

# LOW VALUE CARE IN COLORADO



March 2020

*Opportunities to minimize health care services that provide little or no benefit to patients, have the potential to cause harm, incur unnecessary cost to patients, or waste limited health care resources.*



CENTER FOR IMPROVING  
**VALUE** IN HEALTH CARE

## Contents

Executive Summary.....	3
Key Findings .....	3
Population Impact (2017 unless otherwise noted).....	3
Volume and Spending Impact (2017 unless otherwise noted).....	4
Insurance Payer Variation (2017) .....	4
Geographic Variation (2017).....	5
State Comparisons (2017).....	5
Opportunities for Improvement .....	5
Next Steps .....	5
Important Caveats and Considerations when Reviewing this Report .....	6
Introduction .....	7
Identifying Low Value Care – Choosing Wisely Guidelines .....	8
Key Points about Measurement Methods.....	9
Low Value Care Summary Results.....	11
Statewide .....	11
Statewide (continued) .....	12
Insurance Type.....	13
Insurance Type (continued) .....	14
Geographic Region (Nine Division of Insurance Rating Areas) .....	15
Measures with the Largest Low Value Care Spending.....	17
Measures with the Largest Low Value Care Spending - Observations .....	18
Factors that Contribute to Low Value Care .....	19
Addressing Low Value Care.....	19
Opportunities for Colorado.....	20
Appendix A: Key Concepts - Low Value Care, Overuse, Unnecessary Care and Inappropriate Care.....	21
Appendix B: List of 48 Measures of Low Value Care.....	22
Appendix C: Data Tables – Statewide, by Insurance Type and by DOI .....	27
Appendix D: Measures with the Largest Low Value Care Spending by Insurance Type .....	28
Appendix E: Top Low Value Care Measure Details .....	29
Concurrent Use of Two or More Antipsychotic Medications .....	29
Opiates for Disabling Low Back Pain.....	31
Peripherally Inserted Central Catheters in State III-IV CKD Patients .....	32

Coronary Angiography .....	33
Imaging Tests for Eye Disease .....	34
Routine General Health Checks .....	35
Preoperative Baseline Laboratory Studies.....	36
Colorectal Cancer Screening .....	37
Vertebroplasty .....	38
Imaging for Uncomplicated Headache .....	39
Annual EKGs or Cardiac Screening .....	40
Cardiac Stress Testing .....	41
Renal Artery Revascularization .....	42

## Executive Summary

A recent study published in the Journal of the American Medical Association estimates that 25% of health care spending, approximately \$925 billion, is wasteful and about \$101 billion of this spending is classified as waste due to low value care - the unnecessary use or overuse of services.<sup>1</sup> Low value health care services refers to certain treatments, diagnostic tests, and screenings where the risk of harm or cost exceeds the likely benefit for patients. A variety of medical organizations, principally national boards and medical specialty societies, have collectively identified low value services which are documented and available publicly as part of the Choosing Wisely guidelines. Reducing low value care services is considered an appealing health care strategy because it can lead to both improvements in quality of care and cost savings.

The first step towards minimizing low value care is to identify which services are occurring most often and what impact those services are having on patients and health care spending. To this end, the Center for Improving Value in Health Care (CIVHC), administrator of the Colorado All Payer Claims Database (CO APCD), engaged Milliman, a health care actuarial and consulting firm, to apply its MedInsight software to the CO APCD to measure low value services in Colorado.

Milliman low value care results are classified as **necessary, likely wasteful or wasteful**.

- **Necessary** means clinically appropriate.
- **Likely wasteful** indicates the appropriateness of the services is questionable.
- **Wasteful** means the services were very likely unnecessary.

**Results identified in this report as “low value care” indicate services that are either likely wasteful or wasteful.** Low value care results were produced **only for measures with sufficient patient history** to distinguish necessary from low value care. It is important to note that **not all low value care services identified in this report should or can be eliminated**. In some instances, these services may be deemed clinically appropriate by providers based on a variety of patient factors not available through claims.

This report summarizes results for 48 measures of low value care evaluated from 2015 through 2017 for 4.1M insured Coloradans (over 70% of insured lives) covered by commercial health insurance, Medicaid, Medicare Advantage, and Medicare Fee-for-Service (FFS). The report identifies overall frequency and spending related to low value care in the state of Colorado, highlights the specific measures that account for the majority of spend, and provides breakouts by insurance payer and geographic region. It also offers recommendations on how Colorado stakeholders might address low value care using lessons learned from other states and discusses next steps for future analyses for targeted interventions.

## Key Findings

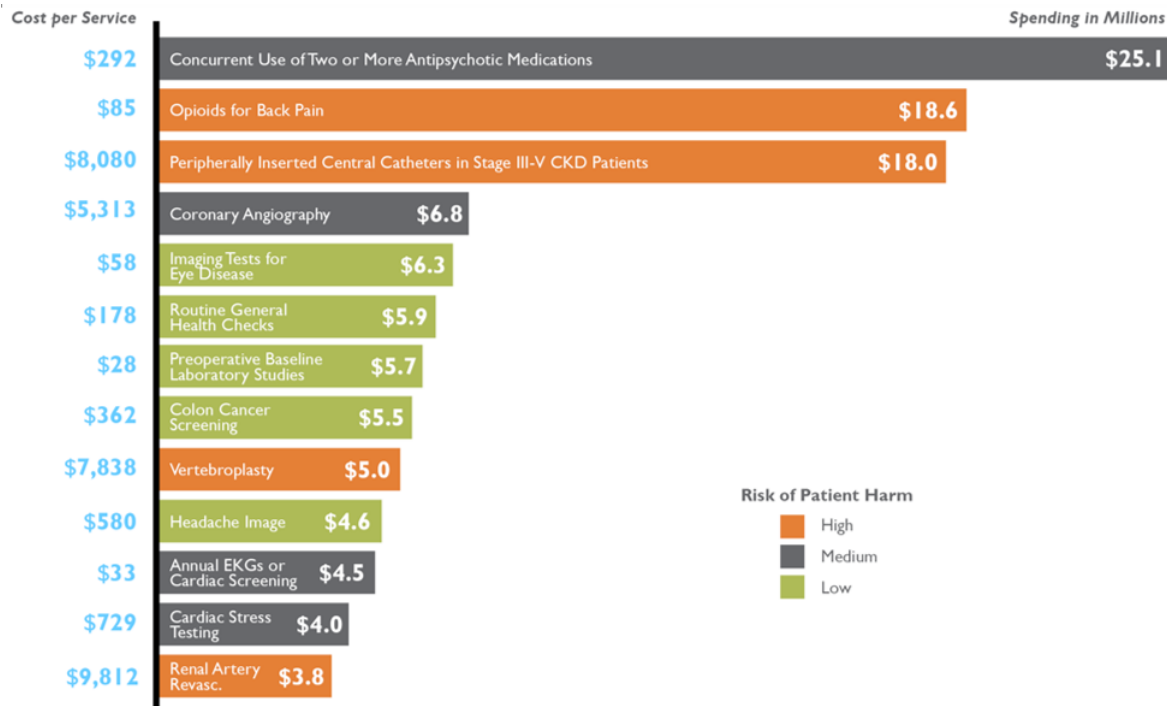
Population Impact (2017 unless otherwise noted)

- Of the 4.1M individuals with medical coverage in the CO APCD, **1.36M individuals (34%) received at least one of the 48 services measured and, of these individuals, 53% received at least one low value service** (likely wasteful or wasteful).
- From 2015 to 2017, the **percentage of individuals who received a least one low value care service grew 11%**.

### Volume and Spending Impact (2017 unless otherwise noted)

- **Total Spending** for the 48 services measured (including necessary, likely wasteful and wasteful services) was **\$1.3B** and accounted for about **6.4%** of total medical expenditures (**\$20.3B**). **Nearly 11% of the spending for these services or \$140M was for low value care.**
- From 2015-2017, **spending for low value care services fell about 9%.** However, the percentage of all health care services measured that were low value was relatively stable, largely due to a decrease in the spending per low value service.

### Thirteen Services Account for Nearly 70% of Total Services and 80% of Total Spending for Low Value Care in 2017 (Colorado All Payer Claims Database, Medicaid, Medicare, Medicare Advantage, Commercial Payers)



- **Three services** (use of two or more antipsychotics, opioids for back pain and central catheters for kidney disease patients) **account for 44%** of low value care spending, and two of these services pose high risk of patient harm.
- **Low value care spending is largely driven by excessive use of low cost services**, rather than excessive use of high cost procedures.

### Insurance Payer Variation (2017)

- **Commercially-insured and Medicaid members had a higher percentage of spending on low value services, as a percentage of spending for all measured services, than Medicare and Medicare Advantage members.**
- **Medicare had a higher volume of low value care services per 1,000 members than commercial and Medicaid.** Delivery of low value services to Medicare members appeared to be concentrated in a smaller population and raises questions about whether low value care is being driven by a smaller cohort of providers.

- Medicaid and Medicare had the highest proportion of spending for low value services for **medications** while Medicare Advantage was highest for **procedures**, and commercial insurance was highest for **procedures and imaging tests**.

#### Geographic Variation (2017)

- When evaluating Colorado Division of Insurance (DOI) regions, significant variation exists between areas of the state. Across all payers combined, low value care PMPM spending and utilization (services per 1,000) were **highest in the Pueblo region and were also high in the Grand Junction region**.

#### State Comparisons (2017)

- Two states - Virginia and Washington - have also used the MedInsight tool to evaluate low value care using claims data. When comparing the percentage of all services indicated as low value, the percentage **for Virginia (34.9%) is similar to that of Colorado (35.3%), and Washington State is significantly higher (47.2%)**.
- **When evaluating spending among states, Colorado spending on low value care appears much smaller, largely due to fundamental differences in methods used to calculate spending.** CIVHC elected to use a more conservative approach and isolated costs for low value services within the total claim amount, whereas Virginia and Washington State used proxy costs and allowed amounts for the entire claim (which may have included other tests and services deemed medically necessary). **As a consequence, a comparison of low value care spending between states is not presented in this report and it is best not to draw conclusions about the level of spending for low value care in Colorado compared to other states.**

## Opportunities for Improvement

The statewide volume and spending impact as well as the variation in results across insurance types and geographic regions indicate opportunities for improvement. These opportunities should be explored at the level of the provider as clinical decision-maker, because differences in provider practices have been shown to contribute substantially to variation.<sup>ii</sup>

Efforts to reduce low value care that have proven effective include supply-side (provider) and demand-side (patient) interventions as well as multi-stakeholder collaborations. The types of interventions should be tailored to the particular low value care service since each will be differentially affected by diagnostic uncertainty, patient expectations regarding treatment, and payment incentives.

In exploring the statewide results in this report alongside the experience of other states, Colorado could consider creating a panel of key stakeholders to discuss the low value care measurement results and discuss potential interventions and achievable performance benchmarks.

## Next Steps

This first view of Low Value Care in Colorado provides high-level information to many stakeholders including the state, payers, providers, employers and others, looking for areas of improvement in both cost savings and quality of care, and helps make the case that opportunities exist. In order for the data to become actionable at the local community level, more specific data for providers and other sub-populations is necessary to inform improvement activities. To this end, CIVHC is working to produce

specific reports for different population subsets such as employer and community-level reports and results specific to patients attributed to provider practices.

## Important Caveats and Considerations when Reviewing this Report

One Milliman measure of low value services identified in this report, Routine General Health Checks, is bound to be controversial. This service, **often called an annual physical and provided without a specific diagnostic reason**, has the highest spending among low value services for commercially-insured Coloradans. While scientific evidence demonstrates that annual physicals do not improve health and may lead to over-diagnosis and over-testing, calling it low value care may contradict current arguments about the value of primary care.

The utilization and spending figures reported here must be used cautiously, because detailed analysis of the results for several measures produced unexpected findings that raise questions about the validity of a portion of the services that were classified as low value. Other states report similar findings. For example, CIVHC found that the measure of concurrent use of two or more antipsychotic medications included some patients who were found to be receiving only one antipsychotic medication, but in different forms or dosages. CIVHC made some modifications to the measurement results to reduce the impact of these occurrences and improve the validity of the measure.

## Introduction

In 2019, Center for Improving Value in Health Care (CIVHC), non-profit administrator of the Colorado All Payer Claims Database (CO APCD), engaged Milliman, a health care actuarial and consulting firm, to apply its MedInsight software to CO APCD to measure the use and cost of low value health care services in the state.

This report summarizes findings from an examination of results for 48 measures of low value care from 2015 through 2017 for commercial, Medicaid, Medicare Advantage and Medicare Fee-for-Service (FFS) claims in the CO APCD. The data includes information for 4.1M Coloradans which represents over 70% of the insured lives in the state. The report presents the overall frequency and costs of low value care in the state of Colorado by type of insurance and geographic region. It also provides detailed results for a subset of measures that account for a large majority of total low value services and costs. Finally, the report discusses possible factors, such as patient and provider characteristics, that contribute to results for this subset of measures and suggestions for improvement based on literature and the experiences of other states.

Low value care is a concept that requires definition. In general, it is a term used to describe care in which the potential harm or costs to a patient are greater than the benefit. (See [Appendix A](#) for a discussion of the concepts of low value care, overuse, unnecessary and inappropriate care). Low value care is a form of “waste” in the health care system and contributes to higher costs without improving patient outcomes.

A 2019 study, published in the Journal of the American Medical Association<sup>1</sup>, estimated current levels of “waste” in the U.S. health care system and potential savings from improvement interventions. The study examined scientific literature on the subject of waste associated with six different domains and estimated the cost of each.

1. **Failure of care delivery** – waste from poor delivery of care or lack of adoption of best- or evidence-based practices that result in patient harm (high end of range of estimated annual cost: \$165.7B)
2. **Failure of care coordination** – waste due to fragmented care, such as hospital readmissions (\$78.2B)
3. **Overtreatment or low value care** – waste from delivery of services that do not benefit the patient (\$101.2B)
4. **Pricing failure** – waste from high prices due to the absence of transparency and effective markets (\$240.5B)
5. **Fraud and abuse** (\$83.9B)
6. **Administrative complexity** – waste from inefficiencies, such as inconsistent payment policies of third party payers (\$265.6B)

The authors of the study estimated that 25% of health care spending, approximately \$925 billion, is wasteful and about \$101 billion of this spending is classified as waste due to low value care. They also extrapolated from studies of interventions such as optimizing medication use, alternative payment models that address low value care, use of patient-provider shared decision-making and savings from expanding access to hospice to estimate a potential savings of up to 28% of low value care spending.



## Identifying Low Value Care – Choosing Wisely Guidelines

The American Board of Internal Medicine Foundation launched the Choosing Wisely campaign in 2012 by issuing a challenge to medical specialty societies. The Board challenged them to identify tests or procedures commonly used in their field whose necessity should be questioned – services that are known to be overused and potentially harmful.<sup>iii</sup> Today, there are more than 550 Choosing Wisely guidelines from more than 80 specialty societies that recommend against use of specific health care services.

Here are two examples of Choosing Wisely guidelines that were used as the basis for Milliman measures of low value care, with a description of their potential harm to patients.

### 1. Opiates in acute disabling low back pain

*Don't prescribe opiates in acute disabling low back pain before evaluation and a trial of other alternatives is considered*

**Potential Harm (High):** Early opiate prescriptions in acute disabling low back pain is associated with longer disability, increased surgical rates, and a greater risk of later opioid use.

### 2. Peripherally inserted central catheters in stage III-V chronic kidney disease patients

*Don't place peripherally inserted central catheters (PICC) in stage III–V CKD patients without consulting nephrology*

**Potential Harm (High):** Arteriovenous fistulas (AVF) are the best hemodialysis access, with fewer complications and lower patient mortality. Excessive venous puncture damages veins, destroying potential AVF sites.

Both of these services have the potential to produce physical harm, which occurs when a medical test or treatment causes an adverse outcome or complication. This is the form of harm that is most often discussed, but harm can take other forms. Harm can also be emotional, if a test produces a false positive or an uncertain result that causes anxiety and requires the patient to undergo additional tests or procedures. And, harm can be financial because of the costs patients must incur in deductibles or copayments associated with the test or treatment.

Take one example of the use of unnecessary imaging, such as a CAT scan. The radiation involved can slightly increase the long-term risk of radiation-induced cancers. These tests can also detect irregularities that may never become problems but may lead to additional testing. And, most of these interventions, whether effective or not, can be costly.

Most of the Milliman measures of low value care were derived from Choosing Wisely; several were derived from the US Preventive Services Task Force guidelines and other organizations.

The guidelines were used to identify and then define measures of low value care that could be produced from health insurance claims data. In many cases, the classification of care as low value depends on the patient's clinical condition and claims may not have the clinical details or patient clinical history necessary to distinguish necessary from low value care. As a consequence, **measures for only a small subset of the guidelines can be produced using claims.**

## Key Points about Measurement Methods

It is important to consider several points about the methods used to measure low value care when reviewing and interpreting the results included in this report.

- **Milliman low value care measurement results are classified as necessary, likely wasteful or wasteful.** Necessary means clinically appropriate. Likely wasteful indicates the appropriateness of the services is questionable. Wasteful means the service was very likely unnecessary. Results identified in this report as **“Low value care”** indicate services that are either likely wasteful or wasteful.
- Low value care results were produced for **only measures with sufficient patient history** to distinguish necessary from low value care.
- **Different low value care services cause different levels of potential harm.** Each measure of low value services is classified as conferring a risk for harm that is high, medium or low. One example of high risk care is elective induction of labor or Cesarean-section prior to 39 weeks gestation. Newborns from these early deliveries have an increased risk of mortality, non-fatal birth outcomes such as respiratory complications, sepsis and cerebral palsy as well as long-term developmental disabilities.
- **Spending for low value care services is reported as the allowed amount** (the payer paid amount and patient portion combined) for the specified services. Some patients may receive a low value care service, like an unnecessary diagnostic test. If the test produces a false positive or unclear result, they may go on to receive other services as a consequence. **Spending for these additional services is not included in this report.**
- The 48 measures of low value care assess the use of **six categories of services** that describe their purpose – diagnostic tests (40% of measures), disease screening tests (17%), preoperative evaluations (8%), routine follow-up monitoring (2%) and treatment for common maladies (10%) and several specific conditions (23%). (See [Appendix B](#) for a list of the 48 measures)  
The measures are **also classified by actual service provided** – imaging (38% of measures), lab tests and pathology (20.8%), procedures (21%), medications (17%) and cardiac testing (4%).
- Some services are typically ordered by primary care physicians and others by specialists. Many services are delivered in an office or non-facility setting, but a significant portion of these services, involving advanced diagnostic imaging tests and surgical treatments, are provided in hospital emergency departments and ambulatory care clinics.
- Low value care results are reported as several statistics – low value index, percentage of low value care spending and percentage of members with a low value care service. This table illustrates the calculation of each statistic.

Statistic	Calculation		
<b>Use of Low Value Care</b>	Volume of services measured (A)	Volume of services that are low value (B)	Low Value Index (B/A)
<b>Members with Low Value Services</b>	Number members with a measured service (C)	Number members with a low value service (D)	Percent members with a low value service (D/C)
<b>Spending for Low Value Services</b>	Spending for services measured (E)	Spending for low value services (F)	Percent low value care spending (F/E)

- Although the above statistics are most common, population-based measures are also important to consider for subpopulations (e.g., insurance type, geographic region) and are represented in this report as low value services per 1,000 members and low value care spending per member per month (PMPM).

It is important to note that **low value care measurement results for subpopulations can differ significantly depending on the type of measure used.** For one population, the percentage of services and spending for low value care might be higher compared to another population and yet services per 1,000 and spending PMPM can be lower. This occurs for two possible reasons – the actual volume and spending for low value services is low and/or utilization and spending for low value care services is spread over a larger population. If the opposite occurs, it suggests the actual volume and spending for low value services is higher and/or is concentrated in a smaller population. **While percentages of low value services and spending can be high, the actual volume of services and spending is important when targeting populations for improvement.**

## Low Value Care Summary Results

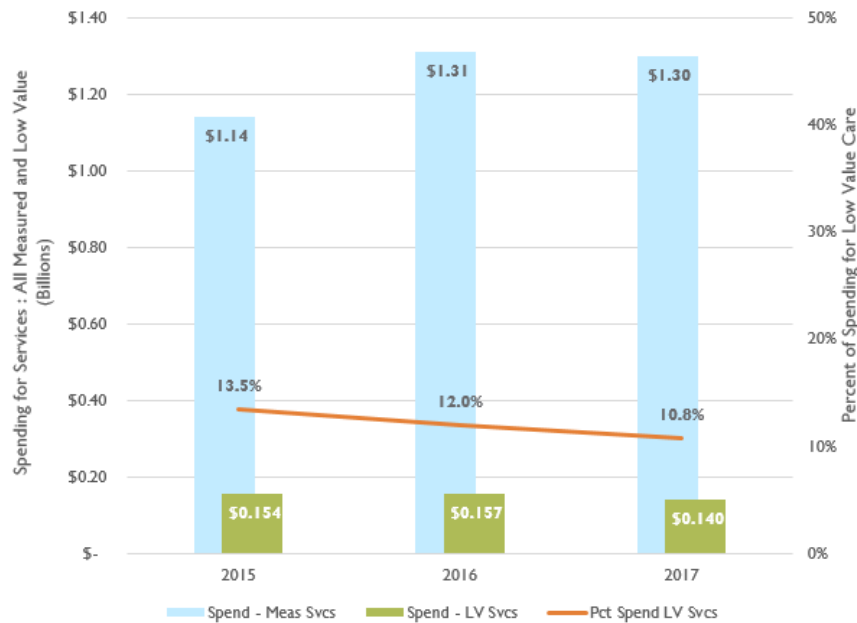
### Statewide

Spending for services for the 48 focus measures was \$1.3B in 2017, which is roughly 6.4% of total medical expenditures for the state (\$20.3B). About \$140M, more than 10% of the \$1.3B, was spent on low value care. The volume of low value care services as a percentage of all services examined (low value index) was more than 35% in 2017. (See [Appendix C](#))

The trend in spending for low value care decreased from 2015-2017, but the low value index was somewhat stable. This means that the types of low value care shifted from higher to lower cost services.

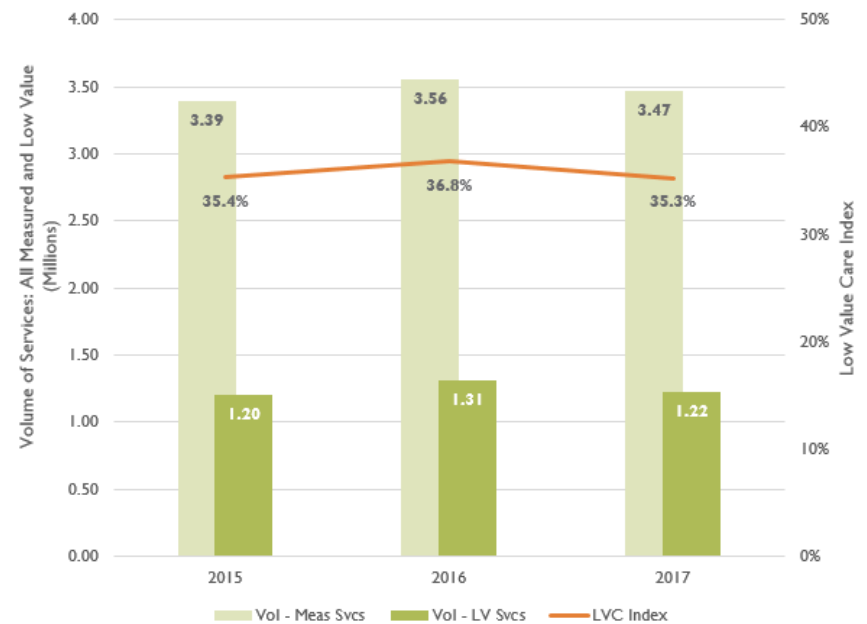
#### \$140M Was Spent on Low Value Care Services in 2017

(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial)



#### Of 48 Measures, 35% Were Low Value Care in 2017

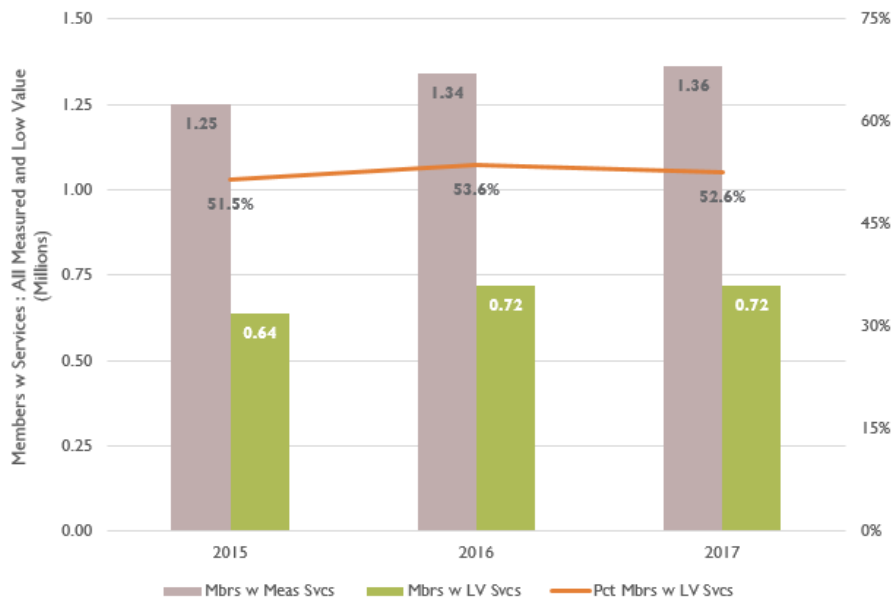
(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial)



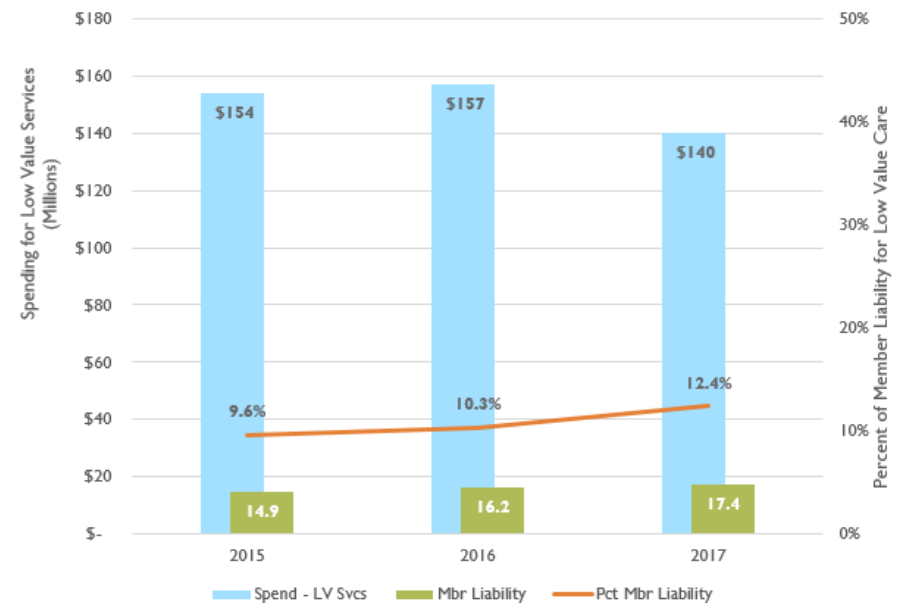
## Statewide (continued)

The percent of Coloradans in the CO APCD (members) with a low value care service as a percentage of the number of distinct members with any measured service was 52.6% in 2017 and was fairly stable from 2015-2017. With a decline in spending for low value care during this period, spending per person declined. Despite the decline in spending, the patient (member) portion of spending for low value care services, including copays, coinsurance, and deductibles, actually increased from 2015-2017 to \$17.4 M. These results were principally driven by increases in member liability for Medicare members.

### 53% of Members With a Measured Service Received Low Value Care in 2017 (CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial)



### Member Portion of Low Value Care Spending Increased to \$17M in 2017 (CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial)

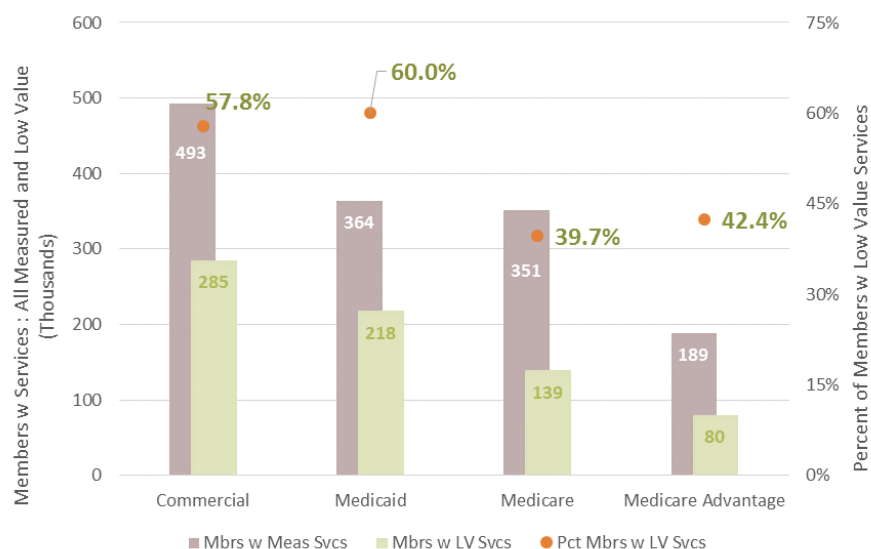


## Insurance Type

Commercial and Medicaid claims accounted for a larger share (62%) of the \$140M expenditure for low value care services than Medicare FFS and Medicare Advantage (38%) in 2017 (not shown). (See [Appendix C](#))

### **Roughly 60% of Medicaid and Commercial Members, and 40% of Medicare Members Received a Low Value Care Service in 2017**

(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial)



Medicaid has a higher percentage of spending for low value care services than commercial even though it had a similar volume of measured services and low value index. This is because the cost per low value care service compared to that of all measured services is higher for Medicaid (data not shown).

Although Medicare reimbursement is based on fee-for-service, which creates incentives to provide more care and potentially more low value care, it had the lowest percentage of spending and of volume of low value care services of the four insurance types. However, when low value care spending and utilization is reported on population-basis, the picture for Medicare changes (see graph).

Similar to the findings observed for low value index, commercial and Medicaid also had a larger percentage of members who received a low value care service. Although the low value index was similar for commercial and Medicaid and higher than that of Medicare and Medicare Advantage, when utilization of low value services is reported on a population-basis, dividing by the total membership for each

insurance type, commercial and Medicaid lines of business had lower utilization per 1,000. Medicare had the highest utilization per 1,000. Although not shown here, the same pattern was observed when low value care utilization rates were calculated based only on members who received low value care.

Lower population-based utilization for commercial and Medicaid were observed because the higher volumes of low value services for these two insurance types were spread over a larger member population. By contrast, the higher utilization rate for Medicare means that delivery of low value care services are concentrated in a smaller population. This raises questions about whether low value care is being driven by a smaller cohort of providers as well.

The higher spending PMPM for Medicare Advantage compared with other insurance types appears to be due to a combination of a relatively high amount of spending for low value care spread over a smaller population.

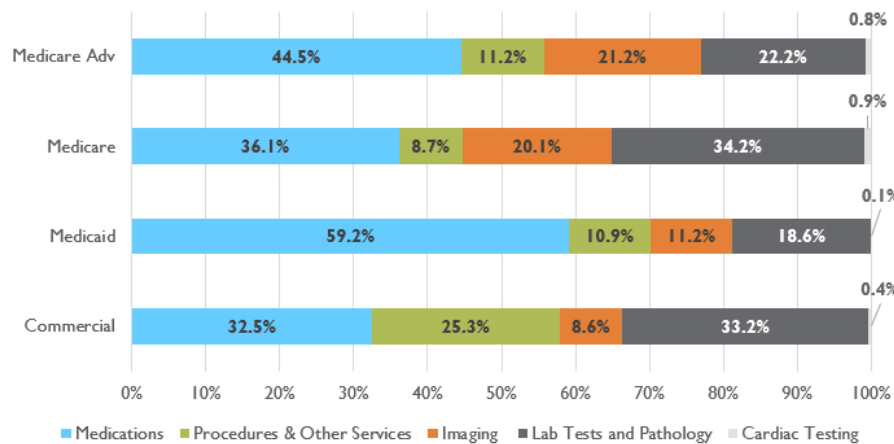
## Insurance Type (continued)

The proportion of services by category that constitute low value care are different across insurance types. The two service categories with the largest percentage of overall services for all insurance types are medications and lab tests. For Medicaid, almost 60% of low value services are medications.

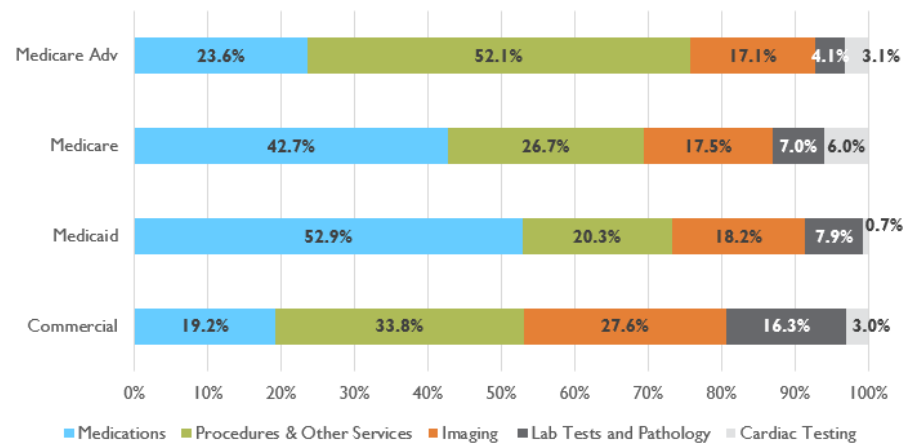
When viewed as a proportion of spending, the picture changes. Across all payers, the service categories with the highest proportion of spending were medications, procedures and imaging tests. For Medicaid and Medicare, the proportion of spending for low value services was highest for medications. For Medicare Advantage, spending was highest for procedures. And, for commercial insurance, the largest proportion of spending for low value services is for procedures and imaging tests.

These results, when combined with information about volume of low value services and spending by low value care measure, can be useful in targeting specific medications, tests or procedures for intervention.

**Most Frequent Low Value Care Service Categories for Most Payers: Medications and Lab Tests/Pathology**  
(Colorado All Payer Claims Database, 2017)



**Highest Spend Low Value Care Service Categories for Most Payers: Medications and Procedures/Other Services**  
(Colorado All Payer Claims Database, 2017)



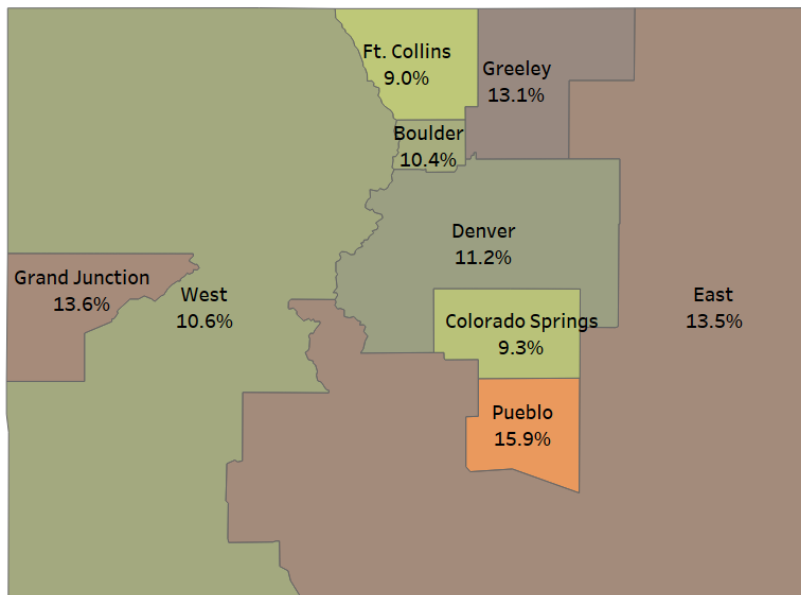
## Geographic Region (Nine Division of Insurance Rating Areas)

The maps below display low value service use and spending statistics by geographic region using the nine Colorado Division of Insurance (DOI) rate setting regions of the member's residence. (See [Appendix C](#))

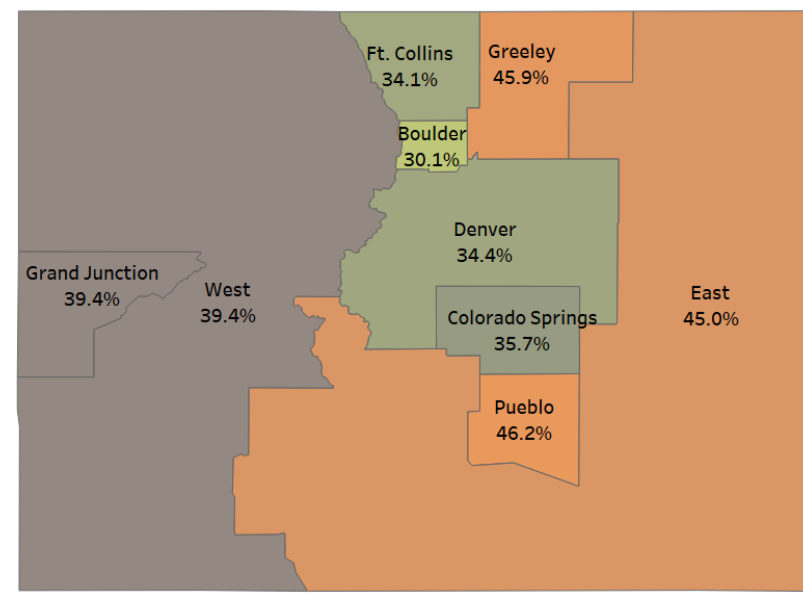
The percentage of spending for low value services was highest in the Pueblo region at 15.9%, which is significantly greater than the statewide figure of 10.3%. The percentage of spending for the East, Grand Junction, and Greeley regions are lower than Pueblo but are still significantly higher than the statewide figure. For the low value index, which is the percentage of low value services out of the services measured, Pueblo again had the highest low value index percentage. But for other regions, the index is also very high. In general, the map of low value index by region appears different from others, with more regions exhibiting very high percentages.

Two regions have high low value indices but also have a percentage of low value care spending that is not as high compared to other regions – East and Greeley. For these regions, the cost per low value service is lower.

**Percentage of Low Value Spending Was Highest In Pueblo, East and Grand Junction DOI Regions in 2017**  
(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial Payers)



**Low Value Care as a Percent of All Services Measured Was Highest in Pueblo, Greeley and East DOI Regions in 2017**  
(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial Payers)



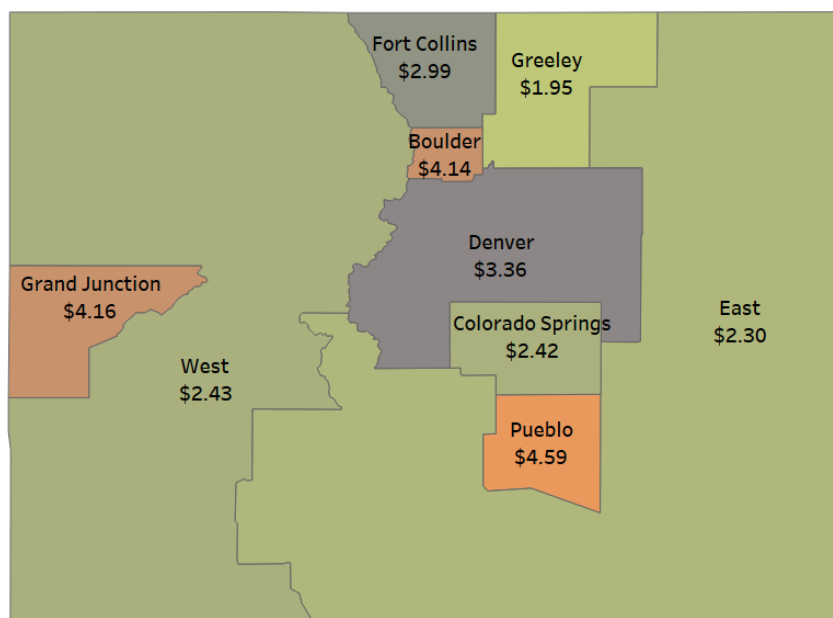
LOWEST HIGHEST  
AVERAGE



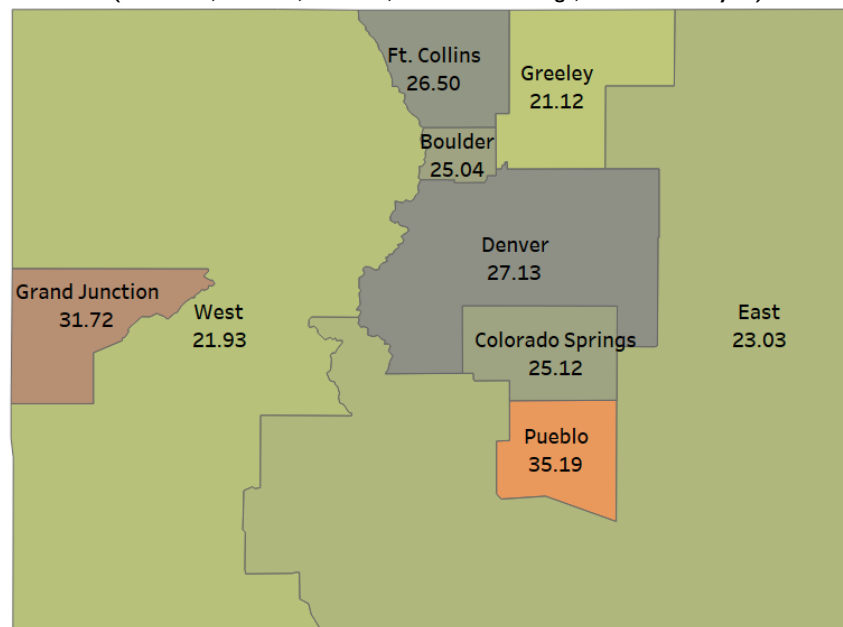
Although the percentage of spending for low value services and low value index was relatively high for several regions, the picture is different when spending and utilization of low value services is reported on a population-basis. The maps below illustrate differences in spending per member per month (PMPM) and low value services per 1,000 by region. The regions with high spending PMPM are Pueblo, Grand Junction, and Boulder; regions with a high volume of services per 1,000 are Pueblo and Grand Junction.

Pueblo is the one constant, having the highest value in all four maps. East and Greeley had high percentages of spending and a low value index, but lower spending PMPM and low value services per 1,000. This is because, while the percentages are high, the actual spending and volume of low value services was low, especially when spread over the population in each region. The opposite occurred in the Grand Junction region, where the percentage of spending and low value index were similar but actual spending and volume were relatively high and spread over a smaller population, producing higher population-based rates.

**Low Value Care Spending** (Per Member Per Month) **Was Highest in Pueblo, Grand Junction and Boulder DOI Regions in 2017**  
(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial Payers)



**Low Value Service Rate** (per 1,000 Members) **Was Highest in Pueblo, Grand Junction and Denver in 2017**  
(CO APCD, Medicaid, Medicare, Medicare Advantage, Commercial Payers)



LOWEST HIGHEST  
AVERAGE

## Measures with the Largest Low Value Care Spending

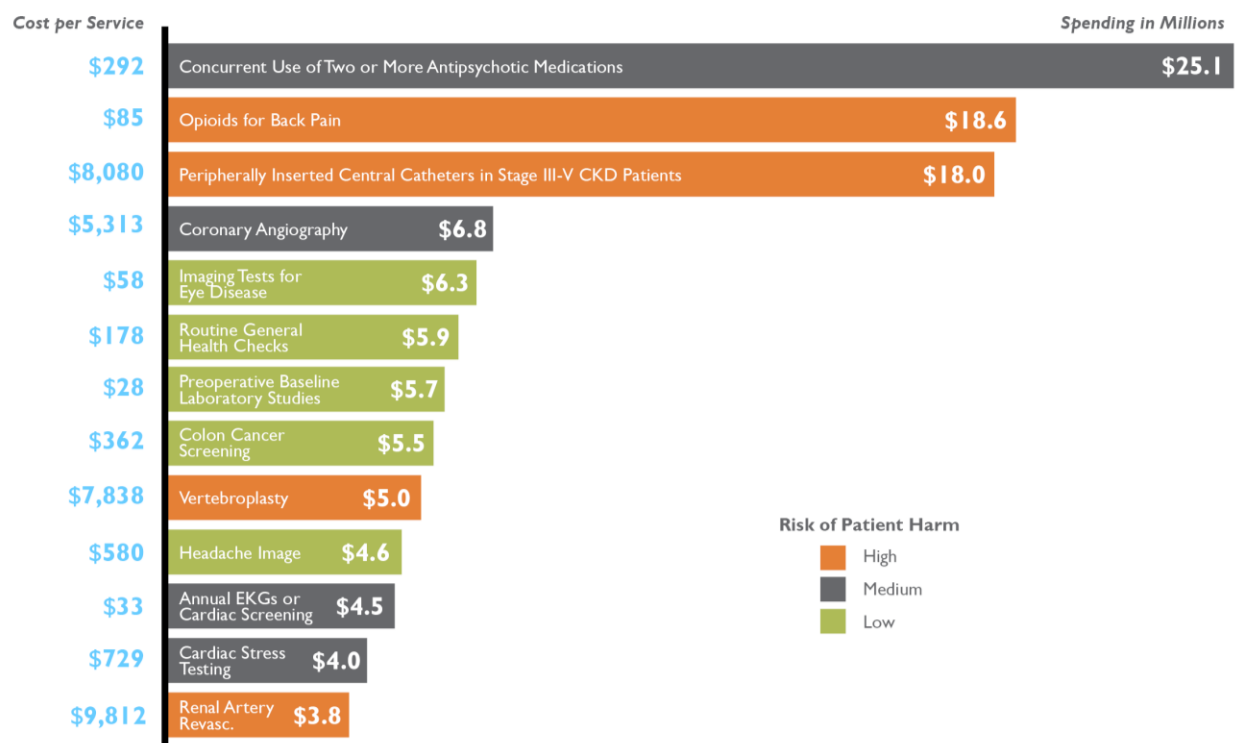
Thirteen services accounting for 81% of total low value care spending in 2017 were selected for detailed analysis. They are shown below in descending order of spending. Some argue that low value care measures should be prioritized for analysis and intervention based on the volume of low value care services. CIVHC chose not to pursue this method because it would replace some of the measures that have a risk of harm of medium or high with ones where the risk of harm is low. And, the alternative method would account for a substantially smaller percentage of total low value care spending. In short, the approach CIVHC chose targets measures that have a greater impact on both costs *and* quality of care.

The list below includes services that are lower cost (less than \$500) and higher cost (more than \$500). Overuse is not only a problem of unnecessary use of expensive tests and procedures (e.g., coronary angiography) but also of excessive unnecessary use of lower cost services (e.g., preoperative baseline laboratory studies). This finding is consistent with other studies and literature.<sup>iv</sup>

The list of thirteen services below accounts for 67% of all low value care. If expanded by four additional measures, the list would account for almost 93% of total low value services. The four additional measures not included in the data below are:

- Cervical Cancer Screening in Women (Medium risk of harm)
- Screening for 25-OH-Vitamin D Deficiency (Low risk of harm)
- Antibiotics for Acute Upper Respiratory and Ear Infections (Low risk of harm)
- Lower Back Pain Image (Medium risk of harm)

### Thirteen Services Account for Nearly 70% of Total Services and 80% of Total Spending for Low Value Care in 2017 (Colorado All Payer Claims Database, Medicaid, Medicare, Medicare Advantage, Commercial Payers)



## Measures with the Largest Low Value Care Spending - Observations

Services that account for the largest share of spending for low value services differ by type of insurance (See [Appendix D](#)). These results help explain previous findings about service categories with high percentages of spending for each insurance type.

As noted above, the proportion of spending for low value services is highest for:

- Medicaid and Medicare related to medications (use of antipsychotic medications and opioids for acute low back pain),
- Medicare Advantage related to procedures (PICC lines, vertebroplasty, colon cancer screening and renal artery revascularization)
- Commercial insurance related to procedures (routine general health checks, PICC lines, annual EKGs or cardiac screening) and imaging tests (headache image, lower back pain image).

The following are observations about measures that drive low value care spending, overall and by insurance type:

- The low value service with the highest spending for commercial population is routine general health checks. This is a controversial measure because, while scientific evidence demonstrates that annual physicals without a diagnostic reason do not improve health and may lead to over-diagnosis and over-testing, calling this low value care contradicts current arguments about the value of primary care on early detection, health promotion and disease prevention.
- Several low value services tend to be provided to younger patients – opioids for acute low back pain, imaging tests for eye disease, annual EKGs or cardiac screening, screening for 25-OH-vitamin D deficiency and lower back pain images.
- A detailed analysis of several measures produced some **unexpected findings that raise questions about the validity of a portion of the services that were classified as low value.**
  - For the measure of concurrent use of **two or more antipsychotic medications**, some patients identified as receiving low value care were found to be receiving only one antipsychotic medication, but in different forms or dosages. Other patients were found to have received three instances of failed monotherapy before being prescribed two concurrent antipsychotic medications.
  - **PICC lines in chronic kidney disease patients** may have been inserted to treat cancer, not establish vascular access for dialysis.
  - For the measure of **preoperative baseline laboratory studies**, some laboratory tests appeared to be unrelated and incidental to subsequent minor physician office procedures like removal of skin lesions and should not have been considered low value care.
  - A significant percentage of **colon cancer screening services** were performed in an emergency department, which raises questions about whether they were performed to determine the source of gastrointestinal bleeding and therefore necessary.

[Appendix E](#) provides details for each of the thirteen services, including factors such as patient characteristics and insurance types that contribute to higher low value care indices.

## Factors that Contribute to Low Value Care

Studies have demonstrated substantial variation in the rates of low value care across geographic regions and providers.<sup>v,vi</sup> The observed variation indicates opportunities for improvement; these opportunities should be explored at the level of the provider as clinical decision-maker, because differences in provider practices contribute substantially to variation. It is important to note that not all low value care identified in this report should or can be eliminated, and in some instances may be deemed clinically appropriate by providers based on a variety of patient factors not available through claims.

Surveys of physicians suggest that several factors contribute to the delivery of low value care:<sup>vii</sup>

- **Fear of malpractice litigation and practice of defensive medicine**, manifest as orders for tests and treatments to protect physicians from liability. This factor was found to contribute to higher use of imaging tests for patients with low back pain.
- **Perception that patients want or expect** diagnostic tests or medications.
- **Lack of information** about the patient's prior medical history, **borderline medical indications** for services in question or **inadequate time** to spend with patients.
- **Financial incentives of fee-for-service reimbursement or financial conflicts of interest** from physician ownership of surgical, laboratory, or radiological centers.

The impact of each factor is unknown, which makes the identification of strategies for improvement more difficult. For example, research indicates that the practice of defensive medicine, cited as the top reason for delivering low value care, accounts for only a small portion of overall costs.<sup>viii</sup>

Studies of the effectiveness of different types of interventions to reduce low value care can offer some guidance.

## Addressing Low Value Care

Efforts to reduce low value care have included supply-side (physician) and demand-side (patient) interventions. The types of interventions should be tailored to the particular low value care service since each will be differentially affected by diagnostic uncertainty, patient expectations regarding treatment and payment incentives.

Dissemination of guidelines, such as Choosing Wisely, by itself, is insufficient to change provider practice.<sup>ix</sup> Two other interventions have proven more effective, especially when combined:

- **Comparison data and feedback to providers** about their practice patterns and use of low value services benchmarked to their peers can have a positive impact, especially when clinical champions are available to help providers act on the information.<sup>x</sup>
- **Clinical decision support at the point of care** that delivers electronic health record alerts to providers when they order tests and medications that are overused, like tests for screening vitamin D deficiency.<sup>xi</sup>

Because patients occasionally believe more is better and do not know the benefits and risks of many services, **education and decision aids that present patients with treatment options are also critical**. Studies of the impact of decision aids on use of low value services show favorable results.<sup>xii</sup>

In addition to these interventions, **steps by purchasers and payers to reduce low value care should be considered** as payment models that reward reduction in low value care and penalize increases have shown promise.<sup>xiii, xiv</sup> Other strategies, involving changes in coverage policies, payment rates, prior authorization, or network and benefit design all require careful planning to avoid adverse consequences, such as higher administrative costs and ill-will among providers and consumers.

Finally, the increasing trend of **regional coalitions that engage key stakeholders** (providers, consumers, payers and employers) in productive efforts to reduce overuse, like the Choosing Wisely Task Force established by the Washington State Health Alliance, have been very active in promoting the Choosing Wisely recommendations to both patients and providers.<sup>xv</sup>

## Opportunities for Colorado

When addressing the statewide results of this analysis and the experience of other states, Colorado could consider creation of an expert panel of key stakeholders to discuss the low value care measurement results and consider potential interventions and achievable performance benchmarks. Some entities, including state agencies and employer groups, have already expressed interest and engagement in this work and have plans to engage providers to collectively identify solutions to address low value care.

To support collaborative efforts underway and in anticipation of those that may form as a result of this initial report, CIVHC intends to focus future explorations of low value care on actionable analysis that can be used at the provider and community level. While claims data can identify the physician who prescribed a medication, it cannot identify the physician who ordered the test or procedure. So, provider performance feedback will be accomplished using three different methods: reporting by prescribing physician, servicing provider (physician or hospital) and for members attributed to primary care physician practices. In addition, CIVHC is working to produce results for additional subpopulations including members by county and employer group when claims volume allows.

Equipped with specific, actionable information, collaborative innovation can take place to reduce harm to patients and save health care costs.

## Appendix A: Key Concepts - Low Value Care, Overuse, Unnecessary Care and Inappropriate Care

Several different terms are used to describe related concepts – low value care, overuse, unnecessary care and inappropriate care. It is important to define and understand the relationship between these terms because confusion can lead to misinterpretation of the measurement results in this report and to difficulty in identifying strategies to reduce low value care.

In general, **low value care** is care in which the potential harm or cost is greater than the benefit to a patient. But, low value care is sometimes more broadly defined to also include care that is provided in an inefficient manner (e.g., repeated diagnostic testing due to inability of providers to share information).<sup>xvi</sup>

**Overuse and unnecessary or inappropriate care** are also terms used to describe care in which risks exceed the benefits.

Overuse is one category of health care quality, defined by the Institute of Medicine, in addition to categories of underuse and misuse. Quality measurement often focuses on underuse; overuse is more difficult to measure without a clear definition of appropriate care. Utilization is used as an indirect measure of overuse where unexpected variation in the utilization of services that cannot be explained by differences in patient characteristics suggest that a portion of these services are unnecessary or inappropriate.

Overuse is thought to occur on a continuum. At one end are tests and treatments that are universally beneficial (e.g., insulin for patients with Type 1 diabetes). At the other end are services that pose such high risk for physical harm, they should never be provided. In-between is a large gray area where the benefits and harms vary substantially across patients. To further complicate this subject, patient preferences can be important to distinguish overuse from appropriate care in this gray zone.<sup>xvii</sup>

**In this report, we are using low value care to describe overuse or inappropriate care. The guidelines from Choosing Wisely and the USPSTF that are the basis for the measures of low value care identify services that nearly always cause more harm than benefit.**

## Appendix B: List of 48 Measures of Low Value Care

Measure	Guideline Recommendation	Guideline	Population Age	Likely Ordering Physician: Specialist or PCP	Purpose (and Type) of Service	Risk of Patient Harm (High, Med, Low)
<b>Two or more antipsychotic medications</b>	Don't routinely prescribe two or more antipsychotic medications concurrently.	Choosing Wisely	All ages	PCP/SPEC	Disease Treatment (Medications)	M
<b>Opiates in acute disabling low back pain</b>	Don't prescribe opiates in acute disabling low back pain before evaluation and a trial of other alternatives is considered.	Choosing Wisely	≥ 18	PCP	Common Treatments (Medications)	H
<b>PICC stage III–V CKD</b>	Don't place peripherally inserted central catheters (PICC) in stage III–V CKD patients without consulting nephrology.	Choosing Wisely	All ages	SPEC	Disease Treatment (Procedures)	H
<b>Coronary angiography</b>	Don't perform coronary angiography in patients without cardiac symptoms unless high-risk markers present.	Choosing Wisely	≥ 18	SPEC	Screening Tests (Imaging)	M
<b>Imaging tests for eye disease</b>	Don't routinely order imaging tests for patients without symptoms or signs of significant eye disease.	Choosing Wisely	All ages	SPEC	Diagnostic Testing (Imaging)	L
<b>Routine general health checks</b>	Don't perform routine general health checks for asymptomatic adults	Choosing Wisely	18-64	PCP	Screening Tests (Procedures)	L
<b>Preoperative baseline laboratory studies</b>	Don't obtain baseline laboratory studies in patients without significant systemic disease (ASA I or II) undergoing low-risk surgery	Choosing Wisely	≥ 2	SPEC	Preoperative evaluation (Lab Tests)	L
<b>Colorectal cancer screening in adults 50 Years and older</b>	Don't order unnecessary screening for colorectal cancer in adults older than age 50 years.	USPSTF	≥ 50	PCP	Screening Tests (Procedures)	L
<b>Vertebroplasty</b>	Don't perform vertebroplasty for osteoporotic vertebral fractures.	MISC Research	≥ 18	SPEC	Disease Treatment (Procedures)	H
<b>Headache image</b>	Don't do imaging for uncomplicated headache.	Choosing Wisely	≥ 18	PCP	Diagnostic Testing (Imaging)	L

Measure	Guideline Recommendation	Guideline	Population Age	Likely Ordering Physician: Specialist or PCP	Purpose (and Type) of Service	Risk of Patient Harm
<b>Annual resting EKGs</b>	Don't order annual electrocardiograms (EKGs) or any other cardiac screening for low-risk patients without symptoms.	Choosing Wisely	≥ 18	PCP	Screening Tests (Procedures)	M
<b>Cardiac stress testing</b>	Don't perform stress cardiac imaging or advanced non-invasive imaging in the initial evaluation of patients without cardiac symptoms unless high-risk markers are present.	Choosing Wisely	≥ 18	PCP/SPEC	Diagnostic Testing (Cardiac Testing)	M
<b>Renal artery revascularization</b>	Don't perform revascularization without prior medical management for renal artery stenosis.	MISC Research	All ages	SPEC	Disease Treatment (Procedures)	H
<b>Cervical cancer screening in women</b>	Don't order unnecessary cervical cancer screening (Pap smear and HPV test) in all women who have had adequate prior screening and are not otherwise at high risk for cervical cancer	Choosing Wisely	All ages	PCP	Screening Tests (Lab Tests)	M
<b>25-OH-Vitamin D deficiency</b>	Don't perform population based screening for 25-OH-Vitamin D deficiency	Choosing Wisely	All ages	PCP	Screening Tests (Lab Tests)	L
<b>Antibiotics for acute upper respiratory and ear infections</b>	Don't prescribe oral antibiotics for members with upper URI or ear infection (acute sinusitis, URI, viral respiratory illness or acute otitis externa)	Choosing Wisely	≥ 3 months	PCP	Common Treatments (Medications)	L
<b>Lower back pain image</b>	Don't do imaging for low back pain within the first six weeks, unless red flags are present.	Choosing Wisely	≥ 18	PCP	Diagnostic Testing (Imaging)	M
<b>Pediatric head computed tomography scans</b>	Don't order computed tomography (CT) head imaging in children 1 month to 17 years of age unless indicated.	Choosing Wisely	1 month - 17 years	PCP/SPEC	Diagnostic Testing (Imaging)	L
<b>CT Scans for abdominal pain in children</b>	Don't perform Computed tomography (CT) scans in the routine evaluation of abdominal pain.	Choosing Wisely	1-17	PCP/SPEC	Disease Treatment (Imaging)	L
<b>Immunoglobulin G / immunoglobulin E testing</b>	Don't perform unproven diagnostic tests, such as immunoglobulin G (IgG) testing or an indiscriminate battery of immunoglobulin E (IgE) tests, in the evaluation of allergy.	Choosing Wisely	All ages	SPEC	Diagnostic Testing (Lab Tests)	L



Measure	Guideline Recommendation	Guideline	Population Age	Likely Ordering Physician: Specialist or PCP	Purpose (and Type) of Service	Risk of Patient Harm
<b>Arthroscopic lavage and debridement for knee OA</b>	Don't perform an arthroscopic knee surgery for knee osteoarthritis.	MISC Research	$\geq 18$	SPEC	Disease Treatment (Procedures)	M
<b>Repeat CT for kidney stones</b>	Don't order CT scans of the abdomen and pelvis in young otherwise healthy emergency department patients (age <50) with known histories of kidney stones, or ureterolithiasis, presenting with symptoms consistent with uncomplicated renal colic.	Choosing Wisely	$\leq 49$	SPEC	Diagnostic Testing (Imaging)	L
<b>NSAIDs for hypertension, heart failure or CKD</b>	Don't prescribe nonsteroidal anti-inflammatory drugs (NSAIDs) in individuals with hypertension or heart failure or CKD of all causes, including diabetes.	Choosing Wisely	$\geq 18$	PCP	Disease Treatment (Medications)	M
<b>Electroencephalography (EEG) for headaches</b>	Don't perform electroencephalography (EEG) for headaches.	Choosing Wisely	All ages	PCP	Diagnostic Testing (Imaging)	L
<b>Preoperative EKG, chest X ray and PFT</b>	Don't obtain EKG, chest X rays or Pulmonary function test in patients without significant systemic disease (ASA I or II) undergoing low-risk surgery	Choosing Wisely	$\geq 2$	PCP/SPEC	Preoperative evaluation (Imaging)	L
<b>ED CT Scans For dizziness</b>	Don't perform routine head CT scans for emergency room visits for severe dizziness.	MISC Research	$\geq 18$	SPEC	Diagnostic Testing (Imaging)	L
<b>Imaging for uncomplicated acute rhinosinusitis</b>	Don't routinely obtain radiographic imaging for patients who meet diagnostic criteria for uncomplicated acute rhinosinusitis.	Choosing Wisely	All ages	PCP	Diagnostic Testing (Imaging)	L
<b>Syncopal image</b>	Don't obtain brain imaging studies (CT or MRI) in the evaluation of simple syncope and a normal neurological examination.	Choosing Wisely	$\geq 18$	PCP/SPEC	Diagnostic Testing (Imaging)	L

Measure	Guideline Recommendation	Guideline	Population Age	Likely Ordering Physician: Specialist or PCP	Purpose (and Type) of Service	Risk of Patient Harm
<b>Multiple palliative radiation treatments in bone metastases</b>	Don't recommend more than a single fraction of palliative radiation for an uncomplicated painful bone metastasis.	Choosing Wisely	All ages	SPEC	Disease Treatment (Procedures)	M
<b>Preoperative cardiac echocardiography or stress testing</b>	Don't obtain baseline diagnostic cardiac testing or cardiac stress testing in asymptomatic stable patients with known cardiac disease undergoing low or moderate risk non-cardiac surgery	Choosing Wisely	≥ 18	PCP/SPEC	Preoperative evaluation (Cardiac Testing)	M
<b>Imaging of the carotid arteries for simple syncope</b>	Don't perform imaging of the carotid arteries for simple syncope without other neurologic symptoms.	Choosing Wisely	All ages	PCP/SPEC	Diagnostic Testing (Imaging)	M
<b>Coronary artery calcium scoring for known CAD</b>	Don't use coronary artery calcium scoring for patients with known coronary artery disease (including stents and bypass grafts).	Choosing Wisely	≥ 18	PCP/SPEC	Diagnostic Testing (Imaging)	M
<b>Dexa</b>	Don't use dual-energy x-ray absorptiometry (DEXA) screening for osteoporosis in women younger than 65 or men younger than 70 with no risk factors.	Choosing Wisely	Women < 65 Men 50-69	PCP	Screening Tests (Imaging)	L
<b>Cough and cold medicines in children &lt;4 years</b>	Don't prescribe or recommend cough and cold medicines for respiratory illnesses in children under four years of age.	Choosing Wisely	<4	PCP	Common Treatments (Medications)	L
<b>CT head/brain for sudden hearing loss.</b>	Don't order computed tomography (CT) scan of the head/brain for sudden hearing loss.	Choosing Wisely	All ages	PCP/SPEC	Diagnostic Testing (Imaging)	L
<b>Antidepressants monotherapy in bipolar disorder</b>	Don't prescribe antidepressants as monotherapy in patients with bipolar I disorder.	MISC Research	All ages	SPEC	Disease Treatment (Medications)	M
<b>Diagnostics chronic urticaria</b>	Don't routinely do diagnostic testing in patients with chronic urticaria.	Choosing Wisely	All ages	SPEC	Diagnostic Testing (Lab Tests)	L
<b>Antibiotics for adenoviral conjunctivitis</b>	Don't order antibiotics for adenoviral conjunctivitis (pink eye).	Choosing Wisely	All ages	PCP	Common Treatments (Medications)	L

Measure	Guideline Recommendation	Guideline	Population Age	Likely Ordering Physician: Specialist or PCP	Purpose (and Type) of Service	Risk of Patient Harm
<b>MRI for rheumatoid arthritis</b>	Don't perform MRI of the peripheral joints to routinely monitor inflammatory arthritis.	Choosing Wisely	≥ 18	PCP/SPEC	Routine FU/Monitoring (Imaging)	L
<b>PFT prior to cardiac surgery</b>	Don't recommend pulmonary function testing prior to cardiac surgery, in the absence of respiratory symptoms.	Choosing Wisely	≥ 18	PCP/SPEC	Preoperative evaluation (Lab Tests)	L
<b>Oral antibiotics for uncomplicated acute TTO</b>	Don't prescribe oral antibiotics for uncomplicated acute tympanostomy tube otorrhea.	Choosing Wisely	6 months-12 years	PCP	Common Treatments (Medications)	L
<b>Postcoital test for infertility</b>	Don't perform a postcoital test (PCT) for the evaluation of infertility.	Choosing Wisely	All ages	SPEC	Diagnostic Testing (Lab Tests)	N/A
<b>Bleeding time testing</b>	Don't use bleeding time test to guide patient care.	Choosing Wisely	All ages	PCP	Diagnostic Testing (Lab Tests)	L
<b>Sperm function testing</b>	Don't perform advanced sperm function testing, such as sperm penetration or hemizona assays, in the initial evaluation of the infertile couple.	Choosing Wisely	All ages	SPEC	Diagnostic Testing (Lab Tests)	N/A
<b>Inductions of labor or cesarean deliveries</b>	Don't schedule elective, non-medically indicated inductions of labor or Cesarean deliveries before 39 weeks, 0 days gestational age.	Choosing Wisely	8-64	SPEC	Disease Treatment (Procedures)	H
<b>Voiding cystourethrogram for urinary tract infection</b>	Don't perform voiding cystourethrogram (VCUG) routinely in first febrile urinary tract infection (UTI) in children aged 2–24 months	Choosing Wisely	2-24 months	PCP/SPEC	Diagnostic Testing (Imaging)	H
<b>Prostate cancer screening (PSA)</b>	Don't perform PSA-based screening for prostate cancer in all men regardless of age.	USPSTF	All ages	PCP	Screening Tests (Lab Tests)	M
<b>Vision therapy for patients with dyslexia</b>	Don't recommend vision therapy for patients with dyslexia	Choosing Wisely	2-17	PCP	Disease Treatment (Procedures)	L

## Appendix C: Data Tables – Statewide, by Insurance Type and by DOI

### Low Value Care Service Use and Costs – Colorado (Statewide)

Calendar Year	Total Allowed Amount for Low Value Services	Percent Allowed Amount for Low Value Care	Percent Member Liability for Low Value Care	Total No. Services Measured	No. Low Value Services	Low Value Index (lower is better)	Quality Index (higher is better)	Total No. Individuals with a Service Measured	No. Individuals with a Low Value Service	Pct. Individuals with a Low Value Service
2015	\$ 154,075,875	13.5%	9.6%	3,393,802	1,200,386	35.4%	64.6%	1,250,889	643,851	51.5%
2016	\$ 157,035,525	12.0%	10.3%	3,561,795	1,310,782	36.8%	63.2%	1,340,820	718,950	53.6%
2017	\$ 140,472,502	10.8%	12.4%	3,469,279	1,223,020	35.3%	64.7%	1,362,257	716,405	52.6%

### Low Value Care Service Use and Costs – Insurance Type

Calendar Year	Insurance Type	Total No. Services Measured	No. Low Value Services	Low Value Index (lower is better)	Quality Index (higher is better)	Total No. Individuals with a Service Measured	No. Individuals with a Low Value Service	Pct. Individuals with a Low Value Service
2017	Commercial	955,649	411,623	43.1%	56.9%	493,077	284,866	57.8%
	Medicaid	933,449	398,337	42.7%	57.3%	363,637	218,100	60.0%
	Medicare FFS	1,072,114	268,668	25.1%	74.9%	350,712	139,132	39.7%
	Medicare Advantage	501,444	141,913	28.3%	71.7%	188,533	79,885	42.4%

### Low Value Care Service Use and Costs – Division of Insurance Region (Medicaid, Medicare, Medicare Advantage, Commercial)

Calendar Year	DOI Region	Total Allowed Amount for Low Value Services	Percent Allowed Amount for Low Value Care	Allowed Amount PMPM for Low Value Services	Total No. Services Measured	No. Low Value Services	Low Value Index (lower is better)	Quality Index (higher is better)
2017	Boulder	\$ 9,301,338	10.4%	\$ 4.14	186,982	56,278	30.1%	69.9%
	Colorado Springs	\$ 12,550,665	9.3%	\$ 2.42	364,932	130,391	35.7%	64.3%
	Denver	\$ 73,197,464	11.2%	\$ 3.36	1,719,190	590,580	34.4%	65.6%
	East	\$ 5,521,642	13.5%	\$ 2.30	122,855	55,235	45.0%	55.0%
	Fort Collins	\$ 7,615,467	9.0%	\$ 2.99	198,220	67,555	34.1%	65.9%
	Grand Junction	\$ 5,471,154	13.6%	\$ 4.16	106,021	41,735	39.4%	60.6%
	Greeley	\$ 4,761,071	13.1%	\$ 1.95	112,718	51,690	45.9%	54.1%
	Pueblo	\$ 7,299,942	15.9%	\$ 4.59	121,120	55,997	46.2%	53.8%
	West	\$ 7,984,764	10.6%	\$ 2.43	182,718	71,968	39.4%	60.6%

## Appendix D: Measures with the Largest Low Value Care Spending by Insurance Type

Listed in Descending Order (High to Low)

Commercial (87% of Spend)	Medicaid (93% of Spend)	Medicare (96% of Spend)	Medicare Adv. (96% of Spend)	Legend
Routine General Health Checks	Concurrent Use of Two or More Antipsychotic Medications	Concurrent Use of Two or More Antipsychotic Medications	Peripherally Inserted Central Catheters in Stage III-V CKD Patients	Services across all payers
Opioids for Acute Back Pain	Opioids for Acute Back Pain	Opioids for Acute Back Pain	Opioids for Acute Back Pain	Three payers
Peripherally Inserted Central Catheters in Stage III-V CKD Patients	Peripherally Inserted Central Catheters in Stage III-V CKD Patients	Colon Cancer Screening	Concurrent Use of Two or More Antipsychotic Medications	Two payers
Concurrent Use of Two or More Antipsychotic Medications	Antibiotics for Acute Upper Respiratory and Ear Infections	Peripherally Inserted Central Catheters in Stage III-V CKD Patients	Vertebroplasty	One payer
Coronary Angiography	Headache Image	Imaging Tests for Eye Disease	Imaging Tests for Eye Disease	
Annual EKGs or Cardiac Screening	Pediatric Head Computed Tomography Scans	Coronary Angiography	Colon Cancer Screening	
Preoperative Baseline Laboratory Studies	Preoperative Baseline Laboratory Studies	Cardiac Stress Testing	Coronary Angiography	
Headache Image	Routine General Health Checks	Preoperative Baseline Laboratory Studies	Cardiac Stress Testing	
Cervical Cancer Screening in Women	Imaging Tests for Eye Disease	Vertebroplasty	Renal Artery Revascularization	
Screening for 25-OH-Vitamin D Deficiency	Screening for 25-OH-Vitamin D Deficiency	Renal Artery Revascularization	Preoperative Baseline Laboratory Studies	
Lower Back Pain Image	Annual EKGs or Cardiac Screening	Annual EKGs or Cardiac Screening	Annual EKGs or Cardiac Screening	
Renal Artery Revascularization	Coronary Angiography	Headache Image	Headache Image	
Imaging Tests for Eye Disease	CT Scans for Abdominal Pain in Children	Cervical Cancer Screening in Women	Screening for 25-OH-Vitamin D Deficiency	
Vertebroplasty	Renal Artery Revascularization	Immunoglobulin G/ Immunoglobulin E Testing	Lower Back Pain Image	
Antibiotics for Acute Upper Respiratory and Ear Infections	Lower Back Pain Image	Electroencephalography (EEG) for Headaches	NSAIDS for Hypertension, Heart Failure, or CKD	
Cardiac Stress Testing	Cervical Cancer Screening in Women	NSAIDS for Hypertension, Heart Failure, or CKD	Cervical Cancer Screening in Women	
Pediatric Head Computed Tomography Scans	Repeat Computed Tomography for Known Kidney Stones	Lower Back Pain Image	Antibiotics for Acute Upper Respiratory and Ear Infections	

## Appendix E: Top Low Value Care Measure Details

This section provides the detailed definition for each of the 13 measures with the highest spending for low value care. The definitions include the guidelines from which the measure was derived and the Milliman definition of “necessary”, “likely wasteful” and “wasteful” services. Most of this information was obtained from Milliman measure specifications documents.

In addition, the results of multivariate logistic regression analyses, used to model the probability of receiving low value care for each, are presented. The outcome was a binary variable that indicated receipt of low value care (wasteful and likely wasteful) versus necessary care. Covariates considered for each model included gender (male and female), line of business (commercial, Medicaid, Medicare, Medicare Advantage), age (17 or younger, 18-39, 40-64, 65 or older), provider (primary care or specialist), visit type (a combination of claim type and place of service), location (urban or rural), and the Johns Hopkins ACG case-mix risk score. The effect of the covariates on receipt of low value care is measured with an odds ratio which indicates the odds of one group receiving low value care versus the comparison group.

Finally, illustrations of the proportion of “necessary”, “likely wasteful” and “wasteful” services and spending are presented.

### Concurrent Use of Two or More Antipsychotic Medications

Antipsychotic medications are the main class of drugs used to treat people with schizophrenia. They are also used to treat people with psychosis that occurs in bipolar disorder, depression and Alzheimer’s disease.

**The Choosing Wisely recommendations are the source for this measure:**

*Don’t routinely prescribe two or more antipsychotic medications concurrently.*

**Justification:** Research shows that use of two or more antipsychotic medications occurs in four to 35% of outpatients and 30 to 50% of inpatients. However, evidence for the efficacy and safety of using multiple antipsychotic medications is limited, and risk for drug interactions, noncompliance and medication errors is increased. Generally, the use of two or more antipsychotic medications concurrently should be avoided except in cases of three failed trials of monotherapy, which included one failed trial of Clozapine where possible, or where a second antipsychotic medication is added with a plan to cross-taper to monotherapy.

**The potential risk for harm is medium.** Antipsychotic polypharmacy can lead to greater side effects, often without improving clinical outcomes. It can also lead to drug interactions, increased risk for metabolic disorders, increased costs and complex medication regimens, which may lead to medication nonadherence among patients.<sup>xviii</sup>

Milliman defines low value care as patient concurrent use of two or more antipsychotic medications during a period of 30 consecutive days. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients with a prescription for only one antipsychotic medication or for a combination of an antipsychotic medication and lithium.
- **Likely Wasteful:** None
- **Wasteful:** Patients with concurrent use of two or more antipsychotic medications during a period of 30 consecutive days during a 60 day period and not in the above categories

**Important Note:** CIVHC discovered problems with the method Milliman used to produce this measure which resulted in an overestimate of low value care services and spending – some patients were found to be receiving one antipsychotic medication, but in different forms or dosages. Other patients were found to have received failed monotherapy before being prescribed two concurrent antipsychotic medications. As a consequence, CIVHC made some modifications to the measurement results to reduce the impact of these occurrences. The modifications did not completely resolve these problems with the measure, so results should be viewed with caution.

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Gender: Males are more likely to receive low value care than females
- Insurance: Medicare members are the most likely to receive low value care
- Physician Provider: Patients are more likely to receive prescriptions for two or more antipsychotics from a specialist than a primary care provider.

### Concurrent Use of Two or More Antipsychotic Medications, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)





## Opiates for Disabling Low Back Pain

The Choosing Wisely recommendations are the source for this measure:

*Don't prescribe opioids for acute or chronic low back pain before a thorough evaluation, consideration of a trial of alternative medications and treatments, and discussion of the risks of opioid therapy.*

**The potential risk for harm is high.** Early opiate prescriptions in acute disabling low back pain are associated with longer disability, increased surgical rates, and a greater risk of later opioid use.<sup>xix</sup>

Milliman defines low value care as an opioid prescription for patients with a diagnosis of low back pain within the prior 28 days. Necessary, likely wasteful and wasteful are defined as:

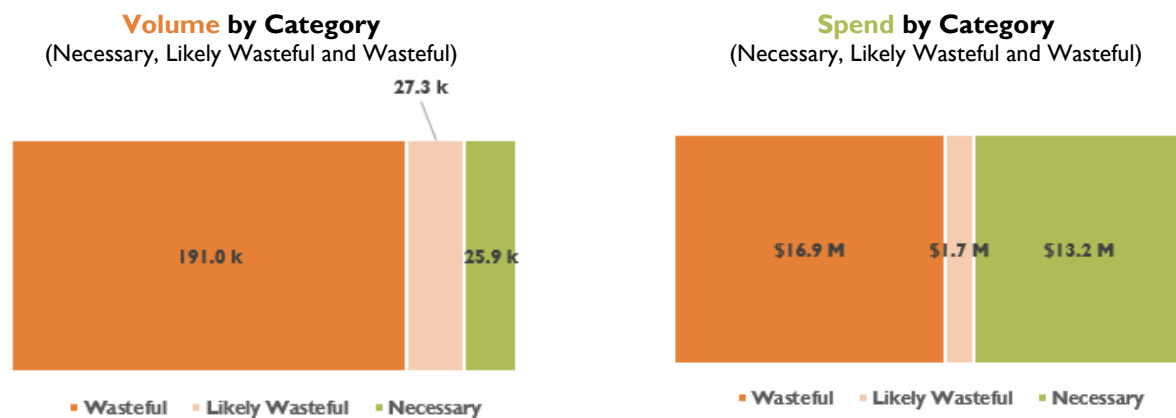
- **Necessary:** Patients with low back pain and a diagnosis of cancer or sickle cell anemia prior to the date of the opioid prescription.
- **Likely Wasteful:** Patients with low back pain and a prescription for non-steroidal anti-inflammatory (NSAID) or tramadol or duloxetine within 90 days prior to the date of the opioid prescription.
- **Wasteful:** Patients with low back pain and an opioid prescription and not in the above categories

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Age: Younger patients are much more likely to be prescribed unnecessary opioids for back pain
- Insurance: Medicaid members are the most likely to receive low value care followed by Commercial, Medicare Advantage, and Medicare

### Opiates for Disabling Low Back Pain, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)





## Peripherally Inserted Central Catheters in State III-IV CKD Patients

The Choosing Wisely recommendations are the source for this measure:

*Don't place peripherally inserted central catheters (PICC) in stage III-V CKD patients without consulting nephrology.*

**Justification:** Venous preservation is critical for stage III–V CKD patients. Arteriovenous fistulas (AVF) are the best hemodialysis access, with fewer complications and lower patient mortality, versus grafts or catheters. Excessive venous puncture damages veins, destroying potential AVF sites. PICC lines and subclavian vein puncture can cause venous thrombosis and central vein stenosis. Early nephrology consultation increases AVF use at hemodialysis initiation and may avoid unnecessary PICC lines or central/peripheral vein puncture.

The potential risk for harm is high.

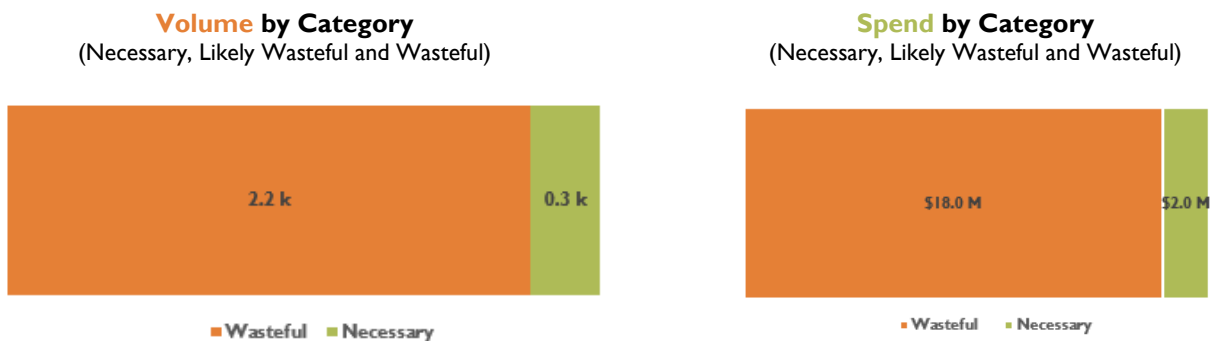
Milliman defines low value care as a PICC line insertion for patients with chronic kidney disease and no nephrology consult within seven days prior to the insertion. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients a diagnosis of chronic kidney disease and a nephrology consult within seven days prior the PICC line insertion.
- **Likely Wasteful:** None.
- **Wasteful:** Patients with a PICC line insertion and chronic kidney disease and not in the above categories.

**Important Note:** CIVHC discovered that PICC lines in chronic kidney disease patients may have been inserted to treat cancer, not establish vascular access for dialysis and therefore may have been necessary.

### Peripherally Inserted Central Catheters in State III-IV CKD Patients, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)



## Coronary Angiography

The Choosing Wisely recommendations are the source for this measure:

*Avoid coronary angiography to assess risk in asymptomatic patients with no evidence of ischemia or other abnormalities on adequate non-invasive testing.*

**Justification:** Asymptomatic patients who have no evidence of ischemia or other abnormalities (for example: arrhythmias) on adequate non-invasive testing are at very low risk for cardiac events. In these patients, coronary angiography is unlikely to add appreciable prognostic value.

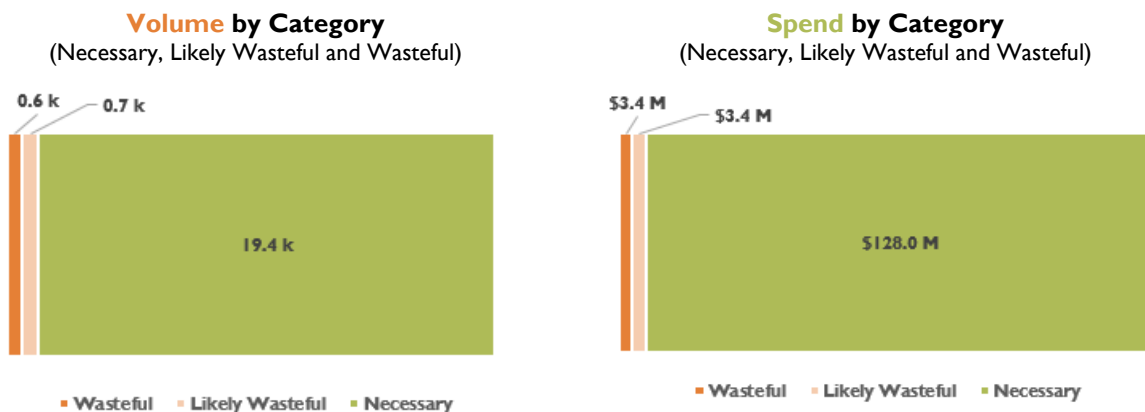
**The potential risk for harm is medium.** Angiography and revascularization are associated with harms, including bleeding, contrast-induced nephropathy, cardiac arrhythmia, stroke, myocardial infarction, coronary artery dissection, allergic reaction to the contrast agent, and death.<sup>xx</sup>

Milliman defines low value care as coronary angiography for patients without a history of cardiac disease and without subsequent cardiac valve surgery. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients with a history of congenital heart anomalies, heart transplant, coronary artery disease, symptoms of cardiac disease or abnormal cardiovascular studies or patients who underwent cardiac valve surgery subsequent to angiography.
- **Likely Wasteful:** Patients with a history of other types of cardiac disease not specified above or abnormal cardiovascular studies
- **Wasteful:** Patients who underwent coronary angiography and are not in the above categories.

### Coronary Angiography, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)



## Imaging Tests for Eye Disease

The Choosing Wisely recommendations are the source for this measure:

*Don't routinely order imaging tests for patients without symptoms or signs of significant eye disease.*

**Justification:** If patients do not have symptoms or signs of significant disease pathology, then clinical imaging tests are not generally needed because a comprehensive history and physical examination will usually reveal if eye disease is present or is getting worse. Examples of routine imaging include: visual-field testing; optical coherence tomography (OCT) testing; retinal imaging of patients with diabetes; and neuroimaging or fundus photography. If symptoms or signs of disease are present, then imaging tests may be needed to evaluate further and to help in treatment planning.

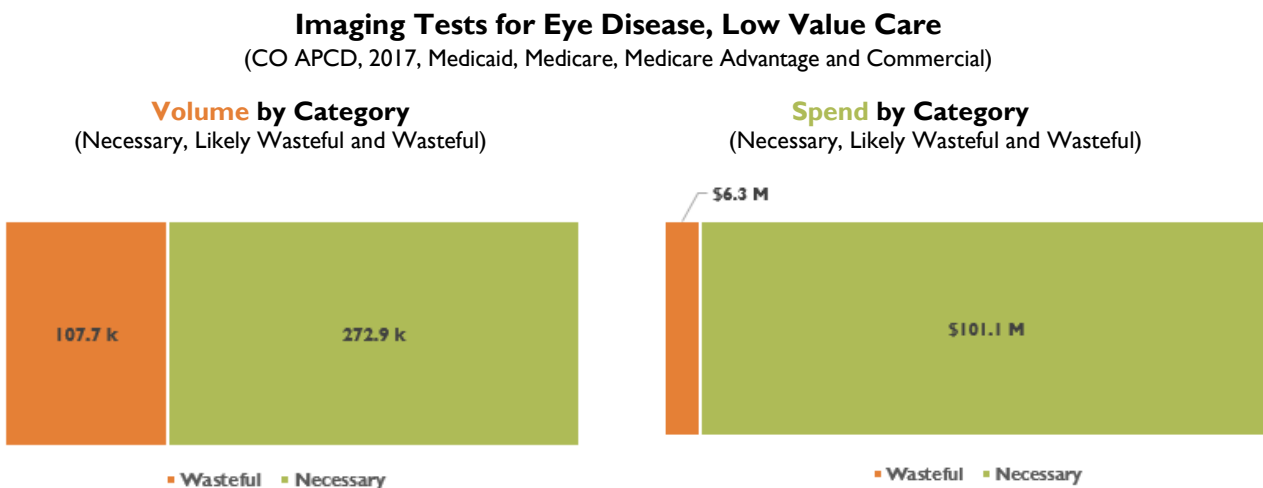
**The potential risk for harm is low.** Harm is associated with the costs of tests.

Milliman defines low value care as the use of an eye imaging test in the absence of significant eye disease (e.g., neoplasms of eye, choroidal detachment, optic atrophy, glaucoma, diabetic retinopathy, macular degeneration). Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who received a specific eye imaging test and had prior diagnosis of eye disease that is an indication for the test and an ophthalmologist visit within 10 days prior to the test
- **Likely Wasteful:** None
- **Wasteful:** Patients who received an eye imaging test and are not in the above categories.

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- **Age:** Patients younger than 18 are more likely to receive imaging tests without a diagnosis of significant eye disease



## Routine General Health Checks

The Choosing Wisely recommendations are the source for this measure:

Don't perform routine general health checks for asymptomatic adults.

Routine general health checks are office visits between a health professional and a patient exclusively for preventive counseling and screening tests. In contrast to office visits for acute illness, specific evidence-based preventive strategies, or chronic care management such as treatment of high blood pressure, regularly scheduled general health checks without a specific cause including the "health maintenance" annual visit, have not shown to be effective in reducing morbidity, mortality or hospitalization, while creating a potential for harm from unnecessary testing.

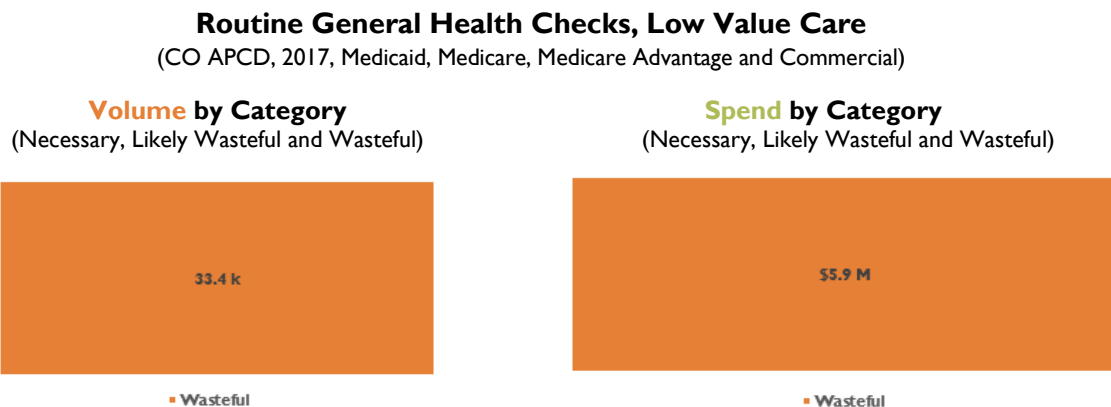
**The potential risk for harm is low.** A Cochrane systematic review and meta-analysis concluded that general health checks promoted over-diagnosis rather than detecting clinically relevant abnormalities, and did not reduce morbidity or mortality from any disease.

Milliman defines low value care as general health checks with no other diagnoses recorded for the general health visit. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who received a general health check with a diagnosis of an acute or chronic condition.
- **Likely Wasteful:** None
- **Wasteful:** Patients who received a general health check and are not in the above categories.

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Insurance: The majority of low value services occur for Commercially-insured members
- Physician Provider: Most low value routine general health checks are performed by a primary care provider



## Preoperative Baseline Laboratory Studies

The Choosing Wisely recommendations are the source for this measure:

*Don't obtain baseline laboratory studies in patients without significant systemic disease (ASA I or II) undergoing low-risk surgery – specifically complete blood count, basic or comprehensive metabolic panel, coagulation studies when blood loss (or fluid shifts) is/are expected to be minimal.*

**Justification:** Performing routine laboratory tests in patients who are otherwise healthy is of little value in detecting disease. Evidence suggests that a targeted history and physical exam should determine whether pre-procedure laboratory studies should be obtained.

**The potential risk for harm is low.** Unnecessary lab tests may result in delays in care and add unnecessarily to the cost of the procedure.

Milliman defines low value care as preoperative baseline laboratory studies prior to low-risk non-cardiac surgery. Patients with endocrine, liver, renal, coagulation disorders or a history of anemia or recent blood loss are excluded, as are patients with electrolyte testing prior to a prescription for medication such as digoxin, diuretics, ACE inhibitor or ARB and patients with a low-risk procedure one day after an emergency, observation or urgent care visit. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who received a preoperative baseline urinalysis with diagnosis of urinary disorder or prior to a urological procedure.
- **Likely Wasteful:** None
- **Wasteful:** Patients who received preoperative baseline laboratory studies and are not in the above categories.

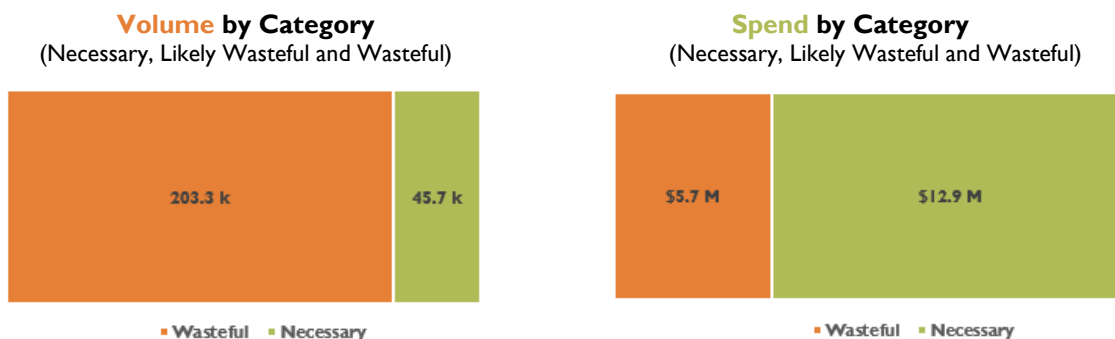
Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Insurance: Patients with commercial insurance are more likely to receive low value care
- Physician Provider: Patients are more likely to receive preoperative baseline lab studies from a primary care physician
- Urban/Rural Geography: Patients in urban locations are more likely to receive low value care.

**Important Note:** CIVHC discovered problems with this measure. Some laboratory studies appeared to be unrelated and incidental to subsequent minor physician office procedures like removal of skin lesions. These incidental services should not have been considered low value care.

### Preoperative Baseline Laboratory Studies, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)



## Colorectal Cancer Screening

The US Preventive Services Task Force is the source for this measure:

*The UPSTF conducted systematic reviews and concluded that screening for colorectal cancer in average-risk, asymptomatic adults aged 50 to 75 years is of substantial net benefit.*

*The recommended intervals for colorectal cancer screening for all over 50 years of age are:*

- Fecal occult blood test (FOBT) every year
- Immunochemical-based fecal occult blood testing (FIT) every year;
- FIT-DNA every 1 or 3 years;
- Flexible sigmoidoscopy every 5 years;
- CT colonography every 5 years;
- Screening colonoscopy every 10 years

More frequent screening is not necessary.

The potential risk for harm is low.

Milliman defines low value care as colorectal cancer screening performed more frequently than recommended. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who received colorectal cancer screening during recommended intervals and not more frequently.
- **Likely Wasteful:** None
- **Wasteful:** Patients who received a colorectal cancer screening and are not in the above categories.

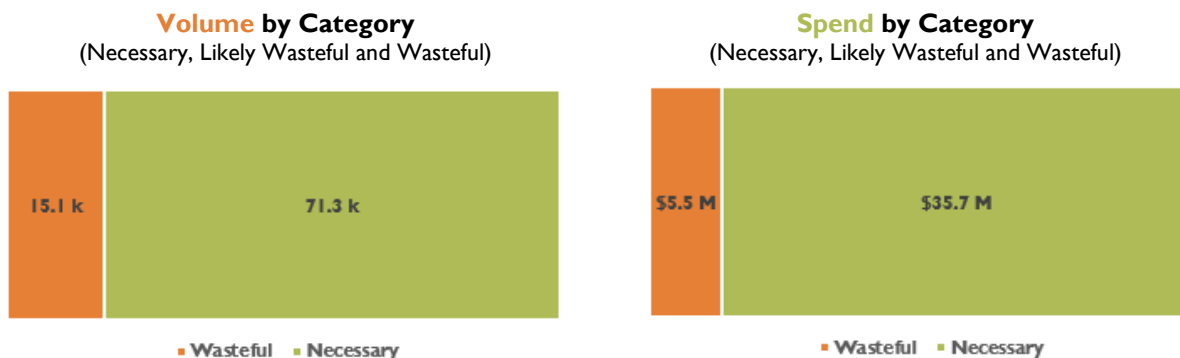
Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Age: Seniors are more likely to receive low value care than older adults
- Insurance: Medicare and Medicare Advantage members are more likely to receive low value care

**Important Note:** CIVHC observed that some colonoscopies were performed in an emergency department, which raises questions about whether they were performed to determine the source of gastrointestinal bleeding and therefore necessary. CIVHC will investigate this measure for validity.

### Colorectal Cancer Screening, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)



## Vertebroplasty

The American Academy of Orthopedic Surgeons is the source for this measure:

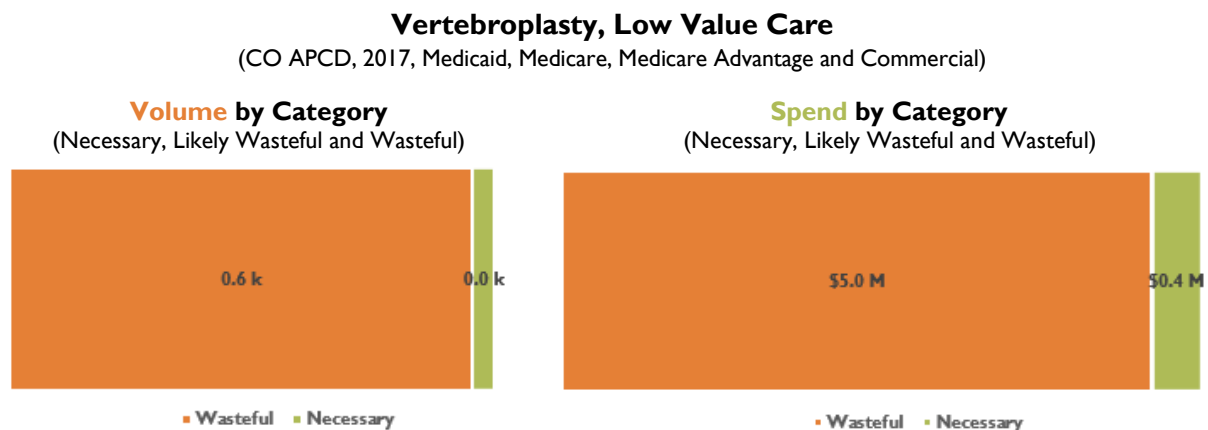
*Don't perform vertebroplasty for osteoporotic vertebral fractures.*

**Justification:** Cochrane Systematic Review does not support a role for vertebroplasty for treating osteoporotic vertebral fractures in routine practice. We found no demonstrable clinically important benefits compared with a sham procedure and subgroup analyses indicated that results did not differ according to duration of pain  $\leq 6$  weeks versus  $> 6$  weeks

**The potential risk for harm is high.** Numerous serious adverse events have been observed following vertebroplasty. However due to the small number of events, we cannot be certain about whether or not vertebroplasty results in a clinically important increased risk of new symptomatic vertebral fractures and/or other serious adverse events. Patients should be informed about both the lack of high quality evidence supporting benefit of vertebroplasty and its potential for harm.<sup>xxi</sup>

Milliman defines low value care as vertebroplasty that is performed for other than several specific spinal or vertebral conditions. Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who received vertebroplasty to treat hemangioma of spine, Kummell disease, multiple myeloma, or eosinophilic granuloma.
- **Likely Wasteful:** None
- **Wasteful:** Patients who received a vertebroplasty and are not in the above categories.



## Imaging for Uncomplicated Headache

The Choosing Wisely recommendations are the source for this measure:

*Don't do imaging for uncomplicated headache.*

**Justification:** Imaging headache patients absent specific risk factors for structural disease is not likely to change management or improve outcome. Those patients with a significant likelihood of structural disease requiring immediate attention are detected by clinical screens that have been validated in many settings. Many studies and clinical practice guidelines concur.

**The potential risk for harm is low.** Incidental findings lead to additional medical procedures and expense that do not improve patient well-being.

Milliman defines low value care as head imaging in members aged 18 years and older with a diagnosis of uncomplicated headache, without any neurological symptoms. Head imaging for these reasons are excluded from the measure: during hospitalization, with diagnosis of cancer, head trauma, complicated sinus/mastoiditis/middle ear disorder.

Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who underwent CT/CTA/MRI/MRA head imaging for complicated headache (thunderclap/Horner syndrome/vertebral dissection; MRI/CT with post-traumatic headache, neurological deficit, epilepsy, ataxia or new headache in pregnancy; MRI with meningitis/encephalitis and chronic conditions (trigeminal headache, immunocompromised); CT/MRI/MRA with cerebrovascular event.
- **Likely Wasteful:** Patients who underwent CT/CTA with raised ESR or temporal arteritis; CT/CTA/MRA with chronic conditions (trigeminal headache, immunocompromised), MRA/CTA with post-traumatic headache, neurological deficit, epilepsy, ataxia; CT with meningitis/encephalitis; MRI with chronic headache.
- **Wasteful:** Patients who received a CT/CTA/MRI/MRA and are not in the above categories.

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Insurance: Commercially-insured and Medicaid members are more likely to receive low value care.

### Imaging for Uncomplicated Headache, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)





## Annual EKGs or Cardiac Screening

The Choosing Wisely recommendations are the source for this measure:

*Don't order annual electrocardiograms (EKGs) or any other cardiac screening for low-risk patients without symptoms.*

**Justification:** Per the UPSTF guideline, a resting or exercise EKG is unlikely to provide additional information about coronary heart disease (CHD) risk beyond that obtained with conventional CHD risk factors (that is, Framingham risk factors) and result in changes in risk stratification that would prompt interventions and ultimately reduce CHD related events.

**The potential risk for harm is medium.** False-positive tests are likely to lead to harm through unnecessary invasive procedures, over-treatment and misdiagnosis.

Milliman defines low value care as annual EKG or other cardiac screening for patients 18 or older who are at low risk or without symptoms. EKGs or cardiac screening for these reasons are excluded from the measure: inflammatory conditions, as part of preoperative testing, performed within 30 days following hospitalization, performed on or after a low-risk surgery.

Necessary, likely wasteful and wasteful are defined as:

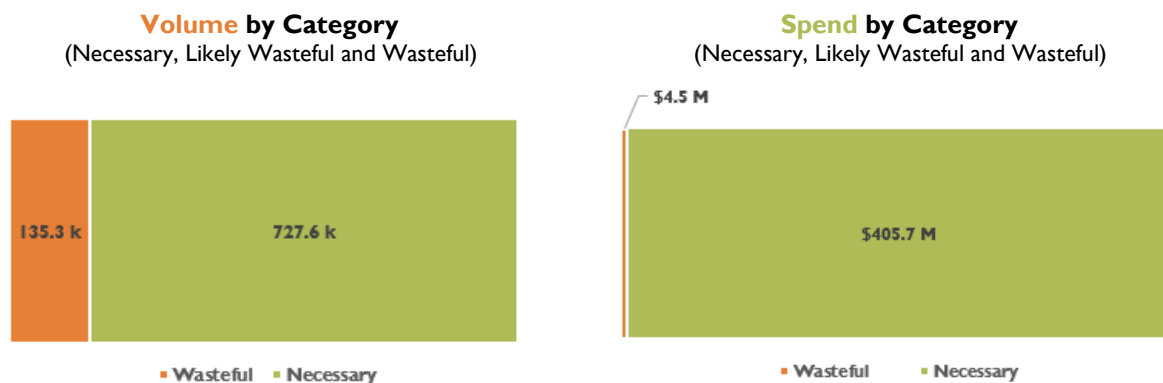
- **Necessary:** Patients who received annual EKG or cardiac screening with high risk markers or risk factors suggestive of CHD and two or more cardiovascular signs and symptoms
- **Likely Wasteful:** None
- **Wasteful:** Patients who received annual EKG or cardiac screening and are not in the above categories.

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Age: Younger patients are much more likely to receive low value care
- Insurance: Commercially-insured members are more likely to receive low value care

### Annual EKGs or Cardiac Screening, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)



## Cardiac Stress Testing

The Choosing Wisely recommendations are the source for this measure:

*Don't perform stress cardiac imaging or advanced non-invasive imaging in the initial evaluation of patients without cardiac symptoms unless high-risk markers are present.*

**Justification:** Asymptomatic, low-risk patients account for up to 45 percent of unnecessary "screening." Testing should be performed only when the following findings are present: diabetes in patients older than 40-years-old; peripheral arterial disease; or greater than 2 percent yearly risk for coronary heart disease events.

**The potential risk for harm is medium.** This practice may, in fact, lead to unnecessary invasive procedures and excess radiation exposure without any proven impact on patients' outcomes. An exception to this rule would be for patients more than five years after a bypass operation.

Milliman defines low value care as all cardiac stress testing (stress EKG, stress echocardiography, stress myocardial perfusion imaging, stress CMR) in members 18 or older in the absence of specific indications.

Necessary, likely wasteful and wasteful are defined as:

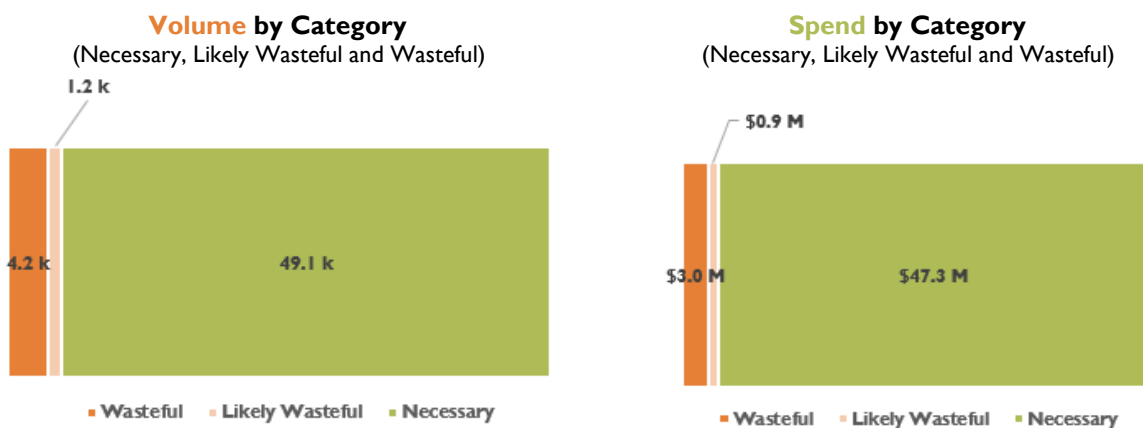
- **Necessary:** Patients who received cardiac stress testing within 30 days following hospitalization or 30 days prior to PCI/CABG or who had acute cardiac symptoms during stress testing or had a history of cardiac conditions and underwent stress radionuclide imaging echo or stress CMR, or underwent stress testing prior to initiation of cardiac rehabilitation.
- **Likely Wasteful:** Patients with cardiac conditions who underwent stress EKG or patients older than age 40 with two or more risk factors for developing coronary artery disease.
- **Wasteful:** Patients who underwent cardiac stress testing and are not in the above categories.

Factors influencing the high percentage of patients that received either likely wasteful or wasteful services are:

- Gender: Male patients are much more likely to receive low value care
- Insurance: Commercially-insured members are more likely to receive low value care

### Annual EKGs or Cardiac Screening, Low Value Care

(CO APCD, 2017, Medicaid, Medicare, Medicare Advantage and Commercial)



## Renal Artery Revascularization

Published evidence from Astral Investigators, CORAL Investigators and the Cochrane Database of Systematic reviews have shown that percutaneous revascularization of the renal arteries improves patency in atherosclerotic renovascular disease, yet evidence of a clinical benefit is limited.

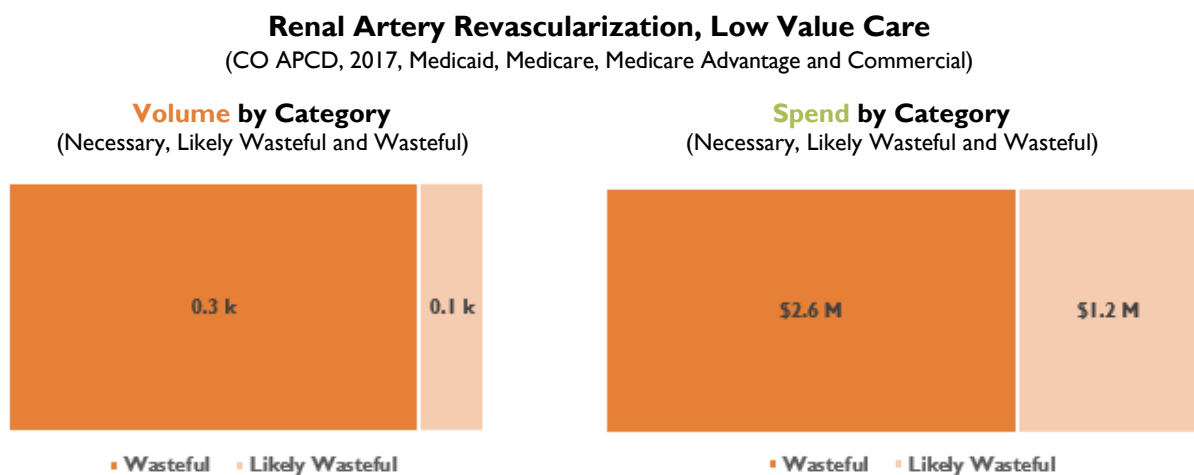
Revascularization carries substantial risk and is not associated with any benefit with respect to renal function, blood pressure, renal or cardiovascular events, or mortality. According to the randomized controlled trials published by the astral investigators, the Cochrane Database of Systematic Reviews and CORAL, there exist substantial risks but no evidence of a worthwhile clinical benefit from revascularization in patients with atherosclerotic renovascular disease. According to the Society for Cardiovascular Angiography and Interventions (SCAI), the clinical scenarios in which endovascular treatment of hemodynamically significant RAS is considered appropriate care are chronic kidney disease, acute coronary syndrome, malignant hypertension or pulmonary edema.

**The potential risk for harm is high.**

Milliman defines low value care as renal artery revascularization in the absence of specific indications (e.g., fibrous dysplasia or uncontrolled hypertension with failure of at least three antihypertensive medications, chronic kidney disease, pulmonary edema, acute coronary syndrome).

Necessary, likely wasteful and wasteful are defined as:

- **Necessary:** Patients who underwent renal revascularization and had a history of fibromuscular dysplasia.
- **Likely Wasteful:** Patients who underwent renal revascularization with a diagnosis of malignant hypertension, chronic kidney disease or pulmonary edema.
- **Wasteful:** Patients who underwent renal revascularization and are not in the above categories.



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