

MRI Lumbar Spine for Low Back Pain (OP-8)
2017 Annual Reevaluation Report

Produced by
Yale-New Haven Health Services Corporation/Center for Outcomes Research and Evaluation
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The Lewin Group

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Center for Outcomes Research & Evaluation (CORE) Project Team

Elizabeth Drye, M.D., S.M. – Contract Director

Lori Geary, M.P.H. – Associate Director

Megan LoDolce, M.A. – Project Manager

Arjun Venkatesh, M.D., M.B.A., M.H.S. – Lead

Melissa A. Davis, M.D. – Lead

Hayley Dykhoff, B.A. – Coordinator

Erin Singleton, M.P.H. – Coordinator

Kofi Dwamena – Research Support

Zhenqiu Lin, Ph. D – Analytic Lead

Haikun Bao, Ph. D – Analyst

Kanchana Bhat, M.P.H. – Additional Support

The Lewin Group Project Team

Charlie Bruetman, M.D., M.B.A. – Lewin Project Director

Colleen McKiernan, M.S.P.H. – Lewin Project Manager

Brandon Maughan, M.D., M.H.S., M.Sc – Clinical Lead

Kelly Anderson, M.P.P. – Senior Task Lead

Yvette Bodrick, M.H.S. – Task Lead

Alexis Estomin, B.A. – Task Lead

Madison Davidson, M.P.H.

Riley O'Shea, M.S.

Lauren Cricchi, B.A.

Bennett Stephens, B.A.

Claire Russell, B.A.

MRI Lumbar Spine for Low Back Pain—Annual Reevaluation Report

Section 1: How to Use this Report

This report describes the Centers for Medicare & Medicaid Services' (CMS) Outpatient Imaging Efficiency measure, *MRI Lumbar Spine for Low Back Pain* (OP-8), used in the Hospital Outpatient Quality Reporting (HOQR) Program and publicly reported on [Hospital Compare](#).

This report provides an overview of the measure methodology and the national results for 2017 public reporting. The appendices provide detailed specifications for the measure, including references to code lists for the measure's initial patient population, numerator criteria, and excluded groups.

Specifically, the report includes

- [Section 1](#): How to Use this Report
- [Section 2](#): Background and Overview of Measure Methodology
 - Background on Outpatient Imaging Efficiency measures
 - Clinical rationale for OP-8
 - Measure methodology, including initial patient population, excluded conditions, and numerator criteria
 - Data sources
 - Measure calculation
- [Section 3](#): Results from 2017 Public Reporting
 - 2017 summary statistics (for all facilities and those meeting minimum case count)
 - OP-8 longitudinal performance
- [Section 4](#): Results from 2016 Environmental Scan/Literature Review (ES/LR)
 - ES/LR methods
 - ES/LR results
 - Conclusions

The Appendices contain detailed measure information, including

- [Appendix A](#): Measure specifications, including code lists for numerator and denominator inclusion and exclusion
- [Appendix B](#): OP-8 annual updates
- [Appendix C](#): Minimum case count rationale and methodology
- [Appendix D](#): References
- [Appendix E](#): Glossary of terms used in this report

Additional information is available on the *Measures* page of [QualityNet](#).

Section 2: Background and Overview of Measure Methodology

CMS began developing measures evaluating imaging efficiency in 2007; the rationale for doing so was four-fold: to promote high-quality, efficient care; to reduce unnecessary exposure to contrast materials and/or radiation; to ensure adherence to evidence-based medicine and practice guidelines; and, to provide data to consumers and other stakeholders about facility imaging use. CMS adopted OP-8, *MRI Lumbar Spine for Low Back Pain* during the Outpatient Prospective Payment System (OPPS) Final Rule for Calendar Year 2010; public reporting for OP-8 began in July 2011. Outpatient Imaging Efficiency measure results are posted on [Hospital Compare](#) annually. The updates and specification reports for all measures are posted on [QualityNet](#).

CMS has contracted with the Yale-New Haven Health Services Corporation/Center for Outcomes Research and Evaluation (CORE) and The Lewin Group (Lewin) to maintain the *MRI Lumbar Spine for Low Back Pain* measure. OP-8 is reevaluated annually by responding to stakeholder input and incorporating advances in the science or changes in coding.

2.1 Clinical Rationale

OP-8 calculates the percentage of MRI of the lumbar spine studies with a diagnosis of low back pain on the imaging claim, for which the beneficiary did not have prior claims-based evidence of antecedent conservative therapy. Antecedent conservative therapy may include:

- Claim(s) for physical therapy in the 60 days preceding the lumbar spine MRI.
- Claim(s) for chiropractic evaluation and manipulative treatment in the 60 days preceding the lumbar spine MRI.
- Claim(s) for evaluation and management (E&M) (office visits) in the period >28 days and <60 days preceding the lumbar spine MRI.

This measure aligns with the care coordination and effective clinical care domains of the National Quality Strategy (NQS).

Acute low back pain, with or without radiculopathy, is one of the most common health problems in the United States (Bradley 2007). It is estimated that the prevalence of low back pain in North America at a given time is 5.6% (Loney and Stratford 1999). According to the American College of Radiology (ACR), uncomplicated acute low back pain is a benign, self-limited condition that warrants no imaging studies (Bradley 2007). Despite consensus that there is little value in diagnostic imaging for acute low back pain, significant practice variation exists for imaging resources, including X-ray imaging, CT, MRI, bone scans, and ultrasound imaging (Modic et al. 2005). Such use has important cost implications, largely due to the high cost of imaging studies and specialty referrals (Rao et al. 2002). The cost of evaluating and treating acute low back pain runs into billions of dollars annually, not including time lost from not working (Luo et al. 2004).

2.2 Overview of Measure Methodology

This section contains an overview of the measure's initial patient population, including conditions for which beneficiaries are excluded from the measure; description of the measure numerator, data sources, and measure calculation.

2.2.1 Initial Patient Population

Outpatient Imaging Efficiency measures apply only to Medicare beneficiaries enrolled in original, fee-for-service (FFS) Medicare who were treated as outpatients in hospital facilities reimbursed through the OPPS. These measures do not include Medicare managed care beneficiaries, non-Medicare patients, or beneficiaries who were admitted to the hospital as inpatients.

Beneficiaries included in the measure's [initial patient population](#) had documentation of MRI of the lumbar spine studies with a diagnosis of low back pain on the imaging claim performed at the hospital outpatient department within a one-year window of claims data. Beneficiaries can be included in the measure's initial patient population multiple times; each MRI lumbar spine study with a diagnosis of low back pain on the imaging claim performed at a facility measured by OPPS is counted once in the measure's [denominator](#).

[Appendix A](#) includes additional information on the measure's initial patient population, such as codes used to define the denominator population.

2.2.2 *Excluded Conditions*

The Outpatient Imaging Efficiency measures are not risk adjusted; instead, beneficiaries who have a clinical diagnosis of one or more conditions for which imaging is considered appropriate are [excluded](#) (removed from the denominator, and, thus, also removed from the numerator) from the measure.

For OP-8, beneficiaries with a history of certain red-flag conditions are excluded from the measure. These include: beneficiaries with lumbar spine surgery in the 90 days prior to the MRI, cancer, congenital spine and spinal cord malformations, inflammatory and autoimmune disorders, infectious conditions, spinal vascular malformations and/or the cause of occult subarachnoid hemorrhage, spinal cord infarction, neoplastic abnormalities, treatment fields for radiation therapy, spinal abnormalities associated with scoliosis, syringohydromyelia, postoperative fluid collections and soft tissue changes, trauma, intravenous (IV) drug abuse, neurologic impairment, human immunodeficiency virus (HIV), unspecified immune deficiencies, and intraspinal abscess. Thus, any beneficiary with a history of one or more of these conditions is excluded from the measure.

[Appendix A](#) includes additional information on the measure's excluded conditions, such as look-back periods and codes used to define each condition.

2.2.3 *MRI Lumbar Spine Scans with No Antecedent Conservative Therapy [Numerator Criteria]*

To meet the [numerator](#) criteria, beneficiaries from the initial patient population have MRI of the lumbar spine studies with a diagnosis of low back pain without the beneficiary having claims-based evidence of prior antecedent conservative therapy counted in the measure's denominator. Not performing antecedent conservative therapy prior to imaging (for beneficiaries not excluded from the measure) may be a reflection of poor quality of care and overuse of diagnostic imaging.

[Appendix A](#) includes additional information on the measure's numerator.

2.3 *Data Sources*

CMS calculates Outpatient Imaging Efficiency measures using data from final claims that facilities submit for Medicare beneficiaries enrolled in FFS Medicare. The data are calculated only for facilities paid through the OPFS for MRI lumbar spine studies performed in the hospital outpatient setting. Due to claims adjudication, there is a lag between when an imaging study is performed and when it is reported on Hospital Compare; the data collection period for values reported on Hospital Compare in July 2017 ran from July 2015 through June 2016.

2.4 *Measure Calculation*

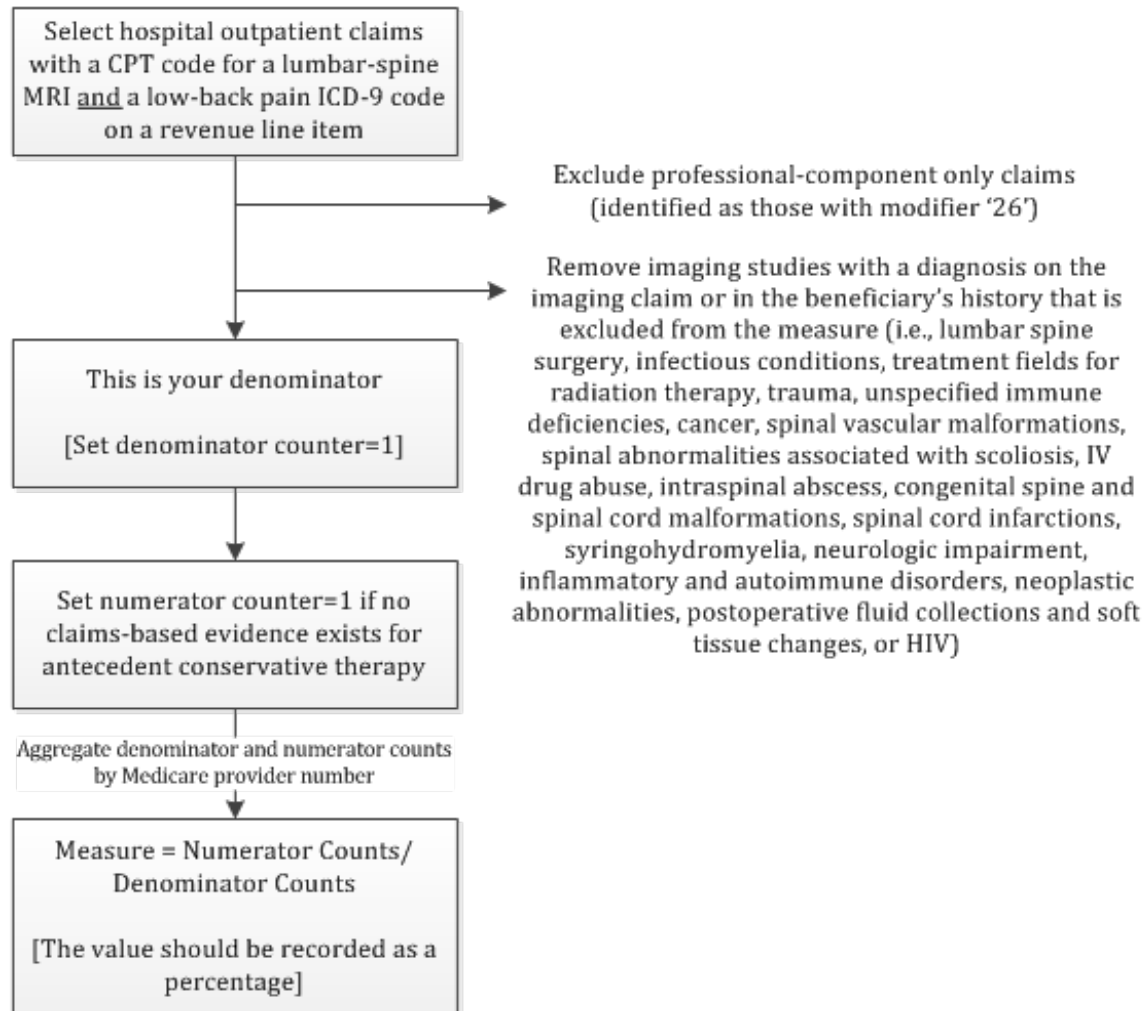
This measure calculates the percentage of MRI of the lumbar spine studies with a diagnosis of low back pain on the imaging claim and for which the beneficiary did not have prior claims-based evidence of antecedent conservative therapy.

The measure's denominator contains any Medicare beneficiary (not excluded from the initial patient population because of a diagnosis or procedure for which the imaging may be appropriate) who underwent any number of MRI of the lumbar spine studies with a diagnosis of low back pain on the imaging claim during a one-year time window of claims data. From these beneficiaries, the numerator contains beneficiaries undergoing MRI of the lumbar spine studies with a diagnosis of low back pain without the beneficiary having claims-based evidence of prior antecedent conservative therapy.

For the Outpatient Imaging Efficiency measures, lower scores are better, which means a high-performing facility reports a value near zero, whereas facilities that may be performing too many inappropriate MRI lumbar spine studies score closer to 100%. [Section 3.3](#) contains additional information on longitudinal trends in facility performance.

Figure 1, below, provides the calculation algorithm used to assess provider performance.

Figure 1: OP-8 Calculation Algorithm



Section 3: Results from 2017 Public Reporting

In 2017, 4,824 facilities were eligible to report OP-8. Of these, 1,542 facilities performed enough outpatient lumbar spine MRI studies to meet [minimum case count](#) requirements, and, thus, were eligible for inclusion in public reporting. The following sections provide summary information on national performance data for all facilities, as well as for those who met minimum case count requirements.

3.1 2017 Summary Statistics (All Facilities)

For the 4,824 facilities eligible to report OP-8 in the HOQR Program for 2017, the national median performance rate was 40.5% (interquartile range [IQR] 33.3%–50.0%), and ranged from 0.0% to 100.0% from the 1st percentile to the 99th percentile. These numbers suggest there is a large range in facility performance. *Table 1*, below, provides summary data for the distribution of performance scores across these facilities.

Table 1: Distribution of OP-8 Performance Data for All Facilities (2017)

National Distribution (Percentile)	Facility Performance Score (%)
1 st	0.0
5 th	17.6
10 th	25.0
25 th	33.3
50 th	40.5
75 th	50.0
90 th	60.0
95 th	71.4
99 th	100.0

The number of denominator cases seen in these facilities varied significantly, ranging from 0 to 262 from the 1st percentile to the 99th percentile (IQR 5–54); this means that some facilities perform a greater number of inappropriate lumbar spine MRI studies, while others perform very few. *Table 2*, below, provides a distribution of facility denominator counts for all facilities eligible for OP-8 reporting.

Table 2: Distribution of OP-8 Denominator Cases for All Facilities (2017)

National Distribution (Percentile)	Facility Denominator Count (# of Cases)
1 st	0
5 th	0
10 th	0
25 th	5
50 th	21
75 th	54
90 th	108
95 th	154
99 th	262

3.2 2017 Summary Statistics (Minimum Case Count)

Like all publicly reported quality measures, the Outpatient Imaging Efficiency measures impose a minimum case count requirement at the facility level to ensure reliability of the facility's performance score. OP-8 minimum case count requirements are described in more detail in [Appendix C](#).

For the 2017 public reporting period, 37.4% (1,542) of facilities met the minimum case count requirements for public reporting. Distribution of facility performance scores ranged from 24.7% to 59.6% from the 1st percentile to the 99th percentile, with a median national performance rate of 40.3% (IQR 35.7%–44.4%); as was seen in *Table 1*, above, these numbers suggest that there is substantial variation in hospital performance. *Table 3*, below, provides a distribution of facility performance for those facilities the meeting minimum case count.

Table 3: Distribution of OP-8 Performance Data for Facilities Meeting Minimum Case Count (2017)

National Distribution (Percentile)	Facility Performance Score (%)
1 st	24.7
5 th	29.2
10 th	31.7
25 th	35.7
50 th	40.3
75 th	44.4
90 th	50.0
95 th	52.8
99 th	59.6

Denominator counts for these 1,542 facilities ranged from 34 to 347 from the 1st percentile to the 99th percentile (IQR 56–122); shown in *Table 2*, above, this means that some facilities perform a great number of lumbar spine MRI studies, while others perform very few. *Table 4*, below, summarizes the distribution of facility case counts.

Table 4: Distribution of OP-8 Denominator Cases for Facilities Meeting Minimum Case Count (2017)

National Distribution (Percentile)	Facility Denominator Count (# of Cases)
1 st	34
5 th	39
10 th	43
25 th	56
50 th	81
75 th	122
90 th	185
95 th	225
99 th	347

Facility performance scores and denominator counts, with and without application of the minimum case count, are compared in *Figure 2* and *Figure 3* (below), respectively; these graphs reflect results taken from the tables included above and show that the distribution of both performance rates and denominator case counts are affected when a minimum case count is applied, with performance rates decreasing and denominator case counts increasing following minimum case count application.

Figure 2: Distribution of 2017 OP-8 Performance Rates, Comparing the Distribution for All Facilities v. Those Meeting Minimum Case Count

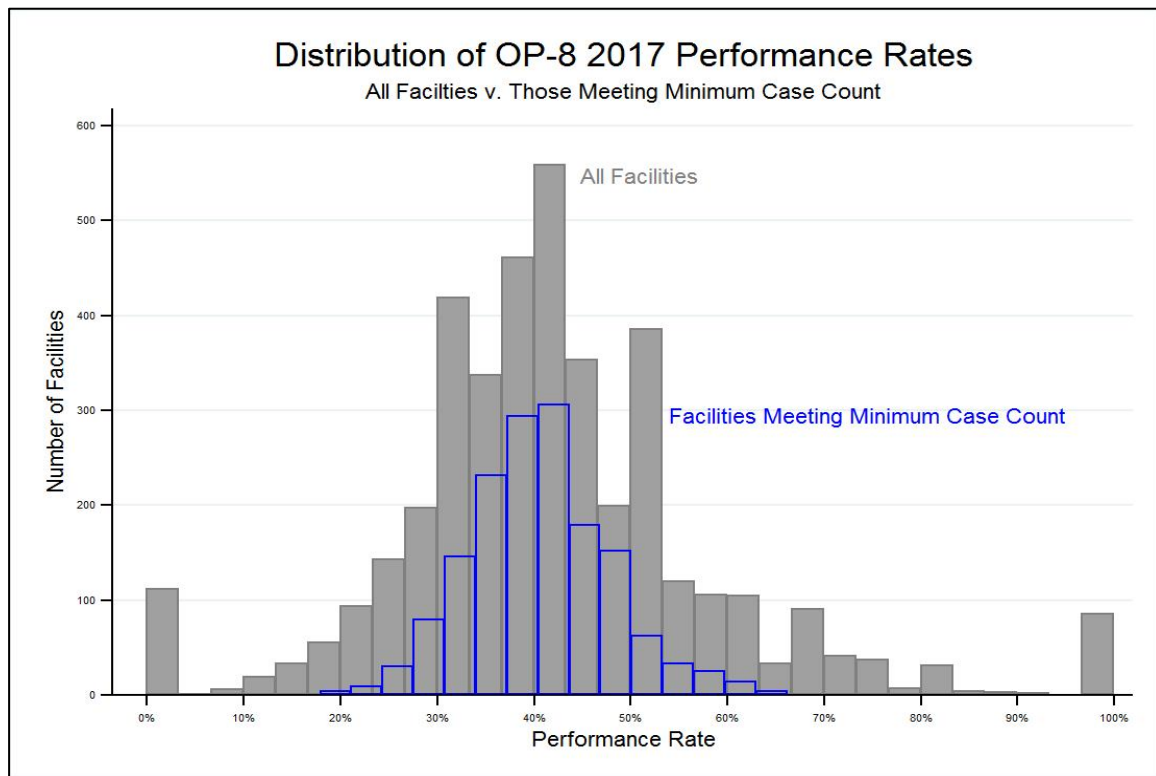
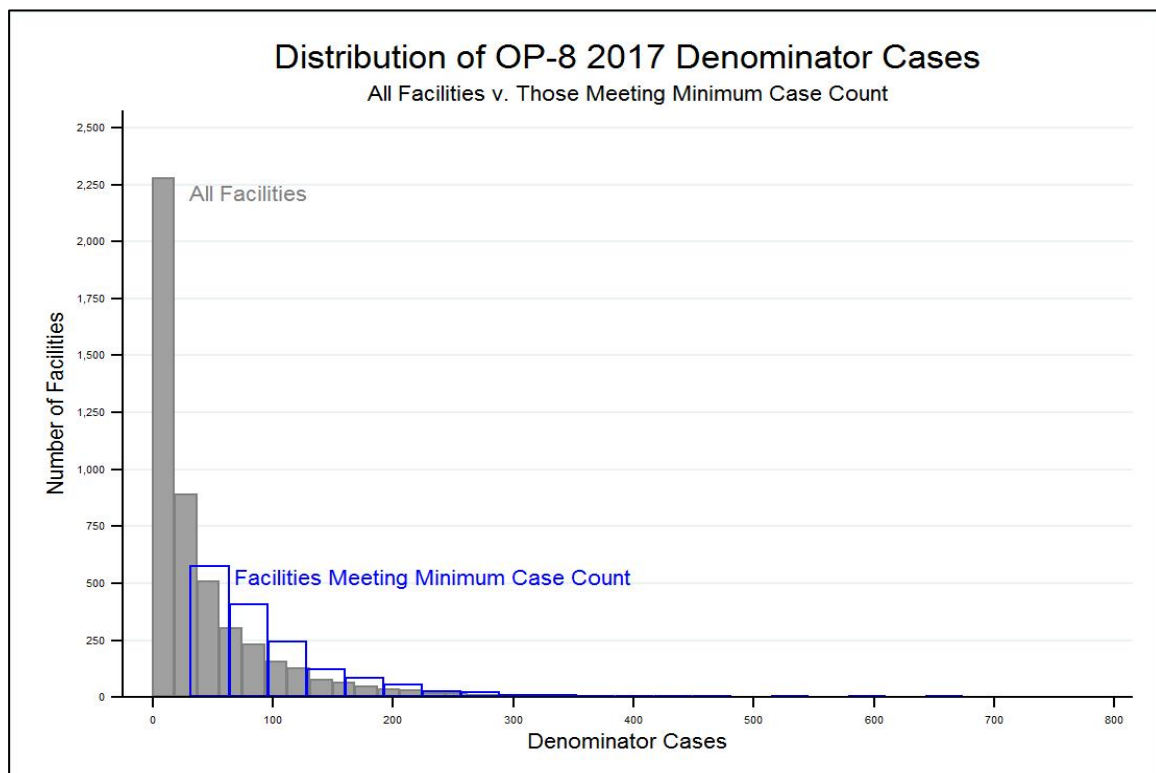


Figure 3: Distribution of 2017 OP-8 Denominator Cases, Comparing the Distribution for All Facilities v. Those Meeting Minimum Case Count



3.3 OP-8 Longitudinal Performance

As was noted in *Section 2*, public reporting for OP-8 began in 2011. Lewin summarizes in *Table 5*, below, performance data for the 913 facilities that met minimum case count requirements for 2011, 2012, 2013, 2014, 2015, 2016 and 2017 public reporting. Across most percentiles, an increased rate of inappropriate imaging was seen from 2011 to 2015. This may be due to increased use of MRI lumbar spine studies without prior attempts of antecedent conservative therapy, or a result of changes in measure specifications and data source during the time period. The increase in performance scores from 2011 through 2015 reversed in 2016; for 2016 public reporting, performance scores fell across most percentiles. An increase in performance scores was observed again, however, for most percentiles in 2017.

Table 5: OP-8 Longitudinal Performance (2011–2017)

	2011	2012	2013	2014	2015	2016	2017
<i>Measurement Period</i>	January 2009– December 2009	January 2010– December 2010	January 2011– December 2011	July 2012– June 2013	July 2013– June 2014	July 2014– June 2015	July 2015– June 2016
<i>Facilities</i>	913	913	913	913	913	913	913
<i>Minimum Value</i>	17.9%	12.3%	17.1%	17.6%	21.8%	14.9%	17.9%
<i>1st Percentile</i>	19.8%	23.1%	24.3%	24.7%	25.8%	25.0%	24.6%
<i>5th Percentile</i>	23.5%	26.7%	26.7%	28.2%	30.1%	29.1%	29.2%
<i>10th Percentile</i>	25.5%	28.7%	28.8%	29.9%	31.8%	31.4%	31.7%
<i>25th Percentile</i>	28.4%	31.9%	32.0%	33.0%	35.6%	35.3%	35.1%
<i>Median</i>	31.7%	35.4%	35.7%	36.7%	39.6%	38.8%	39.1%
<i>75th Percentile</i>	35.4%	40.0%	39.2%	40.4%	43.7%	43.0%	43.2%
<i>90th Percentile</i>	39.7%	44.0%	43.9%	44.2%	47.8%	47.9%	47.7%
<i>95th Percentile</i>	42.8%	47.3%	47.3%	46.7%	51.2%	50.7%	50.9%
<i>99th Percentile</i>	47.7%	53.9%	55.4%	51.3%	56.5%	57.5%	57.4%
<i>Maximum Value</i>	63.5%	66.7%	66.3%	67.7%	72.5%	63.4%	65.7%
<i>Mean Performance (Standard Deviation)</i>	32.2% (5.8)	36.1% (6.4)	36.1% (6.2)	36.8% (5.7)	39.8% (6.4)	39.3% (6.6)	39.5% (6.6)

*The measurement period for HOQR data reported from 2011 through 2013 ran from January through December. Beginning with 2014 public reporting, the measurement period for HOQR was adjusted to run from July through June; consequently, data are not reported for January through June 2012.

**Beginning with 2014 public reporting, calculation of OP-8 performance scores switched from using Data Extract System (DESY) database data to Health Account Joint Information (HAJI) database data. Both databases contain Medicare Part A and Part B FFS claims; the shift does result, however, in a slight change in the distribution of performance across years.

***CMS made changes to the OP-8 measure specifications in 2011, 2012, and 2014; see [Appendix B](#) for more details.

Section 4: Results from 2016 Environmental Scan/Literature Review (ES/LR)

Each year, the Lewin team performs a comprehensive review of clinical practice guidelines and the literature to inform updates to the measure specifications for the Outpatient Imaging Efficiency measures. Findings from the environmental scan will help to inform measure specification updates and future harmonization opportunities. Lewin also reviewed the recent literature, including relevant clinical guidelines, to inform measure maintenance and reevaluation. For the 2016 literature review, Lewin focused on reviewing literature that may suggest: 1) the need for additional denominator exclusions; 2) emerging evidence that may suggest updates to the measure specifications; and, 3) other information relevant to the measure rationale, its impact (including costs, benefits, or unintended consequences), or gaps in performance.

4.1 ES/LR Methods

Lewin selected articles and guidelines using pre-specified inclusion and exclusion criteria. We present the criteria for guidelines/appropriate-use criteria, for other published literature, and for related measures separately below.

4.1.1 Environmental Scan—Review of Related or Competing Measures

Lewin conducted a search of the National Quality Forum (NQF) Quality Positioning System (QPS), Agency for Health Research and Quality (AHRQ) National Quality Measures Clearinghouse (NQMC), and 2016 Measure Applications Partnership (MAP) Reports to identify measures with a similar measure focus and/or the same target population. Lewin used key terms from the measure title and/or description to identify measures that are related (conceptually either the same measure focus or same target population) or competing (conceptually both the same measure focus and the same target population). Lewin examined measures that were NQF endorsed, under initial NQF endorsement review, previously endorsed by NQF, in consideration for use in the HOQR Program, or indexed in the NQMC.

The search of the NQF QPS, NQMC, and 2016 MAP Report did not identify any related or competing measures.

4.1.2 Literature Review—Guidelines/Appropriate-Use Criteria

Lewin identified relevant guidelines and Appropriateness criteria through a structured search of the National Guideline Clearinghouse (NGC), published from January 1, 2014 to December 31, 2015. AHRQ maintains the NGC. In order to be included in the NGC, guidelines must, “include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options” (AHRQ Revised Inclusion Criteria 2014).

Additional information on the NGC’s inclusion criteria for selecting guidelines is available at the following link: <https://www.guideline.gov/about/inclusion-criteria.aspx>. In addition to the text of the guideline, their developers must provide NGC with documentation of the underlying systematic review. Lewin also identified relevant guidelines through the PubMed MEDLINE database, published from January 1, 2014 to December 31, 2015.

Lewin searched the NGC and PubMed for guidelines related to OP-8 by developing a structured search string using key words selected from the measure title and description and connected using Boolean operators:

- Low back pain treatment
- Low back pain chiropractor
- Low back pain physical therapy
- Low back pain management
- Low back imaging
- Low back MRI
- Low back magnetic resonance imaging
- Low back CT
- Low back computed tomography

Lewin vetted newly identified guidelines through several rounds of review by measure development and clinical staff to determine appropriateness of inclusion. This review included a consideration of the strength of evidence and strength of recommendations specific to the measure concept. In order for a guideline to be included in the

2016 literature review, a procedure relevant to OP-10 must be included in the Interventions and Practices Considered summary section. The team resolved any disagreements regarding appropriateness for inclusion by internal consensus.

In addition to a search for new guidelines, Lewin reviewed guidelines included in previous iterations of the annual literature review to determine if each guideline was current or if it had been updated or withdrawn.

The search of the NGC database identified five new guidelines for inclusion in the 2016 literature review.

4.1.3 Literature Review—Peer-Reviewed Literature

Lewin identified relevant peer-reviewed publications by searching the PubMed MEDLINE database from January 1, 2014 to January 15, 2016. Lewin performed two searches of the database for OP-8. The first search used structured MeSH¹ terms to identify indexed articles; the second search relied on a keyword search using tiab² terms to identify recent articles not yet indexed in PubMed.

Lewin limited included results to those published in the English language and that had abstracts available in PubMed. The search initially identified 781 articles.

Lewin measure development and clinical staff vetted abstracts over several rounds of review to determine appropriateness of inclusion. Lewin excluded articles that met one or more of the following exclusion criteria:

- Reported on individual case studies or case series;
- Letters or editorials; or,
- Primary focus was an intervention or population not related to the measure concept.

Lewin resolved any disagreements regarding appropriateness of study inclusion by an internal consensus process. The search identified 26 new articles for inclusion in the 2016 literature review.

4.2 Results and Potential Implications

4.2.1 Results

In our search of the literature published since the previous literature review, Lewin identified five guidelines and 26 studies that addressed MRI lumbar spine studies for patients with low back pain.

4.2.2 Guidelines

Two of the five guidelines identified in this year's ES/LR align with the measure as currently specified. ACR updated its Appropriateness criteria for low-back pain imaging in 2015. The 2015 update to ACR's Low Back Pain Appropriateness criteria evaluated imaging for six clinical variants,³ giving use of MRI lumbar spine a rating of 7 to 9 (usually appropriate) for variants associated with red-flag conditions. For patients with no red flags for which prior back pain management had not been attempted, ACR rated MRI use a "2" (usually not appropriate). Collectively, ratings for these six variants align with the current OP-8 specifications; no changes to the list of measure exclusions are needed.⁴ The second guideline, published by the Washington State Department Labor and Industries, recommends using validated, empirically tested scales to evaluate patient outcomes on improvement in function following an initial diagnosis of low-back pain. Use of these scales should occur at baseline (initial diagnosis of low-back pain) and during the first eight weeks of treatment to ensure that treatments are focused on improvement in outcomes. These assessments of patient outcomes can be incorporated into evaluation and management visits currently captured in the measure's numerator exception; consequently, no changes to the measure specifications are needed.

¹ MeSH terms refer to Medical Subject Headings, a controlled vocabulary maintained by the National Library of Medicine and used to index publications.

² Tiab is an indexing tool used to identify articles for which the key word or set of key words is present in the title or abstract.

³ These six variants include uncomplicated low back pain with no red flags; uncomplicated low back pain or radiculopathy associated with low-velocity trauma, osteoporosis, older age, or chronic steroid use; uncomplicated low back pain concomitant with suspicion of cancer, infection, or immunosuppression; low back pain in surgical candidates following antecedent therapy; new or progressing low back pain symptoms in patients with a history of lumbar spine surgery; and, low back pain with suspected cauda equine syndrome or neurologic deficit

⁴ While OP-8 does not exclude patients over age 70, the TEP has evaluated this patient characteristic and determined that exclusion is not necessary, as concerns around age are based on a higher likelihood of having a "red-flag" condition, which would already exclude the patient.

Three guidelines may suggest modification of the measure specifications to incorporate additional exclusions or novel forms of antecedent therapy. The Colorado Division of Workers' Compensation states that acupuncture may be used as a form of non-operative treatment for acute, non-specific low-back pain. Literature from the guideline's evidence base shows that acupuncture may be superior to standard of care treatments for low-back pain, demonstrating a small clinical benefit when compared to other low-back pain treatments. Because acupuncture can be captured using currently available procedure codes, however, this guideline may suggest the addition of acupuncture as an appropriate method of antecedent conservative therapy, requiring modification of the measure specifications. Two guidelines published by the North American Spine Society (NASS) provide recommendations on imaging for patients presenting with symptoms of spondylolisthesis. Both guidelines support the use of MRI in detection of spondylolisthesis variants—one suggests that MRI is the most appropriate, non-invasive diagnostic test for stenosis accompanying degenerative lumbar spondylolisthesis; the other supports the use of MRI as the most appropriate, non-invasive test for patients with radiculopathy for diagnosing isthmic spondylolisthesis. Neither form of spondylolisthesis is excluded from OP-8; thus, the two NASS guidelines may require a review by the TEP to potentially expand the measure's exclusion criteria to accommodate appropriate use of imaging for these patients.

4.2.3 Articles

Of the 26 newly identified articles, 17 articles supported OP-8, as currently specified. Four articles identified in this year's literature review may warrant additional consideration based on future ES/LR findings; the remaining five articles inform the evidence base on potential disparities in utilization based on socioeconomic status and on trends in facility performance.

The following 17 articles align with the current measure specifications, providing additional evidence in support of a reduction in lumbar-spine imaging for patients with uncomplicated low-back pain before attempting antecedent conservative therapy:

- An article published on behalf of the American Association of Neuromuscular & Electrodiagnostic Medicine (AANEM) documents the top five *Choosing Wisely* recommendations submitted by the AANEM. Recommendation #5 indicates that physicians should not perform an MRI of the spine or brain for patients solely experiencing peripheral neuropathy. The current measure specifications exclude claims with neurological impairments; peripheral neuropathy, however, is not captured in this exclusion. Thus, patients receiving imaging with a diagnosis of peripheral neuropathy would be considered inappropriate cases, aligning with the recommendations of AANEM.
- A meta-analysis conducted by Brinjikji et al. compared the prevalence of common degenerative spine conditions in symptomatic and asymptomatic patients, aged 50 years of age and younger, who have had an imaging study. When comparing imaging results for symptomatic versus asymptomatic individuals under age 50, higher rates of detection for disc bulge, degeneration, extrusion, protrusion, Modic 1 changes, and spondylolysis were seen in the symptomatic cohort. This article supports similar findings already captured in the OP-8 evidence base—that increased use of MRI imaging results in an increased detection of findings on the study. As none of these conditions should result in emergent imaging (as red-flag conditions), no changes to the measure specifications are required.
- In a US, retrospective cohort study by Brooks et al., researchers evaluated the images of 353 patients who previously had a lumbar spine MRI; of the 353 images reviewed, 130 included the sacroiliac joint (SIJ). While many ordering providers suspected SIJ pathology when including it in the MRI field, only 0.02% of patients had clinical findings in the SIJ region on their MRI. Thus, the researchers concluded that SIJ imaging was costly and an ineffective use of resources, and that the SIJ should only be included in a lumbar spine MRI if significant clinical findings are demonstrated during the patient's initial evaluation. As this article validates a need for reduction in overuse of imaging, no changes to the OP-8 specifications are needed.
- A US, retrospective claims analysis by Childs et al. examined the rate of guideline adherent care (i.e., early physical therapy) for 753,450 patients newly diagnosed with low-back pain in a primary care setting and

treated in the Military Health System. Patients were followed for two years post-diagnosis to calculate utilization outcomes including rates of advanced imaging, lumbar injections, surgery, and opioid use. Approximately 16% of patients received early physical therapy. Patients receiving early physical therapy (in adherence with clinical practice guidelines) had significantly lower health care utilization, leading to cost savings of 60%. This study is further support for antecedent conservative therapy prior to imaging for patients with low-back pain.

- In a propensity-matched, US retrospective analysis, Fritz et al. examined utilization and cost outcomes for 406 patients with a diagnosis of low-back pain initially receiving physical therapy or advanced imaging. Patients first receiving advanced imaging incurred an average of \$4,793 more in treatment costs. This article supports the focus of OP-8, showing that early imaging for patients with low-back pain leads to a costly use of resources.
- In a US, retrospective claims analysis, Fritz et al. examined the use of physical therapy for 2,289 Medicaid patients newly diagnosed with low-back pain. Twenty percent of patients included in the study received physical therapy following the diagnosis of low-back pain. This study is a descriptive study of physical therapy use for Medicare beneficiaries with low back pain and does not analyze costs or outcomes. Thus, this study does not impact the measure or specifications. .
- Ganduglia et al. performed a domestic, retrospective claims analysis to determine whether the measurement and public reporting of OP-8 affected the rate of inappropriate MRI lumbar spine studies for two populations: 1) Medicare FFS patients, and 2) Blue Cross/Blue Shield of Texas commercial patients. The analysis included 330,463 MRI studies. Broadly, the authors found no significant difference in the rate of inappropriate studies before and after the adoption of OP-8 for both populations studied; however, hospitals with a high rate of overuse and high percentage of cases paid by Medicare saw larger reductions in the rate of inappropriate use. This suggests that the measure may affect outlier performance, but that a gap in care persists.
- In a domestic, prospective cohort study, Graves et al. estimated utilization of health care resources and associated costs for patients with low-back pain, treated according to guidance from current clinical practice guidelines, as compared to those who received an early MRI (in the first six weeks following injury). Using claims data gathered through the Washington State Disability Risk Identification Study Cohort from 2002-2004, the authors found that 19.0% of patients received an early MRI, against recommendations in clinical practice guidelines. This non-adherence led to higher rates of lumbosacral injections and surgery, as well as increased treatment costs. The study supports the rationale of OP-8—early imaging leads to unnecessary and costly treatments for patients with low-back pain.
- In a domestic, prospective, propensity-matched cohort study, Jarvik et al. compared outcomes for 5,239 elderly patients (aged 65 years and older) with back pain between those who receive early imaging and those who do not receive early imaging. Early diagnostic imaging was defined as an X-ray, CT, or MRI of the lumbar or thoracic spine within six weeks of diagnosis. Of patients receiving early imaging, 1,174 underwent an X-ray and 349 underwent an MRI or CT. The authors found no difference in outcomes for elderly patients receiving an early imaging study. The conclusions support the appropriateness of measuring low back imaging in an elderly population.
- Jenkins et al. performed a systematic review to assess the efficacy of interventions to reduce the rate of low back imaging. The authors identified 54 articles, 7 of which met the criteria for inclusion. Interventions including clinical decision support through a modified referral form and targeted reminders to primary care providers regarding appropriate indications for imaging reduced the rate of referrals for imaging (36.8% and 22.5%, respectively). While other interventions, such as provider education and guideline dissemination, did not reduce the rate of imaging, this study suggests that interventions can influence the rate of low back imaging. Facilities with high outlier performance on OP-8 could potentially improve their performance by adopting interventions identified as effective in this systematic review.
- A systematic review by Karel et al. explored whether diagnostic imaging improved patient outcomes for patients with musculoskeletal disorders. The authors identified 11 trials meeting the inclusion criteria, seven of which

focused on patients with low-back pain. Based on a moderate level of evidence, the authors concluded that diagnostic imaging provided little to no benefit to study patients. This review supports the rationale of OP-8—that diagnostic imaging is inappropriate for patients experiencing uncomplicated low-back pain.

- In a retrospective chart analysis conducted in the United States, Molony et al. examined the pathology of low-back pain for 76 patients with HIV infection treated in a palliative care clinic. In 22 of the cases (29%), the patient had previously undergone an MRI lumbar spine study. Fifty percent of the imaged patients had evidence of a malignancy. While a small cohort, this study concludes that MRI lumbar spine studies are appropriate for HIV patients experiencing low-back pain. As patients with HIV infection are excluded from the measure, recommendations in this article align with the current OP-8 specifications.
- In a domestic systematic review, Ojha et al. compared outcomes for patients with musculoskeletal pain (with a focus on spinal pain) undergoing early physical therapy, compared to delayed initiation of physical therapy. The systematic review identified 3,855 articles, 14 of which met the inclusion criteria. The authors found evidence that early physical therapy had the potential to reduce treatment costs and medical interventions (e.g., advanced imaging, opioid prescription), without adversely affecting patient outcomes; however, the quality of evidence and number of studies was limited. Whether early or delayed, physical therapy has the potential to reduce costly medical interventions and aligns with the measure specifications assessing whether patients receive physical therapy as one possible form of antecedent conservative therapy prior to imaging.
- In a domestic, retrospective chart analysis, Rao et al. assessed whether imaging in the emergency department (ED) for patients with low-back pain is appropriate. The study included 624 patients. The authors rated the appropriateness of each study based on the ACR Appropriateness criteria, and considered studies receiving a score of “5” or higher on the criteria to be appropriate. Twenty-eight percent of patients treated in the ED with a diagnosis of low-back pain received an imaging study; 24% received imaging in a different outpatient setting. The authors conclude that the vast majority of patients receiving imaging as part of their ED encounter in this facility (Mass General Hospital) were imaged appropriately. Though limited to a single center, this study suggests that interventions to reduce the rate of inappropriate imaging are better targeted to hospital outpatient settings other than the ED. While these findings suggest that the measure may not be necessary at this specific facility, it is unclear if the findings of this academic center are generalizable to other settings.
- In a domestic, retrospective claims analysis, Schlemmer et al. evaluated the imaging indications for lumbar spine MRI studies performed in the ED setting during 2011 and 2012 for Blue Cross/Blue Shield of Michigan beneficiaries (aged 18 to 64). Of the 14,838 ED visits associated with low-back pain during 2011 and 2012, 51.9% did not have a clinical reason for imaging. Those patients who did not have imaging performed had fewer claims for other ED visits, hospital stays, low back imaging, primary care visits, and specialist visits than those who were imaged during their index ED visit. For those patients whose clinical presentations did not warrant imaging, 30.1% still had an imaging study performed (including 26.2% of index events during which a CT or MRI was ordered). Results of this study show that many patients presenting with uncomplicated low-back pain in the emergency setting still have imaging performed, despite a lack of red flags. The article finds that many imaging exams for low-back pain, which are considered inappropriate by OP-8, still occur. Thus, this article supports the intent of OP-8.
- Tan et al. performed a domestic retrospective cohort study, using Medicare claims data from Texas beneficiaries; the research team identified 145,320 patients who sought care from 3,297 primary care providers (PCPs) from January 2007 to November 2011. During the study period, 27.2% received radiography and 11.1% received a CT or an MRI during the first four weeks following their initial visit for low-back pain. Imaging patterns varied widely by primary care provider—the average rate of ordering a CT or MRI within four weeks was 18.5% for PCPs in the highest decile, versus 3.2% for PCPs in the lowest decile. Determining whether a beneficiary would undergo any form of imaging during the first four weeks was largely driven by the provider whom they went to see, accounting for 25% of the variability in whether imaging was performed; only 0.44% of the variance was due to measured patient characteristics and 1.4% to

known physician characteristics. This article demonstrates a continued need for standardization of provider behavior in low back imaging and supports the clinical intent of OP-8.

- An international, cross-sectional study by Yamada et al. calculated the relationship between severe low-back pain and radiologic findings for Japanese patients with a diagnosis of rheumatoid arthritis. The study included 201 patients with rheumatoid arthritis without a history of surgery. The authors found no relationship between severe low-back pain and radiologic findings (using either X-ray or MRI). [Aligned](#) with the measure specifications, the article finds no diagnostic benefit in imaging rheumatoid arthritis patients with severe low-back pain.
- Information from four of the identified articles may warrant potential updates to the OP-8 measure specifications, including coding updates or consideration of additional exclusions (i.e., steroid use and prior episodes of low-back pain), imaging procedures (i.e., single photon emission computed tomography [SPECT/CT]), and other forms of antecedent therapy (i.e., acupuncture):
- In an international prospective cohort study conducted by Hancock et al., the research team sought to examine whether lumbar pathology, identifiable on MRI, increases the risk of a recurrence of low-back pain. Using data from a preliminary assessment (including a baseline MRI and questionnaire), researchers evaluated patient low-back pain at two-month intervals for one year; patients followed in the study had disc degeneration, high intensity zone, Modic changes, disc herniation, facet joint arthrosis, and spondylolisthesis identified during baseline. The study found a recurrence of low-back pain in patients with disc degeneration, high intensity zone, or previous episodes of low-back pain identified during their baseline assessment. While the current measure specifications for OP-8 capture both disc degeneration and some high intensity zone presentations, they do not exclude patients with a history of low-back pain. Lewin will continue to monitor the literature for evidence supporting exclusion of recurrent low-back pain cases.
- In an international controlled study by Jain et al., researchers evaluated the use of functional imaging (via a SPECT/CT) in the diagnosis and management of low-back pain. Eighty patients were randomized into one of the study arms, receiving either a bone scan using SPECT/CT followed by treatment customized to the cause identified or standard of care treatment following initial work-up for low-back pain; pain scores were taken immediately following treatment and again prior to discharge. Those patients undergoing a bone scan and customized treatment saw greater overall pain relief, as compared to those who received standard of care. Consequently, the authors concluded that use of SPECT/CT complements the clinical workup of patients with low-back pain and provides better pain management. Lewin will continue to monitor the emerging literature around appropriate use of SPECT/CT to diagnose and treat low-back pain.
- In an international case-control study followed by an uncontrolled intervention, Li et al. examined the effectiveness of acupuncture therapy on patients with chronic low-back pain. Using resting-state functional MRI, the investigators analyzed data from 20 patients with chronic low-back pain, before and after four weeks of acupuncture treatment, evaluating subjective and objective perception of pain. Subjectively, low-back pain was evaluated using a visual analogue pain scale; objectively, functional MRI studies were performed to assess the neural networks for certain pain centers in patient's brains. Study results showed improvement in functional MRI findings for patients undergoing acupuncture compared to the control group; patients saw improvement in subjective and objective pain control after acupuncture therapy. Findings from this study support the use of acupuncture as an alternative conservative therapy for patients with low-back pain. Based on results from this study, Lewin may review the addition of acupuncture to OP-8's measure specifications with the TEP as a form of antecedent conservative therapy.
- An international retrospective cohort study by Sugaya et al. sought 1) to quantify the frequency of advanced spinal epidural lipomatosis (SEL) detected on lumbar MRI studies and 2) to compare the frequency, cause, and progression of SEL in these cases with existing evidence from the literature. Results from the study showed that exogenous steroid usage was associated with advanced SEL and was greater than that which is currently reported in the literature. The investigators concluded that, although most symptoms of SEL

progress slowly, early diagnosis will allow for a dose reduction of prescribed steroids. The authors conclude that patients with exogenous steroid use concomitant with low-back pain should be aggressively imaged via lumbar spine MRI. Findings from this article suggest that Lewin may review patients with exogenous steroid use as a potential exclusion with the TEP.

Lewin identified five articles that discuss disparities in imaging utilization based on patient factors, including socioeconomic status, and describe trends in performance over time:

- A domestic cross-sectional study by Derakhshan et al. investigated the effect of socioeconomic status on the frequency with which imaging studies of the lumbar spine are ordered and completed. Using data from 24,105 patients who were diagnosed with either lumbar radiculopathy or myelopathy and who had at least one lumbar spine MRI, CT, or X-ray ordered, researchers found that patients with lower incomes had higher rates of MRI, CT, and X-ray imaging ordered but were less likely to have an ordered X-ray be completed. No difference in utilization for MRI or CT was seen. The researchers concluded that disparities in imaging utilization based on socioeconomic characteristics, such as insurance status and income level, highlight a critical gap in access to health care. While findings from this article do not affect OP-8's measure specifications, Lewin will continue to consider whether it is necessary to address disparities in socioeconomic status in future updates.
- Giwandi et al. performed a domestic, retrospective claims analysis to evaluate the rate of inappropriate MRI use for low-back pain within Veterans Health Administration facilities. Using the OP-8 specifications, the research team assessed the rate of appropriate imaging for MRI lumbar spine claims in 2012. Of the 110,661 MRIs performed that year, 31% were identified as inappropriate. Fifty-three percent of studies deemed appropriate were preceded by antecedent therapy; the remaining appropriate studies were associated with a red-flag condition (currently excluded from the OP-8 denominator). MRIs ordered in the ED, urgent care, primary care, or internal medicine were more likely to be flagged as inappropriate, with a small number of providers responsible for much of the inappropriate imaging (24% of providers order 74% of inappropriate MRI lumbar spine studies). Findings from this article align with results from recent trends analyses; Lewin will continue to monitor the impact of provider specialty type when considering refinements to the measure specifications.
- A domestic cross-sectional study by Pransky et al. analyzed medical claims for workers' compensation cases from January 1, 2002 to December 31, 2007, examining the extent of geographic variation in utilization of early MRI for working-age patients with acute low-back pain. At a state level, results showed that early MRI use varied significantly, from 6.0% to 58.4%. In the 12 states with the highest rates of early imaging, non-hospital MRI sites and lower state median income were associated with higher rates of early MRIs. Findings from this article support continued use of OP-8 to reduce early imaging, including first-line management of low-back pain through antecedent therapy. As noted above, Lewin will continue to discuss if CMS should consider socioeconomic factors in future updates.
- In a domestic, retrospective claims analysis, Rosenberg et al. calculate trends in performance for seven performance measures closely tied to Choosing Wisely recommendations. One of the measures calculates the rate of inappropriate imaging for patients with low-back pain absent red flag conditions. The authors calculate performance scores over a two- to three-year period, ending in 2013, for patients with Anthem-affiliated commercial insurance. The authors use specifications different from those used to calculate OP-8; however, similar to OP-8, the authors note no statistically significant changes in performance over the measurement period. Of note, the authors calculate the rate of overuse as higher than that reported for OP-8 (at 58.7%). This study demonstrates that there are opportunities for improvement in populations outside of Medicare; the Lewin team will continue to monitor differences in rates of overuse across different data sources and populations, when available, to understand the differences in the reported rates of overuse.
- In a domestic retrospective cohort study, Rosenkrantz and Doshi examined facility performance for five of the Outpatient Imaging Efficiency measures. Using data obtained from Hospital Compare, the authors evaluated facility-level performance over time for OP-8; results of their analysis showed a median national performance rate of 36.7%. Performance varied by facility characteristics, with some critical access or proprietary

hospitals performing worse than highly ranked U.S. News and World Reports facilities. Results from this article align with data analyzed by the Lewin team and continue to demonstrate national opportunity for improvement for facility sub-populations; Lewin will continue to monitor disparities in facility performance based on certain characteristics through the annual trends analysis.

4.3 Conclusions

In this review, Lewin included 5 guidelines and 26 relevant studies not identified in previous ES/LRs. The recommendations and findings from three of the identified guidelines and four studies highlighted emerging issues for Lewin to consider during the measure maintenance process:

- Acupuncture is an increasingly common method of conservatively treating low-back pain. While referrals for acupuncture may be captured through the E&M numerator exception, Lewin will evaluate adding acupuncture CPT codes to the list of numerator exception codes.
- Two guidelines recommend the use of MRI studies for patients with spondylolisthesis. Based on TEP feedback in March 2016 on the newly identified evidence, Lewin is evaluating the addition of spondylolisthesis to the list of measure exclusions.
- Imaging may be appropriate for patients with exogenous steroid use concomitant with low-back pain. Lewin will consider with the TEP the most effective ways to identify such cases, and if exclusion of such cases is appropriate.

The remaining 2 guidelines and 18 of the articles identified either align with the current measure specifications or support the focus of the measure. Five articles describe disparities in imaging for specific patient and facility sub-populations, the impact of which Lewin will monitor in future environmental scans.

Consistent with prior ES/LRs and the current measure specifications, the newly identified guidelines and articles indicate:

- The identification of specific clinical factors should influence the decision to perform a MRI lumbar spine on patients with low-back pain. If patients do not present with these clinical risk factors, an MRI lumbar spine study is inappropriate without antecedent conservative therapy.
- Currently evaluation and management (i.e. pain medication, self-management), physical therapy, chiropractic evaluation and manipulative treatment of low-back pain are used in the measure as the most appropriate initial treatment plan for low-back pain. Lewin will evaluate the addition of acupuncture as a potential alternative antecedent conservative therapy in the treatment of low-back pain for use in OP-8.

In concert with the TEP, Lewin will review these clinical risk factors and approaches to conservative therapy during future specification updates.

Appendices

Appendix A: Measure Specifications

This appendix contains a copy of the 2017 measure specifications for the *MRI Lumbar Spine for Low Back Pain* measure, including the procedure or condition codes for the denominator population, exclusions, and numerator.

All value sets (including the CPT and ICD codes used to calculate the *MRI Lumbar Spine for Low Back Pain* measure) have been moved to the Value Set Authority Center (VSAC) for 2017 public reporting. The VSAC is maintained by the National Library of Medicine (NLM), in collaboration with the Office of the National Coordinator for Health Information Technology and CMS. Users can now download Excel workbooks of the value sets for the measure's denominator, numerator, and exclusions.

Following each numerator, denominator, and exclusion category that contains ICD-9, ICD-10, or CPT codes, we have provided the organizational ID (OID) for the corresponding value set in the VSAC. This OID can be used to locate the value set(s) that contain code-level details about the numerator, denominator, or exclusion code(s).

5.1 Measure Numerator

5.1.1 Numerator Statement

Of beneficiaries in the denominator, number of MRI of the lumbar spine studies with a diagnosis of low back pain without the beneficiary having claims-based evidence of prior antecedent conservative therapy.

5.1.2 Numerator Time Window

Within 60 days preceding the procedure in the denominator, for claims for physical therapy or chiropractic evaluation; 28 to 60 days preceding the denominator procedure, for claims for evaluation and management.

5.1.3 Numerator Codes

Indications of claims based antecedent conservative therapy include any procedure codes in the three following groups:

- MRI lumbar spine procedures (**OID:** 2.16.840.1.113883.3.3157.1801)
- Claim(s) for physical therapy in the 60 days preceding the lumbar spine MRI (**OID:** 2.16.840.1.113883.3.3157.1802)
- Claim(s) for chiropractic evaluation in the 60 days preceding the lumbar spine MRI (**OID:** 2.16.840.1.113883.3.3157.1803)
- Claim(s) for evaluation and management >28 days and <60 days preceding the lumbar spine MRI (**OID:** 2.16.840.1.113883.3.3157.1804)

5.2 Measure Denominator

5.2.1 Denominator Statement

Number of MRI of the lumbar spine studies with a diagnosis of low back pain on the imaging claim

5.2.2 Denominator Time Window

Any day within a one-year window of claims data.

5.2.3 Denominator Codes

• ICD-9 Codes for Denominator Diagnoses

The following ICD-9 code categories are used to identify the measure denominator population:

- MRI lumbar spine procedures (**OID:** 2.16.840.1.113883.3.3157.1805)
- Dorsopathies (**OID:** 2.16.840.1.113883.3.3157.1806)
- Osteopathist, chondropathies, and acquired musculoskeletal deformities (**OID:** 2.16.840.1.113883.3.3157.1807)
- Sprains and strains of joints and adjacent muscles (**OID:** 2.16.840.1.113883.3.3157.1808)

- *ICD-10 Codes for Denominator Diagnoses*

The following ICD-10 code categories are used to identify the measure denominator population:

- Other deforming dorsopathies (**OID:** 2.16.840.1.113883.3.3157.1809)
- Spondylopathies (**OID:** 2.16.840.1.113883.3.3157.1810)
- Other dorsopathies (**OID:** 2.16.840.1.113883.3.3157.1811)
- Biomechanical lesion, not elsewhere classified (**OID:** 2.16.840.1.113883.3.3157.1812)
- Dislocation and sprain of joints and ligaments of lumbar spine and pelvis (**OID:** 2.16.840.1.113883.3.3157.1813)

5.3 Excluded Conditions

Indications for measure exclusion include any beneficiaries with the following procedures or diagnosis codes:

5.3.1 CPT Codes for Excluded Conditions

The following CPT codes are excluded from the measure denominator population:

- Patients with lumbar spine surgery in the 90 days prior to MRI (**OID:** 2.16.840.1.113883.3.3157.18143)

5.3.2 ICD-9 Codes for Excluded Diagnoses

The following ICD-9 code categories are excluded from the measure denominator population:

- Cancer (**OID:** 2.16.840.1.113883.3.3157.1815)
- Congenital spine and spinal cord malformations (**OID:** 2.16.840.1.113883.3.3157.1816)
- Inflammatory and autoimmune disorders (**OID:** 2.16.840.1.113883.3.3157.1817)
- Infectious conditions (**OID:** 2.16.840.1.113883.3.3157.1818)
- Spinal vascular malformations and/or the cause of occult subarachnoid hemorrhage (**OID:** 2.16.840.1.113883.3.3157.1819)
- Spinal cord infarction (**OID:** 2.16.840.1.113883.3.3157.1820)
- Neoplastic abnormalities (**OID:** 2.16.840.1.113883.3.3157.1821)
- Treatment fields for radiation therapy (**OID:** 2.16.840.1.113883.3.3157.1822)
- Spinal abnormalities associated with scoliosis (**OID:** 2.16.840.1.113883.3.3157.1823)
- Syringohydromyelia (**OID:** 2.16.840.1.113883.3.3157.1824)
- Postoperative fluid and soft tissue changes (**OID:** 2.16.840.1.113883.3.3157.1825)
- Trauma (**OID:** 2.16.840.1.113883.3.3157.1826)
- IV drug abuse (**OID:** 2.16.840.1.113883.3.3157.1827)
- Neurological impairment (**OID:** 2.16.840.1.113883.3.3157.1828)
- Human immunodeficiency virus (HIV) (**OID:** 2.16.840.1.113883.3.3157.1829)
- Unspecified immune deficiencies (**OID:** 2.16.840.1.113883.3.3157.1830)
- Intraspinal abscess (**OID:** 2.16.840.1.113883.3.3157.1831)

5.3.3 Denominator Exclusion Codes (ICD-10 Specifications)

The following ICD-10 code categories are excluded from the measure denominator population:

- Cancer (**OID:** 2.16.840.1.113883.3.3157.1832)
- Congenital spine and spinal cord malformations (**OID:** 2.16.840.1.113883.3.3157.1833)
- Inflammatory and autoimmune disorders (**OID:** 2.16.840.1.113883.3.3157.1834)
- Infectious conditions (**OID:** 2.16.840.1.113883.3.3157.1835)
- Spinal vascular malformations and/or the cause of occult subarachnoid hemorrhage (**OID:** 2.16.840.1.113883.3.3157.1836)
- Spinal cord infarction (**OID:** 2.16.840.1.113883.3.3157.1837)
- Neoplastic abnormalities (**OID:** 2.16.840.1.113883.3.3157.1838)
- Treatment fields for radiation therapy (**OID:** 2.16.840.1.113883.3.3157.1839)
- Spinal abnormalities associated with scoliosis (**OID:** 2.16.840.1.113883.3.3157.1840)

- Syringohydromyelia (**OID:** 2.16.840.1.113883.3.3157.1841)
- Postoperative fluid collections and soft tissue changes (**OID:** 2.16.840.1.113883.3.3157.1842)
- Trauma (**OID:** 2.16.840.1.113883.3.3157.1843)
- IV drug abuse (**OID:** 2.16.840.1.113883.3.3157.1844)
- Neurological impairment (**OID:** 2.16.840.1.113883.3.3157.1845)
- Human immunodeficiency virus (HIV) (**OID:** 2.16.840.1.113883.3.3157.1846)
- Unspecified immune deficiencies (**OID:** 2.16.840.1.113883.3.3157.1847)
- Intraspinal abscess (**OID:** 2.16.840.1.113883.3.3157.1848)

Appendix B: Annual Updates

Each year, Lewin considers potential updates to the Outpatient Imaging Efficiency measures to ensure the specifications align with current clinical guidance and consider stakeholder input (solicited from the imaging-efficiency measures' TEP and obtained from inquiries submitted via QualityNet). The following section contains a summary of those updates that have been made to the measure specifications since its implementation in 2011.

6.1 Updates to OP-8 Measure Specifications

6.1.1 Expand Denominator Diagnostic Exclusions (Effective July 2014)

Based on input from technical experts, and in accordance with published guidelines, CMS added denominator diagnostic exclusions to reflect that MRI lumbar spine imaging may be appropriate when beneficiaries have the following diagnoses:

- Congenital Spine and Spinal Cord Malformations
- Inflammatory and Autoimmune Disorders
- Infectious Conditions
- Spinal Vascular Malformations and/or the Cause of Occult Subarachnoid Hemorrhage
- Spinal Cord Infarction
- Effects of Radiation
- Spinal Abnormalities Associated with Scoliosis
- Syringohydromyelia
- Postoperative Fluid Collections and Soft Tissue Changes

6.1.2 Expand Denominator Exclusion Criteria: Extend Look-Back Period for Certain Denominator Exclusions (Effective July 2012)

Starting in July 2012, certain denominator exclusions include a look-back period. Prior to July 2012, these diagnostic exclusions were only considered if they appeared on the MRI claim. Beginning with July 2012 public reporting, CMS identified exclusion diagnoses in one of the diagnoses fields of any inpatient, outpatient, or carrier claim.

Look-back diagnostic exclusions and the look-back period now include:

- Cancer—Within twelve months prior to the MRI procedure
- Trauma—Within 45 days prior to the MRI procedure
- Intravenous Drug Abuse—Within twelve months prior to MRI procedure
- Neurologic Impairment—Within twelve months prior to MRI procedure
- HIV—Within twelve months prior to the MRI procedure
- Unspecified Immune Deficiencies—Within twelve months prior to MRI procedure

6.1.3 Expand Denominator Exclusion Criteria: Exclude Patients with Lumbar Spine Surgery in 90 Days Prior to MRI (Effective July 2012)

Using a 90-day look-back period, beneficiaries with a CPT code 22010–22865 and 22899 are excluded from the measure's denominator.

6.1.4 Clarification of Denominator Calculation (Effective July 2011)

Prior to July 2011, the denominator statement and a related exclusion read: "Patients who had an MRI of the Lumbar Spine with a diagnosis of low back pain," Exclusion: "Lumbar Spine MRI studies without a diagnosis related to low back pain"

The numerator statement now reads: "Patients who had an MRI of the Lumbar Spine with a diagnosis of low back pain without claims based evidence of antecedent conservative therapy."

The combination of the two denominator statements created some confusion as to whether the denominator is counting beneficiaries or MRI lumbar spine studies. Also, the use of the term "beneficiaries" in both the

denominator and numerator raised the question of how beneficiaries are counted if they have more than one study during the measurement period.

The process for developing the denominator involves selection of Medicare FFS imaging claims (either a global bill claim or a technical component claim) with a diagnosis of low back pain. If a beneficiary had more than one MRI lumbar spine study on the same day only one study would be counted. However, if a beneficiary had multiple studies during the measurement period, each study would be counted (i.e., the beneficiary can be included in the denominator count more than once). Similarly, for the numerator, measurement of prior conservative therapy is based on the claim date of the MRI of the lumbar spine, but then prior conservative therapy is examined at the beneficiary level within the defined periods relative to the MRI lumbar spine claim. Thus, a beneficiary can be counted more than once in both the denominator and the numerator.

6.1.5 *Numerator Exclusion Related to Antecedent Therapy for Evaluation and Management Claim(s) (Effective July 2011)*

Prior to July 2011, the antecedent therapy for E&M claims statement read: “Claim(s) >28 days and <60 days preceding the Lumbar Spine MRI for low back pain evaluation and management.”

The statement was then followed by a list of low back pain diagnoses codes.

The technical expert panel that assisted with the development of the measure was concerned with the time window specification because they wanted to have evidence of prior evaluation and management service consistent with a period of prior conservative therapy, without considering the visit that involved the ordering of the imaging study as part of the conservative therapy.

However, as previously described, there are two ways that this specification could be interpreted:

1. Low back pain is related to the lumbar spine MRI and the beneficiary had a claim(s) for E&M service(s) in the specified time window preceding the MRI of the spine; or
2. E&M service claim also has to include a diagnosis for low back pain.

Analyses of Medicare claims data have found that there is a significant difference in the calculated rates depending upon whether the E&M claim contains a diagnosis of low back pain in order for the beneficiary to be considered as having had prior conservative therapy, and thus excluded from the numerator. The 2008 publicly reported data were calculated without application of low back pain diagnoses on the E&M claims and the national average rate was 32.7%. Application of a requirement that the E&M claim have a low back pain diagnosis yielded a national average rate of 65.9% based on an analysis of 2009 data.

Beneficiaries included in the denominator for the MRI lumbar spine measure have a claim with a diagnosis of low back pain. Recognizing that beneficiaries may have an E&M visit that involves multiple presenting complaints which may not always be captured on the diagnostic coding for E&M claims, requiring that the low back pain diagnosis also be applied to the E&M claims may be too restrictive a definition for prior antecedent conservative therapy. Thus, the specification for the MRI lumbar spine measure was updated to clarify how the measure rates were calculated for 2008 (i.e., that no diagnosis codes were applied to the prior E&M visits). Similarly, low back pain diagnostic coding is not required on the claims for the other two numerator exclusions of physical therapy and chiropractic treatment. The 2009 claims data that were publicly reported in summer 2011 and subsequent year publications will be calculated in the same manner that the 2008 data were calculated (i.e., no diagnosis codes applied to prior E&M visits).

6.1.6 *Technical Correction Trauma Exclusion Codes (Effective July 2011)*

CMS received questions regarding why certain trauma codes in the range of 800 through 839 were not included among the exclusions. In examining these questions, we identified that a technical error was made and the initial two codes in the exclusion listing were separated by a comma (800, 839) rather than a dash (800 – 839) to indicate that a range of codes was to have been excluded. The specification was updated to make this correction. Analysis of Medicare claims data indicates that this technical correction results in minimal change to the calculated measure rates.

Appendix C: Minimum Case Count Rationale and Methodology

7.1 Minimum Case Count Rationale for Outpatient Imaging Efficiency Measures

Defining a minimum case count for quality measures is essential in determining how confident CMS can be about any observation that is reported as an average. For the Outpatient Imaging Efficiency measures, each facility's performance score is an average of the imaging studies performed at the facility and captured by the measure. Facility performance data can be unintentionally skewed by seeing a disproportionate number of easy or challenging cases during certain times within the reporting period, which would skew a facility's average.

Because of this uncertainty, minimum case counts are critical for accurate reporting. Statistically, certainty that a facility's actual performance is within a certain range is impossible without having a certain number of cases on which that judgment is based—having more denominator cases that contribute to the facility's average performance strengthens the confidence that the reporting value is correct and diminishes the ability of outliers to influence the distribution. Minimum case counts effectively narrow the distribution that random sampling creates, and make CMS more certain that the true performance of the facility lies within the acceptable bounds of precision for the measure.

7.2 Minimum Case Count Methodology for OP-8

For OP-8, like other measures with notable performance variation, CMS uses a relative precision model to determine the minimum necessary number of cases. Similar approaches are used for OP-9 (Mammography Follow Up Rates), OP-10 (Abdomen CT—Use of Contrast Material), OP-11 (Thorax CT—Use of Contrast Material), and OP-13 (Preoperative Cardiac Imaging for Low-Risk, Non-Cardiac Surgery). For this precision model, the confidence interval for a denominator case depends on the facility's absolute performance rate. When a facility's score falls close to the median performance score, its confidence interval has to become smaller to ensure the facility's score is accurately reported (as a high or a low performer). This approach to assessing precision allows more facilities' performance scores to be publicly reported.

Table 6, below, provides the minimum case counts used for OP-8 in 2017. Facilities must have at least 31 cases to qualify for public reporting; this number can vary from 31 to 67, depending on a facility's performance rate.

Table 6: OP-8 Minimum Case Count Requirements

OP-8 Observed Facility Rate	Required Precision	Case Count Needed to Attain Required Precision
0.00	0.05	45
0.01	0.05	45
0.02	0.05	45
0.03	0.05	45
0.04	0.05	45
0.05	0.05	52
0.06	0.05	56
0.07	0.05	60
0.08	0.06	63
0.09	0.06	64
0.10	0.06	66
0.11	0.06	67
0.12	0.07	67
0.13	0.07	67
0.14	0.07	67

OP-8 Observed Facility Rate	Required Precision	Case Count Needed to Attain Required Precision
0.15	0.07	67
0.16	0.07	66
0.17	0.08	65
0.18	0.08	65
0.19	0.08	64
0.20	0.08	63
0.21	0.09	62
0.22	0.09	61
0.23	0.09	60
0.24	0.09	59
0.25	0.09	57
0.26	0.1	56
0.27	0.1	55
0.28	0.1	54
0.29	0.1	53
0.30	0.11	51
0.31	0.11	50
0.32	0.11	49
0.33	0.11	48
0.34	0.11	47
0.35	0.12	46
0.36	0.12	45
0.37	0.12	43
0.38	0.12	42
0.39	0.13	41
0.40	0.13	40
0.41	0.13	39
0.42	0.13	38
0.43	0.13	37
0.44	0.14	36
0.45	0.14	35
0.46	0.14	34
0.47	0.14	33
0.48	0.15	32

OP-8 Observed Facility Rate	Required Precision	Case Count Needed to Attain Required Precision
0.49	0.15	31
0.50	0.15	31
0.51	0.15	31
0.52	0.15	32
0.53	0.14	33
0.54	0.14	34
0.55	0.14	35
0.56	0.14	36
0.57	0.13	37
0.58	0.13	38
0.59	0.13	39
0.60	0.13	40
0.61	0.13	41
0.62	0.12	42
0.63	0.12	43
0.64	0.12	45
0.65	0.12	46
0.66	0.11	47
0.67	0.11	48
0.68	0.11	49
0.69	0.11	50
0.70	0.11	51
0.71	0.1	53
0.72	0.1	54
0.73	0.1	55
0.74	0.1	56
0.75	0.09	57
0.76	0.09	59
0.77	0.09	60
0.78	0.09	61
0.79	0.09	62
0.80	0.08	63
0.81	0.08	64
0.82	0.08	65

OP-8 Observed Facility Rate	Required Precision	Case Count Needed to Attain Required Precision
0.83	0.08	65
0.84	0.07	66
0.85	0.07	67
0.86	0.07	67
0.87	0.07	67
0.88	0.07	67
0.89	0.06	67
0.90	0.06	66
0.91	0.06	64
0.92	0.06	63
0.93	0.05	60
0.94	0.05	56
0.95	0.05	52
0.96	0.05	45
0.97	0.05	45
0.98	0.05	45
0.99	0.05	45
1.00	0.05	45

Appendix D: References

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Appendix E: Glossary

Denominator: The denominator can be the same as the initial patient population or a subset of the initial patient population. The denominator contains all the beneficiaries or procedures assigned to each facility during the measurement period. For OP-8, the denominator contains a count of the number of MRI lumbar spine studies performed for beneficiaries with a diagnosis of low back pain at each facility during the measurement period.

Denominator Exclusion: Beneficiaries who should be removed from the measure population before determining if the numerator criteria are met. For OP-8, beneficiaries are excluded from the denominator if they had a history of one or more of the following conditions: lumbar spine surgery (look-back of 90 days), infectious conditions (look-back of 1 year), treatment fields for radiation therapy (look-back of 5 years), trauma (look-back of 45 days), unspecified immune deficiencies (look-back within 12 months), cancer (look-back within 12 months), spinal vascular malformations (look-back within 5 years), spinal abnormalities associated with scoliosis (look-back within 5 years), IV drug abuse (look-back within 12 months), intraspinal abscess (on the MRI claim), congenital spine and spinal cord malformations (look-back within 5 years), spinal cord infarctions (look-back within 12 months), syringohydromyelia (look-back within 5 years), neurologic impairment (look-back within 12 months), inflammatory and autoimmune disorders (look-back within 5 years), neoplastic abnormalities (look-back within 5 years), postoperative fluid collections and soft tissue changes (look-back within 12 months), or HIV (look-back within 12 months).

Initial Patient Population: The initial patient population refers to all beneficiaries evaluated by a specific measure. These beneficiaries share a common set of characteristics that make them eligible for inclusion in the measure, including having a specific procedure, being of a certain age, or having some other commonality. For OP-8, the initial patient population includes those beneficiaries who had a lumbar spine MRI associated with a diagnosis of low back pain at a given facility during the measurement period.

Measurement Period: The period for which each measure applies. For OP-8, the measurement period runs from July 1 to June 30 of each year.

Numerator: A measurement of the process or outcome expected for each beneficiary, procedure, or other unit of measurement defined in the denominator. For OP-8, the numerator contains the number of lumbar spine MRI studies not associated with claims-based evidence of antecedent conservative therapy during the measurement period.