deductibles), wasteful spending may indirectly induce actions that ultimately impede access to high quality care, new medicines, and necessary services.

Accordingly, to support efforts to measure and reduce spending on low-value care, this analysis updates the existing work in this area by quantifying and comparing LVC utilization and spending across multiple states, and expands this research by including payer type and, for the first time, measures consumer out-of-pocket expenditures on LVC for three states.

METHODS

The state-mandated APCDs of Virginia, Colorado, and Maine, and the Washington Health Alliance’s voluntary APCD² contributed available data for three calendar years 2015, 2016, and 2017. All four APCDs provided medical and pharmacy claims from commercially-insured and Medicaid enrollees to allow comparison. In addition, Colorado and Maine provided Medicare Fee-For-Service (FFS) and Medicare Advantage (MA) data; Virginia provided Medicare FFS only; Washington provided no Medicare data. Aggregate LVC spending in three states – Maine, Colorado, and Virginia – was quantified across all four payer sectors. In addition, LVC spending was allocated into plan payment and patient spending components by these same three states. Washington did not provide data that distinguished between LVC patient and plan spending. Table 1 summarizes the data available from each APCD.

Table 1. Claims Data Sources included in APCD, by State

	Commercial	Medicaid	Medicare FFS	Medicare Advantage	Patient and Plan Spending
<i>Maine</i>	X	X	X	X	X
<i>Washington</i>	X	X			
<i>Colorado</i>	X	X	X	X	X
<i>Virginia</i>	X	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. (7) The HWC is a proprietary, algorithm-based software program designed to differentiate whether the use of a specific service was clinically necessary, likely low-value, or low-value. 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 (see Appendix 1). Likely low-value and low-value claims as determined by the HWC were included in the LVC utilization and spending estimates. One measure in the HWC – use of two or more antipsychotic medications - was removed because a coding issue resulted in inaccurate waste assessments.

² The Health Waste Calculator results included in this analysis for Washington state were generated using the Washington Health Alliance’s APCD, a voluntary APCD in place since 2007. For more information regarding the Washington Health Alliance’s APCD: www.wahealthalliance.org.

Allowed costs – plan spending plus patient spending – used in the analyses were calculated for Colorado, Maine and Virginia 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 Health Waste Calculator. The HWC and case rate has been used previously to quantify low-value care spending using APCD data. (11) For Washington, allowed costs were based on a standard cost provided for each service that varied by sector (i.e. different standard costs were assigned to commercial and Medicaid payers). We multiplied the standard unit cost by the number of likely low-value or low-value services as identified by the HWC to calculate allowed cost. In the rare instances where claims were not able to be attributed to a specific payer by the HWC, these data were removed from the analysis.

The case rate methodology was chosen for simplicity, with a mixed effect on measurement specificity. On one hand, the HWC may underestimate the total cost impact, because it does not capture the clinical and financial impact of resultant care cascades – subsequent unnecessary services that result from an initial low-value care service or claim. (14)

However, care cascades are more prevalent and costlier for certain low-value services than others: a low-value diagnostic test, for example, could have incidental findings and unnecessary procedures, but unnecessary antibiotics may have fewer next-order low-value consequences. On the other hand, 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 less spending being flagged as low value when compared to the case methods. The overestimate that occurs in the case methods may offset, to some extent, the failure to capture the cost of care cascades. Appendix 2 provides more information on methods used to estimate LVC costs and the impact of this decision.

Further, some amount of low-value care reported by the HWC is “likely low-value,” meaning there is less certainty that the services reported as 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.

For example, in Washington in 2017, “likely low-value” care was reported in only 4% of uses 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 included in the low-value estimates.

A ‘waste index’ was also measured for each specific low-value service. Specifically, because the value of any service, in any particular instance, 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 delivered that it is low value. 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.³ In other words, the wasteful and likely wasteful N divided by the total N. For example, if a service was provided 100 times in a state in one year and 80 of them were deemed low-value, then the waste index would be 80%. 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 this analysis on services with a waste index greater than 80% to only services that were also provided greater than 50 times in 2017 to patients (i.e., N>50). A low N service, albeit commonly wasteful, may be of less interest to decisionmakers.

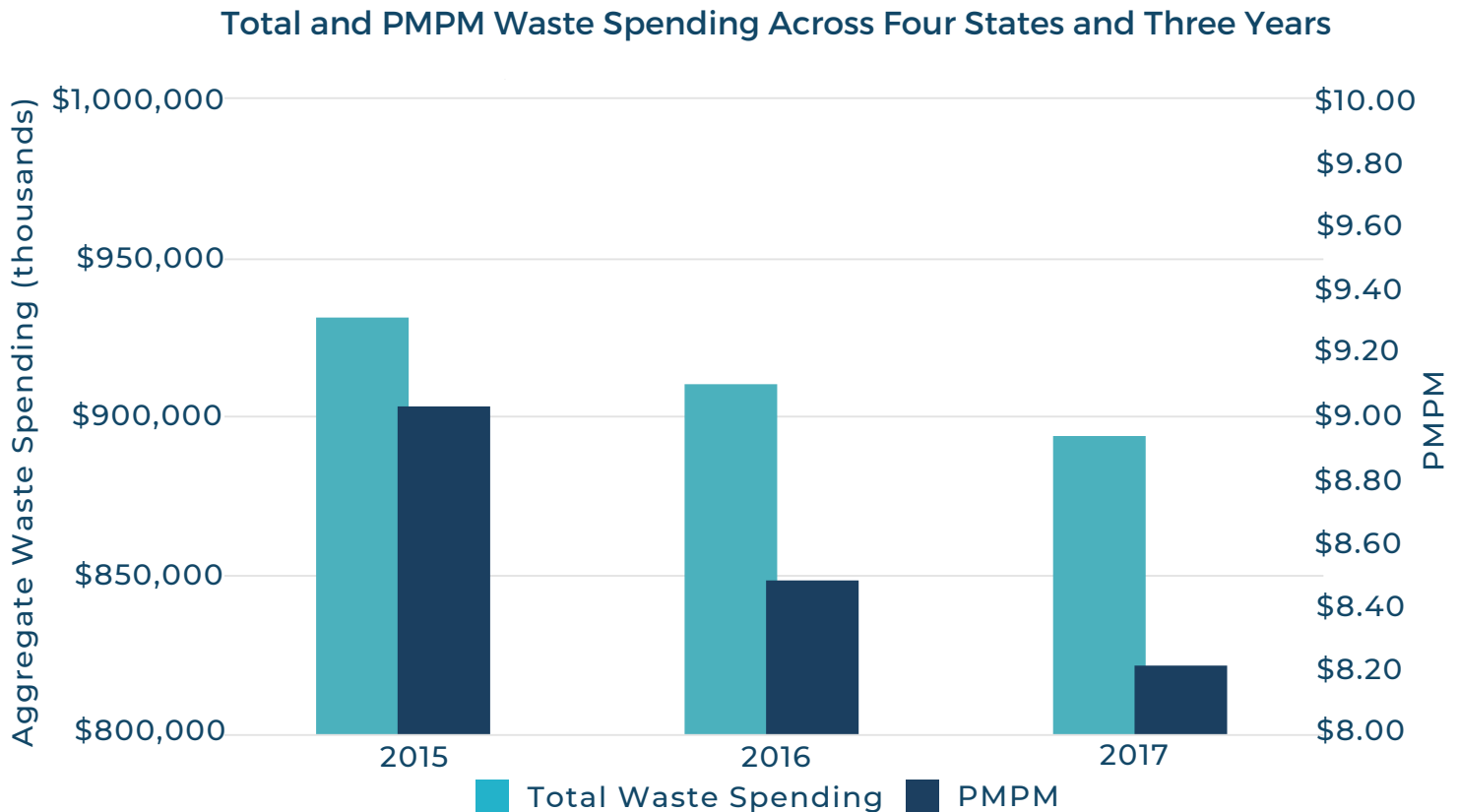
³ (# of likely low-value + # low-value) divided by (# of clinically necessary + # likely low-value + # low-value).

RESULTS

Total Spending on 47 Low-Value Services by Four States in Medicaid and Commercial Plans, 2015-2017

To allow a reasonable comparison across all of the four states, claims from commercially-insured and Medicaid enrollees were used in the initial analyses. Upon combining three years of data from the four states, it was determined that approximately \$2.7 Billion was spent on the 47 pre-specified low-value services in commercial plans and Medicaid between 2015 and 2017 (Figure 1). A small but not practically significant decrease in LVC spending occurred over the study period (PMPM \$9.04 in 2015 to \$8.22 in 2017).

Figure 1. Total and PMPM Medicaid and Commercial Spending Across Four States and Three Years



Notes: this figure shows total spending (sum of plan and patient spending) on the 47 low-value services for commercial and Medicaid only, across three years for all four states: Colorado, Maine, Virginia, Washington.

Spending on 47 Low-Value Services in Medicaid and Commercial Plans in 2017 by State

In 2017 alone, the four states spent \$895 Million combined on the 47 specific LVC measures in the commercial and Medicaid populations in 2017. (Table 2) This amount represented approximately 2% of all commercial and Medicaid spending in that year for the four states. The estimated proportion of total spending on LVC ranged from 1.59% in Virginia to 2.75% in Washington. The PMPM estimates of spending on LVC ranged from \$6.45 to \$10.82.

Table 2. Total Commercial and Medicaid Low-Value Care Spending by State Based on 47 Measures, in 2017 Only

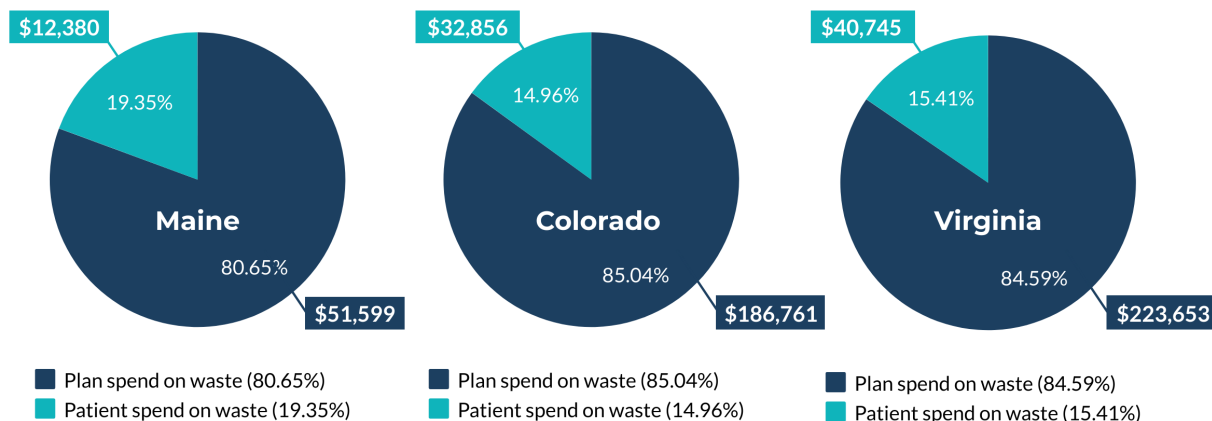
	Patient Waste Spend	Plan Waste Spend	Total Waste Spend	Total PMPM	% Total Health Spending
Maine	\$12,380	\$51,599	\$63,979	\$8.59	1.74%
Washington*	N/A	N/A	\$346,507	\$10.82	2.75%
Colorado	\$32,856	\$186,761	\$219,617	\$7.75	1.72%
Virginia	\$40,745	\$223,653	\$264,398	\$6.45	1.59%
TOTAL	\$85,982	\$808,520	\$894,502	\$8.22	1.96%

*Notes: spending is represented in thousands of dollars. This table compares 2017 waste spending on the 47 low-value services for commercial and Medicaid only. Percent total health spending is Total Waste Spend divided by Total Health Dollars (waste + non-waste) in Medicaid and Commercial. *Washington did not separately report patient and plan spending, and estimated total spending based on standard pricing for Medicaid and commercial plans.*

Spending on 47 Low-Value Services in Medicaid and Commercial Plans in 2017 by Patients and Plans

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 14.96% to 19.35% of expenditures on the 47 services.

Figure 2: Commercial and Medicaid LVC Spending, by Patient and Plan Spending, in 2017



Notes: spending in thousands \$. These figures only represent Maine, Colorado, and Virginia. Washington did not separately report patient and plan spending.

Table 3 demonstrates the utilization and spending on the specified LVC services for the four states by payer type. As expected, there was substantial variation between plans within individual states in both LVC use and spending. LVC use and spending also varied across states. The variation in Medicaid spending, and LVC in Medicaid may reflect many factors, including case mix within and across eligibility categories.

Table 3. Detailed LVC Spending and Utilization for Medicaid and Commercial, in 2017 Only

	Commercial			Medicaid		
	Total Waste Spending	Waste per 1000	PMPM	Total Waste Spending	Waste per 1000	PMPM
Maine	\$54,356	322	\$10.38	\$9,630	317	\$4.36
Washington*	\$272,382	376	\$11.68	\$74,125	629	\$8.52
Colorado	\$150,576	419	\$10.39	\$69,052	339	\$4.98
Virginia	\$219,343	477	\$6.16	\$45,055	106	\$3.11

Notes: spending is represented in thousands of dollars. Total waste spending includes both payer costs and member out-of-pocket. PMPM = total waste spending divided by total member months for that state (Appendix 3). Waste per 1000 = number of wasteful services provided per 1000 members in that sector. This table compares 2017 waste spending on the 47 low-value services for commercial and Medicaid only.

Spending on “Top 10” Commercial and Medicaid Low-Value Services by Volume in 2017

For each of the four states, the ten most frequently provided LVC services by volume in commercial and Medicaid sectors were identified and related spending calculated (Table 4).

Table 4. Low-Value Spending on Top 10 services by Volume, in 2017

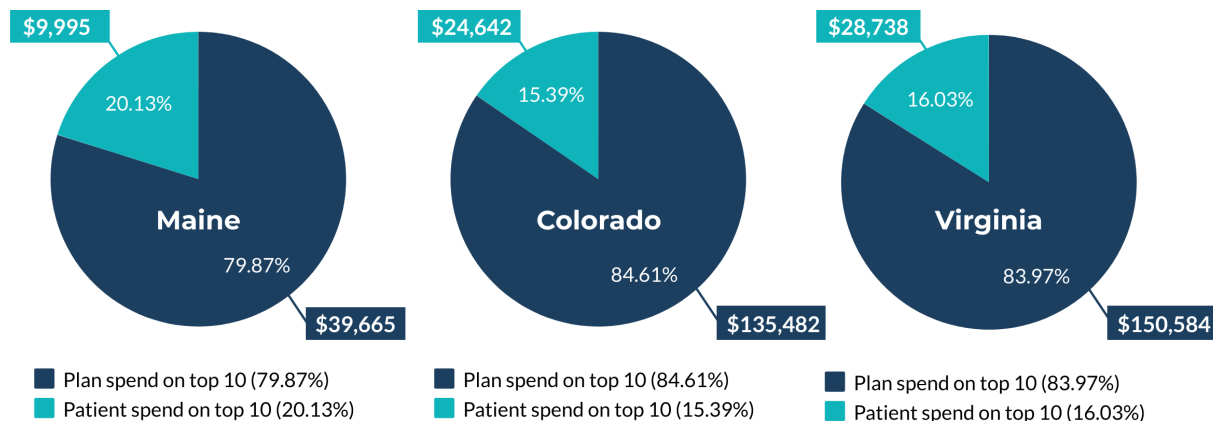
2017	Total Spend on "Top 10" LVC Services	PMPM	% Total Medicaid and Commercial Waste Spending
Maine	\$49,659	\$6.67	78%
Washington*	\$278,236	\$8.69	80%
Colorado	\$160,125	\$5.65	73%
Virginia	\$179,322	\$4.37	68%
Total	\$667,343	\$6.13	70%

*Notes: total spending in thousands \$. PMPM = total spending on the top 10 services divided by total member months (Appendix 3) provided by the states for 2017. These data only include Medicaid and commercial spending. *Washington did not separately report patient and plan spending, and estimated total spending based on standard pricing for Medicaid and commercial plans.*

In all states, the Top 10 low-value services accounted for at least two-thirds, of LVC spending identified in this analysis, (range 68-80%). Appendix 4 lists the specific Top 10 low-value services by volume for each state in 2017. There was overlap of the Top 10 low-value services across states, including: pre-operative baseline testing before low-risk surgery, opioids prescribed for acute low back pain, antibiotics for acute upper respiratory and ear infections, and Screening for Vitamin D deficiency. Patients paid a substantial proportion (range: 15.39%-20.13%) of total LVC spend out-of-pocket for the top 10 LVC services (Figure 3). The PMPM spend on the top 10 ranged \$4.37 - \$8.69 (average \$6.13).

In all states, the Top 10 low-value services accounted for **at least two-thirds** of LVC spending identified in this analysis.

Figure 3. Top 10 Low-Value Care Services by Volume, by Patient and Payer Spend, in 2017



Notes: spending in thousands \$. These figures only represent Maine, Colorado, and Virginia. Washington did not separately report patient and plan spending.

Commercial and Medicaid Spending on Low-Value Services with Waste Index >80%, in 2017

Medicaid and commercial plan spending on services with a waste index greater than 80% was measured. To ensure the results are relevant to decisionmakers, we removed any such high waste index services that were provided less than 50 times in 2017 in a state. (The waste index is calculated by dividing the total number of wasteful and likely wasteful services by the total number of those services provided.) For example, Table 5 illustrates the services with a waste index greater than 80%. Appendix 5 includes the high waste index services used over 50 times for all four states.

Table 5. Colorado Services Measured with Waste Index Greater Than 80%, N>50

Service	Waste Index
Routine General Health Checks (for Asymptomatic Adults)*	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	100%
Coronary Artery Calcium Scoring for Known CAD	100%
Antibiotics for Acute Upper Respiratory and Ear Infections*	100%
Opiates in Acute Disabling Low Back Pain*	94%
Vertebroplasty	91%
PSA Screening for Prostate Cancer*+	90%
Antibiotics for Adenoviral Conjunctivitis	89%
Preoperative Baseline Laboratory Studies*	86%
PICC stage III-V CKD	86%
Pediatric Head Computed Tomography Scans	82%

Notes: *indicates services that also appear on CO's Top 10 list of low-value service by volume. +USPSTF changed recommendation since analyses.

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 Medicaid and commercial data only. Visit www.civhc.org to view the top CO LVC services by spend.

The amount the four states paid for services (N>50) with a waste index >80% is displayed in Table 6. Each state spent between \$2.43 and \$5.45 PMPM (average \$3.74 PMPM) on services that were almost always low-value.

About half of the LVC measured in commercial plans and Medicaid – approximately \$400 Million – can be attributed to frequently used services that are almost always low-value.

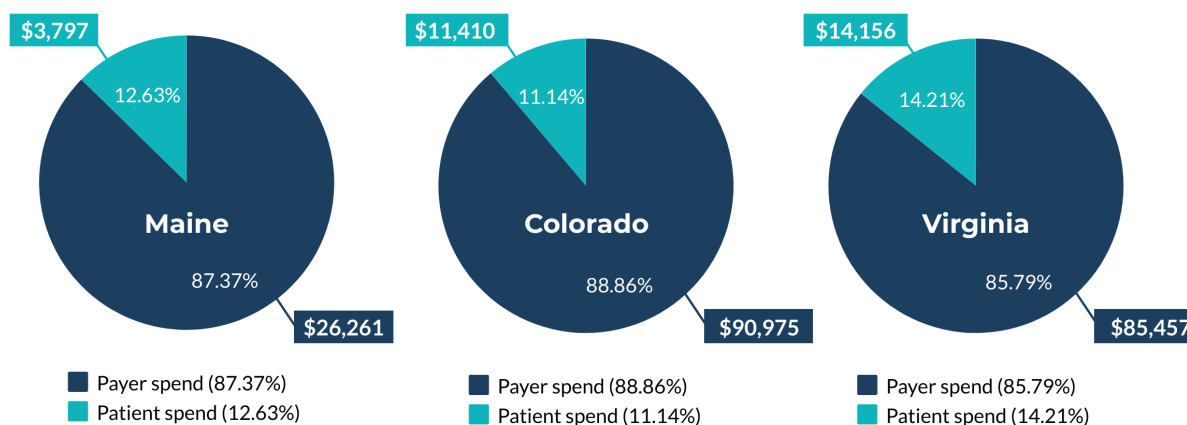
Table 6. Total Spending High Waste Index Services 2017, Spending in Thousands \$ N>50

	Total Spending on High Waste Index LVC	Total Spending PMPM	% of Medicaid+ Commercial Waste Spending
Maine	\$30,058	\$4.04	47%
Washington*	\$174,564	\$5.45	50%
Colorado	\$102,385	\$3.61	47%
Virginia	\$99,612	\$2.43	38%
<i>Total</i>	\$406,619	\$3.74	50%

Notes: total spending = plan + patient spending on LVC in commercial plans and Medicaid. 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 just high waste index services divided by total waste spending in Medicaid and Commercial for that state. *Washington did not separately report patient and plan spending, and estimated total spending based on standard pricing for Medicaid and commercial plans. Includes services with >50 uses per state.

Notably, patients paid a substantial proportion out-of-pocket for the high-waste index LVC services; ranging between \$0.35 PMPM in Virginia to \$0.51 PMPM in Maine (absolute range: \$3.8M Maine to \$14.2M Virginia). (Figure 4).

Figure 4. High Waste Index Services, by Patient and Payer Spend, 2017



Notes: spending in thousands \$. These figures only represent Maine, Colorado, and Virginia. Washington 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 7 highlights services with greater than 80% waste index and greater than \$1 million total spend, in at least 3 of the 4 states.

Table 7. Services That Are Both High Spend And High Waste Index, N>50

Routine General Health Checks (for Asymptomatic Adults)
Antibiotics for Acute Upper Respiratory and Ear Infections
Opiates in Acute Disabling Low Back Pain
Pediatric Head Computed Tomography Scans
Preoperative Baseline Laboratory Studies
PICC Line in Stage III-V CKD Patients

Spending on 47 Low-Value Services by Three States Adding Medicare Data, 2015-2017

Colorado, Virginia, and Maine reported Medicare expenditures, in addition to commercial and Medicaid claims. Maine and Colorado provided Medicare FFS and Medicare Advantage (MA); Virginia only included Medicare FFS. Washington did not provide any Medicare data. Including Medicare data for Colorado, Virginia, and Maine had an incremental impact on relative total LVC spending.

Table 8 shows spending by plans and patients on the 47 services for the three states that provided Medicare data in addition to commercial and Medicaid. Adding Medicare FFS and MA data marginally changed the percentage total expenditures spent on LVC for each of the 3 states. For example, Maine's percentage of spending across on LVC services across all payers, including Medicare, was 1.72% compared to 1.74% without Medicare data.

Table 8. Plan and Patient Spending on 47 Measures Across All Payers Including Medicare, in 2017 Only

	Total LVC Spending, with Medicare	PMPM, with Medicare	% Total Health Spending, with Medicare	% Total Health Spending, without Medicare	Change in % Total Health Spending (pp)
Maine	\$146,884	\$12.53	1.72%	1.74%	+0.02
Colorado	\$358,111	\$9.67	1.86%	1.72%	-0.14
Virginia	\$627,768	\$10.66	1.92%	1.98%	+0.06

Notes: PMPM = Spending in thousands of dollars. Total spending attributed to each payer type divided by the member months attributed to that payer type. Washington was removed to compare the same payers across each state. The change in percent of total health spending is in percentage points.

DISCUSSION

Managing escalating health care budgets is a critical state policy issue. Hence, the development of strategies that improve population health and also save money are in high demand. The availability of APCDs and analytic tools to measure specific low-value services make possible the long-desired goal of reducing wasteful health care spending. Previous reports using APCDs and less sophisticated measurement tools quantified LVC spending in the hundreds of millions of dollars annually. The aim of this project was to update and expand the body of state-specific LVC research by evaluating four states over a three-year study period, assessing LVC spending by plan type and quantifying - for the first time - the amount of LVC spending paid by the patient. Previous analyses did not assess patient spending, nor did they measure spending and utilization over time.

The APCDs claims from 2015 to 2017 from four states were analyzed first using only Medicaid and commercial data. In sum, \$2.7 Billion was spent by commercial and Medicaid over the 3-year study period on the 47 pre-specified low-value services. Despite broad stakeholder interest in reducing low-value care, no meaningful decrease in spending was found between 2015-2017 on the selected measures.

There was some variation among states on the proportion of total health care spending devoted to the measured low-value services in commercial plans and Medicaid (range: 1.59-2.75%). The potential for savings can be illustrated by this variation: for example, if a state like Washington were to reduce its percentage of LVC spending to the same level as a state like Colorado in 2017, Washington could save approximately \$130 Million. (These data include only Medicaid and commercial data.)

In our analyses of 47 low-value services, those with Medicaid coverage generally received the fewest low-value care services per 1000 and Medicaid spent the fewest LVC dollars PMPM in each state. However, it is important to note that these analyses are not meant to infer direct comparisons of LVC use across payer types, as the utilization of the designated LVC services included are unequally distributed across plan beneficiaries (and across states). For example, induction of labor or Caesarian delivery is skewed towards the Medicaid population rather than commercial plans. In addition, reimbursement rates vary significantly among payers.

Patient out-of-pocket contribution to LVC has previously not been reported. For three states, total LVC dollars was split into plan payment and out-of-pocket spending. Our findings suggest that beneficiaries in Medicaid and commercial plans paid between 14.96% and 19.35% of spending (about \$86 Million) on the 47 LVC services in these three states, most of which was unsurprisingly in the commercial market. In 2017, Maine residents spent \$12.4 million out-of-pocket for the 47 services (1.66 PMPM). In contrast Virginians paid over \$40 million out of pocket on the measured low value services (\$1.00 PMPM).

An important finding was that a small number of services in these analyses accounted for a disproportionate amount of the waste spending. When we calculated spending on the most commonly used LVC services for each state, the top 10 services by volume accounted for over two-thirds of LVC spending; producing an average per member per month cost of \$6.13 (range \$4.37-\$8.69 PMPM). Patient out-of-pocket costs on the top 10 ranged from about \$10 Million to \$30 Million or between 12-16% of total patient LVC spending was spent on the top 10 services.

Another approach to reduce low-value spending is to focus on those services that were almost always low-value. In the three states, millions of dollars were spent on care that is almost always low-value. Nearly half of the LVC expenditures measured in commercial plans and Medicaid were attributed to frequently used services that are almost always wasteful (i.e., a waste index above 80%). Medicaid and commercial plans spent between \$2.43 PMPM and \$5.45 PMPM on services that are of limited utility to the patient or health outcomes. In absolute terms, we estimate patients paid at least \$29 Million out-of-pocket for low-value care in 2017.

There are obvious limitations to this analysis on high waste index in isolation. A high waste index does not necessitate high spending (either because the service is relatively rare, such as vertebroplasty, or low cost, such as antibiotics for viral infections).

We estimate that patients paid at least **\$29 Million out-of-pocket** for LVC in three states in 2017.

Some services, across all states, were both high waste index and also high spend. Table 7 highlights LVC services with both a high waste index (greater than 80%) and a high absolute spend (greater than \$1 Million) in all four states. Although not adjusted for population, this analysis can provide insight into specific services to target. Pre-operative baseline laboratory studies in Washington, for example, had a waste index of 85% percent and also cost plans and patients a total of \$92 Million. Virginia spent almost \$60 million on these same studies. For the purposes of targeting services for reduction, finding overlap between high waste index (commonly low-value) and either high spend or high-volume could be a worthwhile start.

Medicare data were included from three states in additional analyses. While the addition of Medicare claims increased the total and PMPM spending on the 47 LVC measures, the inclusion of Medicare data did not substantially change the proportion that Virginia, Colorado, and Maine spent on the specific LVC services, relative to total health spending.

LIMITATIONS

There are numerous limitations associated with this analysis. The most notable 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.

Additional limitations of these analyses include:

- States reported different data (e.g., Virginia did not report Medicare Advantage and Washington did not report any Medicare data).
- The data in each of the four APCDs represent a different percentage of the total population in that state (e.g., Virginia APCD data includes about five of eight million commercially-insured members).
- The report measures a sample of low-value services, only 47, which does not represent a complete picture of all low-value health care.
- Comparisons of spending by payer type will be potentially skewed by the selection of LVC measures and payment rates, rather than how efficient that payer type is (e.g., the measures may be less applicable to a commercially-insured population versus a Medicare population).
- Costs measured in this analysis do not capture the potential downstream care low-value that was a direct result of the original low-value services (e.g., a prostate biopsy following a false positive on a PSA test that was unnecessary in the first place). 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. [\(16\)](#) 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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- For some claims there were insufficient patient history data for the HWC to adequately assess whether wasteful 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.
 - Members in both FFS Medicare and supplemental Medigap plans could potentially be counted twice for the same service.
 - 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

OPPORTUNITY FOR STATES TO REDUCE LOW-VALUE CARE

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 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.

This analysis using three years of data from four states finds that it is feasible to use APCDs and available analytic tools to quantify substantial spending on targeted low-value services. Some (but not all) of the 47 specified LVC services were frequently used across states and payer types, and led to nearly \$900 Million in unnecessary spending per year. Between 15% and 19% of this spending – about \$86 Million – was paid in 2017 by consumers, the first time out of pocket spending on LVC was quantified.

Health care access and affordability are among the most pressing public policy issues. Concerns regarding adequacy of health insurance coverage – especially for those with chronic conditions, will likely be significantly amplified as health care delivery settles on a ‘new normal’ in the post-COVID-19 era. In this time of fiscal instability, reducing LVC spending can generate ‘headroom’ to more generously fund high value clinical services and/or other public health priorities. To date, strategies such as educational initiatives have had only a small effect on reducing LVC. (16) More targeted approaches, informed by direct measurement of low-value care across payers, should motivate states to move forward.

One key step is deciding which low-value services to target. Our findings suggest the top 10 services by volume accounted for at least two-thirds of measured LVC spending. These analyses also reveal that up to half of the LVC spending measured was spent on low-value services with a high waste index.

One example, pre-operative baseline testing for healthy patients prior to low risk surgery, was found to be both a high-volume and a high waste index service. This pre-operative testing has therefore become a target for a number of state-based “drop the pre-op” initiatives, originally started in Washington by the Washington State Choosing Wisely® Task Force. (18) Similar lists of high volume services have informed the “Smarter Care Virginia” initiative, a statewide effort to reduce LVC. (6)

Measurement of low-value care can generate necessary information that states can use to support informed, multi-stakeholder collaborations to tackle the root causes of low-value care and prevent the downstream cascades of costs and harm that result from the delivery of this care. Although there is no agreed-upon formula to precisely reduce low-value care once it is measured, several promising strategies are available for implementation and evaluation. (17)

Importantly, these approaches should be pragmatic, adaptive, and results-driven; engage clinicians and patients alike; and carefully watch for unintended consequences or added confusion

(e.g., trying to increase cervical cancer screening for underserved populations while also trying to lower overuse of cervical cancer screening in well-served populations).

Reducing low-value care is one of the few patient-centered solutions that states can employ to directly address the tension between the need to control the rate of growth of healthcare expenditures and the societal desire to devote more resources to underused, high-value clinical services that improve individual and population health.

The identification, measurement, and reduction of specific low-value services represent a rare opportunity for states to improve individual and population health and reduce medical expenditures.

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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

Preoperative Evaluation

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

*removed from this analysis due to coding issues, at the request of Milliman at the time of analysis.

USPSTF has changed recommendation since data analysis

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 would 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. The table below shows case rate only and Blended methods for 2015-2017, with and without Medicare data included for applicable states – in general, the difference is about 2-3 fold depending on the state.

Impact of Different Methodologies, Case Rate Versus Blended Approach

Medicaid, Commercial, and Medicare

	2015		2016		2017	
	Case	Blend	Case	Blend	Case	Blend
Colorado	\$348,386	\$160,012	\$355,609	\$139,708	\$358,111	\$140,806
Virginia	\$635,352	\$307,266	\$610,168	\$305,376	\$576,095	\$295,100
Maine	\$171,880	\$63,267	\$153,638	\$61,478	\$146,884	\$68,081
Washington	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$1,155,618	\$530,546	\$1,119,415	\$506,562	\$1,081,090	\$503,987

Medicaid and Commercial Spending Only, Excluding Medicare

	2015		2016		2017	
	Case	Blend	Case	Blend	Case	Blend
Colorado	\$225,720	\$88,484	\$231,573	\$90,524	\$220,755	\$90,718
Virginia	\$320,990	\$153,225	\$315,135	\$150,704	\$329,183	\$144,052
Maine	\$91,681	\$38,069	\$72,874	\$32,463	\$64,106	\$27,059
Washington	\$312,431	\$160,808	\$317,816	\$157,902	\$346,507	\$176,929
Total	\$950,822	\$440,586	\$937,398	\$431,593	\$960,550	\$438,758

Notes: "Case" columns include total spending estimates based on case rate method only. The "Blend" columns represent total spending estimates when Line Itemization method is used for some services. The numbers here may differ somewhat from those in the report for case rate: in the actual analyses we removed any data that could not be attributed to a specific payer. The numbers here represent total spending with those data included. Appendix 2 should be seen as demonstrative of the difference between Case and Blend, not a comparison to the results.

Appendix 3 – Member Months Reported by Each APCD for 2015-2017

Below we've included the member months reported to the HWC by the APCDs for each state. Member months are the product of the number of members enrolled in a plan multiplied by the number of months in that plan. Member months better represent population size because any individual person may be enrolled in different programs, or uninsured, for different months in the year. These numbers would be used in per member per month calculations. We have also included total health dollars used in the 2017 analyses: these would be used in total percent health care spending estimates.

Member Months - All payers: Medicaid, Commercial, and

	2015	Medicare 2016	2017	TOTAL
Maine	13,275,930	11,926,933	11,723,143	39,926,006
Washington*	N/A	N/A	N/A	N/A
Colorado	36,434,816	37,929,465	37,015,509	111,379,790
Virginia	53,594,142	57,890,907	58,916,535	170,401,584
TOTAL	103,304,888	107,747,305	107,655,187	318,707,380

*WA did not provide Medicare data.

Member Months - All payers, without Medicare

	2015	2016	2017	TOTAL
Maine	9,277,852	7,761,349	7,444,699	24,483,900
Washington*	26,651,030	31,504,815	32,017,238	93,173,083
Colorado	27,595,591	27,595,591	28,340,806	83,531,988
Virginia	36,541,407	40,349,751	40,990,042	117,881,200
TOTAL	103,065,880	107,211,506	108,792,785	319,070,171

Total Health Dollars (Waste+Non-waste) in Medicaid and Commercial Only, 2017

	Total Dollars	PMPM
Maine	\$3,676,166,677	\$494
Washington	\$12,580,942,125	\$393
Colorado	\$12,781,318,298	\$451
Virginia	\$16,658,812,104	\$332
Total	\$45,697,239,204	\$420

Appendix 4 – Commercial and Medicaid Top 10 Services by Volume for Each State In 2017

MAINE

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

WASHINGTON

1. Opiates in Acute Disabling Low Back Pain
2. Annual Resting EKGs
3. Antibiotics for Acute Upper Respiratory and Ear Infections
4. Preoperative Baseline Laboratory Studies
5. PSA
6. Imaging Tests for Eye Disease
7. Cervical Cancer Screening in Women
8. 25-OH-Vitamin D Deficiency
9. NSAIDs for Hypertension, Heart Failure or CKD
10. Cough and Cold Medicines in Children <4 Years

COLORADO

1. Annual Resting EKGs
2. Antibiotics for Acute Upper Respiratory and Ear Infections
3. Opiates in Acute Disabling Low Back Pain
4. Preoperative Baseline Laboratory Studies
5. 25-OH-Vitamin D Deficiency
6. Cervical Cancer Screening in Women
7. PSA
8. Imaging Tests for Eye Disease
9. Routine General Health Checks (for Asymptomatic Adults)
10. NSAIDs for Hypertension, Heart Failure or CKD

VIRGINIA

1. Annual Resting EKGs
2. Antibiotics for Upper Respiratory and Ear Infections
3. 25-OH-Vitamin D Deficiency
4. Preoperative Baseline Laboratory Studies
5. Opiates in Acute Disabling Low Back Pain
6. PSA
7. Cervical Cancer Screening in Women
8. Imaging Tests for Eye Disease
9. Routine General Health Checks (for Asymptomatic Adults)
10. NSAIDs for Hypertension, Heart Failure or CKD

Appendix 5 – Commercial and Medicaid High (>80%) Waste Index Services for All States, with N>50, in 2017 Only

MAINE

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%
Opiates in Acute Disabling Low Back Pain	92%
PSA Screening for Men Over 75	91%
PICC Stage III-V CKD	90%
Antibiotics for Adenoviral Conjunctivitis	88%
Preoperative Baseline Laboratory Studies	84%
Syncope Image	84%
Pediatric Head Computed Tomography Scans	82%

COLORADO

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	100%
Coronary Artery Calcium Scoring for Known CAD	100%
Antibiotics for Acute Upper Respiratory and Ear Infections	100%
Opiates in Acute Disabling Low Back Pain	94%
Vertebroplasty	91%
PSA Screening for Prostate Cancer	90%
Antibiotics for Adenoviral Conjunctivitis	89%
Preoperative Baseline Laboratory Studies	86%
PICC Stage III-V CKD	86%
Pediatric Head Computed Tomography Scans	82%

WASHINGTON

Cough and Cold Medicines in Children <4 Years	100%
Routine General Health Checks	100%
Diagnostic Chronic Urticaria	100%
Arthroscopic Lavage and Debridement for Knee OA	100%
Postcoital Test for Infertility	100%
Antibiotics for Acute Upper Respiratory and Ear Infections	100%
Renal Artery Revascularization	99%
Opiates in Acute Disabling Low Back Pain	93%
Antibiotics for Adenoviral Conjunctivitis	91%
PICC Stage III-V CKD	88%
Vertebroplasty	87%
PSA Screening for Prostate Cancer	86%
Preoperative Baseline Laboratory Studies	85%
Pediatric Head Computed Tomography Scans	84%

VIRGINIA

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	100%
Antibiotics for Acute Upper Respiratory and Ear Infections	100%
Opiates in Acute Disabling Low Back Pain	92%
PSA Screening for Prostate Cancer	90%
Antibiotics for Adenoviral Conjunctivitis	89%
Pediatric Head Computed Tomography Scans	88%
Preoperative Baseline Laboratory	86%