**National Quality Forum—Evidence (subcriterion 1a)**

**Measure Number** (*if previously endorsed*)**:** 0052

**Measure Title**: Use of Imaging Studies for Low Back Pain

**IF the measure is a component in a composite performance measure, provide the title of the Composite Measure here:** Click here to enter composite measure #/ title

**Date of Submission**: 3/3/2014

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| **Instructions**  *For composite performance measures:*  *A separate evidence form is required for each component measure unless several components were studied together.*  *If a component measure is submitted as an individual performance measure, attach the evidence form to the individual measure submission.*   * Respond to all questions as instructed with answers immediately following the question. All information needed to demonstrate meeting the evidence subcriterion (1a) must be in this form. An appendix of *supplemental* materials may be submitted, but there is no guarantee it will be reviewed. * If you are unable to check a box, please highlight or shade the box for your response. * Maximum of 10 pages (*incudes questions/instructions*; minimum font size 11 pt; do not change margins). ***Contact NQF staff if more pages are needed.*** * Contact NQF staff regarding questions. Check for resources at [Submitting Standards webpage](http://www.qualityforum.org/Measuring_Performance/Submitting_Standards.aspx). |

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| **Note: The information provided in this form is intended to aid the Steering Committee and other stakeholders in understanding to what degree the evidence for this measure meets NQF’s evaluation criteria.**   1a. Evidence to Support the Measure Focus The measure focus is evidence-based, demonstrated as follows:   * Health outcome: [**3**](#Note3) a rationale supports the relationship of the health outcome to processes or structures of care. Applies to patient-reported outcomes (PRO), including health-related quality of life/functional status, symptom/symptom burden, experience with care, health-related behavior. * Intermediate clinical outcome: a systematic assessment and grading of the quantity, quality, and consistency of the body of evidence [**4**](#Note4)that the measured intermediate clinical outcome leads to a desired health outcome. * Process: [**5**](#Note5) a systematic assessment and grading of the quantity, quality, and consistency of the body of evidence [**4**](#Note4) that the measured process leads to a desired health outcome. * Structure: a systematic assessment and grading of the quantity, quality, and consistency of the body of evidence [**4**](#Note4) that the measured structure leads to a desired health outcome. * Efficiency: [**6**](#Note6) evidence not required for the resource use component.   **Notes**  **3.** Generally, rare event outcomes do not provide adequate information for improvement or discrimination; however, serious reportable events that are compared to zero are appropriate outcomes for public reporting and quality improvement.  **4.** The preferred systems for grading the evidence are the U.S. Preventive Services Task Force (USPSTF) [grading definitions](http://www.uspreventiveservicestaskforce.org/uspstf/grades.htm) and [methods](http://www.uspreventiveservicestaskforce.org/methods.htm), or Grading of Recommendations, Assessment, Development and Evaluation [(GRADE) guidelines](http://www.gradeworkinggroup.org/publications/index.htm).  **5.** Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multistep process, the step with the strongest evidence for the link to the desired outcome should be selected as the focus of measurement. Note: A measure focused only on collecting PROM data is not a PRO-PM.  **6.** Measures of efficiency combine the concepts of resource use and quality (see NQF’s [Measurement Framework: Evaluating Efficiency Across Episodes of Care](http://www.qualityforum.org/Publications/2010/01/Measurement_Framework__Evaluating_Efficiency_Across_Patient-Focused_Episodes_of_Care.aspx); [AQA Principles of Efficiency Measures](http://www.aqaalliance.org/files/PrinciplesofEfficiencyMeasurementApril2006.doc)). |

**1a.1.This is a measure of**: (*should be consistent with type of measure entered in De.1*)

Outcome

☐ Health outcome: Click here to name the health outcome

☐Patient-reported outcome (PRO): Click here to name the PRO

*PROs include HRQoL/functional status, symptom/symptom burden, experience with care, health-related behaviors*

☐ Intermediate clinical outcome (*e.g., lab value*): Click here to name the intermediate outcome

☒ Process: Imaging studies for low back pain

☐ Structure: Click here to name the structure

☐ Other: Click here to name what is being measured

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**HEALTH OUTCOME/PRO PERFORMANCE MEASURE**  *If not a health outcome or PRO, skip to* [*1a.3*](#Section1a3)

**1a.2.** **Briefly state or diagram the path between the health outcome (or PRO) and the healthcare structures, processes, interventions, or services that influence it.**

**1a.2.1.** **State the rationale supporting the relationship between the health outcome (or PRO) to at least one healthcare structure, process, intervention, or service (*i.e., influence on outcome/PRO*).**

*Note: For health outcome/PRO performance measures, no further information is required; however, you may provide evidence for any of the structures, processes, interventions, or service identified above.*

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**intermediate outcome, PROCESS, or STRUCTURE PERFORMANCE measure**

**1a.3.****Briefly state or diagram the path between structure, process, intermediate outcome, and health outcomes**. Include all the steps between the measure focus and the health outcome.

The rate in this measure relates to the desired outcome in the following way: Patient is diagnosed with low back pain >>> Health care provider conducts evaluation to characterize severity and cause of low back pain >>> Health care provider and patient discuss whether patient has any “red flags” for which imaging is clinically appropriate >>> If patient does not have any “red flags” and is within 28 days of diagnosis, patient does not receive imaging for low back pain >>> Patient and health care provider discuss alternative treatment options >>> Patient avoids potentially harmful effects from unnecessary imaging (desired outcome).

**1a.3.1.** **What is the source of the systematic review of the body of evidence that supports the performance measure?**

☒ Clinical Practice Guideline recommendation – ***complete sections*** [***1a.4***](#Section1a4)***, and*** [***1a.7***](#Section1a7)

☐ US Preventive Services Task Force Recommendation – ***complete sections*** [***1a.5***](#Section1a5) ***and*** [***1a.7***](#Section1a7)

☐ Other systematic review and grading of the body of evidence (*e.g., Cochrane Collaboration, AHRQ Evidence Practice Center*) – ***complete sections*** [***1a.6***](#Section1a6) ***and*** [***1a.7***](#Section1a7)

☐ Other – ***complete section*** [***1a.8***](#Section1a8)

*Please complete the sections indicated above for the source of evidence. You may skip the sections that do not apply.*

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**1a.4. CLINICAL PRACTICE GUIDELINE RECOMMENDATION**

**1a.4.1.** **Guideline citation** (*including date*) and **URL for guideline** (*if available online*):

**Guideline #1:**

Goertz M, Thorson D, Bonsell J, Bonte B, Campbell R, Haake B, Johnson K, Kramer C, Mueller B, Peterson S, Setterlund L, Timming R. Institute for Clinical Systems Improvement. Adult Acute and Subacute Low Back Pain. Updated November 2012.

**Guideline #2:**

Patel ND, Broderick DF, Burns J, Deshmukh TK, Fries IB, Harvey HB, Holly L, Hunt CH, Jagadeesan BD, Kennedy TA, O'Toole JE, Perlmutter JS, Policeni B, Rosenow JM, Shroeder JW, Whitehead MT, Cornelius RS, Corey AS, Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria® low back pain. Reston (VA): American College of Radiology (ACR); 2015. 12 p.

**1a.4.2.** **Identify guideline recommendation number and/or page number** and **quote verbatim, the specific guideline recommendation**.

**Guideline #1:**

Institute for Clinical Systems Improvement Health Care Guideline for Adult Acute and Subacute Low Back Pain.

Clinicians should not recommend imaging (including computed tomography [CT], magnetic resonance imaging [MRI] and x-ray) for patients with non-specific low back pain *(Strong Recommendation, Moderate Quality Evidence)*. (page 12)

Clinicians should not recommend imaging (including computed tomography [CT], magnetic resonance imaging [MRI] and x-ray) for patients in the first six weeks of radicular pain *(Strong Recommendation, Moderate Quality Evidence)*. (page 29)

Given that low back pain is overall a benign condition, the first task of the evaluation is to identify and address potential red flags that would require further investigation. (page 12)

At each visit, evaluate for presence or absence of red flags and document findings. Red flags include the following:

* Risk factors for cancer including age 50 years old or older with a history of cancer, unexplained weight loss and failure to improve after four to six weeks of conservative low back pain therapy. If all three of these risk factors for cancer are absent, studies suggest that cancer can be ruled out with 100% sensitivity.
* Risk factors for possible spinal infection including intravenous drug use, immunosuppression, urinary infection, fever above 38°C (110.4°F) for greater than 48 hours, and history of tuberculosis or active tuberculosis.
* Signs or symptoms of Cauda Equina Syndrome.
  + New onset of urinary incontinence
  + Urinary retention (if no urinary retention, the likelihood of Cauda Equina Syndrome is less than 1 in 10,000)
  + Saddle anesthesia, unilateral or bilateral sciatica, sensory and motor deficits, and abnormal straight leg raising
* Increased risk factors for fragility fracture.
  + Osteoporosis
  + History of steroid use
  + Immunosuppression
  + Serious accident or injury (fall from heights, blunt trauma, motor vehicle accident) – does not include twisting or lifting injury unless other risk factors are present (e.g., history of osteoporosis)
  + Clinical suspicion of ankylosing spondylitis
  + Drug or alcohol abuse (increased incidence of osteomyelitis, trauma, fracture)
* Unrelenting night pain or pain at rest (increased incidence of clinically significant pathology).
* Consideration of other non-spine origins. (pages 14-15)

**Guideline: #2**

American College of Radiology (ACR) Appropriateness Criteria: Low Back Pain

* Uncomplicated acute LBP and/or radiculopathy are benign, self-limited conditions that do not warrant any imaging studies.
* MRI of the lumbar spine should be considered for those patient presenting with red flags raising suspicion for serious underlying condition, such as cauda equina syndrome (CES), malignancy, or infection.
* In patients with a history of low-velocity trauma, osteoporosis, or chronic steroid use, initial evaluation with radiographs is recommended.
* In the absence of red flags, first-line treatment for chronic LBP remains conservative therapy with both pharmacologic and nonpharmacologic (eg, exercise, remaining active) therapy.
* If there are persistent or progressive symptoms during or following 6 weeks of conservative management and the patient is a surgery or intervention candidate or diagnostic uncertainty remains, MRI of the lumbar spine has become the initial imaging modality of choice in evaluating complicated LBP. (page 10)

Variant 1: Acute, subacute, or chronic uncomplicated low back pain or radiculopathy. No red flags. No prior management. (page 1)

RADIOLOGIC PROCEDURE | RATING

MRI lumbar spine without contrast | 2

X-ray lumbar spine | 2

X-ray myelography and post myelography CT lumbar spine | 2

Tc-99m bone scan with SPECT spine | 2

CT lumbar spine without contrast | 2

CT lumbar spine with contrast | 2

MRI lumbar spine without and with contrast | 2

CT lumbar spine without and with Contrast | 1

Variant 2: Acute, subacute, or chronic uncomplicated low back pain or radiculopathy. One or more of the following: low velocity trauma, osteoporosis, elderly individual, or chronic steroid use. (page 2)

RADIOLOGIC PROCEDURE | RATING

X-ray lumbar spine | 7

CT lumbar spine without contrast | 7

MRI lumbar spine without contrast | 7

Tc-99m bone scan with SPECT spine | 3

CT lumbar spine with contrast | 3

CT lumbar spine without and with contrast | 1

X-ray myelography and post myelography CT lumbar spine | 1

X-ray discography and post-discography CT lumbar spine | 1

Variant 3: Acute, subacute, or chronic low back pain or radiculopathy. One or more of the following: suspicion of cancer, infection, or immunosuppression. (page 3)

RADIOLOGIC PROCEDURE | RATING

MRI lumbar spine without and with contrast | 8

MRI lumbar spine without contrast | 7

CT lumbar spine with contrast | 6

CT lumbar spine without contrast | 6

X-ray lumbar spine | 5

Tc-99m bone scan whole body with SPECT spine | 4

FDG-PET/CT whole body | 4

CT lumbar spine without and with contrast | 3

X-ray myelography and post myelography CT lumbar spine | 3

Variant 4: Acute, subacute, or chronic low back pain or radiculopathy. Surgery or intervention candidate with persistent or progressive symptoms during or following 6 weeks of conservative management. (page 4)

RADIOLOGIC PROCEDURE | RATING

MRI lumbar spine without contrast | 8

CT lumbar spine with contrast | 5

CT lumbar spine without contrast | 5

MRI lumbar spine without and with contrast | 5

X-ray myelography and post myelography CT lumbar Spine | 5

X-ray lumbar spine | 4

Tc-99m bone scan with SPECT spine | 4

X-ray discography and post-discography CT lumbar spine | 3

CT lumbar spine without and with contrast | 3

Variant 5: Low back pain or radiculopathy. New or progressing symptoms or clinical findings with history of prior lumbar surgery. (PAGE 5)

RADIOLOGIC PROCEDURE | RATING

MRI lumbar spine without and with contrast | 8

CT lumbar spine with contrast | 6

CT lumbar spine without contrast | 6

MRI lumbar spine without contrast | 6

X-ray myelography and post myelography CT lumbar spine | 5

X-ray lumbar spine | 5

Tc-99m bone scan with SPECT spine | 5

X-ray discography and post-discography CT lumbar spine | 5

CT lumbar spine without and with contrast | 3

Variant 6: Low back pain with suspected cauda equina syndrome or rapidly progressive neurologic deficit. (page 5)

RADIOLOGIC PROCEDURE | RATING

MRI lumbar spine without contrast | 9

MRI lumbar spine without and with contrast | 8

X-ray myelography and post myelography CT lumbar spine | 6

CT lumbar spine with contrast | 5

CT lumbar spine without contrast | 5

X-ray lumbar spine | 3

CT lumbar spine without and with contrast | 3

Tc-99 bone scan with SPECT spine | 2

**1a.4.3.** **Grade assigned to the quoted recommendation with definition of the grade:**

**Guideline #1:**

The Institute for Clinical Systems Improvement to the guideline assigned a “moderate” grade to the quality of evidence and a “strong” grade to the strength of the recommendation. See table under 1a.4.2. for the grade given to the guideline.

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| --- | --- | --- |
| **Category** | **Quality Definition** | **Strong Recommendation** |
| **Moderate Quality Evidence** | Further research is likely to have an important impact on the work group's confidence in the estimate of effect and may change the estimate. | The work group is confident that the benefits outweigh the risks, but recognizes that the evidence has limitations. Further evidence may impact this recommendation. This is a recommendation that likely applies to most patients. |

**Guideline #2:**

The American College of Radiology (ACR) Appropriateness Criteria Category Names and Definitions

|  |  |  |  |
| --- | --- | --- | --- |
| **Rating** | **Category Name** | **Category Definition** | **Disagreement** |
| 7, 8, or 9 | Usually appropriate | The imaging procedure or treatment is indicated in the specified clinical scenarios at a favorable risk-benefit ratio for patients. | The dispersion of individual ratings from the panel median rating is assessed to determine if there is no disagreement.  When the individual ratings are too dispersed from the panel median (disagreement), “May be appropriate” is the designated rating category. |
| 4, 5, or 6 | May be appropriate | The imaging procedure or treatment may be indicated in the specified clinical scenarios as an alternative to imaging procedures or treatments with a more favorable risk-benefit ration, or risk-benefit ration for patients is equivocal. |
| 1, 2, or 3 | Usually not appropriate | The imaging procedure or treatment is unlikely to be indicated in the specified clinical scenarios, or the risk-benefit ratio for patients is likely to be unfavorable |

**1a.4.4. Provide all other grades and associated definitions for recommendations in the grading system.** (*Note: If separate grades for the strength of the evidence, report them in section 1a.7.*)

Other Institute for Clinical Systems Improvement grades:

**Guideline #1:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Quality Definitions** | **Strong Recommendation** | **Weak Recommendation** |
| **High Quality Evidence** | Further research is very unlikely to change the work group's confidence in the estimate of effect. | The work group is confident that the desirable effects of adhering to this recommendation outweigh the undesirable effects. This is a strong recommendation for or against. This applies to most patients. | The work group recognizes that the evidence, though of high quality, shows a balance between estimates of harms and benefits. The best action will depend on local circumstances, patient values or preferences. |
| **Moderate Quality Evidence** | See table in 1a.4.3 | See table in 1a.4.3 | The work group recognizes that there is a balance between harms and benefit, based on moderate quality evidence, or that there is uncertainty about the estimates of the harms and benefits of the proposed intervention that may be affected by new evidence. Alternative approaches will likely be better for some patients under some circumstances. |
| **Low Quality Evidence** | Further research is very likely to have an important impact on the work group's confidence in the estimate of effect and is likely to change. The estimate or any estimate of effect is very uncertain. | The work group feels that the evidence consistently indicates the benefit of this action outweighs the harms. This recommendation might change when higher quality evidence becomes available. | The work group recognizes that there is significant uncertainty about the best estimates of benefits and harms. |

**Guideline #2:**

The rating system is provided in Section 1.a.4.3.

**1a.4.5. Citation and URL for methodology for grading recommendations** (*if different from 1a.4.1*)**:**

**Guideline #1:**

<https://www.icsi.org/_asset/7mtqyr/ReviewingEvidenceUsingGRADE.pdf>

**Guideline#2:**

<https://acsearch.acr.org/list>

**1a.4.6. If guideline is evidence-based (rather than expert opinion), are the details of the quantity, quality, and consistency of the body of evidence available (e.g., evidence tables)?**

☒Yes **→ *complete section*** [***1a.7***](#Section1a7)

☐No **→ *report on another systematic review of the evidence in sections*** [***1a.6***](#Section1a6) ***and*** [***1a.7***](#Section1a7)***; if another review does not exist, provide what is known from the guideline review of evidence in*** [***1a.7***](#Section1a7)

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**1a.5.** **UNITED STATES PREVENTIVE SERVICES TASK FORCE RECOMMENDATION**

**1a.5.1.** **Recommendation citation** (*including date*) and **URL for recommendation** (*if available online*):

**1a.5.2.** **Identify recommendation number and/or page number** and **quote verbatim, the specific recommendation**.

**1a.5.3.** **Grade assigned to the quoted recommendation with definition of the grade**:

**1a.5.4. Provide all other grades and associated definitions for recommendations in the grading system.** (*Note: the* *grading system for the evidence should be reported in section 1a.7.*)

**1a.5.5. Citation and URL for methodology for grading recommendations** (*if different from 1a.5.1*)**:**

***Complete section*** [***1a.7***](#Section1a7)

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**1a.6. OTHER SYSTEMATIC REVIEW OF THE BODY OF EVIDENCE**

**1a.6.1.** **Citation** (*including date*) and **URL** (*if available online*):

**1a.6.2.** **Citation and** **URL for methodology for evidence review and grading** (*if different from 1a.6.1*)**:**

***Complete section*** [***1a.7***](#Section1a7)

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**1a.7. FINDINGS FROM SYSTEMATIC REVIEW OF BODY OF THE EVIDENCE supporting the measure**

*If more than one systematic review of the evidence is identified above, you may choose to summarize the one (or more) for which the best information is available to provide a summary of the quantity, quality, and consistency of the body of evidence. Be sure to identify which review is the basis of the responses in this section and if more than one, provide a separate response for each review.*

**1a.7.1.** **What was the specific structure, treatment, intervention, service, or intermediate outcome addressed in the evidence review?**

The following evidence review supports the guideline from the Institute for Clinical Systems Improvement.

The evidence review assessed the benefits and harms of conducting imaging studies for patients with acute low back pain who do not have any “red flags.” This aligns with the measure, which assesses the proportion of patients with a primary diagnosis of low back pain who did not have an imaging study (plain X-ray, MRI, CT scan) within 28 days of the diagnosis of low back pain. Appropriate treatments within this timeframe for most patients include pain medications, advice to stay active, and reassurance from the health care provider.

**1a.7.2.** **Grade assigned for the quality of the quoted evidence with definition of the grade**:

The Institute for Clinical Systems Improvement assigned a “moderate” grade to the quality of evidence.

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| --- | --- |
| **Category** | **Quality Definitions** |
| **Moderate Quality Evidence** | Further research is likely to have an important impact on the work group's confidence in the estimate of effect and may change the estimate. |

**1a.7.3. Provide all other grades and associated definitions for strength of the evidence in the grading system.**

OtherInstitute for Clinical Systems Improvement quality of evidence grades:

|  |  |
| --- | --- |
| **Category** | **Quality Definitions** |
| **High Quality Evidence** | Further research is very unlikely to change the work group's confidence in the estimate of effect. |
| **Low Quality Evidence** | Further research is very likely to have an important impact on the work group's confidence in the estimate of effect and is likely to change. The estimate or any estimate of effect is very uncertain. |

**1a.7.4.** **What is the time period covered by the body of evidence? (*provide the date range, e.g., 1990-2010*). Date range**: 1976-2011

**QUANTITY AND QUALITY OF BODY OF EVIDENCE**

**1a.7.5.****How many and what type of study designs are included in the body of evidence**? (*e.g., 3 randomized controlled trials and 1 observational study*)

The Institute for Clinical Systems Improvement reviewed three meta-analyses that included studies regarding inappropriate imaging for patients with non-specific low back pain. The meta-analyses systematically reviewed randomized controlled trials (RCTs). Two of the meta-analyses were specific to imaging strategies for low back pain, while the third focused on interventions for improving the appropriate use of imaging for low back pain. This submission concentrates on the body of evidence found in the two meta-analyses specific to imaging strategies for low back pain. Those two meta-analyses identified the same 6 RCTs that directly supported the guideline.

Five of the RCTs met at least four of eight predefined quality criteria, and were classified as higher quality.

**1a.7.6.** **What is the overall quality of evidence across studies in the body of evidence**? (*discuss the certainty or confidence in the estimates of effect particularly in relation to study factors such as design flaws, imprecision due to small numbers, indirectness of studies to the measure focus or target population*)

Overall, for the two meta-analyses specific to imaging for low back pain, there is high quality evidence supporting the non-use of imaging within 28 days of a low back pain diagnosis for patients presenting without “red flags.” Six randomized controlled trials provide evidence for this guideline.

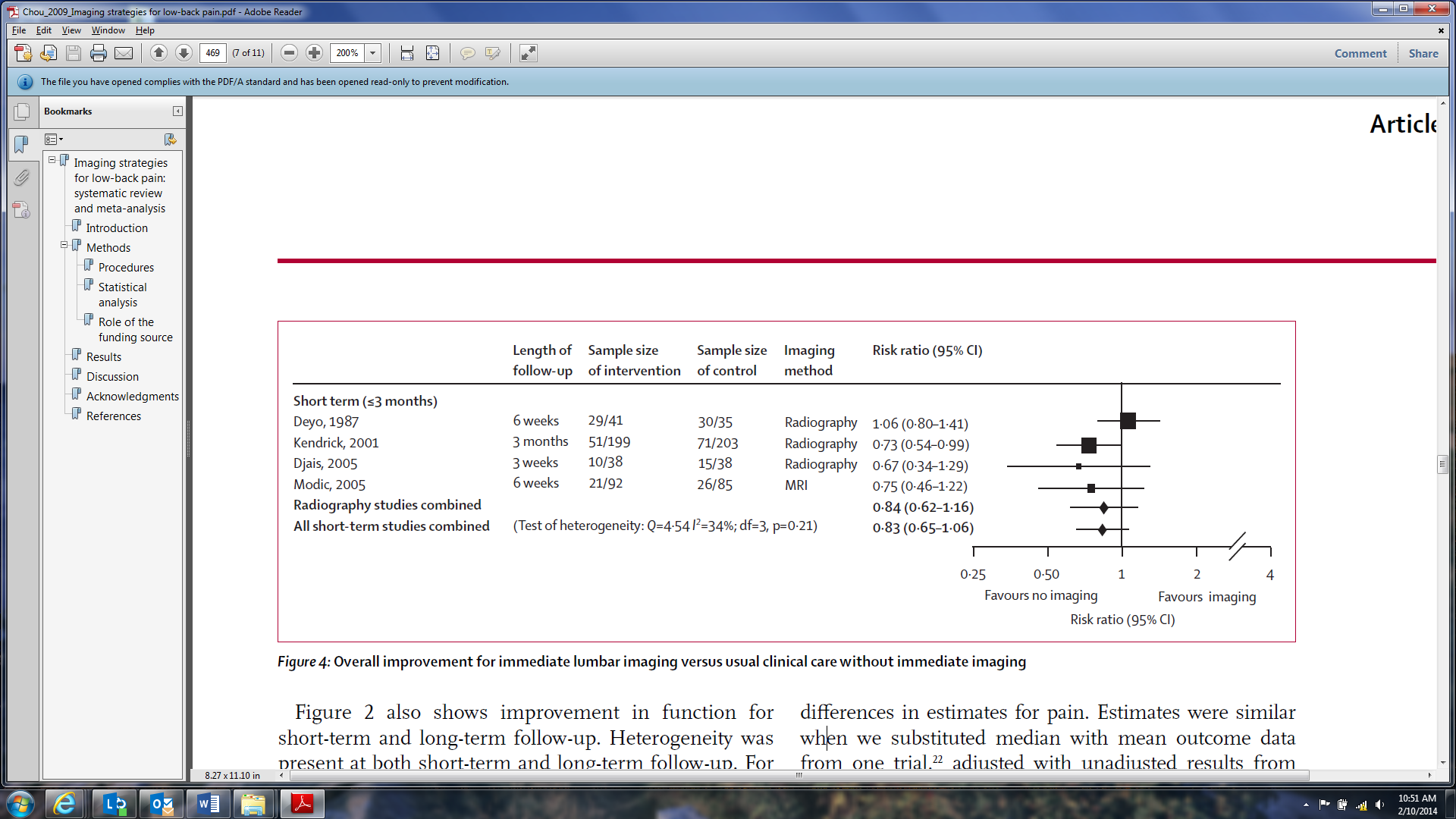
**ESTIMATES OF BENEFIT AND CONSISTENCY ACROSS STUDIES IN BODY OF EVIDENCE**

**1a.7.7.** **What are the estimates of benefit—magnitude and direction of effect on outcome(s) across studies in the body of evidence**? (*e.g., ranges of percentages or odds ratios for improvement/ decline across studies, results of meta-analysis, and statistical significance*)

This measure intends to reduce the use of inappropriate imaging studies (studies within 28 days of diagnosis for patients without red flags). As an overuse measure, the evidence for this measure needs to demonstrate that the harms of imaging in the first 28 days for patients without red flags outweigh the benefits of imaging in the first 28 days for patients without red flags. We present evidence below that there is little harm to patients by avoiding the use of imaging for patients without indications of underlying conditions, and there is significant radiation exposure (harm) to patients who receive imaging studies.

One of the meta-analyses cited by the Institute for Clinical Systems Improvement guideline concluded that, “immediate, routine lumbar-spine imaging in patients with low-back pain and no features suggesting serious underlying conditions did not improve clinical outcomes compared with usual clinical care without immediate imaging. Results were limited by small numbers of trials for some analyses, but seemed consistent for the primary outcomes of pain and function, and for quality of life, mental health, and overall improvement. Data for patient satisfaction could not be pooled, but showed no clear difference. In addition to non-significance, pooled estimates were small or close to zero and, in some cases, slightly favored the non-imaging strategy. This result suggests that, even if statistical power could be increased by other trials, clinically important benefits from routine lumbar imaging are unlikely, assuming that future results are similar to those currently available” (Chou, 2009).

The figure below represents the overall impact of immediate lumbar imaging versus usual clinical care without immediate imaging. The graph, shown on the right, demonstrates that risk ratios less than 1 indicate that the overall results for pain, function, quality of life and mental health favored non-use of immediate lumbar imaging.



(Chou, 2009)

Another meta-analysis cited by the Institute for Clinical Systems Improvement guideline found that, “lumbar radiography and CT contribute to cumulative low-level radiation exposure, which could promote carcinogenesis. Lumbar spine CT is associated with an average effective radiation dose of 6 mSv (Fazel, 2009). On the basis of the 2.2 million lumbar CT scans performed in the United States in 2007, a study (Berrington de Gonzalez, 2009) projected 1,200 additional future cases of cancer” (Chou, 2011).

This meta-analysis also described that lumbar radiography occurs much more frequently than the CT scan, and therefore accounts for a greater proportion of the total radiation dose from lumbar imaging procedures in the United States (3.3% vs. 0.7%). The meta-analysis stated that, “the average radiation exposure from lumbar radiography is 75 times higher than for chest radiography (Fazel, 2009). This is of particular concern in young women because of the proximity to the gonads, which are difficult to effectively shield. The amount of female gonadal irradiation from lumbar radiography has been estimated as equivalent to having chest radiography daily for several years (Jarvik, 2002)” (Chou, 2011).

One meta-analysis identified psychosocial harm to the patient as another harm from unnecessary imaging of low back pain. For instance, telling a patient that they have a back imaging abnormality could result in unintended harms related to labeling, where a patient believes they have some type of malady when in fact they are healthy (Fisher, 1999). Any imaging study can sometimes produce clinically irrelevant results. For many patients, the knowledge of these findings might hinder recovery by causing increased worry and anxiety, excessive focus on minor back symptoms, and avoidance of exercise or other recommended activities due to fear of causing more structural damage (Fisher, 1999).

Low back imaging might also lead to unnecessary procedures. According to one study, “visual evidence can be very compelling, despite the uncertainties related to interpretation of most spinal imaging abnormalities, and imaging abnormalities may be viewed as targets for surgery or other interventions.” (Rhodes, 1999). Another study found that for work-related acute low back pain, receiving an MRI within the first month was associated with more than an 8-fold increase in risk for surgery and more than a 5-fold increase in subsequent medical costs compared with patients who did not receive early MRI (Webster, 2010).

Citations:

Berrington de Gonza´lez A, Mahesh M, Kim KP, Bhargavan M, Lewis R, Mettler F, et al. Projected cancer risks from computed tomographic scans performed in the United States in 2007. Arch Intern Med. 2009; 169:2071-7. [PMID: 20008689]

Chou R, Fu R, Carrino JA, Deyo RA. 2009. “Imaging strategies for low-back pain: systematic review and meta-analysis.” *The Lancet* 373(9662):463-72. (February 7, 2009) doi: 10.1016/S0140-6736(09)60172-0.

Chou R, Qaseem A, Owens DK, Shekelle P; Clinical Guidelines Committee of the American College of Physicians. 2011. “Diagnostic imaging for low back pain: advice for high-value health care from the American College of Physicians.” *Annals of Internal Medicine* 154(3):181-9. (February 1, 2011) doi: 10.7326/0003-4819-154-3-201102010-00008.

Fazel R, Krumholz HM, Wang Y, Ross JS, Chen J, Ting HH, et al. Exposure to low-dose ionizing radiation from medical imaging procedures. N Engl J Med. 2009; 361:849-57. [PMID: 19710483]

Fisher ES, Welch HG. Avoiding the unintended consequences of growth in medical care: how might more be worse? JAMA. 1999; 281:446-53.

Institute for Clinical Systems Improvement (ICSI). Adult Acute and Subacute Low Back Pain. Updated November 2012. Guideline available from: <https://www.icsi.org/_asset/bjvqrj/LBP.pdf>, accessed February 6, 2014.

Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. Ann Intern Med. 2002; 137:586-97. [PMID: 12353946]

Rhodes LA, McPhillips-Tangum CA, Markham C, Klenk R. The power of the visible: the meaning of diagnostic tests in chronic back pain. Soc Sci Med. 1999; 48:1189-203.

Webster BS, Cifuentes M. Relationship of early magnetic resonance imaging for work-related acute low back pain with disability and medical utilization outcomes. J Occup Environ Med. 2010; 52:900-7.

**1a.7.8.** **What harms were studied and how do they affect the net benefit (benefits over harms)?**

An important theoretical harm of this measure would be if patients who might benefit from early imaging do not receive imaging. We have supplied evidence that supports our supposition that the occurrence of such clinical events is quite rare.

There were very few harms described in the research regarding delaying lumbar imaging. A potential harm associated with delaying imaging is related to patient expectations; mentioned in a single study, patients assigned to receive routine imaging for uncomplicated low back pain were more likely to believe that the imaging was necessary, despite not experiencing any clinical benefit (Chou, 2009). In another trial (Kendrick, 2001), 80 percent of patients with low back pain would undergo radiography if given the choice, despite the lack of benefit from routine imaging. Since the harms related to imaging patients without red flags outweigh the benefits, the study concluded, “educational interventions could be effective for reducing the proportion of patients with low-back pain who believe that routine imaging should be done. We need to identify back-pain assessment and educational strategies that meet patient expectations and increase satisfaction, while avoiding unnecessary imaging” (Chou, 2009).

Citations:

Chou R, Deyo RA, Jarvik JG. 2012. “Appropriate use of lumbar imaging for evaluation of low back pain.” *Radiologic Clinics of North America* 50(4):569-85. (July, 2012) doi: 10.1016/j.rcl.2012.04.005.

Chou R, Fu R, Carrino JA, Deyo RA. 2009. “Imaging strategies for low-back pain: systematic review and meta-analysis.” *The Lancet* 373(9662):463-72. (February 7, 2009) doi: 10.1016/S0140-6736(09)60172-0.

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**UPDATE TO THE SYSTEMATIC REVIEW(S) OF THE BODY OF EVIDENCE**

**1a.7.9.** **If new studies have been conducted since the systematic review of the body of evidence, provide for each new study: 1) citation, 2) description, 3) results, 4) impact on conclusions of systematic review**.

We are not aware of new evidence that would impact the current guideline on low back pain imaging.

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**1a.8 OTHER SOURCE OF EVIDENCE**

*If source of evidence is NOT from a clinical practice guideline, USPSTF, or systematic review, please describe the evidence on which you are basing the performance measure.*

**1a.8.1** **What process was used to identify the evidence?**

**1a.8.2.** **Provide the citation and summary for each piece of evidence.**