

North American Spine Society
Diagnosis and Treatment of Low-Back Pain Evidence-Based Guideline
2016-Currently Under Development
Guideline Inclusion/Exclusion Criteria
Clinical Question List

Definition

Low-back pain is defined as pain of musculoskeletal origin extending from the lowest rib to the gluteal fold that may at times extend as somatic referred pain into the thigh (above the knee).*

*See next page for terminology

Inclusion Criteria

1. Adult patients aged 18 and older
2. Patients with low back pain limited to somatic referred pain/non-radicular pain limited to above the knee only

Exclusion Criteria

1. Patients less than 18 years of age
2. Low back pain due to:
 - a. tumor
 - b. infection
 - c. Metabolic disease
 - d. Inflammatory arthritis
 - e. Fracture
3. Patients with a diagnosed deformity, including spondylolisthesis, spondylolysis and scoliosis
4. Pain experienced below the knee
5. Extra-spinal conditions (ie, visceral, vascular, GU)
6. Patients who have undergone prior lumbar surgery
7. Presence of neurological deficit
8. Back pain that is associated with widespread multi-site pain (≥ 2 sites)
9. Pregnancy

Literature Search Parameters

1. Databases Searched: PubMed/Medline, EMBASE, Cochrane Library
2. Date Range: all literature to current date
3. Study Designs: Randomized Controlled Trials, Clinical Trials, Prospective/Retrospective Cohort and Comparative Studies, Observational Studies, Case-Control, Case-Series.
4. Humans
5. English only studies

GLOSSARY

Additional keywords will be added throughout development of guideline

1. **Visceral diseases resulting in back pain:** Pain secondary to diseases of the viscera. Examples: endometriosis, prostatitis, aortic aneurysm.¹
2. **Specific low back pain:** Pain that can be linked to a disorder, disease, infection, injury, trauma, or structural deformity. A *potential* causal relationship can be found between the diagnosis and the pain.²
3. **Non-specific low back pain:** Pain in which no specific cause or structure can be identified to account for the patient's perceived symptoms.²
4. **Acute low back pain:** Within first 6 weeks of person's current LBP episode.³
5. **Sub-acute low back pain:** Symptoms for current LBP episode present for 6-12 weeks.³
6. **Chronic low back pain:** Symptoms for current LBP episode present for greater than 12 weeks.⁴
7. **Recurrent low back pain:** Symptoms less than ½ the days in a year occurring in multiple episodes.⁴
8. **Sciatica:** Pain radiating down the leg below the knee in the distribution of the sciatic nerve, suggesting nerve root compromise due to mechanical pressure or inflammation. Sciatica is the most common symptom of lumbar radiculopathy.⁵
9. **Radiculopathy:** Dysfunction of a nerve root associated with pain, sensory impairment, weakness, or diminished deep tendon reflexes in a nerve root distribution.⁵
10. **Medical/interventional treatment:** The term medical/interventional treatment is used in place of "non-operative," "conservative," or "non-surgical" treatment. It encompasses pharmacological treatment, physical therapy, exercise therapy, manipulative therapy, modalities, various types of external stimulators and injections.
11. **SMT:** SMT is defined as spinal manipulative therapy, manual therapy, mobilization, and high velocity thrusts.
12. **Lumbar stabilization exercises:** Focused on facilitating and strengthening specific muscles that directly or indirectly control spinal joint function, especially the abdominal, gluteal and spinal extensor muscle groups.
13. **General fitness program:** Exercise program not focused on specific muscle groups; by definition the goal is to improve the overall general fitness of the patient by using a combination of aerobic conditioning with stretching/strengthening of all major muscle groups.

Red Flag Conditions⁵⁻⁷

History

- Cancer
- Unexplained weight loss
- Immunosuppression
- Intravenous drug use
- Urinary tract infection
- Fever
- Significant trauma relative to age
- Bladder or bowel incontinence
- Urinary retention (with overflow incontinence)

Physical examination

- Saddle anesthesia
- Loss of anal sphincter tone
- Major motor weakness in lower extremities
- Fever
- Neurologic findings persisting beyond one month or progressively worsening

References

1. Deyo RA. Early diagnostic evaluation of low back pain. *Journal of General Internal Medicine* 1986 September;1(5):328-38.
2. Nordin M, Weiser S, van Doorn JW, Hiebert R. Nonspecific low back pain. In: Rom.W.N., editor. *Environmental and Occupational Medicine*. 3rd ed. Philadelphia, PA: Lippincott-Raven Publishers; 1998. p. 947-56.
3. Frymoyer JW. Back pain and sciatica. *New England Journal of Medicine* 1988 February 4;318(5):291-300.
4. Von Korff M. Studying the natural history of back pain. *Spine* 1994 September 15;19(18 Suppl):2041S-6S.
5. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med*. 2007;147(7):478-491.
6. Bigos SJ, Bowyer OR, Braen GR, Brown K, Deyo R, Haldeman S, et al. Acute low back problems in adults. Clinical practice guideline no. 14 (AHCPR publication no. 95-0642). Rockville, Md.: U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, December 1994.
7. Forseen S, Corey A. Clinical decision support and acute low back pain: evidence-based order sets. *J Am Coll Radiol*. 2012 Oct;9(10):704-12

Diagnosis Work Group Clinical Questions

***All questions address acute, sub-acute and chronic low-back pain unless otherwise specified**

1. In patients with low-back pain, are there specific history or physical examination findings that would indicate the structure causing pain and, therefore, guide treatment?
 - a. Vertebral body
 - b. Intervertebral disc
 - c. Zygapophyseal joint
 - d. Posterior elements
 - e. Sacroiliac joint
 - f. Muscle/tendon
 - g. Central sensitization
2. In patients with low-back pain, are there history or physical examination findings that would serve as predictors for the recurrence of low-back pain?
3. In patients with acute low-back pain, are there history or physical examination findings that would predict that an episode will resolve within one month?
4. In patients with low-back pain, what history and/or physical examination findings are useful in determining if the cause is non-specific in nature and, therefore, guide treatment?
5. In patients with low-back pain, what elements of the patient's history and findings from the physical examination would suggest the need for diagnostic laboratory studies?
6. In patients with low-back pain, are there specific findings on a pain diagram that help differentiate the structure which is causing pain?
7. What are the patient characteristics that increase or decrease the risk of developing chronic low-back pain after an acute episode?
8. Are there assessment tools or questionnaires that can help identify the cause of acute, subacute or chronic low back pain?
9. Does a psychological evaluation assist with identifying patients with low back pain who are at risk for developing chronic pain or disability?
10. What are the history and physical examination findings that would suggest obtaining advanced imaging studies?

Commented [KR1]: Specific key words for economic risk factors/SES/psychosocial factors will be added for lit search.

Commented [KR2]: We will address all of the following as evidence allows.

- a. disability status
- b. substance abuse
- c. employment factors
- d. family support
- e. level of education
- f. coping strategies
- g. presence or absence of directional preference
- h. Physical characteristics—BMI, health status, core strength
- i. Litigation status

Commented [KR3]: The following keywords will be added to the search:
Structure, movement, non-musculoskeletal

Imaging Work Group Clinical Questions

***All questions address acute, sub-acute and chronic low-back pain unless otherwise specified**

1. What is the association between low-back pain and spondylosis on routine radiography?
2. Is there evidence to support the use of computed tomography (CT) or magnetic resonance imaging (MRI) for the evaluation of low-back pain in the absence of x-ray/radiographic abnormality?
3. In patients with low back pain, does duration of symptoms correlate with abnormal findings on imaging?
4. What is the optimal imaging protocol that should be used in the setting of low-back pain?
 - a. Are unique MRI sequences considered preferential or optimal?
 - b. What is the history and clinical presentation that suggests the use of contrast enhanced imaging in patients with low back pain?
 - c. Is there evidence to support imaging the lumbar spine in an oblique plane?
 - d. What is the value of flexion / extension films in evaluating lower back pain?
5. In the absence of red flags, what are the imaging (x-ray, CT or MRI) recommendations for patients with acute or chronic low-back pain?
6. Are there imaging findings that correlate with the presence of low back pain?
7. Are there imaging findings that contribute to decision making by healthcare providers to guide treatment?

Commented [KR4]: Per public comment, the following additional keywords will be added to the literature search: endplate degenerative changes, disc morphology, or arachnoiditis, high signal intensity annular fissures, discogenic marrow edema, disc herniation (Modic 1 signal changes) and disc degeneration

Medical and Psychological Treatment Work Group Clinical Questions

*All questions address acute, sub-acute and chronic low-back pain unless otherwise specified

1. Is smoking cessation effective in decreasing the frequency of low-back pain episodes?
2. In patients with low-back pain, is pharmacological treatment effective in decreasing duration of pain, decreasing intensity of pain, increasing functional outcomes of treatment and improving the return to work rate?
Versus:
 - a. No treatment
 - i. Risks
 - ii. Complications
 - b. cognitive behavioral therapy (CBT) and/or psychosocial intervention alone
 - c. patient education alone
3. In patients with low-back pain, is topical treatment (e.g. cream or gel) effective in decreasing duration of pain, decreasing intensity of pain, increasing functional outcomes of treatment and improving the return to work rate?
4. Following treatment for low-back pain, do patients with healthy sleep habits experience decreased duration of pain, decreased intensity of pain, increased functional outcomes and improved return to work rates compared to patients with poor sleeping habits?
5. In patients with low-back pain, is cognitive behavioral therapy (CBT) and/or psychosocial intervention effective in decreasing duration of pain, decreasing intensity of pain, increasing functional outcomes, decreasing anxiety and/or depression and improving return to work rate?
6. In patients with low-pain pain, does the timing of cognitive behavioral therapy/psychosocial intervention and/or neuroscience education affect duration of pain, intensity of pain, functional outcomes, anxiety, depression and return to work status?
7. In patients undergoing interventional or surgical treatment for low-back pain, does the addition of cognitive behavioral therapy (CBT) and/or psychosocial intervention add incremental benefit?
8. Does educating a patient about low-back pain improve treatment compliance and outcomes, including duration of pain, intensity of pain, functional outcomes, anxiety, depression and return to work status?
9. In patients undergoing treatment for low-back pain, what is the effectiveness of interventions that address fear avoidance behaviors?
10. Is active treatment (pharmacological or psychotherapeutic) of anxiety and depression effective in decreasing low-back pain?
11. What are the psychological factors influencing outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, of low-back pain treatment?

Commented [KR5]: Note: The lit search will include terms for:

- General pharmacological treatment search terms
- Analgesics
- NSAIDs
- Opioids
- Anxiolytics
- Antidepressants
- sleeping medications

Commented [KR6]: Disclaimer: Topical treatment includes all treatments that allow for medication delivery to local tissues (creams, gels and patches), but does not include transdermal delivery of medications (i.e. Fentanyl patch).

Commented [KR7]: Sleep habits will include duration, quality, sleeping position, mattress, and patient report of restorative sleep (added)

Commented [KR8]: Note: The lit search will include search terms for:

- cognitive behavior therapy
- psychosocial intervention
- coping skill straining
- biofeedback
- relaxation techniques
- psychotherapy

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12. In patients with low-back pain, what psychosocial/cognitive/emotional or other assessments should be utilized to establish an accurate diagnosis?
13. Does nutrition (other than weight reduction) influence the frequency of low-back pain episodes?

Commented [KR9]: The question will focus on healthy eating, nutrition/diet and not weight reduction.

Physical Medicine & Rehabilitation Work Group Clinical Questions

*All questions address acute, sub-acute and chronic low-back pain unless otherwise specified

1. In patients undergoing treatment for low-back pain, what is the effectiveness of the following in decreasing the duration of pain, decreasing intensity of pain, increasing functional outcomes and improving return to work status, as compared with natural history plus or minus medication:
 - a. Acute versus subacute versus chronic
 - i. Patient education and self-directed exercise program
 - ii. Spinal manipulative therapy (SMT)
 - iii. Physical agents (eg, heat, cold, ultrasound, electrical stimulation, laser, dry needling, traction, TENS)
 - iv. Acupuncture
 - v. Active stabilization exercise
 - vi. McKenzie exercise (includes directional preference, centralization, and mechanical diagnosis and therapy (MDT)
 - vii. Work hardening or conditioning
 - viii. Bracing
 - Lumbosacral brace
 - Sacroiliac brace
 - ix. Yoga
 - x. Aerobic exercise
2. Are there specific patient or treatment characteristics that predict improved duration of pain, intensity of pain, functional outcomes and return to work status with SMT following an episode of low-back pain?
3. In patients undergoing treatment for low-back pain, what are outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, for exercise therapy alone versus exercise with cognitive behavioral therapy (CBT)?
4. In patients undergoing treatment for low-back pain, what are outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, for a lumbar stabilization exercise program versus a general fitness program?
5. In patients undergoing treatment for low-back pain, what are outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, for SMT versus SMT plus active exercise?
6. In patients undergoing treatment for low-back pain, what are the outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, for bed rest versus active exercise?
7. In patients undergoing treatment for low-back pain, what is the appropriate timing, frequency and duration of treatment with
 - a. Acute versus subacute versus chronic
 - i. Patient education and self-directed exercise program
 - ii. Spinal manipulative therapy (SMT)

Commented [KR10]: NOTE: SMT defined as spinal manipulative therapy, manual therapy, mobilization, high velocity thrusts

Commented [KR11]: Lumbar stabilization exercises are focused on facilitating and strengthening specific muscles that directly or indirectly control spinal joint function, especially the abdominal, gluteal and spinal extensor muscle groups. General fitness programs are not focused on specific muscle groups; by definition the goal is to improve the overall general fitness of the patient by using a combination of aerobic conditioning with stretching/strengthening of all major muscle groups.

(note: stabilization exercise needs to be linked for literature search)

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- iii. Physical agents (eg, heat, cold, ultrasound, electrical stimulation, laser, dry needling, traction, TENS)
 - iv. Acupuncture
 - v. Active stabilization exercise
 - vi. McKenzie exercise (includes directional preference, centralization, and mechanical diagnosis and therapy (MDT))
 - vii. Work hardening or conditioning
 - viii. Bracing
 - Lumbosacral brace
 - Sacroiliac brace
 - ix. Yoga
 - x. aerobic exercise
8. In patients with low-back pain, does a regular exercise program (or pre-surgical intervention with exercise, PT, education) prior to lumbar surgery decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate compared to those who don't exercise?
9. In patients with low-back pain, does exercise treatment after epidural steroid injections/spinal interventions decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate compared to injections alone?
10. Following surgery for low-back pain, are outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, improved with a formal exercise/rehabilitation program versus home instruction plus or minus self-directed exercise program alone?
11. Can a clinical prediction rule determine appropriate indications and predict outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, for exercise for low-back pain?

Interventional Treatment Section Clinical Questions

***All questions address acute, sub-acute and chronic low-back pain unless otherwise specified**

1. In patients with low-back pain, does image guided epidural steroid injections decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
2. When evaluating image guided intra-articular lumbar facet joint injections in patients with acute or chronic low-back pain:
 - a. What is the diagnostic utility of this procedure?
 - b. From a therapeutic standpoint, does this procedure decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
3. In patients with low-back pain, do medial branch blocks have a role in defining treatment for low-back pain?
 - a. Does duration of pain, intensity of pain, functional outcomes and return to work status vary when candidates for neurotomy are determined by single vs comparative medial branch blocks?
 - b. Is there a threshold for the magnitude of relief from diagnostic facet nerve blocks that predict outcomes to neurotomy?
 - c. Does duration of pain, intensity of pain, functional outcomes and return to work status vary when candidates for neurotomy are determined by diagnostic facet nerve blocks vs. intra-articular facet joint injections?
 - d. Is there a therapeutic utility of medial branch blocks?
 - e. Does technical accuracy of medial branch blocks (e.g. contrast use) affects its validity and effectiveness of subsequent neurotomy?
4. In patients with low-back pain due to lumbar facet joint arthropathy, does image guided neurotomy decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
5. In patients with low-back pain, do image guided sacroiliac joint injections (SIJI) decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
 - a. Does duration of pain, intensity of pain, functional outcomes and return to work status vary when candidates for neurotomy are determined by single vs. comparative SIJI?
 - b. Is there a benefit to performing lateral branch blocks as compared with interarticular diagnostic injections as a predictor to response to lateral branch neurotomy?
 - c. Is there a threshold for the magnitude of relief from diagnostic SIJI that predict improvement in duration of pain, intensity of pain, functional outcomes and return to work status from SIJ neurotomy?
6. In patients with pelvic posterior girdle pain relieved temporarily by image guided SIJ injections or lateral branch blocks, does lateral branch neurotomy decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?

Commented [KR12]: Include in search terms: rhizotomy of lumbar facet(z) joint, cryorhizotomy, laser rhizotomy, and radiofrequency

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7. In patients with low-back pain, does spinal cord stimulation decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
8. In patients with low-back pain, does continuous delivery of intrathecal opioids decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate and are there risks associated with its use?
9. In patients with low back pain, is provocative lumbar discography more accurate than other diagnostic modalities in identifying the disc as a source of pain?
10. In patients with low back pain, is anesthetic lumbar discography more accurate than other diagnostic modalities in identifying the disc as a source of pain?
11. In patients with low-back pain, does **intradiscal injection** decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
12. In patients with low-back pain, does **intradiscal electrothermal** therapy or biaculplasty decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
13. In patients with low-back pain, do trigger point injections decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?

Commented [KR13]: Note for literature search: including following search terms- platelet-rich-plasma, stem cell transplantation therapy, oxygen/ozone, methylene blue, corticosteroid, fibrin sealant

Commented [KR14]: Note for literature search: include laser therapy

Surgical Treatment Work Group Clinical Questions

***All questions address acute, sub-acute and chronic low-back pain unless otherwise specified**

1. In patients with low-back pain, does surgical treatment vs. medical/interventional treatment alone decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
2. In patients with low-back pain, are there predictive factors which determine the benefit of initial treatment with surgical intervention versus initial medical/interventional treatment?
3. In patients undergoing fusion surgery for low-back pain, which fusion technique results in the best outcomes for the following: decreased duration of pain, decreased intensity of pain, increased functional outcomes of treatment and improved return to work rate?
 - a. Posterolateral fusion without internal fixation vs.
 - b. Posterolateral transverse fusion with internal fixation vs.
 - c. Stand-alone (anterior) interbody fusion vs.
 - d. Transforaminal lumbar interbody fusion (TLIF) or posterior lumbar interbody fusion (PLIF) vs.
 - e. Circumferential fusion (anterior interbody, lateral techniques)
4. In patients undergoing fusion surgery for low-back pain, are clinical outcomes, including duration of pain, intensity of pain, functional outcomes and return to work status, different for multi-level fusions vs. single level fusions?
5. In patients undergoing fusion surgery for low-back pain, does radiographic evidence of fusion correlate with decreased duration of pain, decreased intensity of pain, increased functional outcomes of treatment and improved return to work rate?
6. In patients undergoing fusion surgery for low-back pain, does the use of bone growth stimulators (vs. fusion alone) treatment decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
7. In patients undergoing fusion surgery for low back pain, does the use of BMP (vs. fusion alone) treatment decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?
8. In patients undergoing fusion surgery for low-back pain, does the use of minimally invasive techniques treatment decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate compared to open fusion techniques?
9. In patients undergoing surgery for low-back pain, do motion preserving systems (disc prosthesis and dynamic stabilization systems) treatment decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate compared to fusion surgery?

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10. In patients undergoing surgery for low-back pain, do motion preserving systems (disc prosthesis and dynamic stabilization systems) result in lower incidence of symptomatic adjacent segment disease?
11. In patients with low-back pain, does fusion treatment decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate compared to treatment with:
 - a. Discectomy
 - b. Discectomy plus rhizotomy
 - c. Decompression alone
12. In patients with low-back pain due to sacroiliac joint dysfunction, does sacroiliac joint fusion compared with medical/interventional treatment decrease the duration of pain, decrease the intensity of pain, increase the functional outcomes of treatment and improve the return to work rate?

Cost-Effectiveness Work Group Clinical Questions

***All questions address acute, sub-acute and chronic low-back pain unless otherwise specified**

Cost Effectiveness of Diagnosis/Screening/General Management Questions

1. What is the most cost-effective spinal care provider for evaluating patients with low back pain:
 - a. Chiropractor vs.
 - b. Physical Therapist vs.
 - c. Primary Care Provider (including non-physician providers) vs.
 - d. Neurologist vs.
 - e. Physiatrist vs.
 - f. Spine Surgeon vs.
 - g. Anesthesiologists/Pain Medicine Physician vs.
 - h. Radiologist
2. What is the cost-effectiveness of diagnostic imaging studies/workup in the evaluation of low-back pain (acute, subacute, and chronic), in terms of influencing/altering treatment or in terms of leading to pain reduction and functional improvement?
 - a. X-rays (lumbar standing, lumbar flexion-extension, entire spine)
 - b. CT scan / CT myelogram
 - c. MRI (conventional or dynamic/upright/weight bearing)
3. Does the use of ordering physician owned diagnostic and treatment facilities affect the cost of low-back pain related healthcare services?

Cost Effectiveness of Medical/Interventional Treatments Questions

4. Are epidural steroid injections (including interlaminar, transforaminal, and caudal injections and selective nerve root blocks) more cost effective in the management of patients with low back pain than other medical/interventional treatments?
5. Is spinal cord stimulation more cost effective in the management of patients with low back pain than other medical/interventional treatments?
6. Is cognitive or psychological based therapy in the management of patients with low back pain more cost effective than other medical/interventional treatments?
7. Is physical therapy in the management of patients with low back pain more cost effective than other medical/interventional treatments?
8. Is pharmacological management (OTC + prescription medications) for patients with low back pain more or less cost-effective than interventional treatments including physical therapy and injection therapies?
9. Is SMT in the management of patients with low back pain more cost-effective than other medical/interventional treatments?
10. Is acupuncture based therapy in the management of patients with low back pain more cost effective than other medical/interventional treatments?

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11. Are OTC medications only without other medical interventions a more cost effective in the management of patients with low back pain than other medical/interventional treatments
12. In patients with low-back pain, is a symptom guided treatment approach using directional preference/centralization matched exercise more cost effective than usual care (Home Care vs. Medication vs Non Specific PT exercise vs Non Specific PT Modalities) long term at 12 months, 36 months?

Cost Effectiveness of Medical/Interventional Treatment vs. Surgical Treatment Questions

13. Is the surgical management (including fusion and lumbar disc replacement and spinal cord stimulators) of patients with low back pain more cost effective than medical/interventional treatments?
14. Is cognitive or psychological based therapy in the management of patients with low back pain more cost effective than surgical therapies?

Cost Effectiveness of Surgical Treatment Questions

15. Are minimally invasive surgical procedures more cost effective in the management of patients with low back pain than conventional open surgical procedures?
16. Is instrumented lumbar fusion more cost-effective compared to non-instrumented fusion for the treatment of patients with low back pain?