Health Evidence Review Commission's Evidence-based Guideline Subcommittee

November 2, 2017

2:00 PM - 5:00 PM

Clackamas Community College
Wilsonville Training Center, Room 111-112
29373 SW Town Center Loop E, Wilsonville, Oregon, 97070

Section 1.0

Call to Order

AGENDA

EVIDENCE-BASED GUIDELINES SUBCOMMITTEE (EbGS)
November 2, 2017
2:00pm - 5:00pm

Clackamas Community College
Wilsonville Training Center, Rooms 111-112
29353 SW Town Center Loop E
Wilsonville, Oregon 97070

Public comment will be taken on each topic per HERC policy at the time at which that topic is discussed. Please sign-in to testify.

#	Time	Item	Presenter
1	2:00 PM	Call to Order	Eric Stecker
2	2:05 PM	Review of September 7, 2017 minutes	Eric Stecker
3	2:10 PM	Staff update	Darren Coffman
4	2:15 PM	Review public comments: Low Back Pain: Minimally-Invasive and Non-corticosteroid Injections	Adam Obley Cat Livingston
5	3:00 PM	Draft coverage guidance: Urine Drug Testing	Adam Obley Cat Livingston
6	4:45 PM	Confirmation of the next meeting, February 1, 2017	Eric Stecker
7	4:50 PM	Next Topics	Cat Livingston
8	5:00 PM	Adjournment	Eric Stecker

Note: All agenda items are subject to change and times listed are approximate

MINUTES

Evidence-based Guidelines Subcommittee

Clackamas Community College
Wilsonville Training Center, Rooms 111-112
29353 SW Town Center Loop E
Wilsonville, Oregon 97070
September 7, 2017
1:00-5:00pm

Members Present: Eric Stecker, MD, MPH, Acting-Chair; Beth Westbrook, PsyD; Alison Little, MD, MPH; George Waldmann, MD; Devan Kansagara, MD (arrived at 1:20), Leslie Sutton (left at 3:00).

Members Absent: None

Staff Present: Darren Coffman; Cat Livingston, MD, MPH; Jason Gingerich.

Also Attending: Adam Obley, MD, Val King MD, MPH and Craig Mosbaek (OHSU Center for Evidence-based Policy); Angela Senders (National University of Natural Medicine); Duncan Neilson (Legacy Health); Helen Bellanca (Health Share of Oregon), Frances Purdy and Ann Kirkwood (Oregon Health Authority Health Systems Division); Julie Magers (OSHU); David Sibell, Brant Thayer and Sandy Christiansen (OHSU Comprehensive Pain Center).

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1. CALL TO ORDER

Eric Stecker called the meeting of the Evidence-based Guidelines Subcommittee (EbGS) to order at 1:11 pm. Stecker welcomed new member Leslie Sutton and members introduced themselves. Sutton is policy director of the Oregon Council on Developmental Disabilities. Coffman also reported the Westbrook's term expires and they are looking for a replacement; that person may be appointed in time for the next meeting. He also introduced Angela Senders, who has been nominated for Commission membership. If confirmed by the Oregon Senate she would be appointed to replace Kim Tippens (who resigned as she has moved to Seattle) both on the Commission and on EbGS. She is a researcher at the National University of Natural Medicine and adjunct professor at OHSU.

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2. MINUTES REVIEW

Minutes from the June 1, 2017 meeting were reviewed and approved 4-0 (Sutton abstaining, Kansagara not present).

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3. STAFF REPORT

Livingston reported about upcoming research related to the back pain coverage influenced by this committee's work. Changes included restrictions on opioid coverage and new coverage for services such

as manipulative therapies, cognitive behavior therapy, physical therapy and acupuncture. The research is being conducted by Kaiser in collaboration with other partners.

Coffman reported that staff is beginning to plan for a retreat early in 2018. Among other things considered, the Commission needs to consider changing the subcommittee structure to incorporate the new prioritization reviews of prescription drugs, as this will take even more time from an already-full VbBS agenda.

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4. Review of public comment: Opportunistic Salpingectomy for Ovarian Cancer Prevention

Adam Obley reported that no public comments were received on the draft coverage guidance. Coffman introduced Dr. Duncan Neilson, the appointed expert for this topic. Neilson mentioned a new study which appears to support the theory that removal of the fallopian tubes would reduce ovarian cancer. Livingston confirmed the subcommittee's intent to recommend coverage of opportunistic salpingectomy for all gynecologic procedures, not just tubal sterilization. There was no additional discussion.

A motion was made to refer the draft coverage guidance to HERC. Motion approved 5-0 (Sutton abstaining).

DRAFT HERC Coverage Guidance

Opportunistic salpingectomy during gynecologic procedures is recommended for coverage, without an increased payment (i.e., using a form of reference-based pricing) (*weak recommendation*).

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5. Multisector Interventions Report: Prevention of Unintended Pregnancies.

Livingston explained that this report is not a coverage guidance but a multisector intervention report. These reports are different in that they do not address clinical interventions but rather other factors which can also influence health outcomes. In this case the report does not evaluate the effectiveness of contraceptive methods but rather of practices, programs and policies which may influence unintended pregnancy rates. Stecker pointed out that unlike coverage guidances, these reports focus on describing the evidence, rather than making recommendations. This is because the audience can include not only health plans, but may also include other policymakers such as legislators. In addition, many of the interventions under consideration would not be appropriate for a health plan to implement as covered services because they are not delivered in clinical settings.

Coffman said that these statements are appended to the end of the Prioritized List but create no expectations that CCOs will cover any of these services. CCOs may decide to use this portion of the list for planning their flexible spending programs.

Subcommittee members asked about the utility of the multisector intervention statements. Livingston said that there is now a metric related to tobacco use prevalence for which the multisector intervention statement on tobacco cessation is highly relevant. Coffman said that the current topic may be used by

an OHA workgroup on effective contraceptive use. Livingston added that it may be helpful to CCOs in meeting their metric for effective use of contraception.

Coffman introduced the ad hoc experts for this topic:

> Dr. Hellen Bellanca is a board-certified family medicine physician from Portland, Oregon. She is an Associate Medical Director at Health Share of Oregon, and previously served as Maternal Child Family Program manager. Her other professional activities include chairing the subcommittee on Maternity Model of Care for the Oregon Perinatal Collaborative, membership on the Planned Parenthood Federation of America National Medical Committee, a founding member of the Oregon Preventive Reproductive Health Advisory Council, and membership on the Oregon Health Authority's Technical Advisory Group to the Metrics and Scoring Committee. She is a co-creator of the "One Key Question" initiative. On her conflicts of interest form, she disclosed her employment and that she has been paid to present on the issue of unintended pregnancy, pregnancy intention screening and contraception. She has no industry ties or any other financial relationships (other than employment) to any pharmaceutical or device manufacturer.
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> Maria Rodriguez is an assistant professor of obstetrics/gynecology at OHSU. She is board certified, and her research has focused on evaluation and monitoring of family planning programs, including cost, equity and quality-related outcomes. Much of her research is international but her research in the U.S. has focused on reproductive outcomes and disparities among the Medicaid population. She has received grant support from the federal government, the Society of Family Planning, Gates Foundation and Robert Wood Johnson Foundation. She disclosed no other unintended pregnancy-related conflicts of interest.
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> Jillian Henderson is a research investigator for the Kaiser Permanente Center for Health Research's Evidence-based Practice Center. Her PhD is in Health Services Organization and Policy. She serves as an associate editor for Contraception, as an ad hoc referee for several research publications and as a research proposal reviewer for several publications and grantmaking organizations, including the National Institutes of Health and Department of Health and Human Services. She is also an expert advisor to the Oregon Preventive Reproductive Health Advisory Council for the Oregon Health Authority. She has received grant funding from the federal government and from the Society of Family Planning. She provides ongoing technical support to the US Preventive Services Task Force.

King reviewed the draft report. The subcommittee specifically discussed issues around the historical coercion of vulnerable populations with regard to contraception. Stecker said that people may feel coerced either to use contraception against their will or in violatation of their religious beliefs. The focus of this report is to identify policies which may support individual choices to reduce the chance of unintended pregnancy.

The subcommittee also discussed disparities, and whether the poor health outcomes associated with unintended pregnancies may in fact simply be a result of the fact that unintended pregnancy is more common in many vulnerable populations also at risk for other kinds of poor outcomes. King said it is difficult to tell from the literature.

A member asked whether some of the educational interventions described were peer-led or teacher-led. King said they were teacher-led unless identified as peer-led.

Bellanca requested that the subcommittee correct the description of the CCO metric; pregnant patients are largely included and the metric now goes from ages 15-50 rather than 18-50 as stated in the report. Staff will correct this error. Bellanca also discussed the difficulties of coming up with a useful metric related to contraceptive use, since some women want to become pregnant, are not having sex with men or cannot become pregnant.

The subcommittee clarified several points around the literature under review. Westbrook asked about the minimum age for the target populations in the studies. King said in one review the minimum age was 10 but most studies were of women who were adolescents and adults. In response to another question she clarified that most of the interventions to support contraceptive use did not focus on LARC, but rather on less effective methods. In addition, most studies reported on self-reported use of contraception (not on pregnancy or unintended pregnancy). These outcomes are not direct (and subject to bias) but they are what the literature reports. King said that because of some of the difficulties with the evidence, the report contains more than the usual amount of information about guidelines as well as information on other interventions not studied in systematic reviews.

Henderson expressed concern that some of the reviews with less rigorous methodology showed more positive results, which may not mean that the programs they reviewed were superior. She said systematic reviews require going deeper in order to evaluate a particular program.

Kansagara said that his organization has been struggling with another topic involving a complex problem—transitional care. There are many more variables with these types of interventions. King acknowledged these difficulties but said that it would be extremely labor intensive to go into sufficient depth on the full range of interventions in scope. She did say that CEBP worked to identify the studies that would be most relevant in Oregon. For instance, they excluded reviews focusing on middle- and lower-income countries.

Henderson said that even in reviews of a large number of studies there may only be a small number of studies on a given intervention.

King said that for interventions to encourage contraceptive use, a single intervention is generally less effective than repeated interventions by a trusted person.

Based on the discussion, the subcommittee asked staff to clearly identify interested audiences, then limit the interventions to those of particular interest and relevance and go into more depth on those interventions. This may require coordination with other groups. Several members as well as appointed experts reaffirmed the importance of the report, but suggested it needed this additional depth in order to be most useful.

Staff will review the scope with stakeholders and bring a draft back to a future meeting.

6. Low Back Pain: Minimally-Invasive and Non-Corticosteroid Percutaneous Interventions

Obley reviewed the remainder of the draft coverage guidance (review was begun but not complete at two previous meetings), discussing the evidence for radiofrequency denervation for discogenic and sacroiliac pain. He also reviewed the other payer policies. Livingston reviewed the values and preferences and resource allocation for these populations.

Obley then summarized the staff work with Dr. Sibell related to the Dreyfuss observational study. This study had stricter enrollment and patient selection criteria. Obley reviewed the exclusions for this study, and reviewed the results which included significant improvement at up to 12 months. As the study lacked a control group, staff looked for a study which used similar criteria. The Nath 2008 study had similar criteria, though it only used a single medial branch block. The study showed statistically improvements on several outcomes. Friedly noted that there was an error in the report and the reduction was not actually statistically significant (Obley confirmed this). However, there were baseline differences between groups. For instance, those in the intervention group had significantly worse baseline pain. The total number of participants was 40 and it was done at a single academic hospital in Sweden. In addition is that, many patients dropped out of the study after having a prolonged response for their medial branch block. Friedly said that the pain levels in the Nath study's control group were significantly less severe than the intervention group, and less severe than people would usually treat with this intervention, so they did not have as much room to improve. There were a couple of other randomized control trials, but they used even less stringent inclusion criteria.

Livingston reviewed the language added to the evidence review describing the randomized trials which most closely resembled the Dreyfuss study.

Subcommittee members asked about the Lakemeier and Tekin studies. Both studies showed small improvements of pain at intervals of up to one year. With the Lakemeier study the small improvements were over a steroid injection, which some consider to be an active control.

Obley also reviewed a new pragmatic Dutch study recently published in the Journal of the American Medical Association (JAMA). The study did not show a clinically significant difference between the control and intervention groups. It too used only a single diagnostic block to select patients.

Livingston reviewed the two options for coverage. The first would recommend coverage with strict criteria based on the Dreyfuss trial; the second would recommend against coverage.

Kansagara briefly summarized the evidence, saying that he couldn't find a rationale for going to option 1, since neither the original review nor the additional trials based on improved patient selection criteria showed clinically-significant improvement. The newer JAMA review also shows negative results.

A subcommittee member asked about the patients in the JAMA trial who showed durable improvement after a diagnostic injection. Sibell said some would consider it a placebo response. He thought it should be considered a false positive response in the predictive value for denervation.

Stecker asked him how many centers use the strict criteria like OHSU. Sibell said that many payers use similar criteria to those used by Medicaire, so most providers would use those criteria. He said it may not be available in the most rural areas of the state.

Sibell then offered his prepared remarks. He said that he agrees that the patients in the JAMA study did not appear to benefit. However, he said the patient selection and surgical technique were not optimal. For instance, they used smaller needles, no image guidance and only a single diagnostic block with a less stringent threshold.

Friedly said she agreed with Sibell's assessment. The challenge is that the clinical experience does not match the results in the controlled trials. She said that this study highlights that the use of the procedural technique in clinical practice may not reflect the identified best practices both in terms of patient selection and in terms of the technique itself.

Sandy Christensen gave testimony. She is an assistant professor at OHSU. She said there is a high quality study underway at Johns Hopkins University. She suggested the subcommittee wait for the results of this study, expected in about a year.

Subcommittee members said the topic could be taken up again if new evidence appears to call the results of this review into question. This is the normal process.

Kansagara said that he understands the difficulties of treating patients with chronic pain; patients will be happy with whatever helps them. When he sees patients who have recently come into the VA or have been treated, they get a lot of repeated procedures. What he sees is out of line with the narrow practice that is being described. If we do this because it's a hard condition to treat and we have good anecdotal evidence, what is preventing us from covering most any chronic pain intervention. Stecker said that the subcommittee needs to be guided by the evidence. Other factors are considered where there is a weak level of evidence. Kansagara said that as he reads the evidence, there is low or moderate strength of evidence showing no benefit.

A motion was made to put the draft coverage guidance out for public comment with option 2 (from the meeting materials) selected. **Motion approved 5-0 (Not present: Sutton).**

Subcommittee thanked the experts for their assistance with this topic. Livingston asked whether to include the additional studies in the draft. Kansagara and Stecker asked her to include them with an explanation about their flaws. Livingston will add some language and review it with Stecker before posting the draft for comment.

DRAFT HERC Coverage Guidance

Minimally invasive discectomy is recommended for coverage as an alternative to microdiscectomy or open discectomy, when discectomy is indicated (weak recommendation).

The following are not recommended for coverage for low back pain:

- Percutaneous laser disc decompression (strong recommendation)
- Ozone therapy injections (strong recommendation)
- Radiofrequency denervation (weak recommendation)

7. Multisector interventions for suicide prevention

Livingston introduced the topic, suggesting that we may need to make similar changes to those made for the unintended pregnancy topic.

Obley reviewed the draft scope statement. Kansagara said a group at the VA recently published some papers related to this topic. He said the scope statement seemed very broad and needed to be focused, with many of the same issues as discussed with unintended pregnancy. The outcomes of suicide and suicide attempt are relatively rare (though not as rare as they should be), making it difficult to find good data. Discussion focused on the need to clarify the stakeholders and limit the interventions to those most relevant. Staff will work internally to focus the scope statement and bring it back to a future meeting.

Kansagara said that suicidal ideation is very difficult to define; a lot of the literature looks at related outcomes but there will be few studies that find differences in suicide and suicide intent. He suggested discussing this with the VA as this topic is the top priority for them.

Westbrook said that in many cases, adverse childhood events are actually what predicts these bigger problems. She would want to know what is predictive early on, and how can we intervene during early childhood to actually make a difference and define the at-risk population. Stecker said he would be interested in an outcome of appropriate healthcare and behavioral health services utilization for at-risk people.

Livingston said that OHA's Public Health Division has a Suicide Intervention and Prevention Plan, and is interested in the evidence behind a variety of interventions. In addition, a review could inform future versions of the plan. Obley suggested that we get information about the outcomes from them.

Ann Kirkwood provided testimony. She said it would be helpful to have input for the next version of the plan. The current plan called for the creation of an Oregon Alliance to Prevent Suicide. This group is 65 experts from around the state. She suggested we could ask that group for help as well. She suggested the subcommittee focus on two or three things and go into more depth. Some of these interventions have very shallow evidence.

Kansagara asked whether the target population includes those who are and aren't receiving healthcare interventions realated to suicide.

Staff will reach out to stakeholders and refine the draft scope statement and bring it back to the subcommittee.

8. ADJOURNMENT

The meeting was adjourned at 5:00 pm. The next meeting is scheduled for November 2, 2017 from 2:00-5:00 pm at Clackamas Community College, Wilsonville Training Center, Rooms 111-112, 29353 SW Town Center Loop E, Wilsonville, Oregon 97070.

Section 2.0

Review Public Comment

HEALTH EVIDENCE REVIEW COMMISSION (HERC)
COVERAGE GUIDANCE: LOW BACK PAIN: MINIMALLY INVASIVE AND NON-CORTICOSTEROID PERCUTANEOUS INTERVENTIONS

DRAFT for 11/2/2017 EbGS meeting materials

HERC COVERAGE GUIDANCE

Minimally invasive discectomy is recommended for coverage as an alternative to microdiscectomy or open discectomy, when discectomy is indicated (*weak recommendation*).

The following are not recommended for coverage for low back pain:

- Percutaneous laser disc decompression *(strong recommendation)*
- Ozone therapy injections *(strong recommendation)*
- Radiofrequency denervation *(weak recommendation)*

Note: Definitions for strength of recommendation are provided in Appendix A *GRADE Informed Framework Element Description*.

RATIONALE FOR DEVELOPMENT OF COVERAGE GUIDANCES AND MULTISECTOR INTERVENTION REPORTS

Coverage guidances are developed to inform coverage recommendations for public and private health plans in Oregon as they seek to improve patient experience of care, population health and the cost-effectiveness of health care. In the era of the Affordable Care Act and health system transformation, reaching these goals may require a focus on population-based health interventions from a variety of sectors as well as individually focused clinical care. Multisector intervention reports will be developed to address these population-based health interventions or other types of interventions that happen outside of the typical clinical setting.

HERC selects topics for its reports to guide public and private payers based on the following principles:

- Represents a significant burden of disease or health problem
- Represents important uncertainty with regard to effectiveness or harms
- Represents important variation or controversy in implementation or practice
- Represents high costs or significant economic impact
- Topic is of high public interest

Our reports are based on a review of the relevant research applicable to the intervention(s) in question. For coverage guidances, which focus on clinical interventions and modes of care, evidence is evaluated using an adaptation of the GRADE methodology. For more information on coverage guidance methodology, see Appendix A.

Multisector interventions can be effective ways to prevent, treat, or manage disease at a population level. For some conditions, the HERC has reviewed evidence and identified effective interventions, but has not made coverage recommendations because many of these policies are implemented in settings beyond traditional healthcare delivery systems.

GRADE-INFORMED FRAMEWORK

HERC develops recommendations by using the concepts of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system. GRADE is a transparent and structured process for developing and presenting evidence and for carrying out the steps involved in developing recommendations. There are several elements that determine the strength of a recommendation, as listed in the table below. HERC reviews the evidence and makes an assessment of each element, which in turn is used to develop the recommendations presented in the coverage guidance box. Estimates of effect are derived from the evidence presented in this document. Assessments of confidence are from the published systematic reviews and meta-analyses, where available. Otherwise, the level of confidence in the estimate is determined by HERC based on assessment of two independent reviewers from the Center for Evidence-based Policy. Unless otherwise noted, estimated resource allocation, values and preferences, and other considerations are assessments of the Commission.

Coverage question: Should minimally invasive discectomy be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Short-term function *(Critical outcome)*	No statistically significant difference in Oswestry Disability Index (ODI) at >6 months compared to microdiscectomy or open discectomy (mean difference 0.84 on a 100 point scale, 95% CI -0.21 to 1.88) ●●○○ *(Low confidence, based on 3 RCTs, N=312)* Lower SF-36 physical functioning subscore at >6 months compared to microdiscectomy or open discectomy (mean difference -4.7 on a 100-point scale, 95% CI -5.05 to -4.35) ●●○○ *(Low confidence, based on 2 RCTs, N=385)*	This is a relatively expensive procedure compared to noninvasive treatments of low back pain. It is associated with some harms (increased risk of worse pain and functional outcomes and rehospitalization) but also with lower rates of surgical site infection. The impact on other factors that would impact the	Patients would likely prefer a treatment that offers rapid and sustained relief, but would prefer to avoid treatments that are more invasive or associated with adverse effects. Patients would like to avoid both hospitalizations for recurrent disk herniation and	Compared to open discectomy, minimally invasive discectomy is associated with slightly higher mean leg pain intensity at one year (0.13, 95% CI 0.09-0.16) and mean low back pain intensity at 6 months (0.35, 95% CI 0.19-0.51). At 1 year, low back pain intensity was similar
Long-term function *(Critical outcome)*	Insufficient data			

Coverage question: Should minimally invasive discectomy be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Long-term risk of surgery *(Critical outcome)*	Insufficient data	resources allocation (e.g. hospital length of stay and utilization of other therapies) was not identified.	surgical site infections. We would expect moderate variability based on patient comorbidities and how individually they would weigh treatment failure and infection risk. Less invasive techniques would likely be much more appealing to patients at higher risk of complications such as surgical site infections.	(0.19, 95% CI -0.22-0.59).
Change in utilization of other therapies *(Important outcome)*	Insufficient data			
Adverse events *(Important outcome)*	Fewer surgical site and other infections compared to microdiscectomy or open discectomy (RR 0.23, 95% CI 0.07 to 0.79) ●●●○ *(Moderate confidence, based on 9 RCTs, N=931)* Greater re-hospitalization for recurrent disc herniation compared to microdiscectomy or open discectomy (RR 1.74, 95% CI 1.03 to 2.94) ●●○○ *(Low confidence, based on 6 RCTs, N=949)*			
Balance of benefits and harms: Minimally invasive discectomy appears generally non-inferior to open discectomy or microdiscectomy. It has slightly lower improvements in pain and functional outcomes, but these do not rise to the level of clinical significance. It decreases the risk of surgical site infections, but is associated with a greater number of re-hospitalizations.				
Rationale: We recommend coverage of minimally invasive discectomy as an alternative to open discectomy, when indicated. This recommendation is based on roughly equivalent benefits and a similar risk of an adverse event (although the adverse events are different compared to open discectomy). Patient preferences would be moderately variable depending on patients' comorbidities and how they would value the tradeoff between a higher surgical failure rate and an improved surgical infection rate. This is a weak recommendation because				

Coverage question: Should minimally invasive discectomy be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
further evidence could change the recommendation, there is moderate variability in values and preferences, and this is a comparison between subtypes of surgery, rather than against placebo or nonsurgical interventions.				
Recommendation: Minimally invasive discectomy is recommended for coverage as an alternative to microdiscectomy or open discectomy, when discectomy is indicated (*weak recommendation*).				

Coverage question: Should percutaneous laser disc decompression be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Short-term function *(Critical outcome)*	No statistically significant difference in Roland-Morris Disability Questionnaire or SF-36 physical function subscore at eight weeks compared to microdiscectomy ●○○○ *(Very low confidence, based on 1 RCT, N=115)*	This is a relatively expensive intervention compared to many other treatments for low back pain.	Patients would likely prefer a treatment that offers rapid relief and helps them to avoid additional procedures, but would prefer to avoid treatments that are more invasive or associated with adverse effects. There would likely be low variability in patients' interest in undergoing this procedure, given	In terms of pain, there were no significant differences in pain between percutaneous laser discectomy and microdiscectomy at 4-, 8-, or 52-week follow-up. At 26 weeks, there was a small benefit in favor of microdiscectomy for VAS back pain score. Overall, VAS leg pain score was better in patients with
Long-term function *(Critical outcome)*	No difference in overall recovery at 12 months compared to microdiscectomy (odds ratio 0.81, 95% CI 0.4 to 1.9) ●○○○ *(Very low confidence, based on 1 RCT, N=115)*			
Long-term risk of surgery *(Critical outcome)*	More patients required repeat surgery within 1 year compared to microdiscectomy (44% vs. 16%) ●○○○ *(Very low confidence, based on 1 RCT, N=115)*			
Change in utilization of other therapies	Insufficient data			

Coverage question: Should percutaneous laser disc decompression be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
(Important outcome)			the need for additional surgical procedures.	microdiscectomy (mean difference -6.9, 95% CI 12.6 to -1.3). Time to perceived recovery was slower for laser discectomy.
Adverse events *(Important outcome)*	Fewer patient experienced adverse events compared to microdiscectomy (5% vs. 11%) ●○○○ *(Very low confidence, based on 1 RCT, N=115)*			
Balance of benefits and harms: We have very low confidence that percutaneous laser discectomy is non-inferior to microdiscectomy with regard to function and may be associated with slightly worse leg pain. The possible benefit of fewer adverse events does not outweigh the much higher harm associated with a need for repeat surgery compared to microdiscectomy.				
Rationale: We recommend against coverage based on the lack of clear benefit, the cost, and uncertainty about harms; it is a strong recommendation because the cost is higher, alternatives are available, and the rehospitalization rate is higher.				
Recommendation: Percutaneous laser decompression is not recommended for coverage (*strong recommendation*).				

Coverage question: Should ozone therapy be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Short-term function *(Critical outcome)*	Greater percentage of patients with ODI<20 at six months compared to patients undergoing intradiscal or intraforaminal steroid with local anesthetic injections without ozone (74% vs. 47%) ●○○○ *(Very low confidence, based on 1 RCT, N=159)*	Intramuscular ozone injection would likely be moderate cost; intradiscal or intraforaminal injection would be significantly	Patients would likely prefer a treatment that offers rapid and sustained relief, but would prefer to avoid treatments	A separate May, 2017 coverage guidance did not find that epidural steroid injections (the comparator)

Coverage question: Should ozone therapy be recommended for the treatment of low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Long-term function *(Critical outcome)*	Insufficient data	higher cost compared with alternative treatments for low back pain.	that are more invasive or associated with adverse effects. We would expect low variability in these preferences.	offered clear clinical benefit. For pain, ozone treatments provided at the level of the herniated disc improved short-and long-term pain relief (OR 2.66, 95% CI 1.94 to 3.63). However, the sham-controlled trial found no statistically significant difference in pain.
Long-term risk of surgery *(Critical outcome)*	Insufficient data			
Change in utilization of other therapies *(Important outcome)*	No change in the use of analgesic medications compared to sham injections ●○○○ *(Very low confidence, based on 1 RCT, N=60)*			
Adverse events *(Important outcome)*	Sparsely reported, but include case reports of serious adverse effects including vitreoretinal hemorrhage, pneumocephalus, and vertebrobasilar stroke			
Balance of benefits and harms: The benefits of improvement in pain and function over epidural steroid injections might outweigh the harms of rare but serious adverse events. However, the evidence is too limited to confidently support this balance in favor of ozone.				
Rationale: We recommend against coverage of ozone therapy based on our very low level of confidence of effectiveness, the cost of the intervention, and risk of rare but serious adverse events. It is a strong recommendation because of very limited evidence of benefit and some serious harms.				
Recommendation: Ozone therapy injections are not recommended for coverage for low back pain (*strong recommendation*).				

Coverage question: Should radiofrequency denervation be recommended for the treatment of low back pain due to facet joint arthropathy?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Short-term function *(Critical outcome)*	Improved ODI at one month compared to placebo (mean difference -5.5, 95% CI -8.7 to -2.4) ●○○○ *(Very low confidence, based on 1 RCT, N=60)* *Note: An additional RCT published after the systematic review found no significant differences in ODI prior to six months; given the inconsistency in these findings, the confidence in the estimate of the effects has been downgraded to very low.*	This is a relatively expensive intervention compared to other treatments for low back pain. Two separate diagnostic medical branch blocks may be required prior to the procedure which increases the associated cost.	Patients would likely prefer a treatment that offers rapid and sustained relief, but would prefer to avoid treatments that are more invasive or associated with adverse effects. However, patients with chronic debilitating pain may be more willing to accept invasive treatments. We would expect moderate variability in these preferences.	For pain outcomes, there is mixed evidence: one study showed benefit at one month and another showed no benefit; these studies had opposite results at longer-term follow-up. Expert and public commenters suggested that the subcommittee focus their examination on studies using more stringent criteria for patient selection.
Long-term function *(Critical outcome)*	Improved ODI beyond six months compared to placebo (mean difference -3.7, 95% CI -6.9 to -0.5) ●○○○ *(Very low confidence, based on 1 RCT, N=60)* *Note: An additional RCT published after the systematic review found considerably greater improvements in ODI beyond one year; given the inconsistency in these findings, the confidence in the estimate of the effect has been downgraded to very low.*			
Long-term risk of surgery *(Critical outcome)*	Insufficient data			
Change in utilization of other therapies *(Important outcome)*	Insufficient data			

Coverage question: Should radiofrequency denervation be recommended for the treatment of low back pain due to facet joint arthropathy?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Adverse events *(Important outcome)*	Insufficient data			

Balance of benefits and harms: There is limited evidence of benefit on short- and long-term pain, and limited evidence of improved short and long term-function. There are mixed results on whether the functional benefits are clinically important or unimportant. Given that there is insufficient evidence about harms, the balance is neutral to positive.

Rationale: We recommend against coverage of radiofrequency denervation for facet joint arthropathy because of very low confidence in its effectiveness for improving pain and function. Given the lack of proven benefit, the relatively high resource allocation, and the availability of alternatives, it is a recommendation against coverage. It is a weak recommendation due the reported discrepancy between the study inclusion criteria and locally-defined optimal patient characteristics which may affect external validity, and the possibility that further studies examining this subgroup may reach different conclusions.

Recommendation: Radiofrequency denervation is not recommended for coverage for the treatment of low back pain (*weak recommendation*).

Coverage question: Should radiofrequency denervation of lumbar discs be recommended for the treatment of discogenic low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Short-term function *(Critical outcome)*	No difference in ODI at one month compared to placebo (mean difference 1.0, 95% CI -6.9 to 8.9) based on one trial with 57 patients ●●○○ *(Low confidence, based on 1 RCT, N=57)*	This is relatively expensive compared to alternate therapies for low back pain. Improved long-term function may be cost-effective.	Patients would prefer interventions that result in rapid and sustained improvement in symptoms and less invasive procedures associated with few	For pain outcomes, low-quality evidence of no differences in VAS pain scores at up to six months. Beyond six months, there was moderate
Long-term function *(Critical outcome)*	Improved ODI beyond 6 months compared to placebo (mean difference -6.8, 95% CI -13.4 to -0.1) ●●●○ *(Moderate confidence, based on 2 RCTs, N=76)*			

Coverage question: Should radiofrequency denervation of lumbar discs be recommended for the treatment of discogenic low back pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Long-term risk of surgery *(Critical outcome)*	Insufficient data		adverse events. We would expect low variability in these preferences.	quality evidence of a statistically significant improvement in VAS pain scores for RF treatment over placebo (mean difference -0.8, 95% CI -1.2 to -0.3).
Change in utilization of other therapies *(Important outcome)*	Insufficient data			
Adverse events *(Important outcome)*	Insufficient data			

Balance of benefits and harms: We have moderate confidence these interventions result in long-term improvements in function and pain, but improvements for both outcomes fail to meet commonly-accepted thresholds for clinically meaningful differences. There is insufficient evidence to understand harms.
Rationale: We recommend against coverage based on the moderate confidence that the benefits of this therapy do not meet commonly-accepted thresholds of clinically meaningful differences, and the cost. It is a weak recommendation because further evidence could change the recommendation.
Recommendation: Radiofrequency denervation of lumbar discs is not recommended for coverage for the treatment of discogenic low back pain (*weak recommendation*).

Coverage question: Should radiofrequency denervation be recommended for the treatment of sacroiliac joint pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Short-term function *(Critical outcome)*	No difference in ODI at one month compared to placebo (mean difference -14.1, 95% CI -30.4 to 2.3) ●○○○ *(Very low confidence, based on 2 RCTs, N=75)* Improved ODI between 1 and 6 months compared to placebo (mean difference -11.0, 95% CI -17.9 to -4.1) ●●○○ *(Low confidence, based on 1 RCT, N=49)*	This treatment is relatively expensive compared to alternate therapies for low back pain. Improved long-term function may be cost-effective.	Patients would prefer interventions that result in rapid and sustained improvement in symptoms and less invasive procedures associated with few adverse events. We would expect low variability in these preferences.	For pain outcomes, there was very low-quality evidence of no differences in VAS pain scores at one month. Between one and six months, there was low-quality evidence of a statistically significant improvement in VAS pain scores for RF treatment over placebo (mean difference -1.3, 95% CI -2.1 to -0.5).
Long-term function *(Critical outcome)*	Insufficient data			
Long-term risk of surgery *(Critical outcome)*	Insufficient data			
Change in utilization of other therapies *(Important outcome)*	Insufficient data			
Adverse events *(Important outcome)*	Insufficient data			
Balance of benefits and harms: We have very low confidence that short-term function (between one and six months) may be improved. There is insufficient data about adverse effects. Our very low confidence in the evidence makes the balance of benefits and harms uncertain.				

Coverage question: Should radiofrequency denervation be recommended for the treatment of sacroiliac joint pain?				
Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Rationale: We recommend against coverage due to the uncertainty about the benefits, unknown harms, and high associated costs. It is a weak recommendation because further evidence could change the recommendation.				
Recommendation: Radiofrequency denervation for sacroiliac joint pain is not recommended for coverage (*weak recommendation*).				

EVIDENCE OVERVIEW

Clinical Background

Low back pain is the leading cause of disability in individuals under 45 years of age in the United States and globally (The American Academy of Pain Medicine, n.d.). Approximately 80% of adults experience low back pain at some point in their lifetimes. In one large survey, more than 25% of adults reported low back pain during the past three months (National Institute of Neurological Disorders and Stroke [NINDS], 2014). The impact of low back pain on health in the U.S. has increased in recent years. A 1990 study ranked low back pain as the sixth most burdensome condition in the U.S. in terms of morbidity or poor health (NINDS, 2014). In a 2010 reproduction of the study, back pain was ranked as the third most burdensome condition, following ischemic heart disease and chronic obstructive pulmonary disease (NINDS, 2014). Low back pain is also associated with high economic costs: annual cost estimates are upward of $100 billion in the United States (Bicket et al., 2013).

A majority of low back pain is defined as acute, lasting a few days to a few weeks, and resolves on its own with self-care. However, about 20% of people affected by low back pain develop chronic low back pain and have persistent symptoms at one year. Even with a thorough examination, it is often challenging to determine a specific cause of a patient's back pain (NINDS, 2014). Many cases of low back pain are attributed to a mechanical disruption influencing the way in which components of the back fit together and move. Low back pain is often associated with spondylosis, which refers to general spinal wear and tear that typically occurs as people age. In rare cases, low back pain is related to more serious underlying conditions requiring immediate medical attention, such as infections, tumors, cauda equina syndrome, and abdominal aortic aneurysms (NINDS, 2014).

A variety of treatment options are used to address low back pain, and treatment plans often reflect individual values and preferences (Chou, 2009). Conservative treatments for low back pain include pharmacological treatment such as nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids, acupuncture, physical therapy, exercise therapy, spinal manipulation, psychological therapies, superficial heat or cold, and back supports (Chou, 2016). Surgical options for treating low back pain include decompression, total disc arthroplasty, total facet arthroplasty, and fusion (Balgia et al., 2015). For some cases of low back pain, surgery may not be indicated and/or the pain may not be adequately relieved by conservative treatment. Multiple percutaneous or minimally invasive interventions are performed for low back pain. This report discusses the following interventions: ozone injections, minimally-invasive percutaneous and laser discectomy, and radiofrequency denervation procedures. Several other interventions had originally been included in the scope, and were excluded either because no or very limited evidence was found using the search criteria or because most major payers do not cover the interventions because of experimental status or insufficient evidence. See Appendix C for details about interventions originally included in scope but not discussed in the remainder of the Coverage Guidance.

Indications

Low back pain is the fifth most common reason for all physician visits in the United States (American Academy of Family Physicians, 2016). Despite use of recommended conservative treatments, management of low back pain remains a challenge (Chou, 2009). Utilization of surgical and nonsurgical interventions for back pain has increased. Yet, disability rates have continued to rise as well (Bicket et al., 2013). As the prevalence of low back pain continues to increase, interventional pain management as a specialty is also growing (Manchikanti et al., 2013).

Table 1 describes some of the more common scales used to measure pain levels and the levels of disability or impairment that might be caused by pain.

Table 1. Scales that Measure Pain and Associated Disability

Scale	Range	Direction
Numeric Rating Scale (NRS)	0 to 10	Higher scores represent greater pain levels
Visual Analog Scale (VAS)	0 to 10	Higher scores represent greater pain levels
Oswestry Disability Index (ODI)	0 to 100	Higher scores represent greater disability/impairment
Roland-Morris Disability Questionnaire (RMDQ)	0 to 24	Higher scores represent greater disability/impairment
Short Form 36 (SF-36)	0 to 100 for each subscale	Lower scores represent greater disability/impairment

Technology Description

Percutaneous Discectomy/Minimally Invasive Discectomy

In endoscopic percutaneous discectomy, an endoscope with fluoroscopic guidance is used as an indirect visualization technique while disc material is removed with micro-instruments or a laser. In automated percutaneous discectomy, a cannula is inserted into the intervertebral disc space and nuclear material is removed using nucleotome, laser, or radiofrequency heat. This technique also involves the use of an endoscope and typically fluoroscopic guidance for indirect visualization. Percutaneous discectomy does not require open dissection of the thoracolumbar fascia (Kreiner, 2014).

Ozone Injections and Chemonucleolysis

Chemonucleolysis broadly refers to procedures involving the injection of a substance into a herniated spinal disc to reduce its size. Ozone injections are one form of chemonucleolysis and involve releasing an ozone-oxygen mixture at a nontoxic concentration near a spinal disc to reduce the size of the disc. Disc shrinkage may in turn reduce nerve root compression. Additionally, medical ozone is used for its analgesic and anti-inflammatory effects (Andreula, 2003) and can be injected into lumbar paraspinal muscles.

Radiofrequency Denervation

Radiofrequency denervation is a procedure performed under local anesthesia or light intravenous sedation in which radiofrequency energy is delivered along an insulated needle to target nerves, which heats and denatures the nerves. Repeated radiofrequency denervation is intended to facilitate the regeneration of axons over time (NICE, 2016).

Key Questions and Outcomes

The following key questions (KQ) guided the evidence search and review described below. For additional details about the review scope and methods, please see Appendix C.

1. What is the comparative effectiveness of non-corticosteroid percutaneous or minimally invasive interventions for low back pain?
2. Does the comparative effectiveness of the interventions vary by:
    a. Duration of back pain
    b. Etiology of back or radicular pain (e.g., stenosis, disc herniation)
    c. Frequency of the intervention
    d. Presence or absence of neurological deficit
    e. Anatomic approach
    f. Use of imaging guidance
    g. Previous back interventions
    h. Response to previous percutaneous interventions (diagnostic or therapeutic)
    i. Risk level for poor functional prognosis
    j. Comorbidities (physical or behavioral)
3. What are the harms of non-corticosteroid percutaneous or minimally invasive interventions for low back pain?

Critical outcomes selected for inclusion in the GRADE table are short-term function, long-term function, and long-term risk of undergoing surgery. Important outcomes selected for inclusion in the GRADE table are adverse events and change in utilization of comparators.

Evidence Review

Minimally Invasive Discectomy

Rasouli et al., 2014

This is a good-quality Cochrane systematic review of 11 randomized or quasi-randomized trials comparing minimally invasive (percutaneous) discectomy procedures to microdiscectomy or open discectomy for patients with sciatica or low back pain who had not responded to conservative treatment (total N=1,172). Seven of the 11 trials were deemed to be at high risk of bias.

In the meta-analysis, there were no statistically significant differences between the two groups with respect to the ODI at six months and beyond (mean difference 0.84, 95% CI -0.21 to 1.88) or in the likelihood of returning to work (odds ratio 2.07, 95% CI 0.18 to 24.15). However, in the minimally

invasive discectomy group, the SF-36 physical function subscore was lower (mean difference -4.7, 95% CI -5.05 to -4.35).

In the meta-analysis of pain outcomes, there were small but statistically significant differences between the two groups with respect to mean leg pain intensity at one year (0.13 higher in the minimally invasive group, 95% CI 0.09 to 0.16), mean low back pain intensity at six months (0.35 higher in the minimally invasive discectomy group, 95% CI 0.19 to 0.51), and mean low back pain intensity at two years (0.54 higher in the minimally invasive discectomy group, 95% CI 0.29 to 0.79). The mean low back pain score was also higher for minimally invasive discectomy at one year follow-up, although that result did not reach statistical significance (0.19 higher, 95% CI -0.22 to 0.59).

The rate of surgical site infections was lower in the minimally invasive group (2.3 per 1,000 vs. 32 per 1,000, risk ratio 0.23, 95% CI 0.07 to 0.79), but the rate of re-hospitalization for recurrent disc herniation was higher in the minimally invasive group (75 per 1,000 vs. 43 per 1,000, risk ratio 1.74, 95% CI 1.03 to 2.94). There were no statistically significant differences in the rate of procedural complications, surgical re-intervention, dural tears, or length of hospital stay.

In the subgroup of trials comparing minimally invasive discectomy to microdiscectomy, the primary functional outcomes were similar, although the physical functioning subscore of the SF-36 was lower for patients who underwent minimally invasive discectomy (mean difference -4.7, 95% CI -5.05 to -4.35). In the sensitivity analysis, when the trials at high risk of bias were excluded, the results were similar except that minimally invasive discectomy no longer showed a statistically significant reduction in the rate of infection at the surgical site or elsewhere.

In a separate good-quality systematic review and meta-analysis of 42 studies reporting microdiscectomy complication rates, the rate of any complication was 12.5% for open microdiscectomy, 13.3% for microendoscopic discectomy, and 10.8% for percutaneous microdiscectomy (Shriver et al., 2015). The rate of wound complications for open, microendoscopic, and percutaneous discectomy was 2.1%, 1.2%, and 0.5% respectively. The rate of reoperation for open, microendoscopic, and percutaneous discectomy was 7.1%, 3.7%, and 10.2% respectively.

Additional RCTs

The extended search identified one additional RCT (Nie et al., 2016) that compared interlaminar to transforaminal approaches for percutaneous endoscopic lumbar discectomy. The improvement in ODI was similar in both groups at the last follow-up. The interlaminar approach did result in significantly shorter operative and fluoroscopy times.

Percutaneous Laser Discectomy

Singh et al., 2013

This is a poor-quality systematic review of percutaneous lumbar laser disc decompression. The authors identified no randomized trials and 17 non-randomized studies (mostly non-comparative case series) for inclusion. Meta-analysis was not performed, and the manuscript is not structured in such a way that it is possible to extract relevant outcomes from the studies. In general, most of the trials reported good or excellent outcomes, including “significant pain relief” beyond 12 months for 60–85% of patients who

underwent laser disc decompression. The authors concluded that the evidence for lumbar laser discectomy is "limited."

Additional RCTs

The extended search identified one randomized controlled non-inferiority trial comparing percutaneous laser disc decompression to microdiscectomy in patients with sciatica (Brouwer et al., 2015). The trial randomized 115 consecutive adults with at least six to eight weeks of sciatica despite conservative measures to undergo percutaneous laser disc decompression (N = 57) or microdiscectomy (N = 58). Patients were eligible if an MRI confirmed disc herniation at the level to which their symptoms could be attributed. The groups were similar at baseline, and the trial was unblinded. The primary outcome measure was improvement in the Roland-Morris Disability Questionnaire (RMDQ) at 8 weeks and 52 weeks. At both time points, there were no statistically significant differences between the two groups for the primary outcome of RMDQ score. Pain was assessed using the VAS leg pain and VAS back pain scores. There were no significant differences between the two groups on either pain measure at 4-, 8-, or 52-week follow-up. At 26 week follow-up, there was a small but statistically significant benefit in favor of microdiscectomy for the VAS back pain score (mean difference -9.4, 95% CI -18.6 to -0.1), but not for the VAS leg pain score. In a repeated measurement analysis spanning the length of the trial, there was a small but statistically significant benefit in favor of microdiscectomy with respect to the VAS leg pain score (mean difference -6.9, 95% CI -12.6 to -1.3). There were no statistically significant differences between the two groups with respect to the SF-36 physical functioning score at any time point during the 12 months of follow-up. There were no statistically significant differences between the groups with respect to the SF-36 pain scale at 4, 8, or 52 weeks; at 26 weeks there was a statistically significant difference in favor of microdiscectomy (mean difference 11.3, 95% CI 2.4 to 20.1). Overall recovery at one year was reported by 69% of the patients undergoing laser discectomy compared to 75% of patients undergoing microdiscectomy (odds ratio 0.81, 95% CI 0.4 to 1.9). However, the median time to perceived recovery was statistically significantly longer for laser discectomy (8 weeks) than for microdiscectomy (6 weeks) (hazard ratio 0.64. 95% CI 0.42 to 0.97). It should be noted that 44% of patients who had a technically successful laser discectomy underwent another surgical procedure within one year compared to 16% in the microdiscectomy arm. The complication rate was 5% in the laser discectomy arm (all transient nerve root injuries) compared to 11% in the microdiscectomy group (including dural tears, urinary retention, transient nerve root injury, and wrong level of surgery). Overall, the authors concluded that laser discectomy is non-inferior to microdiscectomy for the primary outcomes, but acknowledged concerns related to the high rate of reoperation in the laser discectomy group.

Ozone Therapy

Magalhaes et al., 2012

This is a fair-quality systematic review and meta-analysis of four randomized controlled trials (RCTs) and eight observational studies of ozone therapy for discogenic low back pain. The primary purpose of the review was to summarize the results of ozone therapy for pain relief, and outcomes related to functional improvement were not separately summarized or discussed. In the single RCT that reported on a

functional outcome (ODI), 159 patients with lumbar disc herniation and radicular pain for at least eight weeks despite conservative management were randomized to undergo intradiscal and intraforaminal injection of steroid and local anesthetic with (N=77) or without (N=82) ozone. The injection was deemed successful if the ODI was no greater than 20. At six-month follow-up, 47% of patients who received steroid and local anesthetic injections had an ODI <20 compared to 74% of patients who received steroid, local anesthetic, and ozone. One randomized trial reported on SF-36 and reduction in use of analgesics. In this trial, 60 patients with acute low back pain and MRI evidence of disc protrusion were randomized to thrice weekly intramuscular paravertebral infiltration of ozone (N=36) or to a placebo injection with a false needle (N=24) for five weeks. At six-month follow-up, patients receiving the ozone treatment were more likely to be pain-free (61% vs. 33% compared to those receiving placebo), but there were no statistically significant differences in the total SF-36 score or the use of analgesic medications. The authors performed a fixed effects meta-analysis of the four randomized trials with respect to "short- and long-term pain relief." Three of the four trials compared ozone injections to steroid injections; the fourth trial used a sham control. The authors concluded that there is a benefit to ozone treatments provided at the paravertebral muscle and juxtaforaminal area at the level of the herniated disc (OR 2.66, 95% CI 1.94 to 3.63). It should be noted that the sham-controlled trial found no statistically significant differences in pain. The authors of the review noted that complications of ozone therapy are sparsely reported in the literature, but include one case of vitreoretinal hemorrhage, one thunderclap headache that was attributed to an intrathecal puncture and pneumoencephalus, three cases of paresthesias or impaired sensation in the lower extremities, one case of hematoma at the puncture site, and one case of vertebrobasilar stroke.

Additional RCTs

The extended search did not identify any additional RCTs that met inclusion criteria.

Radiofrequency Denervation

Maas et al., 2015

This is a good-quality systematic review and meta-analysis of 23 RCTs of radiofrequency (RF) denervation procedures for chronic low back pain arising from lumbar discs, facet joints, or sacroiliac joints. The 23 studies included 1,309 participants. The authors judged 13 of the included studies to be at low risk of bias. Most of the studies (N=12) examined RF treatments for chronic facet joint pain; the remaining trials examined RF treatments for disc pain, sacroiliac joint pain, or low back pain with or without features of radiculopathy.

For RF treatment of facet joints, the authors found low-quality evidence of improved ODI at one month compared to placebo (mean difference -5.5, 95% CI -8.7 to -2.4) based on one trial with 60 patients. Beyond six months, there was low-quality evidence of improved ODI for RF treatment of facet joints compared to placebo (mean difference -3.7, 95% CI -6.9 to -0.5) based on one trial of 60 patients. For pain outcomes, the authors found moderate-quality evidence of a statistically significant improvement in VAS pain scores at one month with RF treatment compared to placebo (mean difference -1.5, 95% CI -2.3 to -0.7). There were no statistically significant differences in the VAS pain score at one to six months or beyond. For trials comparing RF treatment with steroid injections, the authors found low-quality

evidence of a statistically significant benefit in VAS pain scores at one month with RF treatment (mean difference -2.2, 95% CI -2.4 to -2.1). There was very low-quality evidence of a statistically significant benefit in VAS pain scores at six months (mean difference -2.1, 95% CI -3.5 to -0.8) and 12 months (mean difference -2.7, 95% CI -3.4 to -1.9) with RF treatment.

For RF treatment of discs, the authors found low-quality evidence of no difference in ODI at one month compared to placebo (mean difference 1.0, 95% CI -6.9 to 8.9) based on one trial with 57 patients. Beyond six months, there was moderate-quality evidence of improved ODI for RF treatment of discs compared to placebo (mean difference -6.8, 95% CI-13.4 to -0.1) based on two trials with 76 patients. For pain outcomes, the authors found low-quality evidence of no statistically significant differences in VAS pain scores at up to six months. Beyond six months, there was moderate-quality evidence of a statistically significant improvement in VAS pain scores for RF treatment over placebo (mean difference -0.8, 95% CI -1.2 to -0.3).

For RF treatment of sacroiliac joints, the authors found very low-quality evidence of no difference in ODI at one month compared to placebo (mean difference, -14.1, 95% CI -30.4 to 2.3) based on two trials with 75 patients. Between one and six months, there was low-quality evidence of improved ODI for RF treatment of sacroiliac joints compared to placebo (mean difference -11.0, 95% CI -17.9 to -4.1) based on one trial with 49 patients. For pain outcomes, the authors found very low-quality evidence of no statistically significant differences in VAS pain scores at one month. Between one and six months, there was low-quality evidence of a statistically significant improvement in VAS pain scores for RF treatment over placebo (mean difference -1.3, 95% CI -2.1 to -0.5).

Adverse effects were sparsely reported in the trials: 10 studies reported no adverse effects. Two studies found no differences between RF and control groups with respect to adverse events. The adverse events in the remaining studies included increased pain, transient lower limb weakness, transient paresthesias, and superficial burns. The authors of the review cautioned that no clear conclusions can be drawn about the risks of RF denervation based on the results of small RCTs.

Additional RCTs

Five additional RCTs meeting inclusion criteria were identified in the extended search.

The first study (Kapural et al., 2015) reported 12-month follow-up of an RCT of intradiscal biacuplasty (a form of RF treatment) compared to sham treatment for patients with discogenic low back pain. However, at six months patients were unblinded and patients in the sham arm were allowed to crossover to biacuplasty (24 of 30 subjects did so). Thus, the authors only reported results in comparison to baseline values, not in comparison to the patients remaining in the sham treatment group.

The second trial (Koh et al., 2015) randomly assigned 62 patients with lumbar spinal stenosis in a single interventional pain management practice to undergo pulsed RF treatment to the lumbar dorsal root ganglion (N=31) or to sham lesioning (N=31). All patients received transforaminal injection of local anesthetic and steroid at the end of the procedure. The trial was double-blinded. The groups were similar at baseline. The rates of functional improvement (as measured by a >10 point or >30% decrease in the ODI score) at one and three months were reported. At one month, 45% of patients in the RF

group and 32% in the sham group demonstrated functional improvement (p=0.43); at three months, 26% of patients in the RF group and 19% in the sham group demonstrated functional improvement (p=0.76). At three months, the estimated mean difference in ODI between the RF and sham groups was 2.13 (95% CI -4.3 to 8.5). There were no statistically significant between-group differences with respect to the NRS pain score during three months of follow-up.

The third trial (Lee, Ahn, & Lee, 2016) randomly assigned 38 patients with radicular pain caused by disc herniation to undergo pulsed RF treatment of a targeted dorsal root ganglion or to transforaminal epidural steroid injection with dexamethasone and bupivacaine. There is no description of randomization method, efforts to ensure allocation concealment, or blinding. Among the 20 patients who underwent lumbar procedures (the remaining patients had treatments to the cervical spine), there were no between-group differences at 2-, 4-, 8-, or 12-week follow-up, although both groups demonstrated improvement compared to baseline ODI. There were no statistically significant between-group differences with respect to the mean VAS pain scores through 12 weeks of follow-up.

The fourth trial (Moussa & Khedr, 2016) randomly assigned 120 patients with chronic low back pain caused by a facet joint (confirmed by diagnostic block) to receive RF ablation of the facet joint capsule, RF ablation of the medial dorsal branch nerve, or sham RF treatment. All patients received an injection of methylprednisolone and bupivacaine with the procedure. Methods to ensure proper randomization and allocation concealment were not described. Patients were blinded to the treatment group. The groups were similar at baseline, and the participants were mostly women (72%). Mean change in ODI was measured for each group at 3, 6, 12, 24, and 36 months. At three months, there were no statistically significant differences between the groups with respect to change in ODI. At six months and one year, RF capsule ablation and medial dorsal branch denervation performed similarly and significantly better than the control group for mean change in ODI (mean changes in ODI at 6 months were 38.1, 40.3, and 10.3 for capsule ablation, medial dorsal branch denervation, and sham control respectively, p=0.042). RF capsule ablation performed better than medial dorsal branch ablation at two-year follow-up (mean changes in ODI 29.5, 12.3, and 3.2 for capsule ablation, medial dorsal branch denervation, and sham control respectively, p=0.018) and three-year follow-up (mean changes in ODI at 29.2, 8.2, and 2.9 for capsule ablation, medial dorsal branch denervation, and sham control respectively, p=0.007); both groups showed greater ODI improvement compared to control subjects. For pain outcomes assessed by mean change in the VAS leg pain and VAS back pain scores, there were no statistically significant differences at one and six months, but statistically significant improvement in both measures at one to three years in the patients who received RF joint capsule denervation. By three-year follow-up, 20% of patients were lost to follow-up.

The fifth study (Patel, 2016) reported 12-month follow-up of a trial that randomly assigned 51 patients with sacroiliac region pain to undergo RF denervation of lumbosacral dorsal nerve roots (N=34) or control treatment (N=17). Because 16 of 17 patients in the control group crossed over to RF denervation at three months, between-group comparisons were not performed in this study. Additionally, only 25 “study completers” were included in the analysis. Compared to baseline, patients who originally underwent RF treatment had statistically significant improvements in ODI (mean difference -13.9, P=0.0003) and the SF-36 physical functioning subscore (mean difference 17.4, p<0.0001). Similarly,

when compared to baseline, patients who originally underwent RF treatment had statistically significant improvements in the NRS pain score at 12 months (mean difference -2.7, p<0.0001).

EVIDENCE SUMMARY

A variety of minimally invasive and percutaneous treatments for low back pain have been studied. In general, there is a paucity of RCT data to support these interventions, and most of the trials that do exist are small and methodologically limited. For the interventions for which we can assess outcomes with moderate or low confidence, the benefits may not be clinically important. Minimally invasive discectomy appears to have comparable results to open discectomy. Few trials have examined long-term outcomes beyond 12 months. Adverse events associated with these interventions are inconsistently and sparsely reported in the studies.

OTHER DECISION FACTORS

Other Considerations

For radiofrequency ablation for facet joint pain, public commenters submitted an analysis of the evidence that differed from what was initially gleaned from the evidence review. They provided clinical context showing that many studies are not conducted with what are considered optimal techniques nor on appropriately selected subjects, and they acknowledged overuse of this procedure. They identified for the subcommittee a limited number of studies that approximated the optimal techniques and patient selection criteria, and those studies demonstrated some positive results (i.e., Nath, 2008; Lakemeier, 2013; Tekin, 2007; Dreyfuss, 2000). The subcommittee reviewed specific studies that more closely aligned with the Oregon expert-defined optimal technique to determine if sufficient evidence existed to support a subgroup of patients benefitting from the procedure. The subcommittee did not feel the evidence supported benefit in a selected or nonselected population.

POLICY LANDSCAPE

Quality Measures

A search of the National Quality Measures Clearinghouse did not identify any measures directly related the interventions discussed in this coverage guidance. The National Quality Measures Clearinghouse includes measures that address assessment and collaborative decision-making regarding low back pain. For example, one quality measure is the “percentage of patients with non-specific low back pain diagnosis who have had collaborative decision-making with regards to referral to a specialist” (Institute for Clinical Systems Improvement, 2012).

Payer coverage policies

Private Payers

Coverage policies were assessed for Aetna, Cigna, Moda, and Regence for the interventions outlined below to treat low back pain.

Coverage Policies for Percutaneous Discectomy

Cigna, Moda, and Regence do not cover percutaneous discectomy because the technique is considered investigational. Aetna covers manual or automated percutaneous lumbar discectomy for the treatment of a contained herniated lumbar disc for patients who are otherwise candidates for open laminectomy, have failed six months of conservative management, have no previous surgery or chemonucleolysis of the disc to be treated, and have clinical symptoms of radicular pain.

Coverage Policies for Ozone Injections and Chemonucleolysis

Aetna and Cigna consider ozone injection therapy experimental and do not cover the procedure. No coverage policy addressing ozone injections was identified for Moda or Regence, but both companies have policies stating that chemonucleolysis in general is not covered. Although Aetna and Cigna do not cover ozone injections, they do provide coverage for other forms of chemonucleolysis when medically necessary. Specifically, Aetna covers chymopapain chemonucleolysis for the treatment of sciatica caused by a single-level herniated disc for patients with leg pain worse than their lower back pain, radicular symptoms, a confirmed neurological deficit, and pain that is not relieved by at least six weeks of conservative therapy.

Coverage Policies for Radiofrequency Denervation

Aetna, Cigna, and Regence cover non-pulsed radiofrequency facet denervation, or facet neurotomy, for certain patients with back pain that has failed to respond adequately to a reasonable trial of conservative treatment. Moda lists facet neurotomy as a procedure requiring prior authorization. Both Aetna and Cigna list additional criteria for treatment including a requirement that patients first have a positive clinical response to facet joint injections.

Medicaid

Washington Medicaid provides coverage for percutaneous discectomy and facet neurotomy radiofrequency for low back pain. For treatment with facet neurotomy, Washington Medicaid requires a medical necessity review by Qualis Health, and the patient must fail to respond to a three-month trial of conservative treatment. No coverage policy was identified for ozone injections.

Medicare

A Medicare National Coverage Determination (NCD), effective September 29, 2008, outlines the decision to not cover thermal intradiscal procedures, which include intradiscal electrothermal therapy (IDET), intradiscal thermal annuloplasty (IDTA), percutaneous intradiscal radiofrequency thermocoagulation (PIRFT), radiofrequency annuloplasty (RA), intradiscal biacuplasty (IDB), percutaneous (or plasma) disc decompression (PDD) or coblation, or targeted disc decompression (TDD). No NCDs addressing the other interventions discussed in this coverage guidance were identified.

Six LCDs were identified for radiofrequency neurotomy for low back pain. All six LCDs cover certain patients who have experienced at least three months of moderate to severe pain that has failed to respond adequately to conservative treatment and has contributed to functional impairment. The treated pain must be predominantly axial, not associated with radiculopathy or neurogenic claudication,

and of facet joint origin. Before receiving treatment, a patient must first experience at least 80% pain relief after receiving medial branch block facet joint injections. The procedure should be performed under fluoroscopic or computed tomographic guidance and should only be repeated if the patient has experienced at least five to six months of significant pain relief.

No LCDs addressing the other interventions discussed in this coverage guidance were identified.

Professional society guidelines

Recommendations related to any of the interventions discussed in this Coverage Guidance are outlined below from four guidelines that addressed percutaneous or minimally invasive interventions for low back pain.

The National Institute for Health and Care Excellence (NICE) 2016 guideline on *Low Back Pain and Sciatica* makes the following recommendations regarding the use of percutaneous or minimally invasive interventions for the treatment of low back pain (NICE, 2016):

- Do not offer spinal injections for patients with low back pain.
- Consider referring patients with chronic low back pain for the assessment of radiofrequency when non-surgical treatment has not been effective, the medial branch nerve is thought to be the source of pain (as confirmed by a diagnostic medial branch block), and the patient has moderate or severe levels of localized back pain.
- Do not offer imaging as a prerequisite for the use of radiofrequency denervation to treat low back pain with specific facet joint pain.

The North American Spine Society's (NASS) 2014 guideline, *An Evidence-Based Clinical Guideline for the Diagnosis and Treatment of Lumbar Disc Herniation with Radiculopathy*, makes the following recommendations regarding the use of percutaneous or minimally invasive interventions for the treatment of low back pain (Kreiner et al., 2014):

- Endoscopic percutaneous discectomy and automated percutaneous discectomy may be considered for the treatment of lumbar disc herniation with radiculopathy based on poor-quality evidence for endoscopic percutaneous discectomy and fair-quality evidence for automated percutaneous discectomy.
- There is insufficient evidence to recommend for or against intradiscal ozone injections for the treatment of lumbar disc herniation with radiculopathy.
- There is insufficient evidence to recommend for or against percutaneous electrothermal disc decompression for the treatment of lumbar disc herniation with radiculopathy.

The American Society of Interventional Pain Physicians' 2013 guideline*, An Update of Comprehensive Evidence-Based Guidelines for Interventional Techniques in Chronic Spinal Pain*, makes the following recommendations regarding the use of percutaneous or minimally invasive interventions for the treatment of low back pain (Manchikanti et al., 2013):

- Evidence for automated percutaneous lumbar discectomy, percutaneous disc decompression, and decompressor use is limited. These procedures are recommended in select cases.

- Conventional radiofrequency neurotomy is recommended as a therapeutic lumbar/cervical facet joint intervention for treating low back pain after an appropriate diagnosis with diagnostic facet joint blocks. However, evidence is limited for conventional radiofrequency neurotomy as a therapeutic sacroiliac joint intervention, and instead cooled radiofrequency is recommended after positive diagnostic sacroiliac joint injections. Evidence is limited for the use of radiofrequency neurotomy for therapeutic thoracic facet and zygapophysial joint nerve blocks, but it may be performed based on emerging evidence.

The British Pain Society 2013 guideline, *Low Back and Radicular Pain: A Pathway for Care Developed by the British Pain Society,* makes the following recommendations (Lee et al., 2013):

- Radiofrequency denervation is recommended for certain patients with persistent or severe pain in the context of a multidisciplinary treatment approach after the use of medial branch blocks to diagnose pain of facet joint origin.
- The use of an MRI is not recommended at the primary care level for spinal pain. However, the use of other types of imaging guidance (e.g., X-ray, ultrasound, and fluoroscopy) is often indicated to facilitate spinal interventions to ensure patient safety.

REFERENCES

Evidence Sources

Brouwer, P. A., Brand, R., van den Akker-van Marle, M. E., Jacobs, W. C., Schenk, B., van den Berg-Huijsmans, A. A., ... Peul, W. C. (2015). Percutaneous laser disc decompression versus conventional microdiscectomy in sciatica: A randomized controlled trial. *Spine Journal, 15*(5), 857-865. DOI: 10.1016/j.spinee.2015.01.020.

Kapural, L., Vrooman, B., Sarwar, S., Krizanac-Bengez, L., Rauck, R., Gilmore, C., ... Mekhail, N. (2015). Radiofrequency intradiscal biacuplasty for treatment of discogenic lower back pain: A 12-month follow-up. *Pain Medicine, 16*(3), 425-431. DOI: 10.1111/pme.12595.

Koh, W., Choi, S. S., Karm, M. H., Suh, J. H., Leem, J. G., Lee, J. D., ... Shin, J. (2015). Treatment of chronic lumbosacral radicular pain using adjuvant pulsed radiofrequency: A randomized controlled study. *Pain Medicine, 16*(3), 432-441. DOI: 10.1111/pme.12624.

Lee, D. G., Ahn, S. H., & Lee, J. (2016). Comparative effectivenesses of pulsed radiofrequency and transforaminal steroid injection for radicular pain due to disc herniation: A prospective randomized trial. *Journal of Korean Medical Science, 31*(8), 1324-1330. DOI: 10.3346/jkms.2016.31.8.1324.

Maas, E. T., Ostelo, R. W., Niemisto, L., Jousimaa, J., Hurri, H., Malmivaara, A., & van Tulder, M. W. (2015). Radiofrequency denervation for chronic low back pain. *Cochrane Database of Systematic Reviews (10)*, Cd008572. DOI: 10.1002/14651858.CD008572.pub2.

Magalhaes, F. N., Dotta, L., Sasse, A., Teixera, M. J., & Fonoff, E. T. (2012). Ozone therapy as a treatment for low back pain secondary to herniated disc: A systematic review and meta-analysis of

randomized controlled trials. *Pain Physician, 15*(2), E115-129. Retrieved from http://www.painphysicianjournal.com/current/pdf?article=MTU5Mg%3D%3D&journal=66

Moussa, W. M., & Khedr, W. (2016). Percutaneous radiofrequency facet capsule denervation as an alternative target in lumbar facet syndrome. *Clinical Neurology and Neurosurgery, 150*, 96-104. DOI: 10.1016/j.clineuro.2016.09.004.

Nie, H., Zeng, J., Song, Y., Chen, G., Wang, X., Li, Z., ... Kong, Q. (2016). Percutaneous endoscopic lumbar discectomy for L5-S1 disc herniation via an interlaminar approach versus a transforaminal approach: A prospective randomized controlled study with 2-year follow up. *Spine (Phila Pa 1976), 41* Suppl 19, B30-b37. DOI: 10.1097/brs.0000000000001810.

Patel, N. (2016). Twelve-month follow-up of a randomized trial assessing cooled radiofrequency denervation as a treatment for sacroiliac region pain. *Pain Practice, 16*(2), 154-167. DOI: 10.1111/papr.12269.

Rasouli, M. R., Rahimi-Movaghar, V., Shokraneh, F., Moradi-Lakeh, M., & Chou, R. (2014). Minimally invasive discectomy versus microdiscectomy/open discectomy for symptomatic lumbar disc herniation. *Cochrane Database of Systematic Reviews*(9), Cd010328. DOI: 10.1002/14651858.CD010328.pub2.

Shriver, M. F., Xie, J. J., Tye, E. Y., Rosenbaum, B. P., Kshettry, V. R., Benzel, E. C., & Mroz, T. E. (2015). Lumbar microdiscectomy complication rates: A systematic review and meta-analysis. *Neurosurgical Focus, 39*(4), E6. DOI: 10.3171/2015.7.focus15281.

Singh, V., Manchikanti, L., Calodney, A. K., Staats, P. S., Falco, F. J., Caraway, D. L., ... Cohen, S. P. (2013). Percutaneous lumbar laser disc decompression: An update of current evidence. *Pain Physician, 16*(2 Suppl), Se229-260. Retrieved from http://www.painphysicianjournal.com/current/pdf?article=MTg4Mg%3D%3D&journal=74

Other Citations

American Academy of Family Physicians. (2016). *Imaging for low back pain*. Retrieved from http://www.aafp.org/patient-care/clinical-recommendations/all/cw-back-pain.html

American Academy of Pain Medicine. (n.d.). *AAPM facts and figures on pain*. Retrieved from http://www.painmed.org/patientcenter/facts_on_pain.aspx

Andreula, C. F., Simonetti, L., De Santis, F., Agati, R., Ricci, R., & Leonardi, M. (2003). Minimally invasive oxygen-ozone therapy for lumbar disk herniation. *AJNR American Journal of Neuroradiology, 24*(5), 996-1000.

Baliga, S., Treon, K., & Craig, N. J. (2015). Low back pain: Current surgical approaches. *Asian Spine Journal, 9*(4), 645-657. doi: 10.4184/asj.2015.9.4.645

Bicket, M. C., Gupta, A., Brown, C. H. t., & Cohen, S. P. (2013). Epidural injections for spinal pain: A systematic review and meta-analysis evaluating the "control" injections in randomized controlled trials. *Anesthesiology, 119*(4), 907-931. doi: 10.1097/ALN.0b013e31829c2ddd

Chou, R., Deyo, R., Friedly, J., Skelly, A., Hashimoto, R., Weimer, M., ... Brodt, E. (2016). *Noninvasive treatments for low back pain*. Rockville (MD): Agency for Healthcare Research and Quality. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK350276/

Chou, R., Loeser, J. D., Owens, D. K., Rosenquist, R. W., Atlas, S. J., Baisden, J., ... Wall, E. M. (2009). Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: An evidence-based clinical practice guideline from the American Pain Society. *Spine, 34*(10), 1066-1077. doi: 10.1097/BRS.0b013e3181a1390d

Dreyfuss, P., Halbrook, B., Pauza, K., Joshi, A., McLarty, J., & Bogduk, N. (2000). Efficacy and validity of radiofrequency neurotomy for chronic lumbar zygapophysial joint pain. *Spine, 25*(10), 1270-1277.

Kreiner, D. S., Hwang, S. W., Easa, J. E., Resnick, D. K., Baisden, J. L., Bess, S., ... Toton, J. F. (2014). An evidence-based clinical guideline for the diagnosis and treatment of lumbar disc herniation with radiculopathy. *Spine Journal, 14*(1), 180-191. doi: 10.1016/j.spinee.2013.08.003

Lakemeier, S., Lind, M., Schultz, W., Fuchs-Winkelmann, S., Timmesfeld, N., Foelsch, C., & Peterlein, C. D. (2013). A comparison of intraarticular lumbar facet joint steroid injections and lumbar facet joint radiofrequency denervation in the treatment of low back pain: A randomized, controlled, double-blind trial. *Anesthesia & Analgesia, 117*(1), 228-235. doi: 10.1213/ANE.0b013e3182910c4d

Lee, J., Gupta, S., Price, C., & Baranowski, A. P. (2013). Low back and radicular pain: A pathway for care developed by the British Pain Society. *British Journal of Anaesthesia, 111*(1), 112-120. doi: 10.1093/bja/aet172

Manchikanti, L., Abdi, S., Atluri, S., Benyamin, R. M., Boswell, M. V., Buenaventura, R. M., ... Hirsch, J. A. (2013). An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. *Pain Physician, 16*(2 Suppl), S49-283.

Nath, S., Nath, C. A., & Pettersson, K. (2008). Percutaneous lumbar zygapophysial (facet) joint neurotomy using radiofrequency current, in the management of chronic low back pain: A randomized double-blind trial. *Spine, 33*(12), 1291-1297; discussion 1298. doi: 10.1097/BRS.0b013e31817329f0

National Institute for Health and Care Excellence. (2016). *Clinical guidelines low back pain and sciatica in over 16s: Assessment and management.* London: National Institute for Health and Care Excellence (UK). Retrieved from https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0090162/pdf/PubMedHealth_PMH0090162.pdf

National Institute of Neurological Disorders and Stroke (2014). *Low back pain fact sheet*. Retrieved from https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Low-Back-Pain-Fact-Sheet

Tekin, I., Mirzai, H., Ok, G., Erbuyun, K., & Vatansever, D. (2007). A comparison of conventional and pulsed radiofrequency denervation in the treatment of chronic facet joint pain. *Clinical Journal of Pain, 23*(6), 524-529. doi: 10.1097/AJP.0b013e318074c99c

Coverage guidance is prepared by the Health Evidence Review Commission (HERC), HERC staff, and subcommittee members. The evidence summary is prepared by the Center for Evidence-based Policy at Oregon Health & Science University (the Center). This document is intended to guide public and private purchasers in Oregon in making informed decisions about health care services.

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APPENDIX A. GRADE INFORMED FRAMEWORK – ELEMENT DESCRIPTIONS

Element	Description
Balance of benefits and harms	The larger the difference between the desirable and undesirable effects, the higher the likelihood that a strong recommendation is warranted. An estimate that is not statistically significant or has a confidence interval crossing a predetermined clinical decision threshold will be downgraded.
Quality of evidence	The higher the quality of evidence, the higher the likelihood that a strong recommendation is warranted
Resource allocation	The higher the costs of an intervention—that is, the greater the resources consumed in the absence of likely cost offsets—the lower the likelihood that a strong recommendation is warranted
Values and preferences	The more values and preferences vary, or the greater the uncertainty in values and preferences, the higher the likelihood that a weak recommendation is warranted
Other considerations	Other considerations include issues about the implementation and operationalization of the technology or intervention in health systems and practices within Oregon.

Strong recommendation

In Favor: The subcommittee concludes that the desirable effects of adherence to a recommendation outweigh the undesirable effects, considering the balance of benefits and harms, resource allocation, values and preferences and other factors.

Against: The subcommittee concludes that the undesirable effects of adherence to a recommendation outweigh the desirable effects, considering the balance of benefits and harms, resource allocation, values and preferences and other factors.

Weak recommendation

In Favor: The subcommittee concludes that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects, considering the balance of benefits and harms, resource allocation, values and preferences and other factors., but further research or additional information could lead to a different conclusion.

Against: The subcommittee concludes that the undesirable effects of adherence to a recommendation probably outweigh the desirable effects, considering the balance of benefits and harms, cost and resource allocation, and values and preferences, but further research or additional information could lead to a different conclusion.

Confidence in estimate rating across studies for the intervention/outcome[1]

High: The subcommittee is very confident that the true effect lies close to that of the estimate of the effect. Typical sets of studies are RCTs with few or no limitations and the estimate of effect is likely stable.

Moderate: The subcommittee is moderately confident in the estimate of effect: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different. Typical sets of

[1] Includes risk of bias, precision, directness, consistency and publication bias

studies are RCTs with some limitations or well-performed nonrandomized studies with additional strengths that guard against potential bias and have large estimates of effects.

***Low*:** The subcommittee's confidence in the estimate of effect is limited: The true effect may be substantially different from the estimate of the effect. Typical sets of studies are RCTs with serious limitations or nonrandomized studies without special strengths.

***Very low*:** The subcommittee has very little confidence in the estimate of effect: The true effect is likely to be substantially different from the estimate of effect. Typical sets of studies are nonrandomized studies with serious limitations or inconsistent results across studies.

APPENDIX B. GRADE EVIDENCE PROFILE

Quality Assessment (Confidence in Estimate of Effect) Minimally Invasive Discectomy							
No. of Studies	**Study Design(s)**	**Risk of Bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other Factors**	**Quality**
Short-term function							
2 to 3	RCTs	Moderate	Serious	None	Serious		Low confidence in estimate of the effect ●●○○
Long-term function							
							Insufficient data
Long-term risk of undergoing surgery							
							Insufficient data
Change in utilization of comparators							
							Insufficient data
Adverse events							
6 to 9	RCTs	Moderate	Serious	None	Serious		Low to moderate confidence in estimate of the effect ●●○○ to ●●●○

Quality Assessment (Confidence in Estimate of Effect) Ozone Therapy							
No. of Studies	**Study Design(s)**	**Risk of Bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other Factors**	**Quality**
Short-term function							
1	RCT	Moderate	N/A	None	N/A	Sparse data	Very low confidence in estimate of the effect ●○○○
Long-term function							
							Insufficient data
Long-term risk of undergoing surgery							
							Insufficient data
Change in utilization of comparators							
1	RCT	Moderate	N/A	None	N/A	Sparse data	Very low confidence in estimate of the effect ●○○○
Adverse events							
							Insufficient data

Quality Assessment (Confidence in Estimate of Effect) Radiofrequency denervation low back pain due to facet joint arthropathy?							
No. of Studies	**Study Design(s)**	**Risk of Bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other Factors**	**Quality**
Short-term function							
1	RCT	Moderate	N/A	None	None	Inconsistent findings in subsequent RCT	Very low confidence in estimate of the effect ●○○○
Long-term function							
1	RCT	Moderate	N/A	None	None	Inconsistent findings in subsequent RCT	Very low confidence in estimate of the effect ●○○○
Long-term risk of undergoing surgery							
							Insufficient data
Change in utilization of comparators							
							Insufficient data
Adverse events							
							Insufficient data

Quality Assessment (Confidence in Estimate of Effect) Radiofrequency Denervation for Discogenic Low Back Pain							
No. of Studies	**Study Design(s)**	**Risk of Bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other Factors**	**Quality**
Short-term function							
1	RCT	Moderate	N/A	None	None	Sparse data	Low confidence in estimate of the effect ●●○○
Long-term function							
2	RCTs	Moderate	None	None	Serious		Moderate confidence in estimate of the effect ●●●○
Long-term risk of undergoing surgery							
							Insufficient data
Change in utilization of comparators							
							Insufficient data
Adverse events							
							Insufficient data

Quality Assessment (Confidence in Estimate of Effect) Radiofrequency Denervation for Sacroiliac Joint Pain							
No. of Studies	**Study Design(s)**	**Risk of Bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other Factors**	**Quality**
Short-term function							
1 to 2	RCTs	Moderate	Serious	None	Serious		Very low confidence in estimate of the effect ●○○○
Long-term function							
1	RCT	Moderate	N/A	None	None		Low confidence in estimate of the effect ●●○○
Long-term risk of undergoing surgery							
							Insufficient data
Change in utilization of comparators							
							Insufficient data
Adverse events							
							Insufficient data

APPENDIX C. METHODS

Scope Statement

Populations

Adults with acute, subacute, or chronic low back pain with or without radiculopathy

Population scoping notes: *None*

*Interventions**

Local injections (including trigger point injections), botulinum toxin injection, coblation nucleoplasty, radiofrequency denervation, prolotherapy, intradiscal electrothermal therapy (IDET), medial branch block, percutaneous intradiscal radiofrequency thermocoagulation, lumbar radiofrequency neurotomy, spinal cord (dorsal column) stimulators, sacroiliac joint injections

Intervention exclusions: *Corticosteroid injections are considered separately; these interventions, when used for diagnostic purposes, are beyond the scope of this review. Anesthetic injections are excluded.*

Comparators

Other interventions for low back pain (including others listed above, alone or in combination), no treatment

Outcomes

Critical: Short-term function, long-term function, long-term risk of undergoing surgery

Important: Adverse events, change in utilization of comparators

Considered but not selected for the GRADE table: Short-term pain, long-term pain

Key Questions

KQ1: What is the comparative effectiveness of non-corticosteroid percutaneous or minimally invasive interventions for low back pain?

KQ2: Does the comparative effectiveness of the interventions vary by:

a. Duration of back pain
b. Etiology of back or radicular pain (e.g., stenosis, disc herniation)
c. Frequency of the intervention
d. Presence or absence of neurological deficit
e. Anatomic approach
f. Use of imaging guidance
g. Previous back interventions
h. Response to previous percutaneous interventions (diagnostic or therapeutic)
i. Risk level for poor functional prognosis
j. Comorbidities (physical or behavioral)

KQ3: What are the harms of non-corticosteroid percutaneous or minimally invasive interventions for low back pain?

Contextual Questions

1: Does the use of these therapies affect subsequent use of health care resources?

2: How would availability of these therapies affect the need for imaging to determine appropriate candidates for these interventions?

Search Strategy

A full search of the core sources was conducted to identify systematic reviews, meta-analyses, technology assessments, and clinical practice guidelines using terms for the interventions. Searches of core sources were limited to citations published after 2012.

The core sources searched included:

Agency for Healthcare Research and Quality (AHRQ)
Blue Cross/Blue Shield Health Technology Assessment (HTA) program
BMJ Clinical Evidence
Canadian Agency for Drugs and Technologies in Health (CADTH)
Cochrane Library (Wiley Interscience)
Hayes, Inc.
Institute for Clinical and Economic Review (ICER)
Medicaid Evidence-based Decisions Project (MED)
National Institute for Health and Care Excellence (NICE)
Tufts Cost-effectiveness Analysis Registry
Veterans Administration Evidence-based Synthesis Program (ESP)
Washington State Health Technology Assessment Program

A MEDLINE® search was also conducted to identify systematic reviews, meta-analyses, and technology assessments. The search was limited to publications in English published since 2012. In addition, a MEDLINE® search was conducted for randomized controlled trials published after the search dates of the most recent systematic review selected for each intervention.

Searches for clinical practice guidelines were limited to those published since 2012. A search for relevant clinical practice guidelines was also conducted, using the following sources:

Australian Government National Health and Medical Research Council (NHMRC)
Centers for Disease Control and Prevention (CDC) – Community Preventive Services
Choosing Wisely
Institute for Clinical Systems Improvement (ICSI)
National Guidelines Clearinghouse
New Zealand Guidelines Group
NICE
Scottish Intercollegiate Guidelines Network (SIGN)
United States Preventive Services Task Force (USPSTF)
Veterans Administration/Department of Defense (VA/DOD)

Inclusion/Exclusion Criteria

Studies were excluded if they were not published in English, did not address the scope statement, or were study designs other than systematic reviews, meta-analyses, technology assessments, or clinical practice guidelines.

Interventions Not Reviewed

Several interventions were originally included in the scope, but later excluded to best utilize resources because most other payers do not cover the procedures for reasons of experimental status or insufficient evidence. These procedures are botulinum toxin injection, coblation nucleoplasty, prolotherapy, intradiscal electrothermal therapy, and percutaneous intradiscal radiofrequency thermocoagulation. In addition, other interventions were included in the search, but no systematic reviews were found. These procedures are trigger point injections, spinal cord stimulators, medial branch blocks, and sacroiliac joint injections.

APPENDIX D. APPLICABLE CODES

CODES	DESCRIPTION
CPT Codes	
0275T	Percutaneous laminotomy/laminectomy (interlaminar approach) for decompression of neural elements, (with or without ligamentous resection, discectomy, facetectomy and/or foraminotomy), any method, under indirect image guidance (e.g., fluoroscopic, CT), single or multiple levels, unilateral or bilateral; lumbar
22899	Unlisted procedure, spine
62267	Percutaneous aspiration within the nucleus pulosus, intervertebral disc, or paravertebral tissue for diagnostic purposes
62287	Decompression procedure, percutaneous, of nucleus pulposus of intervertebral disc, any method, single or multiple levels, lumbar (e.g., manual or automated percutaneous discectomy, percutaneous laser discectomy)
62292	Injection procedure for chemonucleolysis, including discography, intervertebral disc, single or multiple levels, lumbar
62380	Endoscopic decompression of spinal cord, nerve root(s), including laminotomy, partial facetectomy, foraminotomy, discectomy and/or excision of herniated intervertebral disc, 1 interspace, lumbar
64635	Destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance (fluoroscopy or CT); lumbar or sacral, single facet joint
64636	… each additional facet joint (List separately in addition to code for primary procedure)
64999	Unlisted procedure, nervous system (applies to the nerve root and not the musculoskeletal system)
HCPCS Level II Codes	
S2348	Decompression procedure, percutaneous, of nucleus pulposus of intervertebral disc, using radiofrequency energy, single or multiple levels, lumbar

HERC Coverage Guidance:
Low Back Pain: Minimally Invasive and Non-Corticosteroid Percutaneous Interventions
Disposition of Public Comments

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Commenters

Identification	Stakeholder
A	David M. Sibell, MD *[Submitted September26, 2017]*
B	Belinda Duszynski, Senior Director of Policy and Practice, Spine Intervention Society on behalf of American Academy of Pain Medicine, American Academy of Physical Medicine and Rehabilitation, American College of Radiology, American Pain Society, American Society of Anesthesiologists, American Society of Neuroradiology, American Society of Regional Anesthesia and Pain Medicine, American Society of Spine Radiology, North American Neuromodulation Society, North American Spine Society, Society of Interventional Radiology, Spine Intervention Society *[Submitted October 16, 2017]*

Public Comments

ID/#	Comment	Disposition
A1	I am writing this from the point of view as a physician specializing in Pain Medicine, and as a taxpayer in the State of Oregon. I am not representing any institution or organization with this opinion. As I reflect on the current state of my specialty, with respect to Oregon Health Authority and Health Evidence Review Commission policy decisions, I feel the need to point out resultant inconsistencies in my ability to treat patients covered by Oregon Health Authority. These inconsistencies may not be	*Thank you for your comments and participation in our process.* *Coverage of pain medicine visits differs throughout the state, by plan, and by availability of some of the interventions (such as pain-focused cognitive behavioral therapy). Coverage of consultations with a specific provider type (i.e., interventional pain physicians) is*

ID/#	Comment	Disposition
	evident to other providers, though I suspect that Primary Care Providers attempting to arrange care for their patients may also be frustrated by them. I should also point out that I have worked with the Evidence-based Guidelines Subcommittee (EbGS) on several occasions, advocating for a reasonable, limited coverage for treatment of patients covered by OHA (similar to that offered patients covered by Medicare in this region). In 2013, I was a consultant to the Subcommittee on cervical interventional procedures. After a detailed and balanced review period, we crafted a recommendation that would have allowed some patients access to treatment, based on strict criteria. After the Subcommittee submitted this recommendation, subsequent processing within the HERC system led to denial of all coverage for these treatments. In the most recent deliberations over treatments for low back pain, the EbGS elected to deny coverage for all treatments we might offer that were considered. Effectively, this has removed any of the treatments that we would be able to offer patients, which would require a Pain Medicine Medical Doctor's contribution. The medications that might be applicable are all handled by Primary Care Providers, and do not require our input (or, in the case of opioid use disorder, which is often referred to Pain Medicine specialists, may actually require the treatment of a chemical dependence specialist). The Complementary and Alternative Medicine practices that are approved by OHA do not require evaluation by or referral from a Pain Medicine specialist. In the EbGS's latest deliberations, there was mention of future study in the area of the treatment of low back pain, specifically one study at Johns Hopkins. However, reviewing the details of this study (available here), it appears that it is fairly open-ended, and is an observational cohort, not a prospective randomized controlled trial. This trial is not likely to contribute in a meaningful way to this debate.	*outside of the scope of this coverage guidance. These insights and concerns will be shared with the relevant stakeholders.*

ID/#	Comment	Disposition
	The current OHA policy allows for patients to have a one-time referral to a Pain Medicine specialist, which can be repeated every 3 years. We are not allowed to provide any treatments to patients and can only make recommendations to Primary Care Providers, usually for other treatments that OHA does not cover, or treatments that the Primary Care Providers could have provided on their own, without our input (e.g., "try gabapentin"). This often results in extremely dissatisfied patients, some of whom are referred specifically for treatments that the referring providers know OHA prevents us from offering. These patients are already economically stressed, and they have had to arrange and pay for transportation, childcare, missing work, and other expenses just to get to their appointment. For them to walk away with no new treatment options is extremely disappointing and a major waste of their already stressed resources. Almost every meeting with these patients results in their dissatisfaction with walking out of the clinic with somewhere between zero and not much value added to their care. As far as I am aware, there is no evidence in the peer reviewed literature supporting sending Oregon patients, insured by Medicaid, to seek care by Pain Medicine specialists. The current strategy appears to offer patients care by the specialty of Pain Medicine, but in reality, all the treatments that we could offer are either already available to Primary Care Providers, without our involvement, (e.g., acupuncture, generic medications) or not available to the patients, at all. With this in mind, I request that the EbGS end coverage for consultations with Pain Medicine specialists for OHA-covered patients. The current state is completely dysfunctional and results in significant patient dissatisfaction. Because no actual treatment can ensue, it is a waste of taxpayer money to have these consultations in the first place. I have already stated that it is a waste of patient resources. OHA has set up a system that does not allow for Pain Medicine specialists to offer treatment, or	

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	from a value-based point of view, to offer value to the customer (patient). By preventing any of the treatments we offer, and through a policy that prevents us from seeing patients more than once every three years, these consultation are an exercise in utter futility. In that case, it is not rational to continue to cause patients covered by OHA to have Pain Medicine consultations. Hopefully, EbGS (and later, the Value-based Benefits Subcommittee) will remain consistent with its policy determinations on spinal procedures and focus only on the peer-reviewed literature surrounding Pain Medicine consultations for Oregon patients covered by Medicaid. There are no prospective randomized controlled trials supporting this practice. There is no value to the patients or the system to the current practice. If all the tools that we would use for other patients are unavailable to these patients, and if the direction OHA is heading with treating chronic pain is away from allopathic medicine, and if there is no perceived value from the treatments that Pain Medicine specialists offer, there is no rational explanation for continuing this practice. If we cannot participate in patients' care in a meaningful way, we should not be asked to do so in a way that is without meaning. Since there is no evidence that supports one-time consultations resulting in no form of specialty treatment, EbGS should make a strong recommendation, based on the absence of any positive evidence, to stop this practice. If the Subcommittee conducts as rigorous an analysis of this system as it has with the treatments recently reviewed, it will find that the current state of Pain Medicine consultation policy does not meet the Subcommittee's standards for coverage. This will end the waste of patient resources and hope, and taxpayer money, funding these futile consultations. I should also mention that, at the same time that I am writing this, I am continuing to advocate for patients' access to chronic pain therapy by participating in the HERC Chronic Pain Task Force. This entity is seeking to find ways to treat chronic pain that	

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	OHA does not currently allow. If the deliberations of this body should include any of the treatments that my specialty offers, that would certainly change my point of view. However, it seems somewhat unlikely that this will be the case, and in any event, would occur long after the period of public input to this recommendation. Therefore, I am submitting this request during the period of response that is available.	
B1	Surely significant relief of pain, with restoration of function and return to work, as well as decreased utilization of other healthcare resources is an outcome that you do not want to deny to patients covered by the Oregon Health Authority. Those outcomes can be achieved by the responsible application of lumbar medial branch thermal radiofrequency neurotomy (LMBTRFN) when performed correctly for appropriately selected patients.	*Thank you for your comments.*
B2	The recently published systematic review by Maas et al.[1] poorly serves the needs of payers and patients because it does not consider correct performance or appropriate patient selection for LMBTRFN. While such reports apply the basic requirements of systematic reviews, their depiction of the evidence is flawed due to lack of insight into these critical clinical practice parameters inherent to the procedures being assessed. The literature on facet RFN must be meticulously stratified by technique, selection, and outcome. For a variety of reasons, practitioners use different techniques (e.g., LMBTRFN, pulsed RF), yet call their procedure by the same name. These procedures are not the same and must be assessed separately. Likewise, different clinical conditions result in different targets (e.g. medial branch nerves, dorsal root ganglion, sacroiliac joint) and must be assessed separately. Hereafter, our comments focus solely on evidence addressing LMBTRFN technique, selection, and outcome.	*The subcommittee heard extensive testimony relating to the limitations of studies included in the Maas review, particularly as they pertain to patient selection and procedural technique. As a result of this testimony, the subcommittee requested additional details on specific trials.* *Based on testimony establishing that the optimal selection and technique was described by Dreyfuss in 2000, the subcommittee considered the studies by Tekin (2007), Nath (2008), and Lakemeier (2013) in greater depth. Most attention was focused on a review of the data from Nath because it most closely approximated the details of the Dreyfuss study. The subcommittee expressed concern about the small size and single center/single operator design of the Nath trial, in addition to differences between*

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	Technique For facet RFN to have face validity the electrode must be accurately placed for the resulting thermal lesion to optimally capture the target nerve. Basic science studies indicate that lesions from perpendicular electrode placements can fail to capture the target nerve while lesions from parallel electrode placements are more likely to capture the target nerve and to do so along a substantial length of the nerve.[2-5] Thus, the orientation of the electrode is likely to be pivotal to clinical outcome, with perpendicular placements expected to have lower success rates and shorter durations of effect compared to parallel placements with greater success rates for longer periods. Indeed, this is borne out in the literature. Several RCTs do not qualify as providing evidence of efficacy because their active treatment arm lacked face validity by using the insufficient perpendicular technique.[6-8] Censoring these studies leaves only those of Nath 2008, Tekin 2007, and van Kleef 1999 eligible to provide evidence.[9-11] Tekin showed statistically significant differences in favor of active RFN at six months and at one year for group scores for back pain and for disability, with a significantly greater proportion of patients reporting an excellent outcome.[10] Nath showed a difference in favor of facet RFN that was significant for relief of leg pain, global perceived effect, and consumption of analgesics, although not for relief of back pain at six months.[9] For the relief of back pain, van Kleef showed a difference in favor of RFN that was not significant statistically, but survival analysis showed a statistically significant greater success rate from three months to one year after facet RFN.[11] Selection The guidelines cited in your report, and others, specify that LMBTRFN only be considered when other non-surgical treatments have proven ineffective. Thus, your	*the experimental and control groups in baseline pain scores. The subcommittee considered the outcomes reported here, but raised further concern that these differences might not be clinically important. Questions were also raised about the large number of patients who obtained prolonged pain relief from their diagnostic block. In the Tekin trial, the subcommittee believed that the differences in pain relief and Oswestry Disability Index between groups, although statistically significant, might not rise to a level of clinical significance.* *The subcommittee considered an option for coverage that was similar to the criteria outlined in the Noridian Local Coverage Determination.* *Citations 22 and 23 are not randomized controlled trials, and therefore were not considered by the subcommittee except to help establish the optimal patient selection and procedural techniques.* *The subcommittee acknowledges the limitations of the evidence, particularly the small number of RCTs that have been conducted using the optimal selection and procedural techniques. The subcommittee's choice of a weak recommendation reflects very low confidence in the estimates of effect and the likelihood that additional well-conducted RCTs could change that estimate.*

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	claim about existing treatment alternatives ignores the clinical circumstances of these patients. Fortunately, useful criteria for appropriate patient selection exist, such as the Noridian Local Coverage Determination (LCD)[12] (which covers Medicare patients in Oregon and is consistent with LCDs applied across the United States) and the North American Spine Society's Facet Joint Interventions Coverage Policy Recommendations.[13] Both address appropriate patient selection for LMBTRFN, as supported by the scientific literature and originating from consensus recommendations of the spine care and interventional pain community. In brief, sufficient pain relief following appropriately performed diagnostic medial branch nerve blocks determines patient selection for LMBTRFN. Low amounts of pain relief following a block, or a patient's response to a single diagnostic block are unacceptable selection methods due to high false-positive rates. Specifically, the single block false- positive rate is between 25-45%, and this is significantly reduced by performance of a second comparative block.[14-21] Both of the benchmark studies of LMBTRFN used appropriate patient selection and treatment technique; [22,23] selection was based on a minimum of 80% relief following comparative local anesthetic blocks. Both studies achieved the best results heretofore reported in the literature. The first study reported 60% of patients maintaining at least 80% relief for 12 months.[22] The second study reported complete relief of pain for at least 6 months in 55% of patients, accompanied by restoration of function, return to work, and no need for other health care, for a median duration of 15 months per treatment.[23] The results of these two studies illustrate what can be achieved by LMBTRFN if performed correctly and in appropriately selected patients. In both instances the technique used for LMBTRFN was that recommended by current LCDs and supported by broad consensus.[12,13] An impressive 55-60% of patients experience at least 80%	*The HERC does support interventions that have been proven to offer significant benefit to patients. The evidence reviewed for radiofrequency neurotomy did not show, on balance, that it would result in a clinically important improvement in pain or function.*

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	pain relief. No other intervention of any kind, for any form of back pain, provides this size of effect at this level of success. Outcomes The outcomes of facet RFN should be quantified in several domains: • Success rate: the proportion of patients who achieve a successful outcome • Degree of relief that constitutes success • Duration of relief • Corroboration of relief by improvements in critical domains such as restoration of function, return to work, and use of other health care Based on the most rigorous studies using appropriate diagnostic techniques to select patients and using optimal treatment techniques of LMBTRFN, • Over 50% of patients treated with LMBTRFN can expect to achieve 80-100% relief of pain,[22,23] accompanied by restoration of activities of daily living, resumption of work, and no need for other health care for their back pain, for a median duration of 15 months, with an interquartile range of 10-28 months.[23] • In the event of recurrence of pain, complete relief can be reinstated by repeating the treatment.[23] Surely OHA would support practices that achieve such outcomes and would ensure that they are available to patients.	

References Provided by Commenters

ID/#	References
B	1. Maas ET, Ostelo RW, Niemisto L, Jousimaa J, Hurri H, Malmivaara A, van Tulder MW. Radiofrequency denervation for chronic low back pain. Cochrane Database Syst Rev 2015;(10), CD008572. 2. International Spine Intervention Society. Lumbar medial branch thermal radiofrequency neurotomy. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures, 2nd edn. International Spine Intervention Society, San Francisco, 2013:601-641. 3. Lau P, Mercer S, Govind J, Bogduk N. The surgical anatomy of lumbar medial branch neurotomy (facet denervation). Pain Med 2004; 5:289-298. 4. Bogduk N, Macintosh J, Marsland A. A technical limitation to efficacy of radiofrequency neurotomy for spinal pain. Neurosurgery 1987; 20:529-535. 5. Feigl GC, Dreu M, Kastner M, Rosmarin W, Ulz H, Kniesel B, Likar R. Thermocoagulation of the medial branch of the dorsal branch of the lumbar spinal nerve: fluoroscopy versus CT. Pain Med 2017;18:36-40. 6. Gallagher J, Petriccione di Valdo PL, Wedley JR, Hamann W, Ryan P, Chikanza I, Kirkham B, Price R, Watson MS, Grahame R, Wood S. Radiofrequency facet joint denervation in the treatment of low back pain: a prospective controlled double-blind study to assess its efficacy. The Pain Clinic 1994; 7:193-198. 7. Leclaire R, Fortin L, Lambert R, Bergeron YM, Rossignol M. Radiofrequency facet joint denervation in the treatment of low back pain: a placebo-controlled clinical trial to assess efficacy. Spine 2001; 26:1411-1416. 8. van Wijk RMA, Geurts JWM, Wynne HJ, Hammink E, Buskens E, Lousberg R, Knape JTA, Groen GJ. Radiofrequency denervation of lumbar facet joints in the treatment of chronic low back pain. A randomized, double-blind sham lesion-controlled trial. Clin J Pain 2004; 21:335-344. 9. Nath S, Nath CA, Pettersson K. Percutaneous lumbar zygapophysial (Facet) joint neurotomy using radiofrequency current, in the management of chronic low back pain: A randomized double-blind trial. Spine 2008; 33:1291-7. 10. Tekin I, Mirzai H, Ok G, Erbuyun K, Vatansever D. A comparison of conventional and pulsed radiofrequency denervation in the treatment of chronic facet joint pain. Clin J Pain 2007; 23524-9. 11. Lakemeier S, Lind M, Schultz W, Fuchs-Winkelmann S, Timmesfeld N, Foelsch C, Peterlain CD. A comparison of intraarticular lumbar facet joint steroid injections and lumbar facet joint radiofrequency denervation in the treatment of low back pain: A randomized, controlled, double-blind trial. Anesth Analg 2013; 117:228-235. 12. Noridian Healthcare Solutions, LLC. Local Coverage Determination (L34955): Facet Joint Injections, Medial Branch Blocks, and Facet Joint Radiofrequency Neurotomy. 13. North American Spine Society. Coverage Policy Recommendations: Facet Joint Interventions. 2016. https://www.spine.org/PolicyPractice/CoverageRecommendations/PayorAccess.aspx 14. Barnsley L, Lord S, Bogduk N. Comparative local anaesthetic blocks in the diagnosis of cervical zygapophysial joint pain. Pain 1993; 55:99-106. 15. Lord SM, Barnsley L, Bogduk N. The utility of comparative local anaesthetic blocks versus placebo-controlled blocks for the diagnosis of cervical zygapophysial joint pain. Clin J Pain 1995; 11:208-213.

ID/#	References
	16. Schwarzer AC, Aprill CN, Derby R, Fortin J, Kine G, Bogduk N. The false-positive rate of uncontrolled diagnostic blocks of the lumbar zygapophysial joints. Pain 1994; 58:195-200. 17. Manchikanti L, Pampati V, Fellows B, Bakhit CE. Prevalence of lumbar facet joint pain in chronic low back pain. Pain Physician 1999; 2:59-64. 18. Manchikanti L, Pampati V, Fellows B, Bakhit CE. The diagnostic validity and therapeutic value of lumbar facet joint nerve blocks with or without adjuvant agents. Curr Rev Pain 2000; 4:337-44. 19. Manchikanti L, Boswell MV, Singh V, Pampati V, Damron KS, Beyer CD. Prevalence of facet joint pain in chronic spinal pain of cervical, thoracic, and lumbar regions. BMC Musculoskeletal Disorders 2004; 5:15. 20. Manchukonda R, Manchikanti KN, Cash KA, Pampati V, Manchikanti L. Facet joint pain in chronic spinal pain: an evaluation of prevalence and false-positive rate of diagnostic blocks. J Spinal Disord Tech 2007; 20:539-545. 21. Barnsley L, Lord S, Wallis B, Bogduk N. False-positive rates of cervical zygapophysial joint blocks. Clin J Pain 1993; 9:124-130. 22. Dreyfuss P, Halbrook B, Pauza K, Joshi A, McLarty J, Bogduk N. Efficacy and validity of radiofrequency neurotomy for chronic lumbar zygapophysial joint pain. Spine 2000; 25:1270-1277. 23. MacVicar J, Borowczyk JM, MacVicar AM, Loughnan BM, Bogduk N. Lumbar medial branch radiofrequency neurotomy in New Zealand. Pain Med 2013; 14:639-645.

Section 3.0

Coverage Guidances

Health Evidence Review Commission (HERC)

Coverage Guidance:

Urine Drug Testing

DRAFT for EbGS meeting materials 11/2/2017

HERC Coverage Guidance

Urine drug testing (UDT) using presumptive testing (i.e., qualitative testing) is recommended for coverage (*weak recommendation*) when the results will affect treatment planning. Definitive testing to confirm a negative or positive presumptive UDT result is recommended for coverage (*weak recommendation*) when there is clinical documentation of a follow-up plan based on the test results and:

- The result is inconsistent with the patient's history, presentation, or current prescribed medication plan, OR
- The clinician suspects use of a substance that is inadequately detected or not detected by a presumptive UDT, OR
- To rule out an error as the cause of a presumptive UDT result

Definitive testing is limited to no more than seven substances per day.

In patients receiving treatment for a substance use disorder, random UDT is recommended for coverage (*strong recommendation*) with limitations on the frequency of testing depending on the period of abstinence (*weak recommendation*):

- For patients with zero to 30 consecutive days of abstinence, UDT is expected at a frequency not to exceed one testing profile in one week
- For patients with 31 to 90 consecutive days of abstinence, UDT is expected at a frequency of one to three testing profiles in one month
- For patients with >90 days of consecutive abstinence, UDT is expected at a frequency of one to three testing profiles in three months

A maximum of 24 presumptive tests are allowed per year, and a maximum of 12 definitive tests, used as a follow-up to presumptive tests, are allowed each year.

In patients receiving chronic opioid therapy for chronic pain, random UDT is recommended for coverage, with frequency of testing depending on the patient's risk level (using a validated opioid risk assessment tool):

- Low Risk: Random testing one to two times every 12 months
- Moderate Risk: Random testing one to two times every six months
- High Risk: Random testing one to three times every three months

A maximum of 12 presumptive tests are allowed per year, and a maximum of eight definitive tests, used as a follow-up to presumptive tests, are allowed each year.

Oregon Health Authority

In patients with unexplained alteration of mental status and when knowledge of drug use is necessary for medical management, UDT (qualitative and confirmatory quantitative testing, if indicated) is recommended for coverage (*strong recommendation*).

Optional:

In a residential treatment facility, ongoing routine drug testing is not recommended for coverage (*weak recommendation*).

Note: Definitions for strength of recommendation are in Appendix A. *GRADE Informed Framework Element Description*.

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Rationale for development of coverage guidances and multisector intervention reports

Coverage guidances are developed to inform coverage recommendations for public and private health plans in Oregon as plan administrators seek to improve patient experience of care, population health, and the cost-effectiveness of health care. In the era of public and private sector health system transformation, reaching these goals requires a focus on maximizing the benefits and minimizing the harms and costs of health interventions.

HERC uses the following principles in selecting topics for its reports to guide public and private payers:

- Represents a significant burden of disease or health problem
- Represents important uncertainty with regard to effectiveness or harms
- Represents important variation or controversy in implementation or practice
- Represents high costs or significant economic impact
- Topic is of high public interest

HERC bases its reports on a review of the best available research applicable to the intervention(s) in question. For coverage guidances, which focus on clinical interventions and modes of care, evidence is evaluated using an adaptation of the GRADE methodology. For more information on coverage guidance methodology, see Appendix A.

Multisector interventions can be effective ways to prevent, treat, or manage disease at a population level. In some cases, HERC has reviewed evidence and identified effective interventions, but has not made formal coverage recommendations when these policies are implemented in settings other than traditional health care delivery systems because effectiveness may be dependent on the environment in which the intervention is implemented.

GRADE-Informed Framework

HERC develops recommendations by using the concepts of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system. GRADE is a transparent and structured process for developing and presenting evidence and for performing the steps involved in developing recommendations. The table below lists the elements that determine the strength of a recommendation. HERC reviews the evidence and makes an assessment of each element, which in turn is used to develop the recommendations presented in the coverage guidance box. Estimates of effect are derived from the evidence presented in this document. Assessments of confidence are from the published systematic reviews and meta-analyses, where available and judged to be reliable.

In some cases, no systematic reviews or meta-analyses encompass the most current literature. In those cases, HERC may describe the additional evidence or alter the assessments of confidence in light of all available information. Such assessments are informed by clinical epidemiologists from the Center for Evidence-based Policy. Unless otherwise noted, estimated resource allocation, values and preferences, and other considerations are assessments of HERC.

Should urine drug testing be recommended in the management of patients receiving opioid prescriptions for chronic pain?

Outcomes	**Estimate of Effect for Outcome/ *Confidence in Estimate***	**Resource Allocation**	**Values and Preferences**	**Other Considerations**
Overdose and death *(Critical outcome)*	Insufficient evidence	Point-of-care presumptive qualitative testing is much less expensive than quantitative confirmatory testing. Routinely performing quantitative testing adds significant cost, especially when testing	Patients receiving opioids for chronic pain would prefer not to have urine drug testing, because it could be seen as indicating suspicion about their behavior, undermine the perceived validity of opioids as chronic pain	UDT can provide critical information about diversion (i.e., a negative UDT on a patient being prescribed an opioid). This has important public safety implications. UDT provides information about other
Identification of diversion *(Critical outcome)*	Insufficient evidence			
Identification of other substance use disorders *(Critical outcome)*	Insufficient evidence			

Should urine drug testing be recommended in the management of patients receiving opioid prescriptions for chronic pain?

Outcomes	Estimate of Effect for Outcome/ *Confidence in Estimate*	Resource Allocation	Values and Preferences	Other Considerations
Test performance characteristics *(Important outcome)*	Limited evidence from single-center diagnostic accuracy studies comparing point-of-care immunoassays to a reference standard (liquid chromatography or mass spectroscopy) suggests low to moderate rates of false-positive or false-negative test results depending on the substance and cut-off values (see Table 1 on page 13 for further details) ●○○○ Very low certainty	for a large number of substances. A strategy of using quantitative testing as confirmatory after unexpected qualitative results could optimize resource allocation. Frequency of testing also affects overall cost.	treatment, and result in changes in management that a patient could feel are unwarranted. Patients would generally prefer accurate tests, so false-positive and negative results would not lead to a change in management. From a societal values perspective, society would want to ensure that patients are not being prescribed medications that increase their risk of death, overdose, or addiction, or that are contributing to street availability of controlled substances.	medication/substance use that is necessary for safe/appropriate prescribing; information that patients might not provide and is otherwise difficult to verify.
Change in management of chronic pain or substance use disorder *(Important outcome)*	Insufficient evidence			

Should urine drug testing be recommended in the management of patients receiving opioid prescriptions for chronic pain?

Outcomes	Estimate of Effect for Outcome/ *Confidence in Estimate*	Resource Allocation	Values and Preferences	Other Considerations
Balance of benefits and harms: Insufficient evidence exists to support the clinical utility of UDT or to address the relative balance of benefits to harms. Theoretically, UDT would provide a significant benefit for safe and appropriate prescribing by ensuring that the patient is using the prescribed medication appropriately and to verify that there is not concurrent use of other substances. The theoretical harms include undermining the patient-physician relationship and creating a new treatment pathway based on erroneous information. Given that opioid medications have well-known risks including overdose, death, and diversion and lack of proven benefit , the expected benefits of UDT significantly outweigh the potential harms.				
Rationale: Despite the lack of evidence, UDT can theoretically help to identify appropriate adherence to a prescribed regimen, confirm absence of illicit substances, and identify diversion. It is universally recommended by guidelines and other payers as a mechanism to objectively identify the appropriate use of opioids and avoidance of other concerning substances. The harms are in the false-positive and false-negative rates, which could lead to inappropriate changes in management and undermine trust in the patient-provider relationship. There are data suggesting overuse of UDT, entailing significant costs, particularly when frequent quantitative testing is performed. Therefore, we make a recommendation for coverage with restrictions.				
Recommendation: Urine drug testing is recommended for coverage, with specified restrictions on the type and quantity of testing (see full recommendation on page 1) (*weak recommendation*).				

Should urine drug testing be recommended in the management of patients with a known or suspected substance use disorder?

Outcomes	Estimate of Effect for Outcome/ *Confidence in Estimate*	Resource Allocation	Values and Preferences	Other Considerations
Overdose and death *(Critical outcome)*	Insufficient evidence	Point-of-care presumptive qualitative testing is much less expensive than quantitative confirmatory	Many patients would prefer not to have UDT to verify their reported substance abstinence or use. Patients would generally prefer tests that have a low false-	Random UDT, rather than predictable UDT, is widely recommended by expert organizations.
Identification of diversion *(Critical outcome)*	Insufficient evidence			

Should urine drug testing be recommended in the management of patients with a known or suspected substance use disorder?

Outcomes	Estimate of Effect for Outcome/ *Confidence in Estimate*	Resource Allocation	Values and Preferences	Other Considerations
Identification of other substance use disorders *(Critical outcome)*	Insufficient evidence	testing. Routinely performing quantitative testing adds significant cost, especially when testing for a large number of substances. A strategy of using quantitative testing as confirmatory after unexpected qualitative results could optimize resource allocation. Frequency of testing also affects overall cost. There are some patients for whom very frequent quantitative testing has been completed (e.g., every few days) for multiple substances (>20).	positive rate for illicit substances because these would decrease trust in the patient-clinician relationship, and potentially erroneously decrease earned privileges (such as in an Opioid Treatment Program). In contrast, some patients might prefer less accurate tests with high false-negative rates if they are actively using other substances that they would prefer not to disclose. From a societal perspective, there would be value that patients receiving substance use disorder treatment are confirming receipt of safe and effective treatment (without high risk concurrent use of illicit substances) and that there is not active diversion occurring, which threatens public safety.	UDT is an essential part of law enforcement and child custody requirements for many patients to ensure ongoing abstinence or adherence to a treatment program.
Test performance characteristics *(Important outcome)*	Limited evidence from single-center diagnostic accuracy studies comparing point-of-care immunoassays to a reference standard (liquid chromatography or mass spectroscopy) suggests low to moderate rates of false-positive or false-negative test results depending on the substance and cut-off values (see Table 1 for further details) ●○○○ Very low certainty			
Change in management of chronic pain or substance use disorder *(Important outcome)*	Insufficient evidence			

Should urine drug testing be recommended in the management of patients with a known or suspected substance use disorder?

Outcomes	Estimate of Effect for Outcome/ *Confidence in Estimate*	Resource Allocation	Values and Preferences	Other Considerations
Balance of benefits and harms: Insufficient evidence on the clinical utility of urine drug testing is available. There is a compelling theoretical argument that, in patients with a substance use disorder, it is very important to understand adherence to a high-risk treatment (i.e., opioid agonist therapy) and concurrent use of other substances that put the patient at high risk of death or overdose. Additionally, identifying patients who are diverting these high-risk medications into the public could be a significant societal benefit if the testing helped to decrease diversion. The harms in this population are small, unless the tests have false-positive or false-negative results that would change the treatment plan in a way that negatively affects patient outcomes.				
Rationale: The expected benefits of appropriately treating individuals with a substance use disorder outweigh the harms, although patient values of accurate and less frequent testing and moderate expense temper the recommendation.				
Recommendation: UDT is recommended for coverage in patients with a substance use disorder (*strong recommendation*), with specified restrictions on the type and quantity of testing (see full recommendation on page 1) (*weak recommendation*).				

Note: GRADE-informed framework elements are described in Appendix A. A GRADE Evidence Profile is in Appendix B.

Background

Urine drug testing (UDT) is a noninvasive procedure used to screen for drug use among patients being treated for a substance use disorder (SUD) and patients prescribed opioids for chronic pain, to test for the use of prescribed medications and other substances. UDT can fulfill multiple purposes during substance use treatment as:

- Part of the initial assessment of a patient being evaluated for a diagnosis of a SUD
- A screen to prevent potential adverse effects of pharmacotherapy (e.g., opioid screen prior to starting naltrexone)
- A component of the treatment plan for a SUD
- A way to monitor the patient's use of illicit substances or adherence to pharmacotherapy treatment for a SUD
- A way to assess the efficacy of the treatment plan (i.e., level of care) (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012)

Although UDT had been used in SUD treatment for decades, UDT has increased recently because of increases in prescriptions for opioid medications, the number of patients with opioid use disorders (OUDs), and overdose deaths (American Society of Addiction Medicine [ASAM], 2013). Opioid Treatment Programs (which can administer methadone or buprenorphine) are federally mandated to provide adequate testing or analysis for drugs of abuse for patients in OUD maintenance treatment, including a minimum of eight random drug abuse tests each year. Patients receiving long-term detoxification treatment (opioid agonist medication in decreasing doses for more than 30 days) in an Opioid Treatment Program must receive an initial drug abuse test and then monthly random tests (Code of Federal Regulations, 2015).

In recent years, there have been concerns about the overuse of drug tests. For example, the U.S. Department of Justice announced a settlement with Millennium Health in 2015 to resolve alleged violations of the False Claims Act for billing Medicare, Medicaid, and other federal health care programs for medically unnecessary urine drug tests (U.S. Department of Justice, 2015). Millennium Health allegedly gave physicians free UDT cups in exchange for referring drug testing to their labs, which violated the federal Physician Self-Referral Law (Stark law) and Anti-Kickback Statute (Office of Inspector General, U.S. Department of Health & Human Services, n.d.). Millennium Health encouraged physicians to order "custom profiles," which caused physicians to order a large number of tests for each patient without an individualized assessment of that patient's needs. Millennium Health agreed to pay more than $200 million for excessive and unnecessary urine drug tests from 2008 to 2015 (U.S. Department of Justice, 2015).

Indications

There are generally two types of patients that are given periodic UDT. First, patients being treated for a SUD can be given UDT to screen for use of substances that the patient might be abusing. Second, patients with chronic pain who are being treated with opioids can be given UDT to ensure that the patient is taking the prescribed medications (and not diverting the opioids and distributing to others) and that the patient is not using other drugs of abuse.

Technology Description

Qualitative (presumptive) drug tests are performed by immunoassay, and quantitative (definitive) drug tests are performed by gas chromatography-mass spectrometry (GC-MS) or liquid chromatography-tandem mass spectrometry (LC-MS/MS). Quantitative testing is more accurate and more expensive than qualitative testing. Quantitative testing is often used as a confirmation test when results of the qualitative test are unexpected. More recently, quantitative testing has been used without an initial qualitative test to provide information about an array of medications, including those that cannot be reliably detected by qualitative tests (ASAM, 2013).

Qualitative immunoassay tests can be analyzed at the point of care or sent to a laboratory. In immunoassay tests, competitive binding and antibodies to the drug of interest are used to detect the presence of a drug at a specific level. A fixed amount of labeled drug is added to a urine sample, and the drug present in the urine competes with the labeled drug to bind to the antibodies. The test measures the amount of labeled drug that binds to the antibody, which is inversely proportional to the concentration of drug in the urine. Immunoassay tests for different drugs vary in their accuracy and cross-reactivity (i.e., ability of the antibody to bind with drugs other than the drug of interest). Qualitative drug tests are reported as "positive" or "negative," based on a specified level of drug detected. Immunoassay tests analyzed at the point of care can be interpreted within minutes, and those sent to a laboratory for analysis are typically analyzed within one to four hours (SAMHSA, 2012).

Quantitative tests are performed in a laboratory and typically take several days to analyze. Gas or liquid chromatography is used to separate the urine analytes, and then mass spectrometry is used to identify the drugs and metabolites by their molecular structure. Results are reported as drug concentrations detected in the urine. Single-drug quantitative tests are available, and quantitative drug test panels can assess for multiple drugs (ASAM, 2013). According to SAMHSA (2012), common drug test panels include the following:

- Amphetamine, methamphetamine
- Barbiturates (amobarbital, butabarbital, butalbital, pentobarbital, phenobarbital, secobarbital)
- Benzodiazepines (alprazolam, chlordiazepoxide, clonazepam, clorazepate, diazepam, flurazepam, lorazepam, oxazepam, temazepam)
- Illicit drugs (cocaine, methylenedioxyamphetamine [MDA], methylenedioxymethamphetamine [MDMA], methylenedioxyethylamphetamine [MDEA], marijuana)
- Opiates/opioids (codeine, dihydrocodeine, fentanyl, hydrocodone, hydromorphone, meperedine, methadone, morphine, oxycodone, oxymorphone, propoxyphene)

Evidence Review

The search for evidence found four systematic reviews and two diagnostic accuracy studies pertaining to the use of UDT for patients with chronic pain or SUD. An updated search of the literature did not find any randomized controlled trials published since 2014, the date of the most recent systematic reviews.

The first systematic review (Chou et al., 2009) was a good-quality systematic review of studies examining the use of UDT for patients receiving treatment for chronic pain. No studies reported on the effects of UDT on patient outcomes. The authors did identify two studies of the effects of UDT on concomitant use of illicit or other controlled substances in patients with chronic pain. In one of the studies (Manchikanti, Manchukonda, Pampati, et al., 2006), a historically controlled cohort study, UDT

was associated with decreased use of marijuana, but no difference in the use of other illicit drugs. The second study (Manchikanti, Manchukonda, Damron, et al., 2006), also a historically controlled cohort study, found that UDT, when used as part of a multicomponent approach that also included treatment contracts, pill counts, and frequent monitoring and education, was associated with a reduction in controlled substance abuse from 18% to 9%. These studies were limited by the use of historical controls and the use of multiple interventions.

The second systematic review (Starrels et al., 2010) was a good-quality review that summarized the effects of treatment contracts and routine UDT in patients with chronic non-cancer pain. The authors identified seven cohort studies that examined the use of treatment contracts and UDT; six of the studies were rated as fair quality and one was rated as poor quality. The studies were performed in outpatient settings including pain clinics and primary care clinics. Notably, four of the studies relied on confirmatory tests (mass spectroscopy or chromatography) rather than immunoassays. Approximately 15% of the patients included in these studies had a history of substance abuse. In one retrospective study (Wiedemer et al., 2007) conducted in a Veterans Affairs primary care setting, the use of treatment contracts and UDT was associated with a reduction in opioid misuse (51% to 28%). Two historically controlled cohort studies (Manchikanti, Manchukonda, Damron, et al., 2006; Manchikanti, Manchukonda, Pampati, et al., 2006) conducted in pain clinics found reductions in the use of opioids prescribed by another source (18% to 9%) and the use of illicit substances (23% to 16%) with the introduction of treatment agreements and UDT. Both of these studies were also included in the review by Chou et al. (2009) mentioned above. None of the studies included in this systematic review examined outcomes of opioid use or dependence, overdose, death, or diversion.

The third systematic review (Chou, Deyo et al., 2014) was a good-quality systematic review for the Agency for Healthcare Research and Quality (AHRQ) that examined evidence for long-term use of opiates for chronic pain and included a key question on risk mitigation approaches including UDT. The AHRQ review identified no studies that addressed clinical outcomes related to UDT.

Two diagnostic accuracy studies compared the performance of point-of-care immunoassay tests to confirmatory tests. Those results are summarized in Table 1. However, these results should be interpreted with caution because they represent the experience of a single center using one type of point-of-care immunoassay and with different cut-offs defining positivity for the index and the reference tests. Additionally, Millennium Health sponsored both studies, provided the urine drug tests, and conducted the reference testing.

Table 1. Diagnostic Accuracy of Immunoassay Testing Compared to LC-MS/MS

<table>
<tr><th>Citation and Study Details</th><th>Findings</th><th>Cut-off values (Immunoassay vs. LC-MS/MS, ng/mL)</th><th>Comments</th></tr>
<tr>
<td>Manchikanti et al. (2011b)

Setting:
U.S. tertiary referral center and intervention pain management practice

Comparators: immunoassay and LC-MS/MS
N = 1,000</td>
<td>Compared to LC-MS/MS, immunoassay had the following:

<table>
<tr><th>False-Negative Reports</th><th>n</th><th>%</th></tr>
<tr><td>Morphine</td><td>52</td><td>8%</td></tr>
<tr><td>Oxycodone</td><td>34</td><td>25%</td></tr>
<tr><td>Methadone</td><td>2</td><td>4%</td></tr>
<tr><td>Marijuana</td><td>3</td><td>9%</td></tr>
<tr><td>Cocaine</td><td>6</td><td>75%</td></tr>
<tr><td>Methamphet-amines</td><td>3</td><td>60%</td></tr>
<tr><td>Amphet-amines</td><td>9</td><td>53%</td></tr>
</table>

<table>
<tr><th>False-Positive Reports</th><th>n</th><th>%</th></tr>
<tr><td>Morphine</td><td>23</td><td>7%</td></tr>
<tr><td>Oxycodone</td><td>66</td><td>8%</td></tr>
<tr><td>Methadone</td><td>11</td><td>1%</td></tr>
<tr><td>Marijuana</td><td>19</td><td>2%</td></tr>
<tr><td>Cocaine</td><td>0</td><td>0%</td></tr>
<tr><td>Methamphet-amines</td><td>12</td><td>1%</td></tr>
<tr><td>Amphet-amines</td><td>9</td><td>1%</td></tr>
</table>
</td>
<td>Morphine: 300 vs. 50
Oxycodone: 100 vs. 50
Methadone: 300 vs. 100
Marijuana: 50 vs. 15
Cocaine: 300 vs. 50
Methamphetamines: NA vs. 50
Amphetamines: 1000 vs. 100</td>
<td>Authors concluded that confirmatory testing will be needed 20% to 32% of the time, but that overall point-of-care testing is efficient in this population.

(The authors assumed that if someone is prescribed an opioid they are actually taking it. Thus, they regard the 11% of people who had negative immunoassay and negative LC-MS for opioids in spite of a prescription as having two false-negative results rather than evidence that the person wasn't taking the medication.)</td>
</tr>
<tr>
<td>Manchikanti et al. (2011b)

Setting:
U.S. tertiary referral center and intervention</td>
<td>Compared to LC-MS/MS, immunoassay had the following for benzodiazepines [n (%)]

Patients prescribed benzodiazepines</td>
<td>300 ng/mL vs. not reported</td>
<td></td>
</tr>
</table>

Citation and Study Details	Findings	Cut-off values (Immunoassay vs. LC-MS/MS, ng/mL)	Comments
pain management practice Comparators: immunoassay and LC-MS/MS N = 1,000	False-negative reports: 99 (24.5%) False-positive reports: 10 (10.5%) *Patients NOT prescribed benzodiazepines* False-negative reports: 16 (36.4%) False-positive reports: 1 (0.2%)		

The fourth systematic review (Dupuoy et al., 2014) was a good-quality systematic review of the effects of UDT in patients with a known or suspected SUD in inpatient or outpatient settings. These studies mainly relied on point-of-care or laboratory immunoassay testing with or without confirmatory testing. Of the eight included studies, six were conducted in inpatient settings. With the exception of one fair-quality randomized controlled trial, all the studies were judged to be poor quality. In the single included RCT, patients in a psychiatric emergency setting were randomly assigned to receive a mandatory UDT or routine care directed by the psychiatrist's clinical judgement (which could include UDT). There was no difference between the two groups with respect to disposition or duration of hospitalization in the intention-to-treat analysis. In an as-treated analysis, patients who were in the routine care arm and who did not receive a UDT were more likely to be admitted to an inpatient unit at a county hospital compared to those who received a UDT. In a cross-sectional study of primary care providers who manage patients with OUD in France, many reported that UDT influenced their decisions about referral to counseling, consultation, and whether to prescribe medication-assisted treatment. The authors concluded that there was insufficient evidence to assess the usefulness of UDT for managing patients with a known or suspected SUD.

Evidence Summary

Limited observational evidence suggests that UDT, particularly when combined with other interventions, could be associated with reductions in opioid misuse and concomitant use of marijuana, but not with other illicit substances in patients with chronic non-cancer pain. There is insufficient evidence to assess the effects of UDT on clinical outcomes including opioid dependence or abuse, overdose, death, or diversion. There was insufficient evidence to draw conclusions about the effects of UDT in patients with a known or suspected SUD.

Policy Landscape

Payer Coverage Policies

Medicaid

Washington

As outlined in the *Physician-Related Services/Health Care Professional Services Billing Guide*, the Washington Medicaid program covers drug testing for SUD when both of the following apply:

- The screen is medically necessary and ordered by a physician as part of a medical evaluation
- The drug or alcohol screen is required to assess suitability for medical tests or treatment being provided by the physician

The Washington Medicaid billing guide states that, "Periodic reviews of ordering patterns will be performed to look for and contact practices that appear to be outliers compared to their peers" (Washington State Health Care Authority, 2017, p. 146).

For patients receiving medication-assisted treatment (MAT) for a SUD, the Washington Medicaid program considers presumptive (in office) testing with a point-of-care immunoassay test medically necessary to:

- Confirm the use of prescribed substances
- Identify the presence of illicit or non-prescribed substances
- Start a patient on MAT for a SUD

Confirmatory testing with GC-MS or LC-MS/MS is considered medically necessary when there is a discrepancy between a presumptive drug test and the patient report. In addition, confirmatory testing should only be ordered and performed on a patient- and drug-specific basis with clinical documentation of a follow-up plan based on the test results. The Washington Medicaid program covers a maximum of 24 presumptive drug tests each year. The allowed Current Procedural Terminology (CPT) codes for presumptive UDT are 80305, 80306, and 80307, and only one of the three codes can be billed per client per day. A maximum of 12 definitive tests, used as follow-up to presumptive tests, are allowed each year. The allowed Healthcare Common Procedure Coding System (HCPCS) codes for definitive UDT are G0480 and G0481, and only one of the two codes can be billed per client per day. If additional tests are needed, providers can submit a limitation extension request to the agency.

Washington Medicaid does not pay for routine drug screening panels or monitoring for program compliance in residential or outpatient drug or alcohol treatment programs. When monitoring a patient for drug or alcohol use, providers are instructed to refer the client to a program approved by the Division of Behavioral Health and Rehabilitation for evaluation and treatment, where the patient may receive drug or alcohol screening as determined by their treating provider.

Drug testing for patients who are on chronic opioid therapy for the treatment of chronic non-cancer pain must follow the Agency Medical Directors' Group *Interagency Guideline on Prescribing Opioids for Pain* (Washington State Agency Medical Directors' Group, 2015). These guidelines recommend UDT annually for those at low risk of abuse or diversion, twice yearly for those at moderate risk, and three to four times yearly for those at high risk. Testing is also recommended as needed for aberrant behavior identified during an office visit. Because of cross-reactivity and the differences in sensitivity and

specificity among immunoassay tests, a confirmatory (definitive) test is required unless the result was expected or the patient has disclosed drug use.

North Carolina

North Carolina Medicaid's drug testing policy covers presumptive testing up to 24 times and definitive testing up to 24 times per fiscal year. Only one presumptive and one definitive test will be reimbursed per beneficiary, per day, regardless of the number of providers performing this service.

Testing frequency for a SUD is based upon consecutive days of beneficiary abstinence from illicit substances:

- Zero to 30 days: Once per calendar week
- 31-90 days: Twice per calendar month
- Greater than 90 days: Once per 30 calendar days

Testing frequency for patients treated for chronic pain is based on risk assessment:

- Low-Risk Beneficiaries: Up to two times every 365 consecutive days
- Moderate-Risk Beneficiaries: Up to four times every 365 consecutive days
- High Risk: Up to three times every 90 consecutive days

New York

In New York Medicaid's drug testing policy, CPT codes 80305, 80306, or 80307 must be used for presumptive drug screening. Only substances that return a positive result on a presumptive test or are inconclusive or inconsistent with clinical presentation are reimbursable for quantitative testing, using CPT codes 80320–80377. Quantitative testing without a prior presumptive test is only reimbursable when no presumptive screening method is available, using HCPCS code G0480. This direct to definitive testing is reimbursable once per date of service, up to a maximum of six times within 365 days.

Provision of drug tests must be based on the patient's medical history or current clinical presentation, and medical records must support the need for each test and be kept on file for a minimum of six years for audit purposes.

Alabama

Alabama Medicaid's policy on qualitative drug limits qualitative drug testing to one specimen every seven days per recipient, using CPT codes 80100, 80101, 80102, and 80104. The ordering/referring provider must retain documentation supporting medical necessity in the medical record.

A 2015 update to the Alabama Medicaid drug testing policy delineates coverage for HCPCS codes G0434 and G6058:

- HCPCS code G0434 will cover one drug screen, regardless of the number of drugs or classes, procedure(s)/methodology(ies), any source(s), per appropriately billed date of service.
- HCPCS code G6058 will cover one drug test (confirmatory and/or definitive, qualitative and quantitative), regardless of the number of drugs or drug classes, procedure(s)/methodology(ies), source(s), including sample validation.

Medicare

No National Coverage Determination was identified for drug testing, and 10 Medicare Local Coverage Determinations (LCDs) were identified. Three (L34501, L34645, L35920) of these 10 LCDs are less comprehensive than the others, although generally consistent with the more comprehensive LCDs.

The seven more comprehensive LCDs (L35006, L36037, L36029, L36393, L36668, L36707, L35724) categorize patients needing UDT into three groups:

- Group A – Symptomatic patients, multiple drug ingestion, or patients with unreliable history
- Group B – Diagnosis and treatment for substance abuse or dependence
- Group C – Treatment for patients on chronic opioid therapy

Group A patients can present in a variety of medical settings, and patients with symptoms such as coma, altered mental status or seizures can be given presumptive UDT as part of evaluation and management. The presumptive drug test findings, any definitive drug tests ordered, and reasons for the testing must be documented in the patient's medical record.

For diagnosis of a SUD in Group B, the clinician may screen for a broad range of commonly abused drugs using presumptive UDT for patients with no known indicators of risk for a SUD. For patients with known indicators of risk for a SUD, the clinician may screen for a broad range of commonly abused drugs using definitive UDT.

For patients with a diagnosed SUD, the clinician should perform random UDT in order to properly monitor the patient. The expected frequency of UDT is one to three tests per week for patients with less than 90 consecutive days of abstinence and one to three tests per month for patients with more than 90 consecutive days of abstinence.

Six of the seven comprehensive LCDs also have limits on the frequency of definitive UDT:

- For patients with zero to 30 consecutive days of abstinence, definitive UDT is expected at a frequency not to exceed one testing profile in one week
- For patients with 31 to 90 consecutive days of abstinence, definitive UDT is expected at a frequency of 1-3 testing profiles in one month
- For patients with >90 days of consecutive abstinence, definitive UDT is expected at a frequency of 1-3 testing profiles in three months

For Group C patients on chronic opioid therapy, medical necessity for drug testing must be based on patient-specific elements and documented in the patient's medical record, including:

- Patient history, physical examination, and previous laboratory findings
- Current treatment plan
- Prescribed medications
- Risk assessment plan

Six of the seven comprehensive LCDs have frequency limitations on UDT for patients on chronic opioid therapy:

- Low Risk: Random testing 1-2 times every 12 months
- Moderate Risk: Random testing 1-2 times every six months
- High Risk: Random testing 1-3 times every three months

Across all three groups of patients (A, B, C), definitive testing to confirm a positive presumptive UDT result is reasonable and necessary when the result is inconsistent with the expected result, a patient's self-report, presentation, medical history, or current prescribed medication plan. Definitive testing to confirm a negative presumptive UDT result is reasonable and necessary when:

- The result is inconsistent with a patient's self-report, presentation, medical history, or current prescribed medication plan
- The clinician suspects use of a substance that is inadequately detected or not detected by a presumptive UDT
- To rule out an error as the cause of a negative presumptive UDT result

Definitive UDT without a prior presumptive UDT is reasonable and necessary, when individualized for a particular patient.

Private Payers

Center researchers searched private payer policies for UDT for Aetna, Cigna, Moda, and Regence. No national policy was found for Aetna, but an update for Aetna's Western Region in 2016 stated that the frequency limit for drug testing per year is eight times each for definitive and presumptive testing.

Cigna's drug testing policy covers UDT when these criteria are met:

- The diagnosis, history and physical examination and/or behavior of the individual being tested support the need for the specific drug testing being requested
- The results of testing will affect treatment planning
- Testing is performed in a physician-supervised treatment setting

Cigna covers presumptive drug testing not to exceed one unit per date of service up to 32 units per year, and definitive drug testing not to exceed 16 dates of service per year for a maximum of eight units per date of service up to 128 units per year. A unit may include testing for a specific individual drug and/or its metabolites, or its structural isomers. Definitive drug testing is allowed only if the presumptive test results are inconsistent with the individual's condition, history, and examination, or if a presumptive drug test is not available for the drug for which there is a suspicion of abuse or misuse.

Moda's policy on *Therapeutic Drug Monitoring (Urine drug testing)* covers presumptive urine drug screening up to 12 units per plan year for patients:

- Where there is a suspicion of drug misuse or abuse
- With a diagnosis where drug toxicity may be a contributing factor
- Who are pregnant and there is possible exposure of the fetus to drug abuse
- Who are being treated for chronic non-cancer pain with opioid therapy, to establish a baseline and random monitoring for adherence or diversion of prescribed medications
- Who are in treatment for chemical dependency—more frequent UDT might be required to monitor compliance with the treatment program

Definitive drug testing to confirm a positive presumptive screening is covered up to 12 units per plan year.

Regence's policy on UDT for substance abuse and chronic pain limits presumptive tests to one per day and 15 times each year unless there is suspected abuse, misuse, or diversion, and documentation indicates how test results will affect management. These same restrictions apply to definitive UDT. Drug

testing is not covered in conjunction with participation in a substance abuse facility because UDT is included in the facility reimbursement.

Recommendations from Others

Guidelines: Substance Use Disorder

Four guidelines were identified related to the use of UDT for patients with a SUD:

- *VA/DoD Clinical Practice Guideline for the Management Of Substance Use Disorders* (U.S. Department of Veterans Affairs & Department of Defense, 2015)
- SAMHSA's *Clinical Drug Testing in Primary Care* (SAMHSA, 2012)
- ASAM's *Appropriate Use of Drug Testing in Clinical Addiction Medicine* (ASAM, 2017)
- *Methadone Safety: A Clinical Practice Guideline from the American Pain Society and College on Problems of Drug Dependence, in Collaboration with the Heart Rhythm Society* (Chou, Cruciani et al. 2014)

These guidelines recommend drug testing at baseline and then periodic monitoring during drug treatment. The guidelines often do not mention a specific interval for ongoing drug testing, explaining that evidence is not available on the most appropriate frequency of testing and that testing frequency should be based on individual patient characteristics. The most detailed recommendations are in ASAM's guidelines, which recommend that drug testing be done at least weekly during the initial phase of treatment and at least monthly when a patient is stable in treatment.

Guidelines: Chronic Pain

Four guidelines were identified that are related to the use of UDT for patients undergoing treatment for chronic pain:

- *CDC Guideline for Prescribing Opioids for Chronic Pain* (Dowel et al., 2016)
- *VA/DoD Clinical Practice Guideline for Opioid Therapy for Chronic Pain* (U.S. Department of Veterans Affairs & Department of Defense, 2017)
- SAMHSA's *Clinical Drug Testing in Primary Care* (SAMHSA, 2012)
- *American Society of Interventional Pain Physicians (ASIPP) Guidelines for Responsible Opioid Prescribing in Chronic Non-Cancer Pain* (Manchikanti et al., 2012)

These guidelines recommend UDT before starting opioid therapy and then ongoing monitoring to assess for prescribed medications and other controlled prescription drugs and illicit drugs. The CDC guidelines recommend UDT at least annually. The ASIPP guidelines recommend that patients at low risk for aberrant behaviors should have UDT every one to two years, patients at medium risk should have UDT every six to 12 months, and patients at high risk should have UDT every three to six months. The guidelines from SAMHSA and VA/DoD are less specific, stating the UDT frequency should be based on individual patient characteristics.

Quality Measures

One quality measure was identified when searching the National Quality Measures Clearinghouse for measures related to drug testing. The Institute for Clinical Systems Improvement developed the measure: *percentage of patients diagnosed with chronic pain who are prescribed an opioid who have an opioid agreement form and urine toxicology screen documented in the medical record*.

References

Evidence Sources

Chou, R., Deyo, R., Devine, B., Hansen, R., Sullivan, S., Jarvik, J. G., . . . Turner, J. (2014). *The effectiveness and risks of long-term opioid treatment of chronic pain: Evidence Report/Technology Assessment No. 218*. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from https://ahrq-ehc-application.s3.amazonaws.com/media/pdf/chronic-pain-opioid-treatment_research.pdf

Chou, R., Fanciullo, G. J., Fine, P. G., Miaskowski, C., Passik, S. D., & Portenoy, R. K. (2009). Opioids for chronic noncancer pain: Prediction and identification of aberrant drug-related behaviors: A review of the evidence for an American Pain Society and American Academy of Pain Medicine clinical practice guideline. *Journal of Pain, 10*(2), 131-146. doi: 10.1016/j.jpain.2008.10.009

Dupouy, J., Memier, V., Catala, H., Lavit, M., Oustric, S., & Lapeyre-Mestre, M. (2014). Does urine drug abuse screening help for managing patients? A systematic review. *Drug and Alcohol Dependence, 136*, 11-20. doi: 10.1016/j.drugalcdep.2013.12.009

Manchikanti, L., Malla, Y., Wargo, B. W., & Fellows, B. (2011a). Comparative evaluation of the accuracy of benzodiazepine testing in chronic pain patients utilizing immunoassay with liquid chromatography tandem mass spectrometry (LC/MS/MS) of urine drug testing. *Pain Physician, 14*(3), 259-270.

Manchikanti, L., Malla, Y., Wargo, B. W., & Fellows, B. (2011b). Comparative evaluation of the accuracy of immunoassay with liquid chromatography tandem mass spectrometry (LC/MS/MS) of urine drug testing (UDT) opioids and illicit drugs in chronic pain patients. *Pain Physician, 14*(2), 175-187.

Manchikanti, L., Manchukonda, R., Damron, K. S., Brandon, D., McManus, C. D., & Cash, K. (2006). Does adherence monitoring reduce controlled substance abuse in chronic pain patients? *Pain Physician, 9*(1), 57-60. Retrieved from http://www.painphysicianjournal.com/current/pdf?article=NTI4&journal=27

Manchikanti, L., Manchukonda, R., Pampati, V., Damron, K. S., Brandon, D. E., Cash, K. A., & McManus, C. D. (2006). Does random urine drug testing reduce illicit drug use in chronic pain patients receiving opioids? *Pain Physician, 9*(2), 123-129. Retrieved from http://www.painphysicianjournal.com/current/pdf?article=NTM1&journal=28

Starrels, J. L., Becker, W. C., Alford, D. P., Kapoor, A., Williams, A. R., & Turner, B. J. (2010). Systematic review: Treatment agreements and urine drug testing to reduce opioid misuse in patients with chronic pain. *Annals of Internal Medicine, 152*(11), 712-720. doi: 10.7326/0003-4819-152-11-201006010-00004

Wiedemer, N. L., Harden, P. S., Arndt, I. O., & Gallagher, R. M. (2007). The opioid renewal clinic: A primary care, managed approach to opioid therapy in chronic pain patients at risk for substance abuse. *Pain Medicine, 8*(7), 573-584. doi: 10.1111/j.1526-4637.2006.00254.x

Other Citations

American Society of Addiction Medicine. (2017). *Appropriate use of drug testing in clinical addiction medicine*. Retrieved from https://www.asam.org/docs/default-source/quality-science/2017_4_5_appropriate-use-of-drug-testing-in-clinical-addiction-medicine-document.pdf

American Society of Addiction Medicine. (2013). *Drug testing: A white paper of the American Society of Addiction Medicine.* Retrieved from http://www.asam.org/docs/default-source/public-policy-statements/drug-testing-a-white-paper-by-asam.pdf

Chou, R., Cruciani, R. A., Fiellin, D. A., Compton, P., Farrar, J. T., Haigney, M. C., . . . Zeltzer, L. (2014). Methadone safety: A clinical practice guideline from the American Pain Society and College on Problems of Drug Dependence, in collaboration with the Heart Rhythm Society. *Journal of Pain, 15*(4), 321-337. doi: 10.1016/j.jpain.2014.01.494

Code of Federal Regulations. (2015). *42 CFR § 8.12 – Federal opioid treatment standards*. Retrieved from https://www.law.cornell.edu/cfr/text/42/8.12

Dowell, D., Haegerich, T. M., & Chou, R. (2016). CDC guideline for prescribing opioids for chronic pain—United States, 2016. *JAMA, 315*(15), 1624-1645. doi: 10.1001/jama.2016.1464

Manchikanti, L., Abdi, S., Atluri, S., Balog, C. C., Benyamin, R. M., Boswell, M. V., . . . Wargo, B. W. (2012). American Society of Interventional Pain Physicians (ASIPP) guidelines for responsible opioid prescribing in chronic non-cancer pain: Part 2—guidance. *Pain Physician, 15*(3 Suppl), S67-116. Retrieved from http://www.painphysicianjournal.com/current/pdf?article=MTcwMw%3D%3D&journal=68

Substance Abuse and Mental Health Services Administration. (2012). *Clinical drug testing in primary care*. Technical Assistance Publication 32. Retrieved from https://store.samhsa.gov/shin/content/SMA12-4668/SMA12-4668.pdf

Office of Inspector General, U.S. Department of Health & Human Services. (n.d.). *A roadmap for new physicians: Fraud & abuse laws*. Retreived from https://oig.hhs.gov/compliance/physician-education/01laws.asp

U.S. Department of Justice. (2015). *Millennium Health agrees to pay $256 million to resolve allegations of unnecessary drug and genetic testing and illegal renumeration to physicians*. Retrieved from https://www.justice.gov/opa/pr/millennium-health-agrees-pay-256-million-resolve-allegations-unnecessary-drug-and-genetic

U.S. Department of Veterans Affairs & Department of Defense. (2017).*VA/DoD clinical practice guideline for opioid therapy for chronic pain*. Retrieved from https://www.healthquality.va.gov/guidelines/Pain/cot/VADoDOTCPG022717.pdf

U.S. Department of Veterans Affairs & Department of Defense. (2015). *VA/DoD clinical practice guideline for the management of substance use disorders. 3.0*. Retrieved from http://www.healthquality.va.gov/guidelines/MH/sud/

Washington State Agency Medical Directors' Group. (2015). *Interagency guideline on prescribing opioids for pain*. Retrieved from http://www.agencymeddirectors.wa.gov/Files/2015AMDGOpioidGuideline.pdf

Washington State Health Care Authority. (2017). *Washington Apple Health (Medicaid) physician-related services/health care professional services billing guide*. Retrieved from https://www.hca.wa.gov/assets/billers-and-providers/physician-related-serv-bi-20171001.pdf

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Appendix A. GRADE-Informed Framework Element Descriptions

Element	Description
Balance of benefits and harms	The larger the difference between the desirable and undesirable effects, the higher the likelihood that a strong recommendation is warranted. An estimate that is not statistically significant or has a confidence interval crossing a predetermined clinical decision threshold will be downgraded.
Quality of evidence	The higher the quality of evidence, the higher the likelihood that a strong recommendation is warranted
Resource allocation	The higher the costs of an intervention—that is, the greater the resources consumed in the absence of likely cost offsets—the lower the likelihood that a strong recommendation is warranted
Values and preferences	The more values and preferences vary, or the greater the uncertainty in values and preferences, the higher the likelihood that a weak recommendation is warranted
Other considerations	Other considerations include issues about the implementation and operationalization of the technology or intervention in health systems and practices within Oregon.

Strong recommendation

In Favor: The subcommittee concludes that the desirable effects of adherence to a recommendation outweigh the undesirable effects, considering the balance of benefits and harms, resource allocation, values and preferences and other factors.

Against: The subcommittee concludes that the undesirable effects of adherence to a recommendation outweigh the desirable effects, considering the balance of benefits and harms, resource allocation, values and preferences and other factors.

Weak recommendation

In Favor: The subcommittee concludes that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects, considering the balance of benefits and harms, resource allocation, values and preferences and other factors., but further research or additional information could lead to a different conclusion.

Against: The subcommittee concludes that the undesirable effects of adherence to a recommendation probably outweigh the desirable effects, considering the balance of benefits and harms, cost and resource allocation, and values and preferences, but further research or additional information could lead to a different conclusion.

Confidence in estimate rating across studies for the intervention/outcome

Assessment of confidence in estimate includes factors such as risk of bias, precision, directness, consistency and publication bias.

High: The subcommittee is very confident that the true effect lies close to that of the estimate of the effect. Typical sets of studies are RCTs with few or no limitations and the estimate of effect is likely stable.

Moderate: The subcommittee is moderately confident in the estimate of effect: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different. Typical

sets of studies are RCTs with some limitations or well-performed nonrandomized studies with additional strengths that guard against potential bias and have large estimates of effects.

Low: The subcommittee's confidence in the estimate of effect is limited: The true effect may be substantially different from the estimate of the effect. Typical sets of studies are RCTs with serious limitations or nonrandomized studies without special strengths.

Very low: The subcommittee has very little confidence in the estimate of effect: The true effect is likely to be substantially different from the estimate of effect. Typical sets of studies are nonrandomized studies with serious limitations or inconsistent results across studies.

Appendix B. GRADE Evidence Profile

Quality Assessment (Confidence in Estimate of Effect)							
No. of Studies	**Study Design(s)**	**Risk of Bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other Factors**	**Quality**
Overdose and death							
0							Insufficient
Identification of diversion							
0							Insufficient
Identification of other substance use disorders							
0							Insufficient
Test performance characteristics							
2	Diagnostic accuracy studies	Moderate	N/A	Not serious	N/A	Sparse single-center data	Very low ●○○○
Change in management of chronic pain or substance use disorder							
0							Insufficient

Appendix C. Methods

Scope Statement

Populations

Patients receiving opioids for chronic pain and patients with a substance use disorder

Population scoping notes: None

Interventions

Urine drug testing (screening and confirmatory testing, qualitative and quantitative, individual drug assays and panels of tests)

Intervention exclusions: None

Comparators

Standardized risk assessment tools, no testing, other interventions

Outcomes

Critical: Overdose and death, identification of diversion, identification of other substance use disorders

Important: Test performance characteristics, change in management of chronic pain or substance use disorder

Considered but not selected for the GRADE table: None

Key Questions

KQ1: What is the comparative effectiveness of qualitative versus quantitative and screening versus diagnostic urine drug testing?

KQ2: What is the comparative effectiveness of different testing strategies?

KQ3: How does the comparative effectiveness vary by:

a. Underlying patient risk
b. Presence of comorbid conditions
c. Presence of multiple controlled substances
d. Types of drugs tested (e.g., illicit such as cocaine, methamphetamines, cannabinoids; licit such as alcohol, or prescription such as benzodiazepines)
e. Frequency of testing
f. Observed versus unobserved testing
g. Dose of prescribed opioid medication

Contextual Questions

CQ1: What is the cost-effectiveness of the different screening/diagnostic test strategies?

CQ2: What is the effectiveness of urine drug testing in patients receiving acute treatment (e.g., in an urgent care or emergency department setting) in patients who also meet the population criteria?

Search Strategy

A full search of the core sources was conducted to identify systematic reviews, meta-analyses, and technology assessments that meet the criteria for the scope described above. Searches of core sources were limited to citations published after 2012.

The following core sources were searched:

Agency for Healthcare Research and Quality (AHRQ)
Blue Cross/Blue Shield Center for Clinical Effectiveness
Canadian Agency for Drugs and Technologies in Health (CADTH)
Cochrane Library (Wiley Online Library)
Institute for Clinical and Economic Review (ICER)
Medicaid Evidence-based Decisions Project (MED)
National Institute for Health and Care Excellence (NICE)
Tufts Cost-Effectiveness Analysis Registry
Veterans Administration Evidence-based Synthesis Program (ESP)
Washington State Health Technology Assessment Program

A MEDLINE® search was also conducted to identify systematic reviews, meta-analyses, and technology assessments, using search terms for urine drug tests and substance abuse disorders. The search was limited to publications in English published since 2012. In addition, a MEDLINE® search was conducted for randomized controlled trials published after the search dates of the most recent systematic reviews (2014). In addition, a MEDLINE® search was conducted for randomized controlled trials published after the search dates of the selected systematic reviews.

Searches for clinical practice guidelines were limited to those published since 2009. A search for relevant clinical practice guidelines was also conducted using MEDLINE® and the following sources:

Australian Government National Health and Medical Research Council (NHMRC)
Canadian Agency for Drugs and Technologies in Health (CADTH)
Centers for Disease Control and Prevention (CDC), Community Preventive Services
National Guidelines Clearinghouse
National Institute for Health and Care Excellence (NICE)
Scottish Intercollegiate Guidelines Network (SIGN)
United States Preventive Services Task Force (USPSTF)
Veterans Administration/Department of Defense (VA/DoD) Clinical Practice Guidelines

Inclusion/Exclusion Criteria

Studies were excluded if they were not published in English, did not address the scope statement, or were study designs other than systematic reviews, meta-analyses, technology assessments, randomized controlled trials, or clinical practice guidelines.

Appendix D. Applicable Codes

CODES	DESCRIPTION
CPT Codes	
80305	Drug test(s), presumptive, any number of drug classes, any number of devices or procedures; capable of being read by direct optical observation only (e.g., utilizing immunoassay [e.g., dipsticks, cups, cards, or cartridges]), includes sample validation when performed, per date of service
80306	Drug test(s), presumptive, any number of drug classes, any number of devices or procedures; read by instrument assisted direct optical observation (e.g., utilizing immunoassay [e.g., dipsticks, cups, cards, or cartridges]), includes sample validation when performed, per date of service
80307	Drug test(s), presumptive, any number of drug classes, any number of devices or procedures; by instrument chemistry analyzers (e.g., utilizing immunoassay [e.g., EIA, ELISA, EMIT, FPIA, IA, KIMS, RIA]), chromatography (e.g., GC, HPLC), and mass spectrometry either with or without chromatography, (e.g., DART, DESI, GC-MS, GC-MS/MS, LC-MS, LC-MS/MS, LDTD, MALDI, TOF) includes sample validation when performed, per date of service
80320-80377	Definitive drug tests of individual substances (many payers do not cover these tests, preferring to use the G0480-G0483)
HCPCS Level II Codes	
G0477	Drug test(s), presumptive, any number of drug classes; any number of devices or procedures, (e.g., immunoassay) capable of being read by direct optical observation only (e.g., dipsticks, cups, cards, cartridges), includes sample validation when performed, per date of service
G0478	Drug test(s), presumptive, any number of drug classes; any number of devices or procedures, (e.g., immunoassay) read by instrument-assisted direct optical observation (e.g., dipsticks, cups, cards, cartridges), includes sample validation when performed, per date of service
G0479	Drug test(s), presumptive, any number of drug classes; any number of devices or procedures by instrumented chemistry analyzers utilizing immunoassay, enzyme assay, tof, maldi, ldtd, desi, dart, ghpc, gc mass spectrometry), includes sample validation when performed, per date of service
G0480	Drug test(s), definitive, utilizing (1) drug identification methods able to identify individual drugs and distinguish between structural isomers (but not necessarily stereoisomers), including, but not limited to, GC/MS (any type, single or tandem) and LC/MS (any type, single or tandem and excluding immunoassays (e.g., IA, EIA, ELISA, EMIT, FPIA) and enzymatic methods (e.g., alcohol dehydrogenase)), (2) stable isotope or other universally recognized internal standards in all samples (e.g., to control for matrix effects, interferences and variations in signal strength), and (3) method or drug-specific calibration and matrix-matched quality control material (e.g., to control for instrument variations and mass spectral drift); qualitative or quantitative, all sources, includes specimen validity testing, per day; 1-7 drug class(es), including metabolite(s) if performed
G0481	…8-14 drug class(es)…
G0482	…15-21 drug class(es)…
G0483	…22 or more drug class(es)…

G0659	Drug test(s), definitive, utilizing drug identification methods able to identify individual drugs and distinguish between structural isomers (but not necessarily stereoisomers), including but not limited to, GC/MS (any type, single or tandem) and LC/MS (any type, single or tandem), excluding immunoassays (e.g., IA, EIA, ELISA, EMIT, FPIA) and enzymatic methods (e.g., alcohol dehydrogenase), performed without method or drug-specific calibration, without matrix-matched quality control material, or without use of stable isotope or other universally recognized internal standard(s) for each drug, drug metabolite or drug class per specimen; qualitative or quantitative, all sources, includes specimen validity testing, per day, any number of drug classes

Note: Inclusion on this list does not guarantee coverage.

Utilization analysis: Urine Drug Screening

Evidence-based Guidelines Subcommittee

November 2, 2017

Oregon Health Authority

Focus of inquiry

- Look for concerning utilization patterns in UDS for Oregon Health Plan recipients from 7/1/2016 to 6/30/2017
  - High frequency of testing
  - High numbers of substances tested for
  - Routine quantitative testing for screening (as opposed to confirmatory)

Oregon Health Authority

HCPCS	CPT	Description (high level)	OHP FFS rate 9/1/17	Total cost (approx. at FFS professional rates)
G0477	**80305**	Presumptive, optical (e.g. dipstick, card)	$10.40	0.27M
G0478	**80306**	Presumptive, optical, instrument assisted (e.g. dipstick, card inserted into a machine)	$13.87	0.15M
G0479	**80307**	Presumptive, using chemical analysis (e.g. immunoassay, chromatography, mass spectrometry)	$55.48	$7.0M
G0659		Definitive, simple, any number of substances. Not immunoassay/enzymatic.	$79.81	0 (new code)
G0480		Definitive, 1-7 classes (e.g. GC/MS or LC/MS)	$82.36	$5.0M
G0481		Definitive, 8-14 classes	$112.69	$3.8M
G0482		Definitive, 15-21 classes	$143.04	$2.1M
G0483		Definitive, 22+ classes	$177.71	$1.8M
80320-77		Definitive, individual substances (not on fee schedule)	N/A	$0.4M*

*No FFS allowable for these codes; some not for of common drugs of abuse. Used estimated CCO allowables for these codes.

Presumptive/definitive on same day?

Test pattern	Count of patient days of service
Presumptive only	~93k
Definitive only	~54k
Both Presumptive and Definitive	~66k

Outliers, etc.

(All costs are at 9/1/2017 OHP FFS outpatient rates, except for 80320-77, which are at estimated CCO payments)

- 72,924 patients had at least 1 UDS date of service; of these:
  - One patient had >$19,000 in UDS;
  - 305 had >$5000;
  - 1172 had >$2500

- Frequency (out of ~72,000 patients, $20.5M)
  - 15 patients with 100-127 dates of service (DOS) during the year (represents $143k)
  - 200 with 52-99 DOS during the year ($1.3 M)
  - 695 with 26-51 DOS ($2.6M)
  - 60619 with <4 DOS ($7M)