



Healthcare Quality Performance

Use of Imaging Studies for Low Back Pain (LBP)

Patterns of Utilization - 2021 Measurement Year

CMS Qualified Entity (QE) Program

Public Report

November 20, 2024

Who We Are

Komodo Health is a technology company with a mission of reducing the burden of disease. We combine an in-depth view of patient encounters with innovative algorithms and decades of clinical expertise to power our Healthcare Map™, one of the most robust and representative views of the U.S. healthcare system. Using our Healthcare Map, we offer a suite of powerful software applications that enable healthcare industry stakeholders to understand how healthcare is currently delivered and identify high-value interventions that can improve cost-effectiveness, clinical effectiveness, and equity.

What Is the Purpose of This Report?

Komodo Health uses data to measure and quantify healthcare processes in the United States. Komodo focuses specifically on the *effectiveness of* and *equity of access* to high-quality and evidence-based healthcare and provides stakeholders with additional and potentially actionable insights relating to variations in quality or effectiveness of care. Komodo Health uses a combination of standard process and outcome measures developed and endorsed by experts over the past decade, and novel/alternative methods that we have been developing to measure and quantify variations in healthcare processes that may impact clinical effectiveness, efficiency, or outcomes for patients. This report presents a summary of our findings on access to/use of specific evidence-based diagnostic practices in 2021 using a standard process measure from the National Committee for Quality Assurance.

What Are We Measuring?

Komodo measures and quantifies the extent to which patients in the United States are receiving appropriate diagnostic services for health conditions. For this report, Komodo used a Healthcare Effectiveness Data and Information Set (HEDIS®) standard measure that was developed by experts and is reporting on the Measurement Year (MY) 2021. The HEDIS® standard measure included in this report is:

- Use of Imaging Studies for Low Back Pain (LBP)
CMS Measure Type: QE CBE-Endorsed: NCQA

This is the first report from Komodo Health utilizing this measure.

Why Is This Measure Important?

Low back pain is the fifth most common reason for a patient to visit a physician. To support positive patient outcomes, patients must be appropriately evaluated to determine the right next steps for their care. As explained in the American Board of Internal Medicine Foundation's Choosing Wisely® campaign and the American College of Radiology's Appropriateness Criteria® evidence-based

guidelines, diagnostic imaging is not recommended for identifying the cause of low back pain after the initial onset period of symptoms unless further red flags are present. There are a number of reasons for this recommendation:

- Most patients' low back pain will recover on its own
- Imaging may show anatomic abnormalities that prompt further unnecessary interventions as these abnormalities may be benign and/or also present in patients with no back pain.
 - For example, there is a correlation between an increased rate of imaging with an increased rate of surgery
- Additional diagnostic imaging causes unnecessary exposure to radiation and wastes time and resources
- Patient labeling has been shown to worsen patients' sense of well-being
- Studies have found no significant clinical difference in patient outcomes between those who had imaging completed versus those who received the usual care

These guidelines underscore the need for continuous measurement and analysis in order to understand why the utilization of diagnostic imaging continues in the low back pain patient population on a state-by-state, region-by-region, and insurance-type basis.

What Data Did We Use for Measurement?

Komodo combined its internal data sources with the Centers for Medicare & Medicaid Services (CMS) Medicare Fee-For-Service dataset. This enabled us to evaluate and measure processes of care across a diverse group of patients. We also were able to look for differences in how care is delivered to patients depending on where a patient lives and whether they enrolled in a private insurance plan (Commercial), the Medicaid program, or the Medicare program.

Komodo Health's substantial all-payer data assets provided us with a sufficiently large population of eligible patients so that we were able to measure imaging rates at the national, regional, and local levels, stratified by health plan enrollment category. The following is a list of U.S. states/district in which Komodo's combined data produced eligible or relevant patient population cohorts of sufficient size to support measure calculation and reporting:

AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY

How Is the Measure Calculated?

Komodo applied the standard HEDIS[®] measure specification to patients enrolled in any of the following types of health insurance categories: Commercial, Medicaid, Medicaid-Medicare Dual, Medicare Advantage, and Medicare Fee-for-Service. Table 1 briefly summarizes the numerator, the denominator, and the exclusions that were applied prior to calculating imaging rates.

The standard denominator for this HEDIS measure in MY2021 is limited to patients aged 18 to 50

and those who have Commercial or Medicaid insurance. For MY2022, this definition was widened to patients aged 18 to 75. Because of this impending change, we will calculate the metric for both age ranges for MY2021 in this report. The two eligible denominator populations will be named *Strict* and *Expanded* and are defined as beneficiaries who had an outpatient or emergency department (ED) visit with a principal diagnosis of low back pain with the following demographic characteristics:

- **Strict:**
 - Between 18 and 50 years of age
 - Commercial, Medicaid, and Medicaid-Medicare Dual beneficiaries
- **Expanded:**
 - Between 18 and 75 years of age
 - Commercial, Medicaid, Medicaid-Medicare Dual, Medicare Advantage, Medicare Fee-for-Service beneficiaries

Komodo used a combination of enrollment and claims data to assign each patient to a health insurance category. For this analysis, the Commercial-Private category represents a mix of traditional indemnity insurance and managed care product types including PPO, HMO, and EPO. It includes employer-sponsored health plans and qualified health plans available through a state or federal health insurance exchange. The Medicaid-Medicare Dual category represents the program for individuals concurrently (“dually”) eligible for Medicare and Medicaid. Medicaid includes the managed care payment model as well as state-administered fee-for-service programs. Medicaid-Medicare Dual and Medicare Advantage are programs in which services are provided under a managed care payment model. Finally, the Medicare Fee-for-Service category represents the traditional Medicare in which services are not provided under a managed care payment model.

If a patient changed health insurance categories during the measurement year, Komodo assigned them to the health insurance category that was active on the date of the index event. If a patient was concurrently enrolled in Medicare and a commercial supplemental benefit, Komodo assigned that patient to their Medicare category (either Medicare Advantage or Medicare Fee-for-Service). If a patient was enrolled in Medicare for medical coverage but concurrently was participating in the Retiree Drug Subsidy (RDS) Program, Komodo assigned that patient to their Medicare category. Komodo assigned each patient in the eligible population exclusively to one state or territory based on their state of residence on the date of the index event.

Table 1. Summary of inclusion and exclusion criteria. See **Appendix 1** for full details of the HEDIS® measure specifications.

<p>Measure Description</p>	<p>The percentage of adult beneficiaries with a principal diagnosis of low back pain who did not have an imaging study (plain X-ray, MRI, CT scan) within 28 days of the diagnosis.</p> <p>The measure is reported as an inverted rate [1 – (numerator/eligible population)], measuring the proportion of the eligible population for whom imaging studies did not occur. A higher score is better, suggesting that providers are judiciously using imaging in the initial management of uncomplicated low back pain.</p>
<p>Denominator (eligible population)</p>	<p>Non-hospice beneficiaries who had an outpatient or ED visit with a principal diagnosis of low back pain. As explained above, two eligible populations have been defined:</p> <ul style="list-style-type: none"> ● Strict (HEDIS measure for MY2021): <ul style="list-style-type: none"> ○ Between 18 and 50 years of age ○ Commercial and Medicaid (including Medicaid-Medicare Dual) beneficiaries ● Expanded: <ul style="list-style-type: none"> ○ All patients between 18 and 75 years of age ○ Commercial, Medicaid, Medicaid-Medicare Dual, Medicare Advantage, Medicare Fee-for-Service beneficiaries
<p>Numerator</p>	<p>An imaging study with a diagnosis of uncomplicated low back pain on the Index Episode Start Date (IESD) or in the 28 days following the IESD.</p>
<p>Exclusions</p>	<p>Exclude any person who meets any of the following criteria:</p> <ul style="list-style-type: none"> ○ Cancer. Cancer any time during the member's history through 28 days after the IESD. ○ Recent trauma. Trauma any time during the 3 months (90 days) prior to the IESD through 28 days after the IESD. ○ Intravenous drug abuse. IV drug abuse any time during the 12 months (1 year) prior to the IESD through 28 days after the IESD. ○ Neurologic impairment. Neurologic impairment any time during the 12 months (1 year) prior to the IESD through 28 days after the IESD. ○ HIV. HIV any time during the member's history through 28 days after the IESD. ○ Spinal Infection. Spinal Infection any time during the 12 months (1 year) prior to the IESD through 28 days after the IESD. ○ Major organ transplant. Major organ transplant any time in the member's history through 28 days after the IESD. ○ Prolonged use of corticosteroids. 90 consecutive days of corticosteroid treatment any time during the 12 months (1 year) prior to and including the IESD.

What Did We Discover?

Population Overview and Demographics

After applying all inclusion and exclusion criteria, Komodo's Healthcare Map yielded 2,762,395 adults between the ages of 18-75 that met the "Expanded" denominator definition and could be evaluated for imaging studies with a diagnosis of uncomplicated lower back pain.

As shown in Table 2, a total of 1,119,276 adults met the "Strict" definition for the HEDIS metric for Measurement Year 2021 (which was limited to beneficiaries aged 18-50 with Commercial or Medicaid beneficiaries, see boxed cells). Since this metric has been expanded to ages 18-75 for measurement year 2022, to enable comparison of trends in future years we have calculated the measure this year using both the "Strict" definition and the "Expanded" definition for the eligible population, which includes patients aged 18-75 and those covered by Medicare Advantage and Medicare Fee-for-Service insurance.

Table 2: Eligible population who satisfy the strict MY2021 denominator definitions and an expanded denominator definition. The boxed values represent the components that are included in the strict MY2021 denominator definition.

Health Insurance Category	Age 18-50	Age 51-75	Total
Commercial-Private	1,011,958	650,851	1,662,809
Medicaid	68,778	21,862	90,640
Medicaid-Medicare Dual	38,540	166,477	205,017
Strict Population Total	1,119,276		
Medicare Advantage	17,829	404,534	422,363
Medicare FFS	8,659	372,907	381,566
Expanded Population Total	1,145,764	1,616,631	2,762,395

As shown in Tables 3 and 4 and Figures 1 and 2, the female-to-male sex ratios observed in the measurement population were biased toward females overall and especially so within the Medicaid and Medicaid-Medicare Dual Eligible categories. The mean and median ages of the individuals in the Expanded eligible population varied as a function of the health insurance coverage category. Patients in the Commercial-Private and Medicaid categories were younger, with a mean age of 45.0 years and 39.3 years, respectively. Patients in the Medicaid-Medicare Dual category, Medicare Advantage, and Medicare Fee-for-Service categories all had mean ages above 60.

Table 3. Demographics of the Expanded eligible population for MY2021, segmented by health insurance coverage category.

Health Insurance Category	Total Eligible	Mean Age	Median Age	Percent Female	Percent Male
Commercial-Private	1,662,809	45.0	46	51.4%	48.6%
Medicaid	90,640	39.3	38	66.1%	33.9%
Medicaid-Medicare Dual	205,017	60.4	64	64.0%	36.0%
Medicare Advantage	422,363	67.5	69	57.5%	42.5%
Medicare Fee-For-Service	381,566	68.9	70	54.9%	45.1%
Expanded Population Total	2,762,395	52.7	55	54.2%	45.8%

Table 4. Demographics of the Strict eligible population for MY2021, segmented by health insurance coverage category.

Health Insurance Category	Total Eligible	Mean Age	Median Age	Percent Female	Percent Male
Commercial-Private	1,011,958	36.4	37	51.3%	48.7%
Medicaid	68,778	33.5	33	68.2%	31.8%
Medicaid-Medicare Dual	38,540	41.0	42	60.2%	39.8%
Strict Population Total	1,119,276	36.4	37	52.7%	47.3%

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Figure 1. Demographic split of the Expanded eligible population by patient sex and health insurance coverage category. 100% represents 2,762,395 beneficiaries.

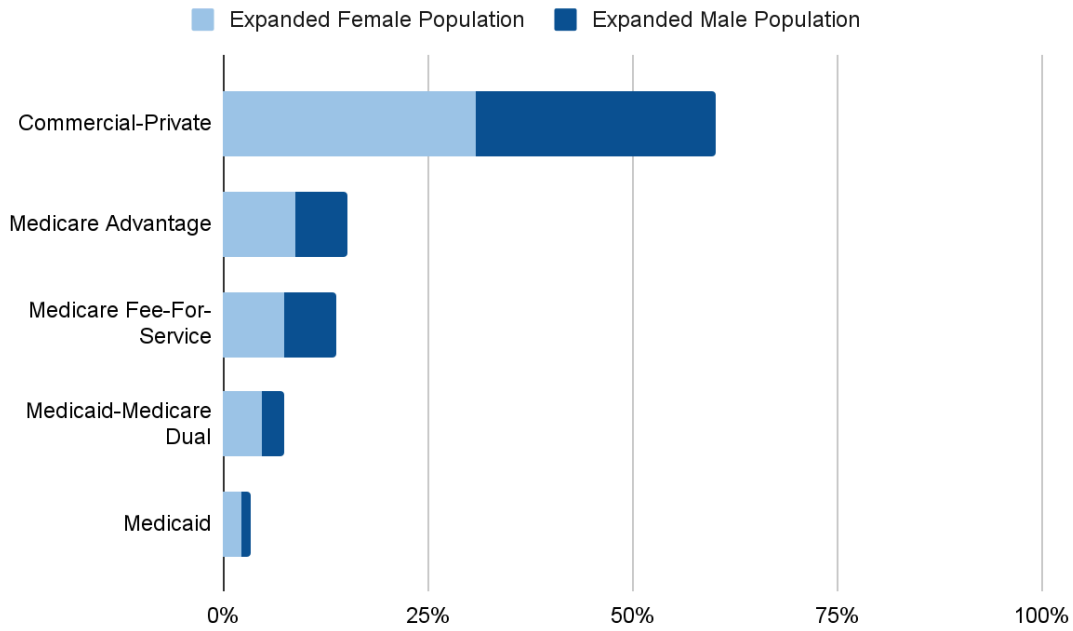


Figure 2. Demographic split of the Strict population by patient sex and health insurance coverage category. 100% represents 1,119,276 beneficiaries.

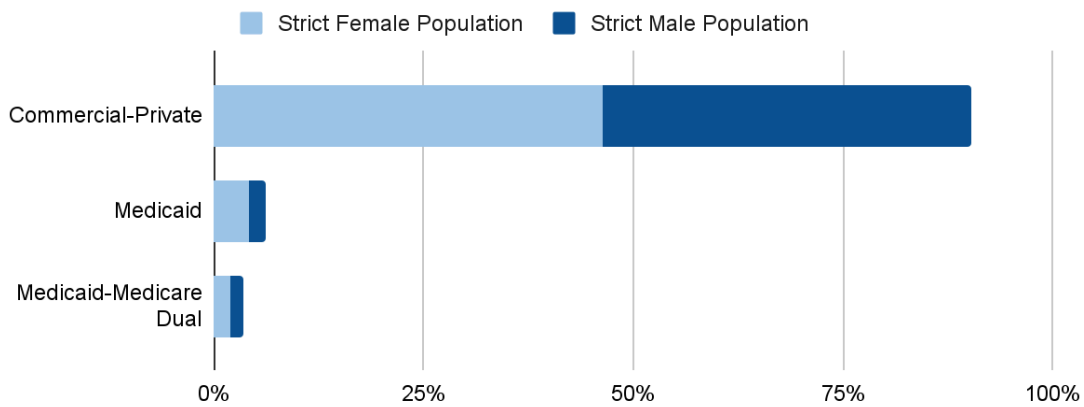
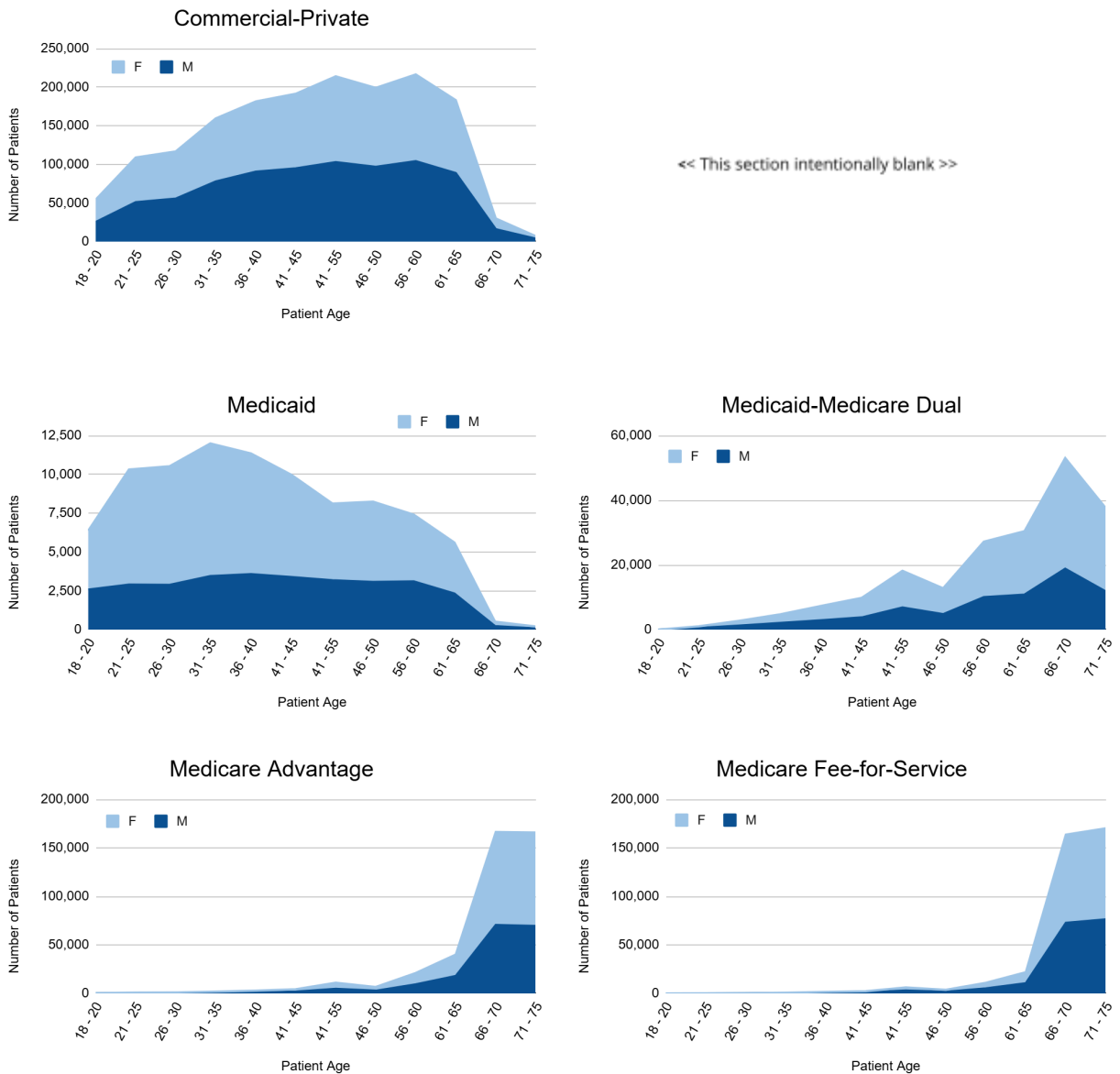


Figure 3 shows the age distributions of the different health insurance coverage categories. Clearly, expanding the age inclusion criteria to 18-75 allows for many more Medicare Advantage, Medicare Fee-for-Service, and Medicaid-Medicare Dual Eligibles to be included in the measurement.

Figure 3: Frequency distribution of patient ages in the eligible population, segmented by health insurance coverage category. Age inclusion criteria create an abrupt left-sided cutoff at 18 years and a right-sided cutoff at 75 years.



Variation Based on Health Insurance Category

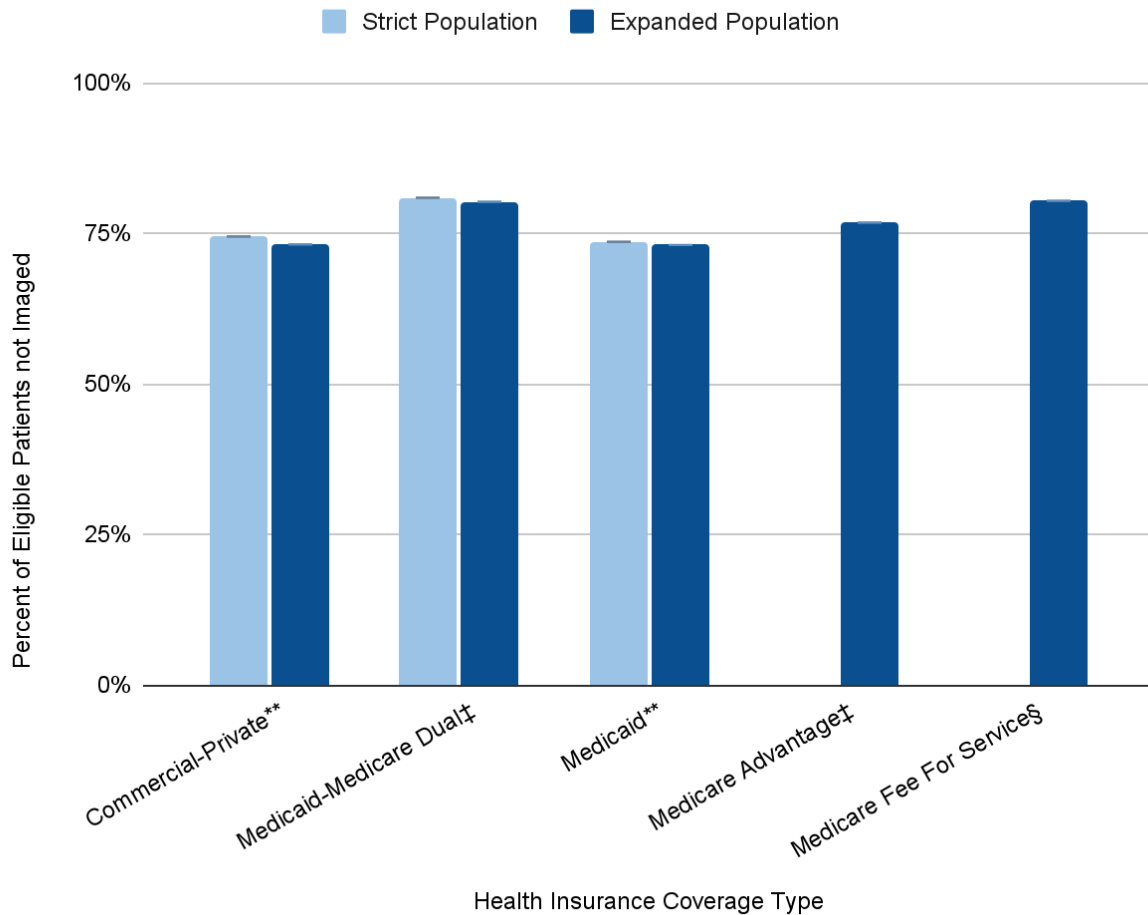
Table 5 and Figure 4 show the summary results for each health insurance category for the two eligible population types. The denominator group, as they meet the eligibility criteria, is referred to as the *eligible population*. The numerator group is a subset of patients from the denominator group who underwent an imaging study with a diagnosis of uncomplicated low back pain on the Index Episode Start Date (IESD) or in the 28 days following the IESD. The numerator group is referred to as the *imaged population*. The measure of interest is the inverse imaging rate (or “*Measure Rate*”), i.e. 1 - numerator / denominator.

Table 5. Summary results for measure rates among the eligible populations segmented by health insurance category.

Health Insurance Category	Total Eligible	Imaged	Measure Rate	Lower Limit*	Upper Limit*
Expanded Population					
Commercial-Private	1,662,809	445,793	73.2	73.12	73.26
Medicaid	90,640	24,398	73.1	72.79	73.37
Medicaid-Medicare Dual	205,017	40,457	80.3	80.09	80.44
Medicare Advantage	422,363	97,929	76.8	76.69	76.94
Medicare Fee-For-Service	381,566	74,652	80.4	80.31	80.56
Strict Population					
Commercial-Private	1,011,958	258,075	74.5	74.41	74.58
Medicaid	68,778	18,138	73.6	73.30	73.96
Medicaid-Medicare Dual	38,540	7,349	80.9	80.54	81.32

* Confidence intervals (CIs) = 0.95 for proportions computed using Clopper–Pearson interval method.

Figure 4. Graphic representation of Table 5 results. Measure rates among the eligible populations segmented by health insurance category. Black bars represent confidence intervals.



** Signifies a mix of indemnity and managed care product types, including PPO, HMO, and EPO.

‡ Signifies exclusively a managed care product type.

§ Signifies exclusively indemnity product type (not managed care).

To estimate the strength of the association between health insurance category and screening and to determine if the variations that we observed were statistically significant, we performed additional analysis. We treated the Medicaid beneficiaries in the Expanded population (those with the lowest measure rate) as our base reference and did a pairwise comparison of the measures. This pairwise analysis is referred to as the relative risk or risk ratio and is defined as the ratio of the probability of a specific outcome in one group compared to another group. It attempts to answer the following specific questions:

- ❖ Compared to patients in the Medicaid of the Expanded population, how much more likely were patients to not receive imaging if they were in each of the following groups (for each age category):
 - Commercial-Private
 - Medicare Advantage
 - Medicaid-Medicare Dual
 - Medicare Fee-for-Service

Although the use of the term risk might suggest that the event or outcome is harmful or undesirable, in this case, the event of interest is not receiving an imaging study within 28 days of the index date, which is consistent with current clinical guidelines for this population. As summarized in Table 6, we found that patients enrolled in a Medicaid-Medicare Dual, Medicare Advantage, or Medicare Fee-for-Service plan were 1.05 to 1.10 times more likely to not receive imaging than patients enrolled in the Medicaid insurance plans represented in our Komodo Health all-payer data map; patients enrolled in a Commercial-Private plan seemed about as likely to not receive an imaging study as the Medicaid patients, with no significant difference observed.

Table 6. Risk ratio of not receiving imaging comparing Medicaid vs. each of the other coverage categories. Refer to text for detailed explanation and interpretation of risk ratios.

Health Insurance Category	Risk Ratio Estimate	Lower Limit at 95% Confidence level	Upper Limit at 95% Confidence level	p-value
Expanded Population				
Commercial-Private	1.002	0.999	1.004	0.479
Medicaid	1	N/A	N/A	N/A
Medicaid-Medicare Dual	1.098	1.096	1.101	<0.001
Medicare Advantage	1.051	1.049	1.053	<0.001
Medicare Fee-For-Service	1.101	1.098	1.103	<0.001
Strict Population				
Commercial-Private	1.019	1.017	1.022	<0.001
Medicaid	1.008	1.004	1.011	0.015
Medicaid-Medicare Dual	1.107	1.104	1.111	<0.001

* Test statistic is a two-tailed z-score (z) defined by the following equation: $z = (p_1 - p_2) / SE$ and used to compare two observed proportions, with $SE_{RR} = RR * \sqrt{SE_{p_1}^2/p_1^2 + SE_{p_2}^2/p_2^2}$

For the following analyses on age, sex, race, ethnicity, and geography, patients from all health insurance categories were grouped together¹

Variation Based on Patient Age

Komodo examined imaging rates by patient age, as summarized in Table 7, by comparing the age range for the “strict” MY2021 denominator definition (18-50) to the newly-added patients (51-75) in the expanded denominator definition which will be used for MY2022.

We selected the 18-50 year old population to serve as the baseline for the risk ratio estimate and p-value calculations laid out in the previous section. While significant (p<0.001), the difference between the age groups is small, with a risk ratio of 1.01.

Table 7. Summary results for measure rates segmented by age. Patients from all health insurance categories were aggregated.

Age Range	Total Eligible	Imaged	Measure Rate	Lower Limit*	Upper Limit*	Risk Ratio Estimate	p-value**
18-50	1,145,764	289,466	74.7	74.66	74.82	1	N/A
51-75	1,616,631	393,763	75.6	75.58	75.71	1.012	<0.001

* Confidence intervals (CIs) = 0.95 for proportions computed using Clopper–Pearson interval method.

** Test statistic is a two-tailed z-score (z) defined by the following equation: $z = (p_1 - p_2) / SE$ and used to compare two observed proportions, with $SE_{RR} = RR * \sqrt{SE_{p1}^2/p1^2 + SE_{p2}^2/p2^2}$

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¹ A set of patients grouped together from all health insurance categories is referred to as an all payer cohort.

Variation Based on Patient Sex

As shown in Table 8, we found female patients had a small (Risk Ratio of 1.02) but significant ($p < 0.001$) higher likelihood of not being imaged as compared to male patients.

Table 8. Summary results for measure rates for the Expanded population segmented by patient sex. Patients from all health insurance categories and ages 18 to 75 were aggregated.

Patient Sex	Total Eligible	Imaged	Measure Rate	Lower Limit*	Upper Limit*	Risk Ratio Estimate	p-value**
Male	1,264,386	323,483	74.4	74.33	74.49	1	N/A
Female	1,498,009	359,746	76.0	75.92	76.05	1.021	<0.001

* Confidence intervals (CIs) = 0.95 for proportions computed using Clopper–Pearson interval method.

** Test statistic is a two-tailed z-score (z) defined by the following equation: $z = (p_1 - p_2) / SE$ and used to compare two observed proportions, with $SE_{RR} = RR * \sqrt{SE_{p_1}^2/p_1^2 + SE_{p_2}^2/p_2^2}$

Variations in Screening Rates Based on OMB Race and Ethnicity Category

Komodo examined imaging rates by race and ethnicity categories. Komodo data had a reliable OMB² race assignment on approximately 71% and a reliable OMB ethnicity assignment on approximately 72% of the total Expanded eligible population.

As shown in Table 9, we found the highest measure rate among the Asian or Pacific Islander population at 78.1% and the lowest among the Black or African American population, at 73.8%. We selected the Black or African American population to serve as the baseline for the risk ratio estimates and p-value calculations. The risk ratio of other known OMB race categories ranged from 1.03 to 1.06 and all differences were significant at the $p < 0.001$ level.

² OMB refers to the Office of Management and Budget (OMB) which sets data collection standards used by the US Department of Health and Human Services (HHS). HHS uses the OMB minimum categories for race and ethnicity in many of its surveys and data collection initiatives relating to evaluation and policy development. For more information, see <https://minorityhealth.hhs.gov/explanation-data-standards-race-ethnicity-sex-primary-language-and-disability>

Table 9. Summary results for measure rates for the Expanded population segmented by OMB Race Category. Patients from all health insurance categories and ages 18 to 75 were aggregated.

OMB Race Category	Total Eligible	Imaged	Measure Rate	Lower Limit*	Upper Limit*	Risk Ratio Estimate	p-value**
Asian or Pacific Islander	86,292	18,939	78.2	77.78	78.33	1.057	<0.001
Black or African American	275,530	72,129	73.8	73.66	73.99	1	N/A
White	1,489,701	362,369	75.7	75.61	75.74	1.025	<0.001
Other	105,431	24,966	76.3	76.06	76.58	1.034	<0.001
Unknown	805,441	204,826	74.6	74.47	74.66	1.010	<0.001

* Confidence intervals (CIs) = 0.95 for proportions computed using Clopper–Pearson interval method.

** Test statistic is a two-tailed z-score (z) defined by the following equation: $z = (p1 - p2) / SE$ and used to compare two observed proportions, with $SE_{RR} = RR * \text{sqrt}(SE_{p1}^2/p1^2 + SE_{p2}^2/p2^2)$

As shown in Table 10, the measure was similar between Hispanic or Latino patients and those who are not Hispanic or Latino. Choosing Hispanic or Latino patients as the baseline resulted in a risk ratio very close to 1, and no statistically significant difference (p = 0.16).

Table 10. Summary results for measure rates for the Expanded population segmented by OMB Ethnicity Category. Patients from all health insurance categories and ages 18 to 75 were aggregated.

OMB Ethnicity Category	Total Eligible	Imaged	Measure Rate	Lower Limit*	Upper Limit*	Risk Ratio Estimate	P-value**
Hispanic or Latino	252,348	61,866	75.5	75.31	75.65	1	N/A
Not Hispanic or Latino	1,724,868	420,633	75.6	75.55	75.67	1.002	0.158
Unknown	785,179	200,730	74.4	74.33	74.53	N/A	N/A

* Confidence intervals (CIs) = 0.95 for proportions computed using Clopper–Pearson interval method.

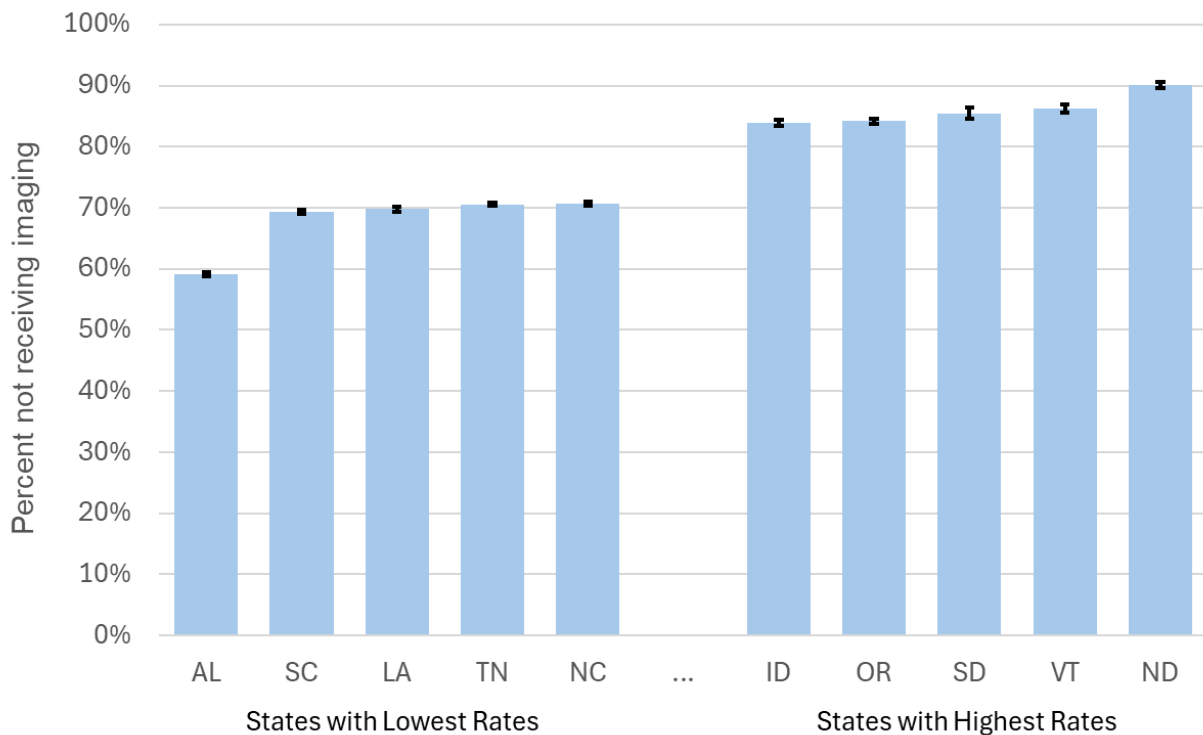
** Test statistic is a two-tailed z-score (z) defined by the following equation: $z = (p1 - p2) / SE$ and used to compare two observed proportions, with $SE_{RR} = RR * \text{sqrt}(SE_{p1}^2/p1^2 + SE_{p2}^2/p2^2)$

Variation Based on State or Territory of Residence

Diagnostic imaging rates varied meaningfully depending on a patient's state or district of residence. Komodo Health only included data from the District of Columbia and the 50 states. We determined that the sample size for each state and district was sufficiently large to detect significant differences in proportion using methods of Fleiss, Tytun, and Ury. Cohort size from U.S. territories was not sufficiently powered to support analysis.

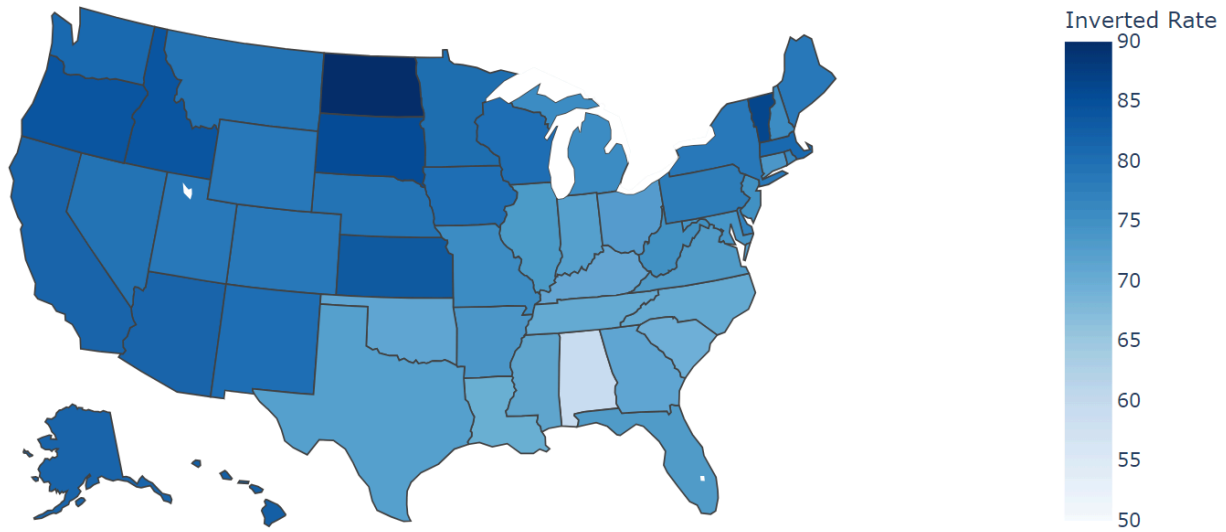
As shown in Figure 5, we observed a 31 percentage point difference between the state with the highest rate (North Dakota) and the state with the lowest rate (Alabama).

Figure 5. Graphic representation of measure rates for the Expanded population by state/district. Patients from all health insurance categories and ages 18 to 75 were aggregated. The five states with the highest measure rates are compared to the five states with lowest measure rates. Black bars represent 95% confidence intervals.



As shown in Figure 6, measure rates tended to be higher in the west and northeast states and lower in the southeast. Rates for each state and district are summarized in Table 11.

Figure 6. Heatmap representation of measure rate for the Expanded population by state/district. Patients from all health insurance categories and ages 18 to 75 were aggregated. Power and sample size for each state were assessed retrospectively and determined to be sufficiently large to detect significant differences in proportion.



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Table 11: Complete list of measure rates for the Expanded population by State/District. Patients from all health insurance categories and ages 18 to 75 were aggregated.

State or District	Measure Rate	State or District	Measure Rate	State or District	Measure Rate
Alabama	59.4	Louisiana	69.8	Oklahoma	71.1
Alaska	81.7	Maine	78.4	Oregon	84.2
Arizona	81.5	Maryland	74.1	Pennsylvania	77.9
Arkansas	73.5	Massachusetts	80.8	Rhode Island	76.6
California	81.5	Michigan	75.5	South Carolina	69.3
Colorado	78.6	Minnesota	80.3	South Dakota	85.4
Connecticut	74.0	Mississippi	71.5	Tennessee	70.6
Delaware	77.3	Missouri	75.8	Texas	72.5
District of Columbia	78.4	Montana	79.4	Utah	78.8
Florida	73.3	Nebraska	79.1	Vermont	86.2
Georgia	71.2	Nevada	79.1	Virginia	73.3
Hawaii	82.5	New Hampshire	75.8	Washington	80.9
Idaho	84.0	New Jersey	75.2	West Virginia	74.6
Illinois	73.4	New Mexico	79.9	Wisconsin	79.8
Indiana	72.3	New York	78.7	Wyoming	79.0
Iowa	79.9	North Carolina	70.7		
Kansas	83.3	North Dakota	90.1		
Kentucky	70.9	Ohio	72.7		

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Discussion of Findings

Komodo Health uses its comprehensive all-payer data assets to measure important indicators of clinical effectiveness, cost-effectiveness, and equity of access to high-quality and evidence-based healthcare across a diverse set of patients, providers, and healthcare systems. Our objectives are to provide stakeholders with additional and potentially actionable insights relating to variations in quality or effectiveness of care.

Three factors enabled comparative analysis and detection of variations. First, Komodo Health was able to evaluate a relatively large number of patients for whom we had a complete longitudinal record of clinical encounters. Second, the number of evaluable patients in each of the Commercial, Medicaid, and Medicare health insurance coverage categories was sufficiently large that the results of the payer-segmented analysis were statistically supported. Finally, the national coverage was complete and the number of evaluable patients in each state and the District of Columbia was sufficiently large that the results of the state-segmented analysis were statistically supported.

Meaningful regional variation was noted in the measure rates in this measure population. Further analysis is needed to determine if there are confounding factors that are driving the difference.

The type of health insurance coverage that a beneficiary has also correlates with measure rates. Medicare patients (whether Medicare Advantage, Medicare Fee-For-Service or Medicaid-Medicare Duals) have slightly higher measure rates as compared to Medicaid-alone or Commercial patients.

There are moderate differences associated with OMB Race categories, with a lower measure rate for Black or African American patients as compared to other groups. Given that there are many potential confounding factors, this warrants further study.

There are also differences associated with patient sex, with the measure rate of women slightly higher than that of men.

Differences between age groups, while statistically significant, were relatively small, which supports changing the measure to encompass 18-75 year old patients for Measurement Year 2022.

These findings suggest the need to examine more extensively the relationship between this eligible population's measure rate and the following:

- Potential drivers of geographic and race category variability, such as comorbidities (e.g. obesity) and access to care (e.g. distance to closest CT/MRI facilities, # of imaging centers)
- Potential confounding factors for the variability by sex, such as relative differences in reported pain severity scores
- Provider knowledge of and incentives (e.g. value based payment) for adherence to guidelines for imaging for low back pain

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Appendix 1: HEDIS[®] measure specifications

Use of Imaging Studies for Low Back Pain (LBP)

Description

The percentage of members with a primary diagnosis of low back pain who did not have an imaging study (plain X-ray, MRI, CT scan) within 28 days of the diagnosis.

Calculation

The measure is reported as an inverted rate $[1 - (\text{numerator}/\text{eligible population})]$. A higher score indicates appropriate treatment of low back pain (i.e., the proportion for whom imaging studies did not occur).

Definitions

Intake Period	January 1–December 3 of the measurement year. The Intake Period is used to identify the first eligible encounter with a primary diagnosis of low back pain.
IESD	Index Episode Start Date. The earliest date of service for an eligible encounter during the Intake Period with a principal diagnosis of low back pain.
Negative Diagnosis History	A period of 180 days (6 months) prior to the IESD when the member had no claims/encounters with any diagnosis of low back pain.

Eligible Population

Note: Members in hospice are excluded from the eligible population. Refer to General Guideline 17: Members in Hospice.

Product line	Commercial, Medicaid (report each product line separately). <i>(Komodo will also compute the measure on Medicare FFS, Medicare Advantage and Medicare-Medicaid Dual Eligible and report each product line separately)</i>
Ages	18 years as of January 1 of the measurement year to 50 years as of December 31 of the measurement year. <i>(Komodo will also compute the measure on an expanded age range of 18 to 75 in line with changes to the MY2022 version of this measure)</i>
Continuous enrollment	180 days (6 months) prior to the IESD through 28 days after the IESD.
Allowable gap	No gaps in enrollment during the continuous enrollment period.

Anchor date IESD.

Benefit Medical.

Event/diagnosis Follow the steps below to identify the eligible population.

Step 1 Identify all members in the specified age range who had any of the following during the Intake Period:

- An outpatient visit (Outpatient Value Set), observation visit (Observation Value Set) or an ED visit (ED Value Set) with a principal diagnosis of uncomplicated low back pain (Uncomplicated Low Back Pain Value Set).
 - Do not include visits that result in an inpatient stay (Inpatient Stay Value Set).
- Osteopathic or chiropractic manipulative treatment (Osteopathic and Chiropractic Manipulative Treatment Value Set) with a principal diagnosis of uncomplicated low back pain (Uncomplicated Low Back Pain Value Set).
- Physical therapy visit (Physical Therapy Value Set) with a principal diagnosis of uncomplicated low back pain (Uncomplicated Low Back Pain Value Set).
- Telephone visit (Telephone Visits Value Set) with a principal diagnosis of uncomplicated low back pain (Uncomplicated Low Back Pain Value Set).
- E-visit or virtual check-in (Online Assessments Value Set) with a principal diagnosis of uncomplicated low back pain (Uncomplicated Low Back Pain Value Set).

Step 2 Determine the IESD. For each member identified in step 1, determine the earliest episode of low back pain. If the member had more than one encounter, include only the first encounter.

Step 3 Test for Negative Diagnosis History. Exclude members with a diagnosis of uncomplicated low back pain (Uncomplicated Low Back Pain Value Set) during the 180 days (6 months) prior to the IESD.

Step 4: Exclude any member who had a diagnosis for which imaging is clinically appropriate. Any of the following meet criteria:

Required exclusions

- **Cancer.** Cancer any time during the member's history through 28 days after the IESD. Any of the following meet criteria:
 - Malignant Neoplasms Value Set.
 - Other Neoplasms Value Set.
 - History of Malignant Neoplasm Value Set.
 - Other Malignant Neoplasm of Skin Value Set.

- *Recent trauma.* Trauma (Trauma Value Set) any time during the 3 months (90 days) prior to the IESD through 28 days after the IESD.
- *Intravenous drug abuse.* IV drug abuse (IV Drug Abuse Value Set) any time during the 12 months (1 year) prior to the IESD through 28 days after the IESD.
- *Neurologic impairment.* Neurologic impairment (Neurologic Impairment Value Set) any time during the 12 months (1 year) prior to the IESD through 28 days after the IESD.
- *HIV.* HIV (HIV Value Set) any time during the member's history through 28 days after the IESD.
- *Spinal infection.* Spinal infection (Spinal Infection Value Set) any time during the 12 months (1 year) prior to the IESD through 28 days after the IESD.
- *Major organ transplant.* Major organ transplant (Organ Transplant Other Than Kidney Value Set; Kidney Transplant Value Set; History of Kidney Transplant Value Set) any time in the member's history through 28 days after the IESD.
- *Prolonged use of corticosteroids.* 90 consecutive days of corticosteroid treatment any time during the 366-day period that begins 365 days prior to the IESD and ends on the IESD.

To identify consecutive treatment days, identify calendar days covered by at least one dispensed corticosteroid (Corticosteroid Medications List). For overlapping prescriptions and multiple prescriptions on the same day assume the member started taking the second prescription after exhausting the first prescription. For example, if a member had a 30-day prescription dispensed on June 1 and a 30-day prescription dispensed on June 26, there are 60 covered calendar days (June 1–July 30).

Count only medications dispensed during the 12 months (1 year) prior to and including the IESD. When identifying consecutive treatment days, do not count days supply that extend beyond the IESD. For example, if a member had a 90-day prescription dispensed on the IESD, there is one covered calendar day (the IESD).

No gaps are allowed.

Corticosteroid Medications

Description	Prescription
Corticosteroid	<ul style="list-style-type: none"> • Hydrocortisone • Cortisone • Prednisone • Prednisolone • Methylprednisolone • Triamcinolone • Dexamethasone • Betamethasone

Step 5 Calculate continuous enrollment. Members must be continuously enrolled for 180 days (6 months) prior to the IESD through 28 days after the IESD.

Administrative Specification

Denominator	The eligible population.
Numerator	An imaging study (<u>Imaging Study Value Set</u>) with a diagnosis of uncomplicated low back pain (<u>Uncomplicated Low Back Pain Value Set</u>) on the IESD or in the 28 days following the IESD.

Note

- *Although denied claims are not included when assessing the numerator, all claims (paid, suspended, pending and denied) must be included when identifying the eligible population.*
- *Do not include supplemental data when identifying the eligible population or assessing the numerator. Supplemental data can be used for only required exclusions for this measure.*

Appendix 2: Glossary of Terms and Abbreviations

CBE. Consensus-Based Entity (CBEs) that endorses measures for public reporting

CMS. Centers for Medicare & Medicaid Services.

Cohort. A specific sub-group of a larger population defined by a specific characteristic. Characteristics defining group membership may be one or a combination of factors thought to potentially influence the outcome of interest. Examples of characteristics that define a cohort include age, race, health insurance coverage, state of residence, etc..

Coverage. A term used by healthcare insurers and health plan sponsors to refer to enrollment and continued eligibility for a specific, defined set of healthcare benefits. Coverage can be segmented into *medical benefit coverage*, *prescription drug benefit coverage*, and possible other subsets of healthcare benefits. In the case of employer-sponsored health insurance benefits, eligibility and enrollment is based on employment status with an employer-sponsored and election into a specific benefit. In the case of Medicaid, eligibility and enrollment is based on residency in the state that is sponsoring the health benefit, combined with other criteria such as income, gender, disability status, possibly work status, and other state-specific criteria. In the case of Medicare, eligibility and enrollment is based on age and disability status or end-stage renal disease status; for some benefits, eligibility and enrollment also requires election into and purchase of a specific benefit.

Employer-Sponsored Coverage. Health insurance or a healthcare benefit offered to a person as a benefit relating to their employment status or the employment status of a spouse, parent, or civil partner.

EPO. Exclusive Provider Organization

HEDIS.[®] Healthcare Effectiveness Data and Information Set. A set of standard metrics quantified using data and designed to measure quality across 6 domains of care: Effectiveness of Care, Access/Availability of Care, Experience of Care, Utilization and Risk-Adjusted Utilization, Health Plan Descriptive Information, Measures Collected Using Electronic Clinical Data Systems.

HMO. Health Maintenance Organization.

IESD. Index Episode Start Date

LBP. Lower back pain

Medicaid. A joint federal- and state-sponsored health insurance program that provides healthcare coverage to eligible low-income adults, children, pregnant women, elderly adults, and people with disabilities. Medicaid is often used to refer to a collection of distinct programs that includes Medicaid Fee-for-Service, Medicaid Managed Care, Medical Assistance, and Children's Health Insurance Plan

(CHIP). It also includes patients, referred to as “dual eligibles,” who concurrently qualify for benefits covered under both the Medicare and Medicaid plans.

MY. Measurement Year. Each metric has a definition that is specific to a given calendar year.

NCQA. National Committee for Quality Assurance, an independent organization that administers evidence-based standards, measures, programs, and accreditation

PPO. Preferred Provider Organization

QE. The Qualified Entity Certification Program, administered by Centers for Medicare & Medicaid Services, allows organizations to access Medicare claims data to evaluate and publicly report on performance