

Duke University Health Systems
Appropriate Use Criteria for Priority Clinical Area: Lower Back Pain

Introduction:

The Centers for Medicare and Medicaid Services (CMS) Appropriate Use Criteria (AUC) program takes effect January 2020 and requires ambulatory and emergency medicine providers to consult AUC using a CMS approved clinical decision support mechanism when ordering advanced imaging (CT, MRI) in eight priority clinical areas (PCAs). The AUC must be derived from evidentiary literature review performed by a medical research librarian, in conjunction with subject specialists. Physicians at the Duke University Health Systems evaluated the evidence in the literature pertaining to the utility of CT and MRI for patients with low back pain and identified high-grade evidence to guide decision-making about when advanced imaging will add value to patient management.

Literature Review Details:

A broad search of the literature from 1990 to the present was performed by dedicated medical librarians from the Duke University Medical Center Library & Archives in conjunction with subject specialists to identify research investigations, systematic reviews, meta-analyses and clinical practice guidelines measuring the utility of advance imaging (CT, MRI) for patients with low back pain. Results from the search strategy were uploaded to Covidence and citations were reviewed by members of the multidisciplinary team in duplicate during two phases of blinded, independent screening (title/abstract review, followed by full-text article review of a smaller subset of articles). Studies are excluded from the review when two independent reviewers from the AUC multidisciplinary team determine to do so, followed by the same process for full text review. From each publication, one or more rules reflecting results and conclusions about the utility of CT or MRI in these clinical settings were extracted into an evidence table. Each publication was graded using Oxford Centre for Evidence Based Medicine Levels of Evidence.

Publication Type:

- Systematic Review (13)
- Clinical Practice Guidelines (9)
- Literature Review(5)
- Randomized Controlled Trial (1)

- Observational Studies (1)
- Case Report (1)

Red Flag Definitions: potential condition and indications for red flags are defined below.

- *Cancer or Infection* – history of cancer, unexplained weight loss, immunosuppression, intravenous drug use, prolonged use of corticosteroids, fever, suspicion of bacteremia, indwelling vascular catheter, recent invasive procedure.
- *Spinal Fracture* - history of significant trauma, minor fall or heavy lift in a potentially osteoporotic or elderly individual, prolonged use of steroids.
- *Cauda equina syndrome or severe neurologic compromise* - acute onset of urinary retention or overflow incontinence, loss of anal sphincter tone or fecal incontinence, saddle anesthesia, global or progressive motor weakness in the lower limbs.

Appropriate Use Criteria for Priority Clinical Area: Lower Back Pain

	CT						MRI			
Indication Name	LUMBAR SPINE REFORMAT TRAUMA WITHOUT CONTRAST	LUMBAR SPINE REFORMAT LEVEL ONE TRAUMA WITHOUT CONT PROTO	LUMBAR SPINE REFORMAT LEVEL TWO TRAUMA WITHOUT CONT PROTO	LUMBAR SPINE WITHOUT CONTRAST	LUMBAR SPINE WITH CONTRAST	LUMBAR SPINE POST MYELOGRAM WITH CONTRAST PROTOCOL	LUMBAR SPINE WITHOUT CONTRAST	LUMBAR SPINE WITH AND WITHOUT CONTRAST	Primary Decision Reference	Authors*
LBP or radicular symptoms, prior fusion XR (NEW)	6	6	6	8	3	5	6	8	Consensus	Dr. Bowlby,L., Dr. Cook, C. , Dr. Clifford C. , Dr. Goertz C., Dr. Gottfried, O., Dr. Hawes J. , Dr. French R. , Dr. Lewis E. , Dr. Liu, G. , Dr. Roth C.
LBP or radicular symptoms, prior fusion, no XR (NEW)	1	1	1	1	1	1	1	1	Consensus	Dr. Bowlby,L., Dr. Cook, C. , Dr. Clifford C. , Dr. Goertz C., Dr. Gottfried, O., Dr. Hawes J. , Dr. French R. , Dr. Lewis E. , Dr. Liu, G. , Dr. Roth C.
Low back pain, cancer suspected, pre-op (NEW)	5	5	5	9	9	5	7	8	Evidence Based Reference #: 6,7,15,23,25	Dr. Roth C., Dr. Kirkpatrick J. , Dr. Austin Dixon A. , Dr. Halsater B. , Saikali, D., Dr. Lewis E. , Dr. Gottfried O.
Low back pain, infection suspected, pre-op (NEW)	5	5	5	9	9	5	7	8	Evidence Based Reference #: 6,7,15,23,25	Dr. Roth C., Dr. Kirkpatrick J. , Dr. Austin Dixon A. , Dr. Halsater B. , Saikali, D., Dr. Lewis E. , Dr. Gottfried O.

	CT						MRI			
Indication Name	LUMBAR SPINE REFORMAT TRAUMA WITHOUT CONTRAST	LUMBAR SPINE REFORMAT LEVEL ONE TRAUMA WITHOUT CONT PROTO	LUMBAR SPINE REFORMAT LEVEL TWO TRAUMA WITHOUT CONT PROTO	LUMBAR SPINE WITHOUT CONTRAST	LUMBAR SPINE WITH CONTRAST	LUMBAR SPINE POST MYELOGRAM WITH CONTRAST PROTOCOL	LUMBAR SPINE WITHOUT CONTRAST	LUMBAR SPINE WITH AND WITHOUT CONTRAST	Primary Decision Reference	Authors*
Low back pain, no red flags, no conservative treatment (New)	2	2	2	2	2	2	2	2	Evidence Based Reference #4,23,25	Dr. Bowlby,L., Dr. Cook, C. , Dr. Clifford C. , Dr. Goertz C., Dr. Gottfried, O., Dr. Hawes J. , Dr. French R. , Dr. Lewis E. , Dr. Liu, G. , Dr. Roth C., Dr. Broder J.
LBP >6 wks. pain or radicular symptoms, symptoms persist with > 6wks conservative treatment (New)	5	5	5	5	5	5	8	5	Evidence Based Reference #: 6,7,23,17	Dr. Bowlby,L., Dr. Cook, C. , Dr. Clifford C. , Dr. Goertz C., Dr. Gottfried, O., Dr. Hawes J. , Dr. French R. , Dr. Lewis E. , Dr. Liu, G. , Dr. Roth C.
Low back pain, increased fracture risk	7	7	7	7	3	1	7	5	ACR Endorsement based on literature review	Dr. Broder J., Dr. Roth C. , Dr. Siewny L., Dr. Dixon, A.
Low back pain, trauma	7	7	7	7	3	1	7	5	ACR Endorsement based on literature review	Dr. Broder J., Dr. Roth C. , Dr. Siewny L., Dr. Dixon, A.

	CT						MRI			
Indication Name	LUMBAR SPINE REFORMAT TRAUMA WITHOUT CONTRAST	LUMBAR SPINE REFORMAT LEVEL ONE TRAUMA WITHOUT CONT PROTO	LUMBAR SPINE REFORMAT LEVEL TWO TRAUMA WITHOUT CONT PROTO	LUMBAR SPINE WITHOUT CONTRAST	LUMBAR SPINE WITH CONTRAST	LUMBAR SPINE POST MYELOGRAM WITH CONTRAST PROTOCOL	LUMBAR SPINE WITHOUT CONTRAST	LUMBAR SPINE WITH AND WITHOUT CONTRAST	Primary Decision Reference	Authors*
Low back pain, cauda equina syndrome suspected	5	5	5	5	5	3	9	9	ACR Endorsement based on literature review	Dr. Roth C., Dr. Kirkpatrick J. , Dr. Austin Dixon A. , Dr. Halsater B. , Saikali, D., Dr. Lewis E. , Dr. Gottfried O.
Low back pain, progressive neurologic deficit	5	5	5	5	5	3	9	8	ACR Endorsement based on literature review	Dr. Bowlby L., Dr. Gottfried O., Dr. Goertz C. , Schmidt, M. , Dr. Leverenz D. , Dr. Hawes J., Dr. Roth C.
Low back pain, cancer suspected	5	5	5	6	6	3	7	8	ACR Endorsement based on literature review	Dr. Roth C., Dr. Kirkpatrick J. , Dr. Austin Dixon A. , Dr. Halsater B. , Saikali, D., Dr. Lewis E. , Dr. Gottfried O.
Low back pain, infection suspected	5	5	5	6	6	3	7	8	ACR Endorsement based on literature review	Dr. Roth C., Dr. Kirkpatrick J. , Dr. Austin Dixon A. , Dr. Halsater B. , Saikali, D., Dr. Lewis E. , Dr. Gottfried O.

Scores:
1-3 = Inappropriate

4-6 = Maybe Appropriate

7-9 = Appropriate

PCA: Lower Back Pain - Evidence Table

#	Title	Authors	Published Year	Design	Journal	Evidence Grade based on OCEBM
1	Chapter 4 - European guidelines for the management of chronic nonspecific low back pain	Airaksinen, O.; Brox, J. I.; Cedraschi, C.; Hildebrandt, J.; Klaber-Moffett, J.; Kovacs, F.; Mannion, A. F.; Reis, S.; Staal, J. B.; Ursin, H.; Zanolli, G.; Cost B. Working Grp Guidelines Ch	2006	Literature Review	European Spine Journal	1
2	The time-sensitive challenge of diagnosing spinal epidural abscess in the emergency department	Alerhand, S.; Wood, S.; Long, B.; Koyfman, A.	2017	Systematic Literature Review	Intern Emerg Med	2
3	Diagnostic imaging practice guidelines for musculoskeletal complaints in adults-an evidence-based approach-part 3: spinal disorders	Bussi�res, A. E., Taylor, J. A., & Peterson, C.	2008	Clinical Practice Guidelines	Journal of manipulative and physiological therapeutics	1
4	Acute Lumbar Back Pain	Casser, H. R.; Seddigh, S.; Rauschmann, M.	2016	Literature Review	Dtsch Arztebl Int	2
5	Degenerative magnetic resonance imaging changes in patients with chronic low back pain: a systematic review	Chou, D.; Samartzis, D.; Bellabarba, C.; Patel, A.; Luk, K. D.; Kisser, J. M.; Skelly, A. C.	2011	Systematic Review	Spine (Phila Pa 1976)	2
6	Diagnostic imaging for low back pain: advice for high-value health care from the American College of Physicians	Chou, R.; Qaseem, A.; Owens, D. K.; Shekelle, P.	2011	Case Report	Ann Intern Med	1
7	Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society	Chou, R.; Qaseem, A.; Snow, V.; Casey, D.; Cross, J. T., Jr.; Shekelle, P.; Owens, D. K.	2007	Clinical Practice Guidelines	Ann Intern Med	1

#	Title	Authors	Published Year	Design	Journal	Evidence Grade based on OCEBM
8	Synthesis of recommendations for the assessment and management of low back pain from recent clinical practice guidelines	Dagenais, S.; Tricco, A. C.; Haldeman, S.	2010	Clinical Practice Guidelines	Spine J	2
9	What is the diagnostic accuracy of red flags related to cauda equina syndrome (CES), when compared to Magnetic Resonance Imaging (MRI)? A systematic review	Dionne, N.; Adefolarin, A.; Kunzelman, D.; Trehan, N.; Finucane, L.; Levesque, L.; Walton, D. M.; Sadi, J.	2019	Systematic Review	Musculoskelet Sci Pract	2
10	Red flags to screen for malignancy and fracture in patients with low back pain: systematic review	Downie, A.; Williams, C. M.; Henschke, N.; Hancock, M. J.; Ostelo, R. W.; de Vet, H. C.; Macaskill, P.; Irwig, L.; van Tulder, M. W.; Koes, B. W.; Maher, C. G.	2013	Systematic Review	Bmj	2
11	Do not routinely offer imaging for uncomplicated low back pain	Hall, A. M.; Aubrey-Bassler, K.; Thorne, B.; Maher, C. G.	2021	Randomized Controlled Trial	Bmj	2
12	Diagnostic Tests for Low Back Disorders	Hegmann, K. T.; Travis, R.; Belcourt, R. M.; Donelson, R.; Eskay-Auerbach, M.; Galper, J.; Haldeman, S.; Hooper, P. D.; Lessenger, J. E.; Mayer, T.; Mueller, K. L.; Murphy, D. R.; Tellin, W. G.; Thiese, M. S.; Weiss, M. S.	2019	Literature Review	J Occup Environ Med	1
13	Red flags to screen for malignancy in patients with low-back pain	Henschke, N.; Maher, C. G.; Ostelo, R. W.; de Vet, H. C.; Macaskill, P.; Irwig, L.	2013	Systematic Review	Cochrane Database Syst Rev	3
14	A systematic review identifies five "red flags" to screen for vertebral fracture in patients with low back pain	Henschke, N.; Maher, C. G.; Refshauge, K. M.	2008	Systematic Review	J Clin Epidemiol	2
15	Diagnostic evaluation of low back pain with emphasis on imaging	Jarvik, J. G.; Deyo, R. A.	2002	Systematic Review	Annals of Internal Medicine	1

#	Title	Authors	Published Year	Design	Journal	Evidence Grade based on OCEBM
16	Imaging for low back pain: is clinical use consistent with guidelines? A systematic review and meta-analysis	Jenkins, H. J.; Downie, A. S.; Maher, C. G.; Moloney, N. A.; Magnussen, J. S.; Hancock, M. J.	2018	Literature Review	Spine J	1
17	Effect of routine diagnostic imaging for patients with musculoskeletal disorders: A meta-analysis	Karel, Y. H.; Verkerk, K.; Endenburg, S.; Metselaar, S.; Verhagen, A. P.	2015	Systematic Review	Eur J Intern Med	1
18	An evidence-based clinical guideline for the diagnosis and treatment of lumbar disc herniation with radiculopathy	Kreiner, D. S.; Hwang, S. W.; Easa, J. E.; Resnick, D. K.; Baisden, J. L.; Bess, S.; Cho, C. H.; DePalma, M. J.; Dougherty, P.; Fernand, R.; Ghiselli, G.; Hanna, A. S.; Lamer, T.; Lisi, A. J.; Mazanec, D. J.; Meagher, R. J.; Nucci, R. C.; Patel, R. D.; Sembrano, J. N.; Sharma, A. K.; Summers, J. T.; Taleghani, C. K.; Tontz, W. L.; Toton, J. F.	2014	Clinical Practice Guidelines	Spine Journal	1

#	Title	Authors	Published Year	Design	Journal	Evidence Grade based on OCEBM
19	Guideline summary review: an evidence-based clinical guideline for the diagnosis and treatment of low back pain	Kreiner, D. S.; Matz, P.; Bono, C. M.; Cho, C. H.; Easa, J. E.; Ghiselli, G.; Ghogawala, Z.; Reitman, C. A.; Resnick, D. K.; Watters, W. C., 3rd; Annaswamy, T. M.; Baisden, J.; Bartynski, W. S.; Bess, S.; Brewer, R. P.; Cassidy, R. C.; Cheng, D. S.; Christie, S. D.; Chutkan, N. B.; Cohen, B. A.; Dagenais, S.; Enix, D. E.; Dougherty, P.; Golish, S. R.; Gulur, P.; Hwang, S. W.; Kilincer, C.; King, J. A.; Lipson, A. C.; Lisi, A. J.; Meagher, R. J.; O'Toole, J. E.; Park, P.; Pekmezci, M.; Perry, D. R.; Prasad, R.; Provenzano, D. A.; Radcliff, K. E.; Rahmathulla, G.; Reinsel, T. E.; Rich, R. L., Jr.; Robbins, D. S.; Rosolowski, K. A.; Sembrano, J. N.; Sharma, A. K.; Stout, A. A.; Taleghani, C. K.; Tauzell, R. A.; Trammell, T.; Vorobeychik, Y.; Yahiro, A. M.	2020	Clinical Practice Guidelines	Spine J	1
20	What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review	Lin, I.; Wiles, L.; Waller, R.; Goucke, R.; Nagree, Y.; Gibberd, M.; Straker, L.; Maher, C. G.; O'Sullivan, P. P. B.	2020	Systematic Review	Br J Sports Med	1
21	Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview	Oliveira, C. B.; Maher, C. G.; Pinto, R. Z.; Traeger, A. C.; Lin, C. C.; Chenot, J. F.; van Tulder, M.; Koes, B. W.	2018	Clinical Practice Guidelines	Eur Spine J	1

#	Title	Authors	Published Year	Design	Journal	Evidence Grade based on OCEBM
2 2	VA/DoD Clinical Practice Guideline: Diagnosis and Treatment of Low Back Pain	Pangarkar, S. S.; Kang, D. G.; Sandbrink, F.; Bevevino, A.; Tillisch, K.; Konitzer, L.; Sall, J.	2019	Clinical Practice Guidelines	J Gen Intern Med	1
2 3	ACR Appropriateness Criteria Low Back Pain	Patel, N. D.; Broderick, D. F.; Burns, J.; Deshmukh, T. K.; Fries, I. B.; Harvey, H. B.; Holly, L.; Hunt, C. H.; Jagadeesan, B. D.; Kennedy, T. A.; O'Toole, J. E.; Perlmutter, J. S.; Policeni, B.; Rosenow, J. M.; Schroeder, J. W.; Whitehead, M. T.; Cornelius, R. S.; Corey, A. S.	2016	Clinical Practice Guidelines	J Am Coll Radiol	1
2 4	Lumbar spine MRI for low back pain: indications and yield	Roudsari, B.; Jarvik, J. G.	2010	Literature Review	AJR Am J Roentgenol	2
2 5	A best-evidence review of diagnostic procedures for neck and low-back pain	Rubinstein, S. M.; van Tulder, M.	2008	Systematic Review	Best Pract Res Clin Rheumatol	1
2 6	Application of "less is more" to low back pain	Srinivas, S. V.; Deyo, R. A.; Berger, Z. D.	2012	Systematic Review	Arch Intern Med	1
2 7	Computed tomography for the diagnosis of lumbar spinal pathology in adult patients with low back pain or sciatica: a diagnostic systematic review	van Rijn, R. M.; Wassenaar, M.; Verhagen, A. P.; Ostelo, R. W.; Ginai, A. Z.; de Boer, M. R.; van Tulder, M. W.; Koes, B. W.	2012	Systematic Review	Eur Spine J	2
2 8	Red flags presented in current low back pain guidelines: a review	Verhagen, A. P.; Downie, A.; Popal, N.; Maher, C.; Koes, B. W.	2016	Clinical Practice Guidelines	Eur Spine J	2
2 9	Relationship of early magnetic resonance imaging for work-related acute low back pain with disability and medical utilization outcomes	Webster, B. S.; Cifuentes, M.	2010	Observational Studies	J Occup Environ Med	3
3 0	Red flags to screen for vertebral fracture in patients presenting with low-back pain	Williams, C. M.; Henschke, N.; Maher, C. G.; van Tulder, M. W.; Koes, B. W.; Macaskill, P.; Irwig, L.	2013	Systematic Review	Cochrane Database Syst Rev	3

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