Ref #	Cycle #	Topic	Citation	SORT Grade or Source	Fulltext or Citation Link	Abstract	Comments by Reviewer
Cycle 1: Disability due to back pain despite conservative therapy							
1		Measurement of Disability	Brodke DS, Goz V, Voss MW, Lawrence BD, Spiker WR, Hung M. PROMIS PF CAT Outperforms the ODI and SF-36 Physical Function Domain in Spine Patients. Spine (Phila Pa 1976). 2017 Jun 15;42(12):921-929. PMID: 27792105	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	STUDY DESIGN: The Oswestry Disability Index v2.0 (ODI), SF36 Physical Function Domain (SF-36 PFD), and PROMIS Physical Function CAT v1.2 (PF CAT) questionnaires were prospectively collected from 1607 patients complaining of back or leg pain, visiting a university-based spine clinic. All questionnaires were collected electronically, using a tablet computer. OBJECTIVE: The aim of this study was to compare the psychometric properties of the PROMIS PF CAT with the ODI and SF36 Physical Function Domain in the same patient population. SUMMARY OF BACKGROUND DATA: Evidence-based decision-making is improved by using high-quality patient-reported outcomes measures. Prior studies have revealed the shortcomings of the ODI and SF36, commonly used in spine patients. The PROMIS Network has developed measures with excellent psychometric properties. The Physical Function domain, delivered by Computerized Adaptive Testing (PF CAT), performs well in the spine patient population, though to-date direct comparisons with common measures have not been performed. METHODS: Standard Rasch analysis was performed to directly compare the psychometrics of the PF CAT, ODI, and SF36 PFD. Spearman correlations were computed to examine the correlations of the three instruments. Time required for administration was also recorded. RESULTS: One thousand six hundred seven patients were administered all assessments. The time required to answer all items in the PF CAT, ODI, and SF-36 PFD was 44, 169, and 99 seconds. The ceiling and floor effects were excellent for the PF CAT (0.81%, 3.86%), while the ceiling effects were marginal and floor effects quite poor for the ODI (6.91% and 44.24%) and SF-36 PFD (5.97% and 23.65%). All instruments significantly correlated with each other. CONCLUSION: The PROMIS PF CAT outperforms the ODI and SF-36 PFD in the spine patient population and is highly correlated. It has better coverage, while taking less time to administer with fewer questions to answer.	Prospective study compared 1607 patient complaining of back or leg pain with regard to 3 PROS: PF CAT, ODI, and SF36 PDF. PF CAT required less time to completion, correlates with the two other pros and had better statistical attributes. --> PROMIS PF CAT performs rapidly and well as a patient reported outcome measure
2		Measurement of Disability	Papuga MO, Mesfin A, Molinari R, Rubery PT. Correlation of PROMIS Physical Function and Pain CAT Instruments With Oswestry Disability Index and Neck Disability Index in Spine Patients. Spine (Phila Pa 1976). 2016 Jul 15;41(14):1153-9. PMID: 26909832	2/B (minus)	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4938742/	STUDY DESIGN: A prospective and retrospective cross-sectional cohort analysis. OBJECTIVE: The aim of this study was to show that Patient-Reported Outcomes Measurement Information System (PROMIS) computer adaptive testing (CAT) assessments for physical function and pain interference can be efficiently collected in a standard office visit and to evaluate these scores with scores from previously validated Oswestry Disability Index (ODI) and Neck Disability Index (NDI) providing evidence of convergent validity for use in patients with spine pathology. SUMMARY OF BACKGROUND DATA: Spinal surgery outcomes are highly variable, and substantial debate continues regarding the role and value of spine surgery. The routine collection of patient-based outcomes instruments in spine surgery patients may inform this debate. Traditionally, the inefficiency associated with collecting standard validated instruments has been a barrier to routine use in outpatient clinics. We utilized several CAT instruments available through PROMIS and correlated these with the results obtained using "gold standard" legacy outcomes measurement instruments. METHODS: All measurements were collected at a routine clinical visit. The ODI and the NDI assessments were used as "gold standard" comparisons for patient-reported outcomes. RESULTS: PROMIS CAT instruments required 4.5 ± 1.8 questions and took 35 ± 16 seconds to complete, compared with ODI/NDI requiring 10 questions and taking 188 ± 85 seconds when administered electronically. Linear regression analysis of retrospective scores involving a primary back complaint revealed moderate to strong correlations between ODI and PROMIS physical function with r values ranging from 0.5846 to 0.8907 depending on the specific assessment and patient subsets examined. CONCLUSION: Routine collection of physical function outcome measures in clinical practice offers the ability to inform and improve patient care. We have shown that several PROMIS CAT instruments can be efficiently administered during routine clinical visits. The moderate to strong correlations found validate the utility of computer adaptive testing when compared with the gold standard "static" legacy assessments.	Lower quality study that included prospective and retrospective cohorts in which completion time for PROMIS CATs was compared to ODI/NDI (Neck Disability Index). Authors report of a rapid completion time for PROMIS CATs with variable correlation with ODI/NDI depending on cohort. Did not separate PROMIS PF and PROMIS PI assessments. --> Less robust study than study by Brodke, et al suggests that PROMIS CAT tools can be administered efficiently in an outpatient setting.

3		Measurement of Disability	Kendall R, Wagner B, Brodke D, Bounsanga J, Voss M, Gu Y, Spiker R, Lawrence B, Hung M. The Relationship of PROMIS Pain Interference and Physical Function Scales. Pain Med. 2017 Dec 7. doi: 10.1093/pm/pnx310. [Epub ahead of print] PMID: 29228284	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	Objectives: To examine the relationship between the Patient Reported Outcome Measurement Information System (PROMIS) Pain Interference (PI) and PROMIS Physical Function (PF) scales in patients with spinal pain at a university spine center. Design: Retrospective analysis of prospectively collected patient-reported outcome data at a university spine clinic. Pearson correlation was done to examine the relationship of the PROMIS PF and PROMIS PI scores. Age, gender, and race were analyzed by subgroups on the PROMIS Physical Function and Pain Interference score. Linear regression analyzed predictive relationships. Statistical significance was set at $P < 0.05$. Results: A total of 1,992 participants completed an assessment, with 1,923 completing the PF CAT and 1,927 the PI CAT. Participants' mean age was 52.8 years (range = 18-94 years, SD = 6.5 years). Correlation analysis of the PROMIS PF with the PROMIS PI showed a Pearson correlation value of -0.717 ($P < 0.05$). There was a strong linear relationship with a high negative correlation between PF CAT and PI CAT. The PI CAT predicted PF CAT scores ($\beta = -0.707$, $P < 0.001$). Conclusions: For patients with pain from spinal origin, there is a strong negative correlation between self-reported physical function and pain interference related to physical, social, and mental health. The predictive relationship of function from pain scores supports the PROMIS PI being used as an important adjunct measure of physical function in patients with spinal pain.	A retrospective analysis comparing 1900 patients with spine pain with respect to results of PF CAT and PI CAT. Study demonstrated a strong linear correlation predicting function from pain scores. **--> Pain scores have predictive relationship to function and may add value to assessing disability in patients with spine pain.**
4		Measurement of Disability	Roland M, Morris R. A study of the natural history of back pain. Part I: development of a reliable and sensitive measure of disability in low-back pain. Spine (Phila Pa 1976). 1983 Mar;8(2):141-4. PMID: 6222486	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	No abstract available	Single institution study of a small number of patients with back pain in which function scores were correlated with pain scores. Limited statistical analysis. Questionaire is rapidly completed by patients and in wide use. **--> In this study statistical validation was less robust than for some other patient reported outcome measures.**
5		Measurement of Disability	Revicki DA, Kawata AK, Harnam N, Chen WH, Hays RD, Cella D. Predicting EuroQol (EQ-5D) scores from the patient-reported outcomes measurement information system (PROMIS) global items and domain item banks in a United States sample. Qual Life Res. 2009 Aug;18(6):783-91. PMID: 19472072	2/B	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2704290/	BACKGROUND: Preference-based health index scores provide a single summary score assessing overall health-related quality of life and are useful as an outcome measure in clinical studies, for estimating quality-adjusted life years for economic evaluations, and for monitoring the health of populations. We predicted EuroQoL (EQ-5D) index scores from patient-reported outcomes measurement information system (PROMIS) global items and domain item banks. METHODS: This was a secondary analysis of health outcome data collected in an internet survey as part of the PROMIS Wave 1 field testing. For this study, we included the 10 global items and the physical function, fatigue, pain impact, anxiety, and depression item banks. Linear regression analyses were used to predict EQ-5D index scores based on the global items and selected domain banks. RESULTS: The regression models using eight of the PROMIS global items (quality of life, physical activities, mental health, emotional problems, social activities, pain, and fatigue and either general health or physical health items) explained 65% of the variance in the EQ-5D. When the PROMIS domain scores were included in a regression model, 57% of the variance was explained in EQ-5D scores. Comparisons of predicted to actual EQ-5D scores by age and gender groups showed that they were similar. CONCLUSIONS: EQ-5D preference scores can be predicted accurately from either the PROMIS global items or selected domain banks. Application of the derived regression model allows the estimation of health preference scores from the PROMIS health measures for use in economic evaluations.	Study correlating selected PROMIS domains with EQ-5D that features a single numberical score for quality of life that has been applied to economic analysis. Cohort included a broad array of medical conditions including heart disease, cancer, rheumatoid arthritis, osteoarthritis, psychiatric disorders, COPD, spinal injury, and other conditions. **--> Suggests PROMIS measures can predict EQ-5D results. Not specifically related to spine conditions.**
6		Measurement of Disability	Amtmann D, Cook KF, Jensen MP, Chen WH, Choi S, Revicki D, Cella D, Rothrock N, Keefe F, Callahan L, Lai JS. Development of a PROMIS item bank to measure pain interference. Pain. 2010 Jul;150(1):173-82. PMID: 20554116	2/B	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2916053/	This paper describes the psychometric properties of the PROMIS-pain interference (PROMIS-PI) bank. An initial candidate item pool (n=644) was developed and evaluated based on the review of existing instruments, interviews with patients, and consultation with pain experts. From this pool, a candidate item bank of 56 items was selected and responses to the items were collected from large community and clinical samples. A total of 14,848 participants responded to all or a subset of candidate items. The responses were calibrated using an item response theory (IRT) model. A final 41-item bank was evaluated with respect to IRT assumptions, model fit, differential item function (DIF), precision, and construct and concurrent validity. Items of the revised bank had good fit to the IRT model (CFI and NNFI/TLI ranged from 0.974 to 0.997), and the data were strongly unidimensional (e.g., ratio of first and second eigenvalue=35). Nine items exhibited statistically significant DIF. However, adjusting for DIF had little practical impact on score estimates and the items were retained without modifying scoring. Scores provided substantial information across levels of pain; for scores in the T-score range 50-80, the reliability was equivalent to 0.96-0.99. Patterns of correlations with other health outcomes supported the construct validity of the item bank. The scores discriminated among persons with different numbers of chronic conditions, disabling conditions, levels of self-reported health, and pain intensity ($p<0.0001$). The results indicated that the PROMIS-PI items constitute a psychometrically sound bank. Computerized adaptive testing and short forms are available.	Investigators, with responses from 14,848 participants, developed a pain interference bank of questions from the larger PROMIS domains. Statistical analysis indicated that the PROMIS PI items constitute "psychometrically sound bank" that can be used in computerized adaptive testing. **--> A subset of PROMIS questions can be used to measure the effect of pain on interfering with outcomes reported by patients.**
7		Measurement of Disability	Dworkin RH(1), Turk DC, Farrar JT, Haythornthwaite JA, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. Pain. 2005 Jan;113(1-2):9-19. PMID: 15621359	Consensus based recommendations	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	No abstract available	Recommentations of an international consensus conference on outcome measures for chronic pain trials. **--> Contains recommended clinical measures**

8		Measurement of Disability	Turk DC, Dworkin RH, Revicki D, Harding G, Burke LB, Cella D, Cleeland CS, Cowan P, Farrar JT, Hertz S, Max MB, Rappaport BA. Identifying important outcome domains for chronic pain clinical trials: an IMMPACT survey of people with pain. Pain. 2008 Jul 15;137(2):276-85. PMID: 17937976	3/C	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	This two-phase study was conducted to identify relevant domains of patient-reported outcomes from the perspective of people who experience chronic pain. In Phase 1, focus groups were conducted to generate a pool of patient outcome-related domains and their components. The results of the focus groups identified 19 aspects of their lives that were significantly impacted by the presence of their symptoms and for which improvements were important criteria they would use in evaluating the effectiveness of any treatment. Phase 2 was conducted to examine the importance and relevance of domains identified from a much larger and diverse sample of people with chronic pain. A survey was developed and posted on the American Chronic Pain Association website. Participants were asked to rate the importance of each item or domain identified by the focus groups on a scale of 0 to10 (i.e., 0="not at all important" and 10="extremely important"). The survey was completed by 959 individuals. The results indicate that all 19 aspects of daily life derived from the focus groups were considered important with a majority of respondents indicating a score of 8 or greater. In addition to pain reduction, the most important aspects were enjoyment of life, emotional well-being, fatigue, weakness, and sleep-related problems. Chronic pain clearly impacts health-related quality of life. The results of the two phases of the study indicate that people with chronic pain consider functioning and well-being as important areas affected by the presence of symptoms and as appropriate targets of treatment. These multiple outcomes should be considered when evaluating the efficacy and effectiveness of chronic pain treatments.	A survey of 959 patients with chronic pain was used to determine categories of impact to daily living. Selection bias may be a shortcoming of the methodology related to those who chose to take the survey. **--> Authors conclude that "people with chronic pain consider functioning and well-being as important areas affected by the presence of symptoms and as appropriate targets of treatment. These multiple outcomes should be considered when evaluating the efficacy and effectiveness of chronic pain treatments."**
9		Measurement of Disability	Hays RD, Bjorner JB, Revicki DA, Spritzer KL, Cella D. Development of physical and mental health summary scores from the patient-reported outcomes measurement information system (PROMIS) global items. Qual Life Res. 2009 Sep;18(7):873-80. PMID: 19543809	2/B	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2724630/	BACKGROUND: The use of global health items permits an efficient way of gathering general perceptions of health. These items provide useful summary information about health and are predictive of health care utilization and subsequent mortality. METHODS: Analyses of 10 self-reported global health items obtained from an internet survey as part of the Patient-Reported Outcome Measurement Information System (PROMIS) project. We derived summary scores from the global health items. We estimated the associations of the summary scores with the EQ-5D index score and the PROMIS physical function, pain, fatigue, emotional distress, and social health domain scores. RESULTS: Exploratory and confirmatory factor analyses supported a two-factor model. Global physical health (GPH; 4 items on overall physical health, physical function, pain, and fatigue) and global mental health (GMH; 4 items on quality of life, mental health, satisfaction with social activities, and emotional problems) scales were created. The scales had internal consistency reliability coefficients of 0.81 and 0.86, respectively. GPH correlated more strongly with the EQ-5D than did GMH (r = 0.76 vs. 0.59). GPH correlated most strongly with pain impact (r = -0.75) whereas GMH correlated most strongly with depressive symptoms (r = -0.71). CONCLUSIONS: Two dimensions representing physical and mental health underlie the global health items in PROMIS. These global health scales can be used to efficiently summarize physical and mental health in patient-reported outcome studies.	Study of 21,133 subjects aimed at estimating associations between PROMIS 10 global health items and the EQ-5D index score as well as subsets of global health items related to physical functions, pain, fatigue, emotional distress and social health domains. Findings supported a two factor model of four items to reflect global physical health and four items to reflect global mental health. **--> "These global health scales can be used to efficiently summarize physical and mental health in patient-reported outcome studies."**
10		Measurement of Disability	Schalet BD, Hays RD, Jensen SE, Beaumont JL, Fries JF, Cella D. Validity of PROMIS physical function measured in diverse clinical samples. J Clin Epidemiol. 2016 May;73:112-8. PMID: 26970039	2/C	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4968197/	OBJECTIVES: To evaluate the validity of the Patient-Reported Outcomes Measurement Information System (PROMIS) Physical Function measures using longitudinal data collected in six chronic health conditions. STUDY DESIGN AND SETTING: Individuals with rheumatoid arthritis (RA), major depressive disorder (MDD), back pain, chronic obstructive pulmonary disease (COPD), chronic heart failure (CHF), and cancer completed the PROMIS Physical Function computerized adaptive test or fixed-length short form at baseline and at the end of clinically relevant follow-up intervals. Anchor items were also administered to assess change in physical function and general health. Linear mixed-effects models and standardized response means were estimated at baseline and follow-up. RESULTS: A total of 1,415 individuals participated (COPD n = 121; CHF n = 57; back pain n = 218; MDD n = 196; RA n = 521; cancer n = 302). The PROMIS Physical Function scores improved significantly for treatment of CHF and back pain patients but not for patients with MDD or COPD. Most of the patient subsamples that reported improvement or worsening on the anchors showed a corresponding positive or negative change in PROMIS Physical Function. CONCLUSION: This study provides evidence that the PROMIS Physical Function measures are sensitive to change in intervention studies where physical function is expected to change and able to distinguish among different clinical samples. The results inform the estimation of meaningful change, enabling comparative effectiveness research.	Study of 1415 individuals including 218 patients with back pain were evaluated using PROMIS physical function scores during a course of therapy. Authors conclude that PROMIS physical function measures are sensitive to medical interventions. **--> Supports the conclusion that PROMIS physical function is reponsive the therapeutic interventions.**
11	I	WA Health Technology Clinical Committee Findings and Decision on Lumbar Fusion for Degenerative Disc Disease	Washington State Health Care Authority. Health Technology Assessment: Lumbar fusion for degenerative disc disease. Final adoption January 15, 2016.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/lumbar_fusion-rr_final_findings_decision_012016[1].pdf	"Based on these findings, the committee voted to not cover lumbar fusion for patients >17 years of age with chronic (≥ 3 months) lumbar pain and uncomplicated degenerative disc disease.... The committee discussed the meaning of "uncomplicated degenerative disc disease" for this review and noted, for the record, that the population addressed in this decision includes individuals > 17 years of age with chronic (3 or more months) lumbar pain and uncomplicated degenerative disc disease; excluded conditions include radiculopathy, spondylolisthesis (> Grade 1) or severe spinal stenosis, as well as acute trauma or systemic disease affecting the lumbar spine (e.g., malignancy)."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> "Health Technology Assessment Program does not recommend payment for lumbar fusion in patients over 17 years of age with chronic lumbar pain and uncomplicated degenerative disc disease."**

12	I	WA Health Technology Clinical Committee Findings and Decision on Cervical Spinal Fusion for Degenerative Disc Disease	Washington State Health Care Authority. Health Technology Assessment: Cervical spinal fusion for degenerative disc disease. Final adoption May 17, 2013.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/csf_final_findings_decision_052013[1].pdf	"The committee concluded that the current evidence on Cervical Spinal Fusion for Degenerative Disc Disease demonstrates that there is sufficient evidence to cover with conditions."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> Document lists decision rules for coverage for cervical spinal fusion.**
13	I	WA Health Technology Clinical Committee Findings and Decision on Facet Neurotomy	Washington State Health Care Authority. Health Technology Assessment: Facet Neurotomy. Final adoption May 16, 2014.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/052714_facet_final_findings_decision[1].pdf	"The committee concluded that the current evidence on Facet Neurotomy demonstrates that there is sufficient evidence to cover with conditions."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> Document lists decision rules for coverage for facet neurotomy.**
14	I	WA Health Technology Clinical Committee Findings and Decision on Discography	Washington State Health Care Authority. Health Technology Assessment: Discography. Final adoption August 15, 2008.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/decision_findings_discography_final_090308[1].pdf	"Based on the evidence presented on safety, efficacy and cost-effectiveness, the committee voted for non-coverage."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> Committee does not support coverage for discography.**
15	I	WA Health Technology Clinical Committee Evaluation for Coverage for Surgery for Symptoms of Lumbar Radiculopathy	Washington State Health Care Authority. Health Technology Assessment: Surgery for Symptoms of Lumbar Radioculopathy. Draft key questions: public comments and response. IN PROCESS January 24, 2018	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/lumbar-radiculopathy-draft-response-comments-key%20Qs-20171221.pdf	Decision pending	Decision pending
16	I	WA Health Technology Clinical Committee Findings and Decision on Spinal Cord Stimulation	Washington State Health Care Authority. Health Technology Assessment: Spinal Cord Stimulation. Final adoption October 22, 2010.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/adopted_findings_decision_scs_102510[1]_0.pdf	"The committee concluded that the current evidence on Spinal Cord Stimulation demonstrates that there isn't sufficient evidence to cover the use of Spinal Cord Stimulation for chronic neuropathic pain."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> Committee does not support coverage for spinal cord stimulation for chronic neuropathic pain.**
17	I	WA Health Technology Clinical Committee Findings and Decision on Upright/Positional MRI	Washington State Health Care Authority. Health Technology Assessment: Upright/Positional MRI. Date May 18, 2007.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/decision_and_finding_070530_public[1]_0.pdf	"Upright and positional MRI is not a covered benefit due to insufficient evidence to conclude that the health technology is safe, efficacious, and cost-effective."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> Committee does not support coverage for upright/positional MRI.**
18	I	WA Health Technology Clinical Committee Findings and Decision on Vertebroplasty, Kyphoplasty and Sacroplasty	Washington State Health Care Authority. Health Technology Assessment: Vertebroplasty, Kyphoplasty, Sacroplasty. Date March 11, 2011.	VM Tier 1 Source	https://www.hca.wa.gov/assets/program/findings_decision_vks_031811[1].pdf	"Vertebroplasty, Kyphoplasty and Sacroplasty are not a covered benefit."	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **--> Committee does not support coverage for vertebroplasty, kyphoplasty and sacroplasty.**
19	I	Nonsurgical Treatment	NICE guideline [NG59]. Low back pain and sciatica in over 16s: assessment and management. Published date: November 2016.	VM Tier 1 Source	https://www.nice.org.uk/guidance/ng59	This guideline includes recommendations on: •assessment of low back pain and sciatica •non-invasive treatments for low back pain and sciatica •invasive treatments for low back pain and sciatica	Respected source with robust evidence appraisal. **--> Comprehensive recommendations for evaluation of nonsurgical therapy for adult patients with low back pain and sciatica.**

20	I	Nonsurgical Treatment versus Surgery	Weinstein JN, Lurie JD, Tosteson TD, Hanscom B, Tosteson AN, Blood EA, Birkmeyer NJ, Hilibrand AS, Herkowitz H, Cammisa FP, Albert TJ, Emery SE, Lenke LG, Abdu WA, Longley M, Errico TJ, Hu SS. Surgical versus nonsurgical treatment for lumbar degenerative spondylolisthesis. N Engl J Med. 2007 May 31; 356(22):2257-70. PMID: 17538085	2/B	http://www.nejm.org/doi/pdf/10.1056/NEJMoa070302	BACKGROUND: Management of degenerative spondylolisthesis with spinal stenosis is controversial. Surgery is widely used, but its effectiveness in comparison with that of nonsurgical treatment has not been demonstrated in controlled trials. METHODS: Surgical candidates from 13 centers in 11 U.S. states who had at least 12 weeks of symptoms and image-confirmed degenerative spondylolisthesis were offered enrollment in a randomized cohort or an observational cohort. Treatment was standard decompressive laminectomy (with or without fusion) or usual nonsurgical care. The primary outcome measures were the Medical Outcomes Study 36-Item Short-Form General Health Survey (SF-36) bodily pain and physical function scores (100-point scales, with higher scores indicating less severe symptoms) and the modified Oswestry Disability Index (100-point scale, with lower scores indicating less severe symptoms) at 6 weeks, 3 months, 6 months, 1 year, and 2 years. RESULTS: We enrolled 304 patients in the randomized cohort and 303 in the observational cohort. The baseline characteristics of the two cohorts were similar. The one-year crossover rates were high in the randomized cohort (approximately 40% in each direction) but moderate in the observational cohort (17% crossover to surgery and 3% crossover to nonsurgical care). The intention-to-treat analysis for the randomized cohort showed no statistically significant effects for the primary outcomes. The as-treated analysis for both cohorts combined showed a significant advantage for surgery at 3 months that increased at 1 year and diminished only slightly at 2 years. The treatment effects at 2 years were 18.1 for bodily pain (95% confidence interval [CI], 14.5 to 21.7), 18.3 for physical function (95% CI, 14.6 to 21.9), and -16.7 for the Oswestry Disability Index (95% CI, -19.5 to -13.9). There was little evidence of harm from either treatment. CONCLUSIONS: In nonrandomized as-treated comparisons with careful control for potentially confounding baseline factors, patients with degenerative spondylolisthesis and spinal stenosis treated surgically showed substantially greater improvement in pain and function during a period of 2 years than patients treated nonsurgically. (ClinicalTrials.gov number, NCT00000409 [ClinicalTrials.gov].).	Two year study of laminectomy with or without fusion versus non-surgical care for degenerative spondylolisthesis with spinal stenosis. A combination randomized and observational study with substantial cross-over and inconsistent conservative care. Precursor report to the four year Weinstein/JBJS article cited elsewhere. Cohort had neurogenic claudication or radicular leg pain with associated neurologic signs for at least 12 weeks and degenerative spondylolithesis on lateral radiographs with patient in standing position. Non-surgical care not prespecified. 94% of group randomized to surgery (158/168) had fusion. The RCT portion of the trial showed no difference in surgery vs no surgery but this is severely limited by substantial crossover. Adjusted cohort analysis ("as-treated") showed improved pain and function in patients treated surgically compared to those treated without surgery. Of all patients receiving surgery, the intraoperative complication rate was 13%, postop complication rate was 13%, and rate of repeat surgery within one year was 6%. **→ In the nonrandomized as-treated comparisons of symptomatic patients with degenerative spondylolisthesis and spinal stenosis treated surgically showed substantially greater improvement in pain and function during a period of 2 years than patients treated nonsurgically. (but with high complication rates).**
21	I	Nonsurgical Treatment versus Surgery	Weinstein JN, et al. Surgical compared with nonoperative treatment for lumbar degenerative spondylolisthesis. four-year results in the Spine Patient Outcomes Research Trial (SPORT) randomized and observational cohorts. Journal of Bone and Joint Surgery, American Volume, 2009 Jun ; 91(6):1295-304. PMID: 19487505 Supplementarty tables: http://jbjs.org/data/Journals/JBJS/961/1295.pdf	2/B	http://jbjs.org/data/Journals/JBJS/961/JBJA0910612950E01.pdf	BACKGROUND: The management of degenerative spondylolisthesis associated with spinal stenosis remains controversial. Surgery is widely used and has recently been shown to be more effective than nonoperative treatment when the results were followed over two years. Questions remain regarding the long-term effects of surgical treatment compared with those of nonoperative treatment. METHODS: Surgical candidates from thirteen centers with symptoms of at least twelve weeks' duration as well as confirmatory imaging showing degenerative spondylolisthesis with spinal stenosis were offered enrollment in a randomized cohort or observational cohort. Treatment consisted of standard decompressive laminectomy (with or without fusion) or usual nonoperative care. Primary outcome measures were the Short Form-36 (SF-36) bodily pain and physical function scores and the modified Oswestry Disability Index at six weeks, three months, six months, and yearly up to four years. RESULTS: In the randomized cohort (304 patients enrolled), 66% of those randomized to receive surgery received it by four years whereas 54% of those randomized to receive nonoperative care received surgery by four years. In the observational cohort (303 patients enrolled), 97% of those who chose surgery received it whereas 33% of those who chose nonoperative care eventually received surgery. The intent-to-treat analysis of the randomized cohort, which was limited by nonadherence to the assigned treatment, showed no significant differences in treatment outcomes between the operative and nonoperative groups at three or four years. An as-treated analysis combining the randomized and observational cohorts that adjusted for potential confounders demonstrated that the clinically relevant advantages of surgery that had been previously reported through two years were maintained at four years, with treatment effects of 15.3 (95% confidence interval, 11 to 19.7) for bodily pain, 18.9 (95% confidence interval, 14.8 to 23) for physical function, and -14.3 (95% confidence interval, -17.5 to -11.1) for the Oswestry Disability Index. Early advantages (at two years) of surgical treatment in terms of the secondary measures of bothersomeness of back and leg symptoms, overall satisfaction with current symptoms, and self-rated progress were also maintained at four years. CONCLUSIONS: Compared with patients who are treated nonoperatively, patients in whom degenerative spondylolisthesis and associated spinal stenosis are treated surgically maintain substantially greater pain relief and improvement in function for four years.	Four year study. A combination randomized and observational study with substantial cross-over. Patients with spondylosithesis and spinal stenosis were treated surgically or with ill-defined conservative therapy. Surgical care included laminectomy with or without fusion. **→ Randomized arm showed no difference between surgical and non-surgical care at four years. Analysis of observational cohort showed benefit from surgery. (see Weinstein 2007 for the 2y results)**

22	I	Nonsurgical Treatment versus Surgery	Weinstein JN(1), Tosteson TD, Lurie JD, Tosteson A, Blood E, Herkowitz H, Cammisa F, Albert T, Boden SD, Hilibrand A, Goldberg H, Berven S, An H. Surgical versus nonoperative treatment for lumbar spinal stenosis four-year results of the Spine Patient Outcomes Research Trial. Spine, 2010 Jun 15; 35(14):1329-38. PMID: 20453723	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-201006150-00002&D=ovft&PDF=y	STUDY DESIGN: Randomized trial and concurrent observational cohort study. OBJECTIVE: To compare 4 year outcomes of surgery to nonoperative care for spinal stenosis. SUMMARY OF BACKGROUND DATA: Surgery for spinal stenosis has been shown to be more effective compared to nonoperative treatment over 2 years, but longer-term data have not been analyzed. METHODS: Surgical candidates from 13 centers in 11 US states with at least 12 weeks of symptoms and confirmatory imaging were enrolled in a randomized cohort (RC) or observational cohort (OC). Treatment was standard decompressive laminectomy or standard nonoperative care. Primary outcomes were SF-36 bodily pain (BP) and physical function scales and the modified Oswestry Disability index assessed at 6 weeks, 3 months, 6 months, and yearly up to 4 years. RESULTS: A total of 289 patients enrolled in the RC and 365 patients enrolled in the OC. An as-treated analysis combining the RC and OC and adjusting for potential confounders found that the clinically significant advantages for surgery previously reported were maintained through 4 years, with treatment effects (defined as mean change in surgery group minus mean change in nonoperative group) for bodily pain 12.6 (95% confidence interval [CI], 8.5-16.7); physical function 8.6 (95% CI, 4.6-12.6); and Oswestry Disability index -9.4 (95% CI, -12.6 to -6.2). Early advantages for surgical treatment for secondary measures such as bothersomeness, satisfaction with symptoms, and self-rated progress were also maintained. CONCLUSION: Patients with symptomatic spinal stenosis treated surgically compared to those treated nonoperatively maintain substantially greater improvement in pain and function through 4 years.	This study cohort was limited to patients with spinal stenosis without spondylolisthesis (studied separately in Weinstein 2007 and 2009), with neurogenic claudication and/or radicular leg pain of at least 12 weeks duration, treated with standard decompressive laminectomy. - As in the related trial (SPORT) of degenerative spondylolisthesis noted above, there was an RCT component and an observational cohort component. The RCT portion had substanstial crossover. Results were based on an "as-treated" analysis combining randomized and observational cohorts. Patients treated surgically has less pain, improved physical function and improved Oswestry scores. **→ Favors standard decompressive laminectomy versus conservative care for patients with spinal steonsis.**
23	I / A / 1	Document Disability	Fairbank JCT, Pynsent PB. The Oswestry Disability Index. Spine, 2000 Nov 15; 25(22): 2940-53. PMID: 11074683	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-200011150-00017&D=ovft&PDF=y	Study Design. The Oswestry Disability Index (ODI) has become one of the principal condition-specific outcome measures used in the management of spinal disorders. This review is based on publications using the ODI identified from the authors' personal databases, the Science Citation Index, and hand searches of Spine and current textbooks of spinal disorders. Objectives. To review the versions of this instrument, document methods by which it has been validated, collate data from scores found in normal and back pain populations, provide curves for power calculations in studies using the ODI, and maintain the ODI as a gold standard outcome measure. Summary of Background Data. It has now been 20 years since its original publication. More than 200 citations exist in the Science Citation Index. The authors have a large correspondence file relating to the ODI, that is cited in most of the large textbooks related to spinal disorders. Methods. All the published versions of the questionnaire were identified. A systematic review of this literature was made. The various reports of validation were collated and related to a version. Results. Four versions of the ODI are available in English and nine in other languages. Some published versions contain misprints, and many omit the scoring system. At least 114 studies contain usable data. These data provide both validation and standards for other users and indicate the power of the instrument for detecting change in sample populations. Conclusions. The ODI remains a valid and vigorous measure and has been a worthwhile outcome measure. The process of using the ODI is reviewed and should be the subject of further research. The receiver operating characteristics should be explored in a population with higher self-report disabilities. The behavior of the instrument is incompletely understood, particularly in sensitivity to real change	Study reviews four version of ODI and measures of validity and power to detect clinically relevant change. Somewhat limited search strategy. Unclear quality assessment of individual studies. "The ODI correlates with the Short Form (SF)36. ODI is a better predictor of return to work than two different mechanical methods of lumbar spine assessment." Authors key points: "The ODI has stood the test of time and many reviews. It is usable in a wide variety of applications as a condition-specific outcome measure of spine-related disability. Results of a meta-analysis show variations in estimated population means of ODI scores for different spinal diseases and changes after treatment consistent with clinical experience." **→ Supports use of ODI as an outcome measure**.
24	I / A / 1	Document Disability	Davidson M(1), Keating JL. A comparison of five low back disability questionnaires: reliability and responsiveness. Phys Ther. 2002 Jan;82(1):8-24. PMID: 11784274	2/B	http://ptjournal.apta.org/content/82/1/8.full.pdf+html	BACKGROUND AND PURPOSE: The aim of this study was to examine 5 commonly used questionnaires for assessing disability in people with low back pain. The modified Oswestry Disability Questionnaire, the Quebec Back Pain Disability Scale, the Roland-Morris Disability Questionnaire, the Waddell Disability Index, and the physical health scales of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) were compared in patients undergoing physical therapy for low back pain. SUBJECTS AND METHODS: Patients with low back pain completed the questionnaires during initial consultation with a physical therapist and again 6 weeks later (n=106). Test-retest reliability was examined for a group of 47 subjects who were classified as "unchanged" and a subgroup of 16 subjects who were self-rated as "about the same." Responsiveness was compared using standardized response means, receiver operating characteristic curves, and the proportions of subjects who changed by at least as much as the minimum detectable change (MDC) (90% confidence interval [CI] of the standard error for repeated measures). Scale width was judged as adequate if no more than 15% of the subjects had initial scores at the upper or lower end of the scale that were insufficient to allow change to be reliably detected. RESULTS: Intraclass correlation coefficients (2,1) calculated to measure reliability for the subjects who were classified as "unchanged" and those who were self-rated as "about the same" were greater than.80 for the Oswestry and Quebec questionnaires and the SF-36 Physical Functioning scale and less than.80 for the Waddell and Roland-Morris questionnaires and the SF-36 Role Limitations-Physical and Bodily Pain scales. None of the scales were more responsive than any other. DISCUSSION AND CONCLUSION: Measurements obtained with the modified Oswestry Disability Questionnaire, the SF-36 Physical Functioning scale, and the Quebec Back Pain Disability Scale were the most reliable and had sufficient width scale to reliably detect improvement or worsening in most subjects. The reliability of measurements obtained with the Waddell Disability Index was moderate, but the scale appeared to be insufficient to recommend it for clinical application. The Roland-Morris Disability Questionnaire and the Role Limitations-Physical and Bodily Pain scales of the SF-36 appeared to lack sufficient reliability and scale width for clinical application.	Validates minimum detectable change on ODI as 10.5-15 points. **→ Supports minimum difference of 10.5 points on ODI to be 90% certain that change has occurred.**

25	I / A-B-C-D	Document Imaging Findings	Washington State Department of Labor & Industries. Surgical guideline for lumbar fusion (arthrodesis). 1 Nov 2009.	VM Tier 1 Source	http://www.lni.wa.gov/ClaimsIns/Files/OMD/MedTreat/LumbarFusion.pdf	The purpose of this guideline is to provide utilization review staff with the information necessary to make recommendations about the medical necessity and clinical appropriateness of lumbar fusions.	Washington State standard dealing with conservative care (including use of Structured Intensive Multidisciplinary Program, SIMP), surgical criteria, and contraindications for lumbar fusion. Refers to Health Technology Clinical Committee decision of November 2007. L&I guideline development process outlined here: http://www.lni.wa.gov/ClaimsIns/Files/OMD/MedTreat/Guidelinehistoryprocess.pdf **→ Defines L&I imaging standards for reimbursement for lumbar fusion**
26	I / B	Document Imaging Findings	Blumenthal C, Curran J, Benzel EC, Potter R, Magge SN, Harrington JF Jr, Coumans JB, Ghogawala Z. Radiographic predictors of delayed instability following decompression without fusion for degenerative grade I lumbar spondylolisthesis. J Neurosurg Spine, 2013 Apr; 18(4): 340-6. PMID: 23373567	2/B	http://thejns.org/doi/pdf/10.3171/2013.1.SPINE12537	Abstract: OBJECT: It is not known whether adding fusion to lumbar decompression is necessary for all patients undergoing surgery for degenerative lumbar spondylolisthesis with symptomatic stenosis. Determining specific radiographic traits that might predict delayed instability following decompression surgery might guide clinical decision making regarding the utility of up-front fusion in patients with degenerative Grade I spondylolisthesis. METHODS: Patients with Grade I degenerative lumbar spondylolisthesis (3-14 mm) with symptomatic stenosis were prospectively enrolled from a single site between May 2002 and September 2009 and treated with decompressive laminectomy without fusion. Patients with mechanical back pain or with gross motion (> 3 mm) on flexion-extension lumbar radiographs were excluded. The baseline radiographic variables measured included amount of slippage, disc height, facet angle, motion at spondylolisthesis (flexion-extension), and sagittal rotation angle. Data were analyzed using multivariate forward selection stepwise logistic regression, chi-square tests, Student t-test, and ANOVA. RESULTS: Forty patients were enrolled and treated with laminectomy without fusion, and all patients had complete radiographic data sets that were available for analysis. Reoperation was performed in 15 (37.5%) of 40 patients, with a mean follow-up duration of 3.6 years. Reoperation was performed for pain caused by instability at the index level in all 15 cases. Using multivariate stepwise logistic regression with a threshold p value of 0.35, motion at spondylolisthesis, disc height, and facet angle were predictors of reoperation following surgery. Facet angle > 50° was associated with a 39% rate of reoperation, disc height > 6.5 mm was associated with a 45% rate of reoperation, and motion at spondylolisthesis > 1.25 mm was associated with a 54% rate of reoperation. Patients with all 3 risk factors for instability had a 75% rate of reoperation, whereas patients with no risk factors for instability had a 0% rate of reoperation (p = 0.14). CONCLUSIONS: Patients with motion at spondylolisthesis > 1.25 mm, disc height > 6.5 mm, and facet angle > 50° are more likely to experience instability following decompression surgery for Grade I lumbar spondylolisthesis. Identification of key risk factors for instability might improve patient selection for decompression without fusion surgery	Cohort study examining radiographic predictors for patients requiring fusion in addition to decompression (based on predictors of need for reoperation w/ fusion following initial decompression surgery). **→ Presents preoperative imaging findings that predict instability following decompression.**
27	I / B	Document Imaging Findings	Spinelli J, Rainville J. Lumbar spondylolysis and spondylolisthesis, chapter 45. *In:* Essentials of physical medicine and rehabilitation: musculoskeletal disorders, pain, and rehabilitation / W.R. Frontera, et.al. 2nd edition. Saunders, 2008.	Reference (Textbook)	http://www.mdconsult.com/books/page.do?eid=4-u1.0-B978-1-4160-4007-1..50047-X&isbn=978-1-4160-4007-1&uniqId=440011340-4#4-u1.0-B978-1-4160-4007-1..50047-X		Textbook. "The grade of spondylolisthesis is rated by the percentage of slippage of the posterior corner of the vertebral body above over the superior surface of the vertebral body below. At least 5% slippage must be present for a diagnosis of spondylolisthesis to be conferred. Slippage can be further categorized into five grades. Grade I indicates slippage from 5% to 25%; grade II is 26% to 50%; grade III is 51% to 75%; grade IV is more than 75% and grade V is complete dislocation of adjacent vertebrae." **→ Defines grades of spondylolithesis to assist in interpreting Labor and Industries imaging standards**

28	I / B	Document Imaging Findings	Lattig F, et al. Lumbar facet joint effusion in MRI: a sign of instability in degenerative spondylolisthesis? Eur Spine J. 2012 Feb;21(2):276-81. PMID: 21932065	2/B	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3265597/	PURPOSE: The term "segmental instability" of the lumbar spine is not clearly defined, especially as it relates to degenerative spondylolisthesis (DS) and rotational translation (RT). We investigated whether facet joint effusion on conventional supine MRI indicated increased abnormal motion in DS and RT. METHODS: 160 patients (119 female, 41 male, mean age 68.8 years, range 38.8-89.3 years) who had undergone decompression only or decompression with instrumented fusion for degenerative spondylolisthesis with different degrees of narrowing of the spinal canal were identified retrospectively from our spine surgery database. All had preoperative upright X-rays in AP and lateral views as well as supine MRI. The imaging studies were assessed for the following parameters: percent of slippage, absolute value of facet joint effusion, facet angles, degree of facet degeneration and spinal canal central narrowing, disc height, presence of facet cysts and the presence of rotational translation in the AP X-ray. RESULTS: 40/160 patients showed no facet joint effusion, and in these the difference in the values for the % slip on upright X-ray and % slip on supine MRI was ≤3%. A further 12 patients also showed a difference ≤3%, but had some fluid in the joints (0.44 ± 0.38 mm). In 108 patients, the difference in the % slip measured on X-ray and on MRI was >3% (mean 10.6%, range 4-29%) and was associated with a mean facet effusion size of 2.15 ± 0.85 mm. The extent of effusion correlated significantly with the relative slippage difference between standing and supine positions ($r = 0.64$, $p < 0.001$), and the extent of the left/right difference in effusion was associated with the presence of rotational translation (RT 1.31 ± 0.8 mm vs. no-RT 0.23 ± 0.17 mm, $p < 0.0001$). CONCLUSIONS: Facet joint effusion is clearly correlated with spontaneous reduction of the extent of slippage in the supine position compared to the upright position. Also, the greater the difference in right and left facet effusion, the higher the likelihood of having a RT. Future studies should assess whether analysis of facet joint effusion measured on routine MRI can help in decision-making regarding the optimal surgical treatment to be applied (decompression alone or combined with fusion).	A retrospective cohort study assessing the correlation of preoperative facet joint effusion with "% slip" on upright X-ray on supine MRI. Study established a correlation between effusion and and slippage of vertebre. Authors acknowledge the difficulty in achieving consistent imaging planes. Did not include functional measures pre or post operatively. --> Supports the conclusion that sensitivity of conventional imaging techniques may be sub-optimal and additional or alternative imaging studies may help in decision making with regard to surgery.
29	I / C	Nonsurgical Treatment	NICE National Institute for Health and Care Excellence. NG59: Low back pain and sciatica in over 16s: assessment and management. London: National Collaborating Centre for Primary Care and Royal College of General Practitioners. November 2016.	VM Tier 1 Source	https://www.nice.org.uk/guidance/ng59/evidence/full-guideline-assessment-and-noninvasive-treatments-pdf-2726158003	Need abstract	Respected source with robust evidence appraisal. **→ Among recommended non-surgical care interventions are education, self-management, physical activity, structured exercise programs, cognitive behavioral therapy, combined physical and psychology programs, facilitating return to usual function, NSAIDs (with PPI), and manual therapy. Recommends stratification with STarT Back tool at first visit.**
30		Nonsurgical Treatment Early PT	Fritz JM, Magel JS, McFadden M, Asche C, Thackeray A, Meier W, Brennan G. Early Physical Therapy vs Usual Care in Patients With Recent-Onset Low Back Pain: A Randomized Clinical Trial. JAMA. 2015 Oct 13;314(14):1459-67. PMID: 26461996	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	IMPORTANCE: Low back pain (LBP) is common in primary care. Guidelines recommend delaying referrals for physical therapy. OBJECTIVE: To evaluate whether early physical therapy (manipulation and exercise) is more effective than usual care in improving disability for patients with LBP fitting a decision rule. DESIGN, SETTING, AND PARTICIPANTS: Randomized clinical trial with 220 participants recruited between March 2011 and November 2013. Participants with no LBP treatment in the past 6 months, aged 18 through 60 years (mean age, 37.4 years [SD, 10.3]), an Oswestry Disability Index (ODI) score of 20 or higher, symptom duration less than 16 days, and no symptoms distal to the knee in the past 72 hours were enrolled following a primary care visit. INTERVENTIONS: All participants received education. Early physical therapy (n = 108) consisted of 4 physical therapy sessions. Usual care (n = 112) involved no additional interventions during the first 4 weeks. MAIN OUTCOMES AND MEASURES: Primary outcome was change in the ODI score (range: 0-100; higher scores indicate greater disability; minimum clinically important difference, 6 points) at 3 months. Secondary outcomes included changes in the ODI score at 4-week and 1-year follow-up, and change in pain intensity, Pain Catastrophizing Scale (PCS) score, fear-avoidance beliefs, quality of life, patient-reported success, and health care utilization at 4-week, 3-month, and 1-year follow-up. RESULTS: One-year follow-up was completed by 207 participants (94.1%). Using analysis of covariance, early physical therapy showed improvement relative to usual care in disability after 3 months (mean ODI score: early physical therapy group, 41.3 [95% CI, 38.7 to 44.0] at baseline to 6.6 [95% CI, 4.7 to 8.5] at 3 months; usual care group, 40.9 [95% CI, 38.6 to 43.1] at baseline to 9.8 [95% CI, 7.9 to 11.7] at 3 months; between-group difference, -3.2 [95% CI, -5.9 to -0.47], P = .02). A significant difference was found between groups for the ODI score after 4 weeks (between-group difference, -3.5 [95% CI, -6.8 to -0.08], P = .045]), but not at 1-year follow-up (between-group difference, -2.0 [95% CI, -5.0 to 1.0], P = .19). There was no improvement in pain intensity at 4-week, 3-month, or 1-year follow-up (between-group difference, -0.42 [95% CI, -0.90 to 0.02] at 4-week follow-up; -0.38 [95% CI, -0.84 to 0.09] at 3-month follow-up; and -0.17 [95% CI, -0.62 to 0.27] at 1-year follow-up). The PCS scores improved at 4 weeks and 3 months but not at 1-year follow-up (between-group difference, -2.7 [95% CI, -4.6 to -0.85] at 4-week follow-up; -2.2 [95% CI, -3.9 to -0.49] at 3-month follow-up; and -0.92 [95% CI, -2.7 to 0.61] at 1-year follow-up). There were no differences in health care utilization at any point. CONCLUSIONS AND RELEVANCE: Among adults with recent-onset LBP, early physical therapy resulted in statistically significant improvement in disability, but the	A randomized control trial of 220 patients with back pain and an ODI score of 20 or higher, symptom duration of less than 16 days and without "red flag findings" that received four physical therapy sessions. Control group received educational sessions but no physical therapy. Outcomes included ODI, Pain Catastrophizing Scale, and healthcare utilization. Experimental group had statistically significant improvement in disability at 4 weeks but this did not reach minimum clinically important difference at 3 months. No difference in healthcare utilization at 4 weeks, 3 months, and 1 year. 16 of 108 patient in the control group had "off protocol" therapeutic interventions. **--> Data does not support value of early physical therapy in reducing impairment or healthcare utilization in patients with uncomplicated low back pain.**

31	I / C	Nonsurgical Treatment	Jacobs WC. Rubinstein SM. Koes B. van Tulder MW. Peul WC. Evidence for surgery in degenerative lumbar spine disorders. [Review] Best Practice & Research in Clinical Rheumatology. 27(5): 673-84, 2013 Oct. PMID: 24315148	2/B		Abstract: We aimed to evaluate the available evidence on the effectiveness of surgical interventions for a number of conditions resulting in low back pain (LBP) or spine-related irradiating leg pain. We searched the Cochrane databases and PubMed up to June 2013. We included systematic reviews and randomised controlled trials (RCTs) on degenerative disc disease (DDD), herniated disc, spondylolisthesis and spinal stenosis due to degenerative osteoarthritis. We included comparisons between surgery and conservative care and between different techniques. The quality of the systematic reviews was evaluated using assessment of multiple systematic reviews (AMSTAR). Twenty systematic reviews were included which covered the following diagnoses: disc herniation (n = 9), spondylolisthesis (n = 2), spinal stenosis (n = 3), DDD (n = 4) and combinations (n = 2). For most of the comparisons, no significant and/or clinically relevant differences between interventions were identified. In general, surgery is only indicated for relief of leg pain in clear indications such as disc herniation, spondylolisthesis or spinal stenosis. Copyright 2013. Published by Elsevier Ltd.	Systematic review of studies with inconsistent findings (2/B for this specific conclusion). **→ Concludes surgery is only indicated for relief of leg pain with clear indications such as disc herniation, sponlylolistesis or spinal stenosis. Does not support surgical intervention for low back pain.**
32	I / C	Nonsurgical Treatment	Kreiner DS, Shaffer WO, Baisden JL, Gilbert TJ, Summers JT, Toton JF, Hwang SW, Mendel RC, Reitman CA; North American Spine Society. An evidence-based clinical guideline for the diagnosis and treatment of degenerative lumbar spinal stenosis (update). Spine J. 2013 Jul; 13(7):734-43. PMID: 23830297	VM Tier 2 Source			**→ Provides an update to the NASS Guideline, 2011, cited below.**
33	I / C	Nonsurgical Treatment	North American Spine Society. Evidence-based clinical guidelines for multidisciplinary spine care. Diagnosis and treatment of degenerative lumbar spinal stenosis. 2011.	VM Tier 2 Source	Copy/Paste hyperlink for access: https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarStenosis.pdf AND https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarStenosisTechReport.pdf	The guideline is intended to reflect contemporary treatment concepts for symptomatic degenerative lumbar spinal stenosis as reflected in the highest quality clinical literature available on the subject as of July 2010.	Reasonably well-detailed methods section re: evidence grading and guideline development. Cohort is patients with spinal stenosis in 18 years and older with a chief complaint of neurogenic claudication without associat spondylolisthesis.Among the recommendations are: B-level recommendation that validated criteria should be used for interpretting imaging studies. Work Group consensus that physical therapy is an option for patients with lumbar spinal stenosis, unsupported by reliable evidence. B-level recommendation for the use of lumbosacral corset to increase walking distance and decrease pain in patients with lumbar spinal stenosis. Insufficient evidence to support use of traction, electrical stimulation, TENS, or accupuncture. C-level evidence that medical / interventional treatment may provide improvement for 2-10 years. B-level recommendation that decompressive surgery may improve outcomes in patients with moderate to severe symptoms of lumbar spinal stenosis. B-level recommendation that decompression alone is suggested for patients with leg predominant symptoms without instability. See Kreiner article as possible updated edition of this document. **→ Society guidelie on management of lumbar stenosis emphasizing standards or interpretation of imaging, conservative care and decompressive surgery in the absence of spinal instability.**
34	I / C	Nonsurgical Treatment	Gibson JNA, Waddell G. Surgery for degenerative lumbar spondylosis. Cochrane Database of Systematic Reviews 2005 Oct 19, Issue 4. Art. No.: CD001352. PMID: 16235281	2/C	http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001352.pub3/abstract	Degeneration of the lumbar spine is described as lumbar spondylosis or degenerative disc disease and may lead to spinal stenosis (narrowing of the spinal canal), vertebral instability and/or malalignment, which may be associated with back pain and/or leg symptoms. This review considers the available evidence on the procedures of spinal decompression (widening the spinal canal or laminectomy), nerve root decompression (of one or more individual nerves) and fusion of adjacent vertebrae.	"There was a particular lack of long term outcomes beyond two to three years. Seven heterogeneous trials on spondylolisthesis, spinal stenosis and nerve compression permitted limited conclusions. Two new trials on the effectiveness of fusion showed conflicting results. One showed that fusion gave better clinical outcomes than conventional physiotherapy, while the other showed that fusion was no better than a modern exercise and rehabilitation programme. Eight trials showed that instrumented fusion produced a higher fusion rate (though that needs to be qualified by the difficulty of assessing fusion in the presence of metal-work), but any improvement in clinical outcomes is probably marginal, while there is other evidence that it may be associated with higher complication rates. " **→ Note publication date of 2005. Heterogeneity, difference in clinical outcomes was marginal. Does not provide strong evidence for benefit from surgery**
35	I / C	Nonsurgical Treatment	Agency for Healthcare Research and Quality. DRAFT: Spinal fusion for treatment of degenerative disease affecting the lumbar spine. November 1, 2006.	VM Tier 1 Source	http://www.cms.gov/Medicare/Coverage/DeterminationProcess/downloads/id41a.pdf	"Conclusion: The evidence for lumbar spinal fusion does not conclusively demonstrate short-term or long-term benefits compared with non-surgical treatment, especially when considering patients over 65 years of age; for degenerative disc disease, for spondylolisthesis, considerable uncertainty exists due to lack of data, particularly for older patients."	2006 document, still a "draft" version. **→Evidence does not support benefit of spinal fusion surgery compared to non-surgical care, particularly for age >65 with degenerative disc disease or spondylolisthesis.**

36	I / C	Nonsurgical Treatment	Chou R(1), Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians; American College of Physicians; American Pain Society Low Back Pain Guidelines Panel. 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 Oct 2;147(7):478-91. PMID: 17909209	VM Tier-2 Source	http://annals.org/article.aspx?articleid=736814	RECOMMENDATION 1: Clinicians should conduct a focused history and physical examination to help place patients with low back pain into 1 of 3 broad categories: nonspecific low back pain, back pain potentially associated with radiculopathy or spinal stenosis, or back pain potentially associated with another specific spinal cause. The history should include assessment of psychosocial risk factors, which predict risk for chronic disabling back pain (strong recommendation, moderate-quality evidence). RECOMMENDATION 2: Clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain (strong recommendation, moderate-quality evidence). RECOMMENDATION 3: Clinicians should perform diagnostic imaging and testing for patients with low back pain when severe or progressive neurologic deficits are present or when serious underlying conditions are suspected on the basis of history and physical examination (strong recommendation, moderate-quality evidence). RECOMMENDATION 4: Clinicians should evaluate patients with persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis with magnetic resonance imaging (preferred) or computed tomography only if they are potential candidates for surgery or epidural steroid injection (for suspected radiculopathy) (strong recommendation, moderate-quality evidence). RECOMMENDATION 5: Clinicians should provide patients with evidence-based information on low back pain with regard to their expected course, advise patients to remain active, and provide information about effective self-care options (strong recommendation, moderate-quality evidence). RECOMMENDATION 6: For patients with low back pain, clinicians should consider the use of medications with proven benefits in conjunction with back care information and self-care. Clinicians should assess severity of baseline pain and functional deficits, potential benefits, risks, and relative lack of long-term efficacy and safety data before initiating therapy (strong recommendation, moderate-quality evidence). For most patients, first-line medication options are acetaminophen or nonsteroidal anti-inflammatory drugs. RECOMMENDATION 7: For patients who do not improve with self-care options, clinicians should consider the addition of nonpharmacologic therapy with proven benefits-for acute low back pain, spinal manipulation; for chronic or subacute low back pain, intensive interdisciplinary rehabilitation, exercise therapy, acupuncture, massage therapy, spinal manipulation, yoga, cognitive-behavioral therapy, or progressive relaxation (weak recommendation, moderate-quality evidence).	Professional society guidelines with robust search strategy. **→For patient education, strong recommendation based on moderate quality evidence.** **→Clinicians should choose medications, when necessary, based on proven benefit; strong recommendation based on moderate quality evidence.** **→For patients who do not respond to self-care, clinicians should consider non-pharmacologic therapy of proven benefit; weak recommendation based on moderate quality evidence.**
37	I / C	Nonsurgical Treatment; Paracetamol	Williams CM, Maher CG, Latimer J, McLachlan AJ, Hancock MJ, Day RO, Lin CWC. Efficacy of paracetamol for acute low-back pain: a double-blind, randomised controlled trial. Lancet, in press 23 July 2014.	1/C	http://ac.els-cdn.com/S0140673614608059/1-s2.0-S0140673614608059-main.pdf?_tid=98b15996-136d-11e4-bc1c-00000aacb35e&acdnat=1406232396_32de69889c3f4ac4287686582155ceea	Abstract: Background: Regular paracetamol is the recommended first-line analgesic for acute low-back pain; however, no high-quality evidence supports this recommendation. We aimed to assess the efficacy of paracetamol taken regularly or as-needed to improve time to recovery from pain, compared with placebo, in patients with low-back pain. Methods: We did a multicentre, double-dummy, randomised, placebo controlled trial across 235 primary care centres in Sydney, Australia, from Nov 11, 2009, to March 5, 2013. We randomly allocated patients with acute low-back pain in a 1:1:1 ratio to receive up to 4 weeks of regular doses of paracetamol (three times per day; equivalent to 3990 mg paracetamol per day), as-needed doses of paracetamol (taken when needed for pain relief; maximum 4000 mg paracetamol per day), or placebo. Randomisation was done according to a centralised randomisation schedule prepared by a researcher who was not involved in patient recruitment or data collection. Patients and staff at all sites were masked to treatment allocation. All participants received best-evidence advice and were followed up for 3 months. The primary outcome was time until recovery from low-back pain, with recovery defined as a pain score of 0 or 1 (on a 0–10 pain scale) sustained for 7 consecutive days. All data were analysed by intention to treat. This study is registered with the Australian and New Zealand Clinical Trial Registry, number ACTN 12609000966291. Findings: 550 participants were assigned to the regular group (550 analysed), 549 were assigned to the as-needed group (546 analysed), and 553 were assigned to the placebo group (547 analysed). Median time to recovery was 17 days (95% CI 14–19) in the regular group, 17 days (15–20) in the as-needed group, and 16 days (14–20) in the placebo group (regular *vs* placebo hazard ratio 0·99, 95% CI 0·87–1·14; as-needed *vs* placebo 1·05, 0·92–1·19; regular *vs* as-needed 1·05, 0·92–1·20). We recorded no difference between treatment groups for time to recovery (adjusted p=0·79). Adherence to regular tablets (median tablets consumed per participant per day of maximum 6; 4·0 [IQR 1·6–5·7] in the regular group, 3·9 [1·5–5·6] in the as-needed group, and 4·0 [1·5–5·7] in the placebo group), and number of participants reporting adverse events (99 [18·5%] in the regular group, 99 [18·7%] in the as-needed group, and 98 [18·5%] in the placebo group) were similar between groups. Interpretation: Our findings suggest that regular or as-needed dosing with paracetamol does not affect recovery time compared with placebo in low-back pain, and question the universal endorsement of paracetamol in this patient group. Funding: National Health and Medical Research Council of Australia and GlaxoSmithKline Australia.	High-quality RCT, blinded with concealed allocation, intetion to treat analysis, adequate statistical power, and follow-up (12 weeks). Paracetamol was found to be no better than placebo in reducing time to recovery from pain. **→ Does not support the use of paracetamol for patients with low back pain.** **→ Authors speculate that reassurance had a positive benefit to patients with low back pain.** **→ Given safety profile and low cost, not an unreasonable option to trial but likely ineffective.**

38	I / C	Nonsurgical Treatment	Hill JC, Whitehurst DG, Lewis M, Bryan S, Dunn KM, Foster NE, Konstantinou K, Main CJ, Mason E, Somerville S, Sowden G, Vohora K, Hay EM. Comparison of stratified primary care management for low back pain with current best practice (STarT Back): a randomised controlled trial. Lancet. 2011 Oct 29;378(9802):1560-71. PMCID: PMC3208163 PMID: 21963002	2/B	http://ac.els-cdn.com/S0140673611609379/1-s2.0-S0140673611609379-main.pdf?_tid=c39ba418-f667-11e3-ad1a-00000aacb362&acdnat=1403041307_348b4870bf7f1fcc85575b1b88e96006	BACKGROUND: Back pain remains a challenge for primary care internationally. One model that has not been tested is stratification of the management according to the patient's prognosis (low, medium, or high risk). We compared the clinical effectiveness and cost-effectiveness of stratified primary care (intervention) with non-stratified current best practice (control). METHODS: 1573 adults (aged ≥18 years) with back pain (with or without radiculopathy) consultations at ten general practices in England responded to invitations to attend an assessment clinic. Eligible participants were randomly assigned by use of computer-generated stratified blocks with a 2:1 ratio to intervention or control group. Primary outcome was the effect of treatment on the Roland Morris Disability Questionnaire (RMDQ) score at 12 months. In the economic evaluation, we focused on estimating incremental quality-adjusted life years (QALYs) and health-care costs related to back pain. Analysis was by intention to treat. This study is registered, number ISRCTN37113406. FINDINGS: 851 patients were assigned to the intervention (n=568) and control groups (n=283). Overall, adjusted mean changes in RMDQ scores were significantly higher in the intervention group than in the control group at 4 months (4·7 [SD 5·9] vs 3·0 [5·9], between-group difference 1·81 [95% CI 1·06-2·57]) and at 12 months (4·3 [6·4] vs 3·3 [6·2], 1·06 [0·25-1·86]), equating to effect sizes of 0·32 (0·19-0·45) and 0·19 (0·04-0·33), respectively. At 12 months, stratified care was associated with a mean increase in generic health benefit (0·039 additional QALYs) and cost savings (£240·01 vs £274·40) compared with the control group. INTERPRETATION: The results show that a stratified approach, by use of prognostic screening with matched pathways, will have important implications for the future management of back pain in primary care. FUNDING: Arthritis Research UK.	Good-quality RCT limited by loss to follow-up of 25%. Intervention involved initial PT assessment and treatment visit --> stratification into low-risk, medium-risk, and high-risk groups, then offering either no-further treatment, standard PT, or psychologically-informed PT depending on risk level. **→ Stratification of patients with back pain and customization of treatment, including psycholoically-informed PT for high-risk patients, leads to greater improvement as judged by self-reported disability scores, at lower cost of care.**
39	I / C	Nonsurgical Treatment	Fox J, Haig AJ, Todey B, Challa S. The effect of required physiatrist consultation on surgery rates for back pain. Spine (Phila Pa 1976). 2013 Feb 1;38(3):E178-84. PMID: 23138405	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-201302010-00021&LSLINK=80&D=ovft	STUDY DESIGN: Prospective trial with insurance database and surveys. OBJECTIVE: This study was developed to determine whether an insurer rule requiring physiatrist consultation before nonurgent surgical consultation would affect surgery referrals and surgery rates. SUMMARY OF BACKGROUND DATA: Spine surgery rates are highly variable by region and increasing without evidence of a concordant decrease in the burden of disease. Efforts to curb misuse of surgery have not shown large changes, especially across different provider groups. As nonsurgical spine experts, physiatrists might provide patients with a different perspective on treatment options. METHODS: In 2007, the insurer required patients with nonurgent spine surgical consultations in a geographic region to first have a single visit with a physiatrist, who received extra compensation for the assessment. Surgical consultation and surgical rates results were compared between 2006-2007 and 2008-2010. An automated telephone survey of patients evaluated by physiatrists was performed to assess patient satisfaction. RESULTS: Physiatry referrals increased 70%, surgical referrals decreased 48%, and the total number of spine operations dropped 25%, with concomitant decreased overall cost. Although spinal fusion rates dropped, the percentage of fusion operations increased from 55% to 63% of all surgical procedures. Of 740 patients surveyed (48% response rate), 74% were satisfied or very satisfied with the physiatry consultation. Only 40% of patients who underwent previous spine surgery were satisfied. Although surgical rates decreased at all regional hospitals and all surgical groups, there were substantial shifts in market share. CONCLUSION: Mandatory physiatrist consultation prior to surgical consultation resulted in decreased surgical rates and continued patient satisfaction across a large region.	Cohort study featuring a requirement for physiatry consultation prior to back surgery. **→ Rate of back surgery decreased 25% with this requirement.** **→ 74% of patients responding to a telephone survey were satisfied or very satisfied with the physiatry consulation.**
40	I / C / 1	Nonsurgical Treatment	Chronic pain management, chapter 34. *In:* Payment policies for healthcare services provided to injured workers and crime victims. Washington State Department of Labor and Industries, effective July 1, 2013.	Washington State L&I Payment Policy	http://www.lni.wa.gov/ClaimsIns/Providers/Billing/FeeSched/2013/MARFS/2013PDFs/Chapter34.pdf		Defines comprehensive conservative therapy for chronic pain, including lumbar pain. Includes graded exercise, cognitive behavioral therapy, and coordination of health services. **→ Washington State L&I reimbursement standard**

41	I / C / 1	Nonsurgical Treatment	Brox JI, Sorensen R, Friis A, Nygaard O, Indahl A, Keller A, Ingebrigtsen T, Eriksen HR, Holm I, Koller AK, Riise R, Reikeras O. Randomized controlled trial of lumbar instrumented fusion and cognitive intervention and exercises in patients with chronic low back pain and disc degeneration. Spine 2003; 28(17):1913-1921. PMID: 12973134	1/A	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-200309010-00002&D=ovft&PDF=y	Study Design. Single blind randomized study. Objectives. To compare the effectiveness of lumbar instrumented fusion with cognitive intervention and exercises in patients with chronic low back pain and disc degeneration. Summary of Background Data. To the authors' best knowledge, only one randomized study has evaluated the effectiveness of lumbar fusion. The Swedish Lumbar Spine Study reported that lumbar fusion was better than continuing physiotherapy and care by the family physician. Patients and Methods. Sixty-four patients aged 25–60 years with low back pain lasting longer than 1 year and evidence of disc degeneration at L4–L5 and/or L5–S1 at radiographic examination were randomized to either lumbar fusion with posterior transpedicular screws and postoperative physiotherapy, or cognitive intervention and exercises. The cognitive intervention consisted of a lecture to give the patient an understanding that ordinary physical activity would not harm the disc and a recommendation to use the back and bend it. This was reinforced by three daily physical exercise sessions for 3 weeks. The main outcome measure was the Oswestry Disability Index. Results. At the 1-year follow-up visit, 97% of the patients, including 6 patients who had either not attended treatment or changed groups, were examined. The Oswestry Disability Index was significantly reduced from 41 to 26 after surgery, compared with 42 to 30 after cognitive intervention and exercises. The mean difference between groups was 2.3 (-6.7 to 11.4) (P = 0.33). Improvements inback pain, use of analgesics, emotional distress, life satisfaction, and return to work were not different. Fear-avoidance beliefs and fingertip-floor distance were reduced more after nonoperative treatment, and lower limb pain was reduced more after surgery. The success rateaccording to an independent observer was 70% after surgery and 76% after cognitive intervention and exercises. The early complication rate in the surgical group was 18%. Conclusion. The main outcome measure showed equal improvement in patients with chronic low back pain and disc degeneration randomized to cognitive intervention and exercises, or lumbar fusion	RCT of pts age 25-60 w/ chronic LBP and localized disc degeration, comparing lumbar fusion (and post-op PT) vs cognitive intervention w/ individualized goals and exercise plans. Randomized, concealed allocation, single-blinded (outcome assesors), intention-to-treat, near complete f/u, but small cohort and some cross-over of patients between treatment groups. No difference in primary outcome (ODI) w/ moderately wide confidence intervals, though confidence intervals do exclude a statistically meaningful effect on ODI (noted in the paper to be >12 points). Surgical complication rate was 18%. Fear avoidance beliefs and fingertip-floor distance were reduced more after nonoperative treatment, and lower limb pain was reduced more after surgery. The success rate according to an independent observer was 70% after surgery and 76% after cognitive intervention and exercises. **→ Supports conclusion that lumbar fusion offers no greater benefit than non-surgical care for patients with low back pain and disc degeneration. Complication rate of 18% (6/33) included wound infection, bleeding, venous thrombosis and dural tear.**
42	I / C / 1	Nonsurgical Treatment; Measure of treatment response	Hoekstra CJ, Deppeler DA, Rutt RA. Criterion validity, reliability and clinical responsiveness of the CareConnections Functional Index. Physiother Theory Pract. 2014 Mar 25. PMID: 24666407	2/B		This study established the criterion validity, test–retest reliability and responsiveness of the CareConnections Functional Index (CCFI). The CCFI is composed of four body-region specific subscales, measuring functional ability. Reference standards included the Neck Disability Index; Modified Oswestry Disability Index; Quick Disabilities of the Arm, Shoulder and Hand and the Lower Extremity Functional Scale. One hundred subjects per body region were enrolled. Subject's rated their perceived improvement based on the 15-point Global Rating of Change questionnaire. Minimal clinically important differences (MCID) were calculated via receiver operator characteristic curve. Test–retest reliability coefficients were good to excellent. Validity correlations with the reference standard measures were acceptable (r40.7) for all subscales. MCID for the cervical subscale¼7 points, lumbar¼8 points, upper extremity¼16 points and lower extremity¼11 points. The results of this study support the use of the CCFI in outpatient physical therapy practice as a responsive tool with good reliability and validity. The results also indicate that future work should focus on the impact of baseline patient factors that may affect future outcome.	Diagnosis study looking the value of CareConnections Functional Index for estimating patient self-reported improvement. Cohort includes patients in with cervical, lumbar, upper extremity, and lower extremity pain undergoing physical therapy without regard to specific diagnosis. Minimal clinically important differences (MCID) for lumbar conditions was 8 points. **→ Supports CCFI as a valid measure of disability related to back pain with 8 points as the MCID.**
43	I / C / 1 / c	Nonsurgical Treatment; Cognitive Behavioral Therapy	Sullivan MJ(1), Ward LC, Tripp D, French DJ, Adams H, Stanish WD. Secondary prevention of work disability: community-based psychosocial intervention for musculoskeletal disorders. J Occup Rehabil. 2005 Sep;15(3):377-92. PMID: 16119228	3/C	http://dx.doi.org/10.1007/s10926-005-5944-7	INTRODUCTION: One objective of the present research was to examine the degree to which psychological risk factors could be reduced through participation in a community-based psychosocial intervention for work-related musculoskeletal disorders. A second objective was to examine whether psychosocial risk reduction had an effect on the probability of return to work. METHODS: Participants were 215 Workers Compensation Board claimants with work-related musculoskeletal disorders who had been absent from work for an average of approximately 7 months (M = 28.8 weeks, range = 4-100 weeks) and were referred to a community-based multidisciplinary secondary prevention program in Nova Scotia, Canada. RESULTS: In the current sample, 63.7% of participants returned to work within 4 weeks of treatment termination. The percentage reductions in targeted risk factors from pretreatment to posttreatment were as follows: catastrophizing (32%), depression (26%), fear of movement/re-injury (11%), and perceived disability (26%). Logistic regression indicated that elevated pretreatment scores on fear of movement and re-injury (OR = 0.58, 95% CI = 0.35-0.95) and pain severity (OR = 0.64, 95% CI = 0.43-0.96) were associated with a lower probability of return to work. A second logistic regression addressing the relation between risk factor reduction and return to work revealed that only reductions in pain catastrophizing (OR = 0.17, 95% CI = 0.07-0.46) were significant predictors of return to work. CONCLUSIONS: The results of the present study provide further evidence that risk factor reduction can impact positively on short term return to work outcomes. SIGNIFICANCE: Outcomes of rehabilitation programs for work disability might be improved by incorporating interventions that specifically target catastrophic thinking. Community-based models of psychosocial intervention might represent a viable approach to the management of work disability associated with musculoskeletal disorders.	Case series of 215 Workers Compensation Board claimants with work-related musculoskeletal disorders with long-term absence from work. 10-week, community-based psychosocial intervention returned 63% of patients to work. **→ Supports use of behavior therapy in patients with workers' compensation claims.**

44	I / C / 1 / c	Nonsurgical Treatment; Prognostic factors	Turner JA(1), Franklin G, Fulton-Kehoe D, Sheppard L, Stover B, Wu R, Gluck JV, Wickizer TM. ISSLS prize winner: early predictors of chronic work disability: a prospective, population-based study of workers with back injuries. Spine (Phila Pa 1976). 2008 Dec 1;33(25):2809-18. PMID: 19050587	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-200812010-00017&LSLINK=80&D=ovft	STUDY DESIGN: Prospective population-based cohort study. OBJECTIVE: To identify early predictors of chronic work disability after work-related back injury. SUMMARY OF BACKGROUND DATA: Identification of early predictors of prolonged disability after back injury could increase understanding concerning the development of chronic, disabling pain, and aid in secondary prevention. Few studies have examined predictors across multiple domains in a large, population-based sample. METHODS: Workers (N = 1885) were interviewed 3 weeks (average) after submitting a lost work-time claim for a back injury. Sociodemographic, employment-related, pain and function, clinical, health care, administrative/legal, health behavior, and psychological domain variables were assessed via worker interviews, medical records, and administrative databases. Logistic regression analyses identified early predictors of work disability compensation 1 year after claim submission. RESULTS: Significant baseline predictors of 1-year work disability in the final multidomain model were injury severity (rated from medical records), specialty of the first health care provider seen for the injury (obtained from administrative data), and worker-reported physical disability (Roland-Morris disability questionnaire), number of pain sites, "very hectic" job, no offer of a job accommodation (e.g., light duty), and previous injury involving a month or more off work. The model showed excellent ability to discriminate between workers who were/were not disabled at 1 year (area under the receiver operating characteristic curve = 0.88, 95% CI = 0.86-0.90). CONCLUSION: Among workers with new lost work-time back injury claims, risk factors for chronic disability include radiculopathy, substantial functional disability, and to a lesser extent, more widespread pain and previous injury with extended time off work. The roles of employers and health care providers also seem important, supporting the need to incorporate factors external to the worker in models of the development of chronic disability and in disability prevention efforts.	A large prospective cohort study that identifies factors predicting return to work for patients with workers' compensation claims. Limited to workers covered under State Fund and only 49% completed baseline interview. Treatment interventions not specified and may have influenced return to work. **→ Study identifies possible barriers to return to function.**
45	I / C / 1 / g	Nonsurgical Treatment; Cognitive Behavioral Therapy	Fairbank J, et al. Randomised controlled trial to compare surgical stabilization of the lumbar spine with an intensive rehabilitation programme for patients with chronic low back pain: the MRC spine stabilization trial. BMJ, 2005 May 28; 330(7502): 1233-9. PMID: 15911537	2/B	http://www.bmj.com/highwire/filestream/361994/field_highwire_article_pdf_abri/0.pdf	OBJECTIVES: To assess the clinical effectiveness of surgical stabilisation (spinal fusion) compared with intensive rehabilitation for patients with chronic low back pain. DESIGN: Multicentre randomised controlled trial. SETTING: 15 secondary care orthopaedic and rehabilitation centres across the United Kingdom. PARTICIPANTS: 349 participants aged 18-55 with chronic low back pain of at least one year's duration who were considered candidates for spinal fusion. INTERVENTION: Lumbar spine fusion or an intensive rehabilitation programme based on principles of cognitive behaviour therapy. MAIN OUTCOME MEASURE: The primary outcomes were the Oswestry disability index and the shuttle walking test measured at baseline and two years after randomisation. The SF-36 instrument was used as a secondary outcome measure. RESULTS: 176 participants were assigned to surgery and 173 to rehabilitation. 284 (81%) provided follow-up data at 24 months. The mean Oswestry disability index changed favourably from 46.5 (SD 14.6) to 34.0 (SD 21.1) in the surgery group and from 44.8 (SD14.8) to 36.1 (SD 20.6) in the rehabilitation group. The estimated mean difference between the groups was -4.1 (95% confidence interval -8.1 to -0.1, P = 0.045) in favour of surgery. No significant differences between the treatment groups were observed in the shuttle walking test or any of the other outcome measures. CONCLUSIONS: Both groups reported reductions in disability during two years of follow-up, possibly unrelated to the interventions. The statistical difference between treatment groups in one of the two primary outcome measures was marginal and only just reached the predefined minimal clinical difference, and the potential risk and additional cost of surgery also need to be considered. No clear evidence emerged that primary spinal fusion surgery was any more beneficial than intensive rehabilitation.	Cohort is patients with chronic low back pain for which providers and patients were uncertain regarding relative benefit of surgery versus conservative care. Randomized controlled trial of spinal fusion surgery versus intensive non-surgical therapy (5 days/week, 5-7 hours/day, for 3 weeks), but lacking "no treatment" arm. Surgical and non-surgical groups had similar improvement in Oswestry scale and no significant difference between groups on shuttle walking test. No clear evidence emerged that primary spinal fusion surgery was any more beneficial than intensive rehabilitation. - Level 2 because: 20% lost to follow-up. Significant crossover in both groups **→ For patients with mostly non-specific chronic low back pain, there was minimal difference in ODI or shuttle walking in patients receiving spinal fusion vs intensive non-surgical therapy.**

46	I / C / 3	Nonsurgical Treatment; Chiropractic	Walker BF, French SD, Grant W, Green S. Combined chiropractic interventions for low-back pain. Cochrane Database of Systematic Reviews 2010, Issue 4. Art. No.: CD005427. PMID: 20393942	VM Tier 1 Source	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-04354&D=coch&PDF=y	BACKGROUND: Many therapies exist for the treatment of low-back pain including spinal manipulative therapy (SMT), which is a worldwide, extensively practiced intervention. OBJECTIVES: To assess the effects of SMT for chronic low-back pain. SEARCH STRATEGY: An updated search was conducted by an experienced librarian to June 2009 for randomised controlled trials (RCTs) in CENTRAL (The Cochrane Library 2009, issue 2), MEDLINE, EMBASE, CINAHL, PEDro, and the Index to Chiropractic Literature. SELECTION CRITERIA: RCTs which examined the effectiveness of spinal manipulation or mobilisation in adults with chronic low-back pain were included. No restrictions were placed on the setting or type of pain; studies which exclusively examined sciatica were excluded. The primary outcomes were pain, functional status and perceived recovery. Secondary outcomes were return-to-work and quality of life. DATA COLLECTION AND ANALYSIS: Two review authors independently conducted the study selection, risk of bias assessment and data extraction. GRADE was used to assess the quality of the evidence. Sensitivity analyses and investigation of heterogeneity were performed, where possible, for the meta-analyses. MAIN RESULTS: We included 26 RCTs (total participants = 6070), nine of which had a low risk of bias. Approximately two-thirds of the included studies (N = 18) were not evaluated in the previous review. In general, there is high quality evidence that SMT has a small, statistically significant but not clinically relevant, short-term effect on pain relief (MD: -4.16, 95% CI -6.97 to -1.36) and functional status (SMD: -0.22, 95% CI -0.36 to -0.07) compared to other interventions. Sensitivity analyses confirmed the robustness of these findings. There is varying quality of evidence (ranging from low to high) that SMT has a statistically significant short-term effect on pain relief and functional status when added to another intervention. There is very low quality evidence that SMT is not statistically significantly more effective than inert interventions or sham SMT for short-term pain relief or functional status. Data were particularly sparse for recovery, return-to-work, quality of life, and costs of care. No serious complications were observed with SMT. AUTHORS' CONCLUSIONS: High quality evidence suggests that there is no clinically relevant difference between SMT and other interventions for reducing pain and improving function in patients with chronic low-back pain. Determining cost-effectiveness of care has high priority. Further research is likely to have an important impact on our confidence in the estimate of effect in relation to inert interventions and sham SMT, and data related to recovery.	**→ Neither supports nor discourages spinal manipulative therapy compared to other conservative interventions for reducing pain and improving function.**
47	I / C / 3	Nonsurgical Treatment; Chiropractic	Rubinstein SM, van Middelkoop M, Assendelft WJJ, de Boer MR, van Tulder MW. Spinal manipulative therapy for chronic low-back pain. Cochrane Database of Systematic Reviews 2011, Issue 2. Art. No.: CD008112. PMID: 21328304	VM Tier 1 Source	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-06636&D=coch&PDF=y	BACKGROUND: Many therapies exist for the treatment of low-back pain including spinal manipulative therapy (SMT), which is a worldwide, extensively practiced intervention. OBJECTIVES: To assess the effects of SMT for chronic low-back pain. SEARCH STRATEGY: An updated search was conducted by an experienced librarian to June 2009 for randomised controlled trials (RCTs) in CENTRAL (The Cochrane Library 2009, issue 2), MEDLINE, EMBASE, CINAHL, PEDro, and the Index to Chiropractic Literature. SELECTION CRITERIA: RCTs which examined the effectiveness of spinal manipulation or mobilisation in adults with chronic low-back pain were included. No restrictions were placed on the setting or type of pain; studies which exclusively examined sciatica were excluded. The primary outcomes were pain, functional status and perceived recovery. Secondary outcomes were return-to-work and quality of life. DATA COLLECTION AND ANALYSIS: Two review authors independently conducted the study selection, risk of bias assessment and data extraction. GRADE was used to assess the quality of the evidence. Sensitivity analyses and investigation of heterogeneity were performed, where possible, for the meta-analyses. MAIN RESULTS: We included 26 RCTs (total participants = 6070), nine of which had a low risk of bias. Approximately two-thirds of the included studies (N = 18) were not evaluated in the previous review. In general, there is high quality evidence that SMT has a small, statistically significant but not clinically relevant, short-term effect on pain relief (MD: -4.16, 95% CI -6.97 to -1.36) and functional status (SMD: -0.22, 95% CI -0.36 to -0.07) compared to other interventions. Sensitivity analyses confirmed the robustness of these findings. There is varying quality of evidence (ranging from low to high) that SMT has a statistically significant short-term effect on pain relief and functional status when added to another intervention. There is very low quality evidence that SMT is not statistically significantly more effective than inert interventions or sham SMT for short-term pain relief or functional status. Data were particularly sparse for recovery, return-to-work, quality of life, and costs of care. No serious complications were observed with SMT. AUTHORS' CONCLUSIONS: High quality evidence suggests that there is no clinically relevant difference between SMT and other interventions for reducing pain and improving function in patients with chronic low-back pain. Determining cost-effectiveness of care has high priority. Further research is likely to have an important impact on our confidence in the estimate of effect in relation to inert interventions and sham SMT, and data related to recovery.	**→ Neither supports nor discourages spinal manipulative therapy compared to other conservative interventions for reducing pain and improving function.**

48	1 / C / 3	Nonsurgical Treatment; Acupuncture	Cherkin DC, Sherman KJ, Avins AL, Erro JH, Ichikawa L, Barlow WE, Delaney K, Hawkes R, Hamilton L, Pressman A, Khalsa PS, Deyo RA. A randomized trial comparing acupuncture, simulated acupuncture, and usual care for chronic low back pain. Arch Intern Med. 2009 May 11;169(9):858-66. PMID: 19433697	1/A	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2832641/	BACKGROUND: Acupuncture is a popular complementary and alternative treatment for chronic back pain. Recent European trials suggest similar short-term benefits from real and sham acupuncture needling. This trial addresses the importance of needle placement and skin penetration in eliciting acupuncture effects for patients with chronic low back pain. METHODS: A total of 638 adults with chronic mechanical low back pain were randomized to individualized acupuncture, standardized acupuncture, simulated acupuncture, or usual care. Ten treatments were provided over 7 weeks by experienced acupuncturists. The primary outcomes were back-related dysfunction (Roland-Morris Disability Questionnaire score; range, 0-23) and symptom bothersomeness (0-10 scale). Outcomes were assessed at baseline and after 8, 26, and 52 weeks. RESULTS: At 8 weeks, mean dysfunction scores for the individualized, standardized, and simulated acupuncture groups improved by 4.4, 4.5, and 4.4 points, respectively, compared with 2.1 points for those receiving usual care (P < .001). Participants receiving real or simulated acupuncture were more likely than those receiving usual care to experience clinically meaningful improvements on the dysfunction scale (60% vs 39%; P < .001). Symptoms improved by 1.6 to 1.9 points in the treatment groups compared with 0.7 points in the usual care group (P < .001). After 1 year, participants in the treatment groups were more likely than those receiving usual care to experience clinically meaningful improvements in dysfunction (59% to 65% vs 50%, respectively; P = .02) but not in symptoms (P > .05). CONCLUSIONS: Although acupuncture was found effective for chronic low back pain, tailoring needling sites to each patient and penetration of the skin appear to be unimportant in eliciting therapeutic benefits. These findings raise questions about acupuncture's purported mechanisms of action. It remains unclear whether acupuncture or our simulated method of acupuncture provide physiologically important stimulation or represent placebo or nonspecific effects.	High quality randomized controlled trial of patients with chronic low back pain, allocated to three acupuncture groups and one control group with conventional therapy only. The three acupuncture groups exhibited similar improvement in terms of function. Simulated acupuncture was effective as individualized or standardized acupuncture treatments. The conventional therapy regimen for the control group was not well defined. **→ Conventional or simulated acupuncture afforded benefits compared to "usual care."**
49	1 / C / 3	Nonsurgical Treatment; Acupuncture	Xu M, Yan S, Yin X, Li X, Gao S, Han R, Wei L, Luo W, Lei G. Acupuncture for chronic low back pain in long-term follow-up: a meta-analysis of 13 randomized controlled trials. Am J Chin Med. 2013;41(1):1-19. PMID: 23336503	2/B		Chronic low back pain is one of the most common reasons that people seek medical treatment, and the consequent disability creates a great financial burden on individuals and society. The etiology of chronic low back pain is not clear, which means it is often refractory to treatment. Acupuncture has been reported to be effective in providing symptomatic relief of chronic low back pain. However, it is not known whether the effects of acupuncture are due to the needling itself or nonspecific effects arising from the manipulation. To determine the effectiveness of acupuncture therapy, a meta-analysis was performed to compare acupuncture with sham acupuncture and other treatments. Overall, 2678 patients were identified from thirteen randomized controlled trials. The meta-analysis was performed by a random model (Cohen's test), using the I-square test for heterogeneity and Begg's test to assess for publication bias. Clinical outcomes were evaluated by pain intensity, disability, spinal flexion, and quality of life. Compared with no treatment, acupuncture achieved better outcomes in terms of pain relief, disability recovery and better quality of life, but these effects were not observed when compared to sham acupuncture. Acupuncture achieved better outcomes when compared with other treatments. No publication bias was detected. Acupuncture is an effective treatment for chronic low back pain, but this effect is likely to be produced by the nonspecific effects of manipulation.	Systematic review of use of acupuncture in the treatment of low back pain, concluding that both sham and conventional acupuncture methods are effective. **→ Supports the use of either conventional or sham acupuncture as a component of non-surgical care for low back pain.**
50	I / C / 3	Injection therapy	Spinal injections: Health Technology Clinical Committee findings and coverage decision. Washington State Health Care Authority. June 17, 2011.	VM Tier-1 Source	http://www.hca.wa.gov/hta/documents/findings_decision_spinal_injections_061711.pdf	Based on the evidence about the technologies' safety, efficacy, and cost-effectiveness, therapeutic Sacroiliac Joint Injections for chronic pain is a covered benefit when all of the following conditions are met: with Fluoroscopic guidance or CT guidance; after failure of conservative therapy; mo more than one without clinically meaningful improvement in pain and function, under agency review.	**→ HTAP supports conditional use of injections.**
51	I / C / 3	Injection therapy	Friedly JL, Comstock BA, Turner JA, Heagerty PJ, Deyo RA, Sullivan SD, Bauer Z, Bresnahan BW, Avins AL, Nedeljkovic SS, Nerenz DR, Standaert C, Kessler L, Akuthota V, Annaswamy T, Chen A, Diehn F, Firtch W, Gerges FJ, Gilligan C, Goldberg H, Kennedy DJ, Mandel S, Tyburski M, Sanders W, Sibell D, Smuck M, Wasan A, Won L, Jarvik JG. Randomized trial of epidural glucocorticoid injections for spinal stenosis. New England Journal of Medicine, 3 July 2014. 371(1): 11-21. PMID: 24988555	2/B	http://www.nejm.org/doi/pdf/10.1056/NEJMoa1313265	Abstract: BACKGROUND: Epidural glucocorticoid injections are widely used to treat symptoms of lumbar spinal stenosis, a common cause of pain and disability in older adults. However, rigorous data are lacking regarding the effectiveness and safety of these injections. METHODS: In a double-blind, multisite trial, we randomly assigned 400 patients who had lumbar central spinal stenosis and moderate-to-severe leg pain and disability to receive epidural injections of glucocorticoids plus lidocaine or lidocaine alone. The patients received one or two injections before the primary outcome evaluation, performed 6 weeks after randomization and the first injection. The primary outcomes were the score on the Roland-Morris Disability Questionnaire (RMDQ, in which scores range from 0 to 24, with higher scores indicating greater physical disability) and the rating of the intensity of leg pain (on a scale from 0 to 10, with 0 indicating no pain and 10 indicating "pain as bad as you can imagine"). RESULTS: At 6 weeks, there were no significant between-group differences in the RMDQ score (adjusted difference in the average treatment effect between the glucocorticoid-lidocaine group and the lidocaine-alone group, -1.0 points; 95% confidence interval [CI], -2.1 to 0.1; P=0.07) or the intensity of leg pain (adjusted difference in the average treatment effect, -0.2 points; 95% CI, -0.8 to 0.4; P=0.48). A prespecified secondary subgroup analysis with stratification according to type of injection (interlaminar vs. transforaminal) likewise showed no significant differences at 6 weeks. CONCLUSIONS: In the treatment of lumbar spinal stenosis, epidural injection of glucocorticoids plus lidocaine offered minimal or no short-term benefit as compared with epidural injection of lidocaine alone. (Funded by the Agency for Healthcare Research and Quality; ClinicalTrials.gov number, NCT01238536.)	*See also comment* : Andersson GB. Epidural glucocorticoid injections in patients with lumbar spinal stenosis. N Engl J Med. 2014 Jul 3;371(1):75-6. PMID: 24988561. Randomized, blinded, intention-to-treat study with allocation concealed that did not include sham injections and that permitted variation in the type of glucocorticoid used as well as injection approach. Small, statistically significant but clinically insignificant improvement in RMDQ and pain at 6 weeks but no statistically significant effect at 6 weeks. Symptoms of depression and patient satisfaction were secondary outcomes and were slightly improved. **→ Study supports the conclusion that local glucocorticoid injections are ineffective for treating symptoms related to spinal stenosis compared to injections of lidocaine-alone.**

52		Epidural injection therapy	Singla A, Yang S, Werner BC, Cancienne JM, Nourbakhsh A, Shimer AL, Hassanzadeh H, Shen FH. The impact of preoperative epidural injections on postoperative infection in lumbar fusion surgery. J Neurosurg Spine. 2017 May;26(5):645-649. PMID: 28291411	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	OBJECTIVE Lumbar epidural steroid injections (LESIs) are performed for both diagnostic and therapeutic purposes for a variety of indications, including low-back pain, the leading cause of disability and expense due to work-related conditions in the US. The steroid agent used in epidural injections is reported to relieve nerve root inflammation, local ischemia, and resultant pain, but the injection may also have an adverse impact on spinal surgery performed thereafter. In particular, the possibility that preoperative epidural injections may increase the risk of surgical site infection after lumbar spinal fusion has been reported but has not been studied in detail. The goal of the present study was to use a large national insurance database to analyze the association of preoperative LESIs with surgical site infection after lumbar spinal fusion. METHODS A nationwide insurance database of patient records was used for this retrospective analysis. Current Procedural Terminology codes were used to query the database for patients who had undergone LESI and 1- or 2-level lumbar posterior spinal fusion procedures. The rate of postoperative infection after 1- or 2-level posterior spinal fusion was analyzed. These study patients were then divided into 3 separate cohorts: 1) lumbar spinal fusion performed within 1 month after LESI, 2) fusion performed between 1 and 3 months after LESI, and 3) fusion performed between 3 and 6 months after LESI. The study patients were compared with a control cohort of patients who underwent lumbar fusion without previous LESI. RESULTS The overall 3-month infection rate after lumbar spinal fusion procedure was 1.6% (1411 of 88,540 patients). The infection risk increased in patients who received LESI within 1 month (OR 2.6, $p < 0.0001$) or 1-3 months (OR 1.4, $p = 0.0002$) prior to surgery compared with controls. The infection risk was not significantly different from controls in patients who underwent lumbar fusion more than 3 months after LESI. CONCLUSIONS Lumbar spinal fusion performed within 3 months after LESI may be associated with an increased rate of postoperative infection. This association was not found when lumbar fusion was performed more than 3 months after LESI.	A claims-based retrospective cohort study comparing 30,683 patients over 65 years of age receiving epideral steroid injections compared to 70,857 of the same age range who did not with respect to postoperative infection following 1 or 2 level lumbar fusion surgery. Patient receiving epidural steroid injection within the 3 months prior to lumbar fusion surgery had increased rates of infection. Controlled for major comorbidities. --> Supports the conclusion that epidural steroid injections are associated with infection when administered within 3 months of subsequent surgery.
53	I/D/5	Collaborative conference	Yanamadala V(1), Kim Y, Buchlak QD, Wright AK, Babington J, Friedman A, Mecklenburg RS, Farrokhi F, Leveque JC, Sethi RK. Multidisciplinary Evaluation Leads to the Decreased Utilization of Lumbar Spine Fusion: An Observational Cohort Pilot Study. Spine (Phila Pa 1976). 2017 Sep 1;42(17):E1016-E1023. PMID: 28067696	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	STUDY DESIGN: Observational cohort pilot study. OBJECTIVE: To determine the impact of a multidisciplinary conference on treatment decisions for lumbar degenerative spine disease. SUMMARY OF BACKGROUND DATA: Multidisciplinary decision making improves outcomes in many disciplines. The lack of integrated systems for comprehensive care for spinal disorders has contributed to the inappropriate overutilization of spine surgery in the United States. METHODS: We implemented a multidisciplinary conference involving physiatrists, anesthesiologists, pain specialists, neurosurgeons, orthopaedic spine surgeons, physical therapists, and nursing staff. Over 10 months, we presented patients being considered for spinal fusion or who had a complex history of prior spinal surgery. We compared the decision to proceed with surgery and the proposed surgical approach proposed by outside surgeons with the consensus of our multidisciplinary conference. We also assessed comprehensive demographics and comorbidities for the patients and examined outcomes for surgical patients. RESULTS: A total of 137 consecutive patients were reviewed at our multidisciplinary conference during the 10-month period. Of these, 100 patients had been recommended for lumbar spine fusion by an outside surgeon. Consensus opinion of the multidisciplinary conference advocated for nonoperative management in 58 patients (58%) who had been previously recommended for spinal fusion at another institution ($\chi = 26.6$; $P < 0.01$). Furthermore, the surgical treatment plan was revised as a product of the conference in 28% (16 patients) of the patients who ultimately underwent surgery ($\chi = 43.6$; $P < 0.01$). We had zero 30-day complications in surgical patients. CONCLUSION: Isolated surgical decision making may result in suboptimal treatment recommendations. Multidisciplinary conferences can reduce the utilization of lumbar spinal fusion, possibly resulting in more appropriate use of surgical interventions with better candidate selection while providing patients with more diverse nonoperative treatment options. Although long-term patient outcomes remain to be determined, such multidisciplinary care will likely be essential to improving the quality and value of spine care. LEVEL OF EVIDENCE: 3.	Observational cohort study --> Supports the conclusion that a substation proportion of patients recommended for spinal fusion do not meet evidence based appropriateness and safety standards and are likely better managed, at least initially, with nonsurgical therapies.
Cycle 2: Fitness for Surgery							

54	II / A / 1	BMI-Obesity	Buerba R.A., Fu M.C., Gruskay J.A., Long III W.D., Grauer J.N. Obese Class III patients at significantly greater risk of multiple complications after lumbar surgery: an analysis of 10,387 patients in the ACS NSQIP database. Spine J, 2013 Dec 6. pii: S1529-9430(13)01962-1 [epub ahead of print]. PMID: 24316118	2/B		Background context: Prior studies on the impact of obesity on spine surgery outcomes have focused mostly on lumbar fusions, do not examine lumbar discectomies or decompressions, and have shown mixed results regarding complications. Differences in sample sizes and body mass index (BMI) thresholds for the definition of the obese versus comparison cohorts could account for the inconsistencies in the literature. Purpose: The purpose of the study was to analyze whether different degrees of obesity influence the complication rates in patients undergoing lumbar spine surgery. Study design/setting: This was a retrospective cohort analysis of prospectively collected data using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database from 2005 to 2010. Patient sample: Patients in the de-identified, risk-adjusted, and multi-institutional ACS NSQIP database undergoing lumbar anterior fusion, posterior fusion, transforaminal lumbar interbody fusion/posterior lumbar interbody fusion (TLIF/PLIF), discectomy, or decompression were included. Outcome measures: Primary outcome measures were 30-day postsurgical complications, including pulmonary embolism and deep vein thrombosis, death, system-specific complications (wound, pulmonary, urinary, central nervous system, and cardiac), septic complications, and having one or more complications overall. Secondary outcomes were time spent in the operating room, blood transfusions, length of stay, and reoperation within 30 days. Methods: Patients undergoing lumbar anterior fusion, posterior fusion, TLIF/PLIF, discectomy, or decompression in the ACS NSQIP, 2005 to 2010, were categorized into four BMI groups: nonobese (18.5-29.9 kg/m2), Obese I (30-34.9 kg/m2), Obese II (35-39.9 kg/m2), and Obese III (greater than or equal to 40 kg/m2). Obese I to III patients were compared with patients in the nonobese category using chi-square test and analysis of variance. Multivariate linear/logistic regression models were used to adjust for preoperative risk factors. Results: Data were available for 10,387 patients undergoing lumbar surgery. Of these, 4.5% underwent anterior fusion, 17.9% posterior fusion, 6.3% TLIF/PLIF, 40.7% discectomy, and 30.5% decompression. Among all patients, 25.6% were in the Obese I group, 11.5% Obese II, and 6.9% Obese III. On multivariate analysis, Obese I and III had a significantly increased risk of urinary complications, and Obese II and III patients had a significantly increased risk of wound complications. Only Obese III patients, however, had a statistically increased risk of having increased time spent in the operating room, an extended length of stay, pulmonary complications, and having one or more complications (all p<.05). Conclusions: Patients with high BMI appear to have higher complication rates after lumbar surgery than patients who are nonobese. However, the	Prognosis study. Retrospective cohort study. Compared to non-obese patients, those with BMI ≥ 40 had a "statistically increased risk of having increased time spent in the operating room, an extended length of stay, pulmonary complications, and having one or more complications (all p<.05)." **→ Relates elevated BMI to pulmonary embolism, deep venous thrombosis, death, and septic complications.**
55	II / A / 1	BMI-Obesity	Rihn JA. Radcliff K. Hilibrand AS. Anderson DT. Zhao W. Lurie J. Vaccaro AR. Freedman MK. Albert TJ. Weinstein JN. Does obesity affect outcomes of treatment for lumbar stenosis and degenerative spondylolisthesis? Analysis of the Spine Patient Outcomes Research Trial (SPORT). Spine. 37(23):1933-46, 2012 Nov 1. PMID: 22614793	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-201211010-00003&D=ovft&PDF=y	Abstract: STUDY DESIGN: Retrospective subgroup analysis of prospectively collected data according to treatment received. OBJECTIVE: The purpose of this study was to determine whether obesity affects treatment outcomes for lumbar stenosis (SpS) and degenerative spondylolisthesis (DS). SUMMARY OF BACKGROUND DATA: Obesity is thought to be associated with increased complications and potentially less favorable outcomes after the treatment of degenerative conditions of the lumbar spine. This, however, remains a matter of debate in the existing literature. METHODS: An as-treated analysis was performed on patients enrolled in the Spine Patient Outcomes Research Trial for the treatment of SpS or DS. A comparison was made between patients with a body mass index (BMI) of less than 30 ("nonobese," n = 373 SpS and 376 DS) and those with a BMI of 30 or more ("obese," n = 261 SpS and 225 DS). Baseline patient characteristics, intraoperative data, and complications were documented. Primary and secondary outcomes were measured at baseline and regular follow-up time intervals up to 4 years. The difference in improvement over baseline between surgical and nonsurgical treatment (i.e., treatment effect) was determined at each follow-up interval for the obese and nonobese groups. RESULTS: At 4-year follow-up, operative and nonoperative treatment provided improvement in all primary outcome measures over baseline in patients with BMI of less than 30 and 30 or more. For patients with SpS, there were no differences in the surgical complication or reoperation rates between groups. Patients with DS with BMI of 30 or more had a higher postoperative infection rate (5% vs. 1%, P = 0.05) and twice the reoperation rate at 4-year follow-up (20% vs. 11%, P = 0.01) than those with BMI of less than 30. At 4 years, surgical treatment of SpS and DS was equally effective in both BMI groups in terms of the primary outcome measures, with the exception that obese patients with DS had less improvement from baseline in the 36-Item Short Form Health Survey (SF-36) physical function score than nonobese patients (22.6 vs. 27.9, P = 0.022). With nonoperative treatment, patients with SpS with BMI of 30 or more did worse in regard to all 3 primary outcome measures, and patients with DS with BMI of 30 or more had similar SF-36 bodily pain scores but less improvement over baseline in the SF-36 physical function and Oswestry Disability Index scores. Treatment effects for SpS and DS were significant within each BMI group for all primary outcome measures in favor of surgery. Obese patients had a significantly greater treatment effect than nonobese patients with SpS (Oswestry Disability Index, P = 0.037) and DS (SF-36 PF, P = 0.004) largely due to the relatively poor outcome of nonoperative treatment in obese patients. CONCLUSION: Obesity does not affect the clinical outcome of	"Obesity does not affect the clinical outcome of operative treatment of SpS. There are higher rates of infection and reoperation and less improvement from baseline in the SF-36 physical function score in obese patients after surgery for DS. Nonoperative treatment may not be as effective in obese patients with SpS or DS." **→ 2/B grade is for the treatment recommendation of weight loss prior to surgery.**

56	II / A / 10	Screening for Dementia	Hu CJ, Liao CC, Chang CC, Wu CH, Chen TI. Postoperative adverse outcomes in surgical patients with dementia: a retrospective cohort study. World Journal of Surgery, 2012 Sep; 36(9): 2051-8. PMID: 22535212	2/B	http://link.springer.com/article/10.1007/s00268-012-1609-x	BACKGROUND: Dementia patients often present with coexisting medical conditions and potentially face higher risk of complications during hospitalization. Because the general features of postoperative adverse outcomes among surgical patients with dementia are unknown, we conducted a nationwide, retrospective cohort study to characterize surgical complications among dementia patients compared with sex- and age-matched nondementia controls. METHODS: Reimbursement claims from the Taiwan National Health Insurance Research Database were studied. A total of 18,923 surgical patients were enrolled with preoperative diagnosis of dementia for 207,693 persons aged 60 years or older who received inpatient major surgeries between 2004 and 2007. Their preoperative comorbidities were adjusted and risks for major surgical complications were analyzed. RESULTS: Dementia patients who underwent surgery had a significantly higher overall postoperative complication rate, adjusted odds ratio (OR) 1.79 (95 % confidence interval [CI] 1.72-1.86), with higher medical resources use, and in-hospital expenditures. Compared with controls, dementia patients had a higher incidence of certain postoperative complications that are less likely to be identified in their initial stage, such as: acute renal failure, OR = 1.32 (1.19-1.47); pneumonia, OR = 2.18 (2.06-2.31); septicemia, OR = 1.8 (1.69-1.92); stroke, OR = 1.51 (1.43-1.6); and urinary tract infection, OR = 1.62 (1.5-1.74). CONCLUSIONS: These findings have specific implications for postoperative care of dementia patients regarding complications that are difficult to diagnose in their initial stages. Acute renal failure, pneumonia, septicemia, stroke, and urinary tract infection are the top priorities for prevention, early recognition, and intervention of postoperative complications among surgical patients with dementia. Further efforts are needed to determine specific protocols for health care teams serving this population.	**→ Suggests that for patients undergoing surgical procedures, those with dementia have a higher rate of postoperative complications.**
57	II / A / 10	Screen for Dementia; Screening tool	Freitas S, Simões MR, Alves L, Duro D, Santana I. Montreal Cognitive Assessment (MoCA): validation study for frontotemporal dementia. J Geriatr Psychiatry Neurol. 2012 Sep; 25(3): 146-54. PMID: 22859702	2/B		The Montreal Cognitive Assessment (MoCA) is a brief instrument developed for the screening of milder forms of cognitive impairment, having surpassed the well-known limitations of the Mini-Mental State Examination (MMSE). The aim of the present study was to validate the MoCA as a cognitive screening test for behavioral-variant frontotemporal dementia (bv-FTD) by examining its psychometric properties and diagnostic accuracy. Three matched subgroups of participants were considered: bv-FTD (n = 50), Alzheimer disease (n = 50), and a control group of healthy adults (n = 50). Compared with the MMSE, the MoCA demonstrated consistently superior psychometric properties and discriminant capacity, providing comprehensive information about the patients' cognitive profiles. The diagnostic accuracy of MoCA for bv-FTD was extremely high (area under the curve AUC [MoCA] = 0.934, 95% confidence interval [CI] = 0.866-.974; AUC [MMSE] = 0.772, 95% CI = 0.677-0.850). With a cutoff below 17 points, the MoCA results for sensitivity, specificity, positive predictive value, negative predictive value, and classification accuracy were significantly superior to those of the MMSE. The MoCA is a sensitive and accurate instrument for screening the patients with bv-FTD and represents a better option than the MMSE.	Validates use of MoCA as an instrument for screening for cognitive impairment. **→ Limitation: study cohort is patients undergoing hip surgery for displaced femoral neck fracture.**
58	II / A / 11	Depression screening	Wahlman M(1), Häkkinen A, Dekker J, Marttinen I, Vihtonen K, Neva MH. The prevalence of depressive symptoms before and after surgery and its association with disability in patients undergoing lumbar spinal fusion. Eur Spine J. 2014 Jan;23(1):129-34. PMID: 23880866	2/B		PURPOSE: The aim of this study was to evaluate the prevalence of depressive symptoms and disability pre-operatively, at 3 months and at 1 year after lumbar spine fusion surgery. METHODS: Data was extracted from a dedicated lumbar spine fusion register, giving 232 patients (mean age 62 years, 158 females) who had undergone instrumented lumbar spine fusion. The frequency of depressive symptoms and disability was evaluated using the Depression Scale (DEPS) and Oswestry Disability Index (ODI). RESULTS: Depressive symptoms were found in 34, 13, and 15 % of the patients pre-operatively, at 3 months and at 1 year after surgery, respectively. The mean DEPS score decreased from 16.2 to 8.6 ($p < 0.001$) in patients who had depressive symptoms pre-operatively, and from 6.1 to 3.8 ($p < 0.001$) in those patients without pre-operative depressive symptoms. The mean ODI values pre-operatively, at 3 months and at 1 year after surgery were 53, 30, and 23, respectively, in patients with pre-operative depressive symptoms and 41, 23, and 20 in those patients without pre-operative depressive symptoms. The differences between the groups were statistically significant at all time points ($p < 0.001$). CONCLUSIONS: One-third of our patients with chronic back pain undergoing spinal fusion had depressive symptoms pre-operatively. The prevalence of depressive symptoms decreased after surgery. Although disability remained higher in those patients who had reported depressive symptoms pre-operatively, disability did decrease significantly in both groups post-operatively. Thus, there is no need to exclude depressive patients from operation, but screening measures and appropriate treatment practises throughout both pre-operative and post-operative periods are encouraged.	Prospective cohort study from 2 Finnish hospitals with good follow-up. High prevalence of depression prior to lumbar fusion, improves following surgery, but remains above control population. **→ Supports the conclusion that depression is common in patients prior to and following lumbar fusion.**

59	II / A / 11	Depression screening	Sinikallio S(1), Aalto T, Airaksinen O, Herno A, Kröger H, Savolainen S, Turunen V, Viinamäki H. Depression is associated with poorer outcome of lumbar spinal stenosis surgery. Eur Spine J. 2007 Jul;16(7):905-12. PMID: 17394027	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2219645/pdf/586_2007_Article_349.pdf	The objective of this observational prospective study was to investigate the effect of depression on short-term outcome after lumbar spinal stenosis (LSS) surgery. Surgery was performed on 99 patients with clinically and radiologically defined LSS, representing ordinary LSS patients treated at the secondary care level. They completed questionnaires before surgery and 3 months postoperatively. Depression was assessed with the 21-item Beck Depression Inventory (BDI). Physical functioning and pain were assessed with Oswestry disability index, Stucki Questionnaire, self-reported walking ability, visual analogue scale (VAS) and pain drawing. Preoperatively, 20% of the patients had depression. In logistic regression analyses, significant associations were seen between preoperative depression and postoperative high Oswestry disability and Stucki severity scores and high intensity of pain (VAS score). In subsequent analyses, the patients with continuous depression, measured with BDI (60% of the patients who had preoperative depression), showed fewer improvements in symptom severity, disability score, pain intensity and walking capacity than the patients who did not experience depression at any phase. In those patients who recovered from depression, according to BDI-scores (35% of the patients with preoperative depression), the postoperative improvement was rather similar to the improvement seen in the normal mood group. In the surgical treatment of LSS, we recommend that the clinical practice should include an assessment of depression.	Prospective cohort study measuring prognosis for recovery in patients with preoperative depression. Patients remaining with persistent depression had less improvement following surgery. Small "n." Follow-up limited to three months. Type of surgery not specified and follow-up care not specified. **→ Supports value of preoperative detection of depression.**
60	II / A / 13	Screen for Osteoporosis	Schreiber JJ, Hughes AP, Taher F, Girardi FP. An association can be found between hounsfield units and success of lumbar spine fusion. HSS J. 2014 Feb;10(1):25-9. PMID: 24482618	2/B		BACKGROUND: Measuring Hounsfield units (HUs) from computed tomography (CT) scans has recently been proposed as a tool for assessing vertebral bone quality, as it has been associated with bone mineral density, compressive strength, and fracture risk. Vertebral bone quality is believed to be an important determinant of outcome and complication rates following spine surgery and potentially influences success of interbody spinal fusion. QUESTIONS/PURPOSES: The purpose of this study was to investigate the association between HU on CT scans and fusion success in patients with lateral transpsoas surgery for lumbar interbody fusion (LIF). METHODS: The CT scans of 28 patients with a combined 52 levels of stand-alone LIF were evaluated at a minimum of 12 weeks postoperatively. Coronal and sagittal images were evaluated for evidence of fusion, and HU values were collected from axial images. HU measurements were also taken from vertebral bodies proximal to the construct to evaluate global bone quality. RESULTS: Of the 52 LIF levels, 73% were assessed as fused and 27% were nonunited at the time of evaluation. The successful fusion levels had significantly higher HU measurements than the nonunion levels (203.3 vs. 139.8, $p < 0.001$). Patients with successful fusion constructs also had higher global bone density when vertebral bodies proximal to the construct were compared (133.7 vs. 107.3, $p < 0.05$). CONCLUSION: With the aging population and increasing prevalence of osteoporosis, preoperative assessment of bone quality prior to spinal fusion deserves special consideration. We found that a successful lumbar fusion was associated with patients with higher bone density, as assessed with HU, both globally and within the fusion construct, as compared to patients with CT evidence of nonunion.	Retrospective cohort study of 28 patients with spinal fusion with subsequent measurement of bone quality as judged by CT scans (Hounsfield Units). Patients with successful fusion had higher global bone density than patients with nonfusion, as measured at minimum 12 weeks postoperative. **→ Low quality study due to small cohort and retrospective design. Relates successful lumbar fusion to higher bone density.**
61	II / A / 13	Screen for Osteoporosis	Chin DK(1), Park JY, Yoon YS, Kuh SU, Jin BH, Kim KS, Cho YE. Prevalence of osteoporosis in patients requiring spine surgery: incidence and significance of osteoporosis in spine disease. Osteoporos Int. 2007 Sep;18(9):1219-24. PMID: 17387420	2/B		The purpose of this study is to evaluate the incidence of osteoporosis in patients requiring spine surgery. Among patients older than 50 years, the rate of osteoporosis in males was 14.5% and the rate osteoporosis in females was 51.3%. We strongly recommend an evaluation and treatment for osteoporosis in the patients requiring spine surgery, especially in females over 50 years old.INTRODUCTION: Because lifespan is increasing, there is an increase in the incidence of osteoporosis in elderly spine surgery patients. The osteoporosis may adversely influence the fusion rate and the surgical outcome. The purpose of this study is to evaluate the incidence of osteoporosis in patients requiring spine surgery. METHODS: A total of 1,321 patients underwent spine surgeries at our institute from January 1, 2005 to December 31, 2005. Among them, there were 562 patients (42.5%) younger than 50 years old, and 759 patients (57.6%) older than 50 years old. Prior to operation, we evaluated the patients for osteoporosis on both the femur head and lumbar spine by measuring the bone mineral density (BMD) by the dual-energy X-ray absorptiometry (DXA). Based on the World Health Organization (WHO) criteria for osteoporosis, we chose the T-score to determine normal (>-1), osteopenia (-1>or=, >-2.5), and osteoporosis (<or=-2.5). Among the 562 patients younger than 50 years, DXA was performed in 22 (3.9%) patients and there were 13 (2.3%) cases of osteopenia and 2 (0.3%) cases of osteoporosis. RESULTS: Among 759 patients older than 50 years, DXA was performed on 516 (68.0%) patients, 193 males and 323 females. Among the male patients, there were 89 (46.1%) patients with osteopenia and 28 (14.5%) with osteoporosis. Among the female patients, there were 134 (41.4%) with osteopenia and 166 (51.3%) with osteoporosis. The incidence of osteoporosis was higher in female patients and significantly increased with increasing age. Among 759 patients older than 50 years, 676 patients underwent a major spine operation with or without fusion. Among these patients, DXA was performed in 446 (66.0%) patients and there were 207 (46.4%) patients with osteopenia and 139 (31.1%) with osteoporosis. CONCLUSIONS: The patients over 50 year-old who need spine operation have osteoporosis often. In conclusion, the number of spine operations in elderly patients is increasing and the incidence of osteoporosis in spine surgery patients is also increasing. We strongly recommend an evaluation for osteoporosis and post-operative treatment for osteoporosis in patients over 50 years old, especially for female patients.	Observational study of 1,321 Korean patients undergoing spine surgery with bone density measured prior to surgery. Prevalence of osteoporosis in patients over 50 years were 14.5% for males and 51.3% for females. No outcome data reported. May not be applicable to non-Korean populations. **→ Study records high prevalence of osteoporosis in patients over 50 years requiring spine surgery.**

62	II / A / 4	Liver function (prothrombin, proteins, etc.)	Lin T.-Y., Liao J.-C., Chen W.-J., Chen L.-H., Niu C.-C., Fu T.-S., Lai P.-L., Tsai T.-T. Surgical risks and perioperative complications of instrumented lumbar surgery in patients with liver cirrhosis. Biomedical Journal, 2014 Jan-Feb; 37(1): 18-23. PMID: 24667674	2/B	http://www.biomedj.org/article.asp?issn=2319-4170;year=2014;volume=37;issue=1;spage=18;epage=23;aulast=Lin	Background: Patients with liver cirrhosis have high surgical risks due to malnutrition, impaired immunity, coagulopathy, and encephalopathy. However, there is no information in English literature about the results of liver cirrhotic patients who underwent instrumented lumbar surgery. The purpose of this study is to report the perioperative complications, clinical outcomes and determine the surgical risk factors in cirrhotic patients. Methods: We retrospectively reviewed 29 patients with liver cirrhosis who underwent instrumented lumbar surgery between 1997 and 2009. The hepatic functional reserves of the patients were recorded according to the Child-Turcotte-Pugh scoring system. Besides, fourteen other variables and perioperative complications were also collected. To determine the risks, we divided the patients into two groups according to whether or not perioperative complications developed. Results: Of the 29 patients, 22 (76%) belonged to Child class A and 7 (24%) belonged to Child class B. Twelve patients developed one or more complications. Patients with Child class B carried a significantly higher incidence of complications than those with Child class A (p = 0.011). In the Child class A group, patients with 6 points had a significantly higher incidence of complications than those with 5 points (p = 0.025). A low level of albumin was significantly associated with higher risk, and a similar trend was also noted for the presence of ascites although statistical difference was not reached. Conclusion: The study concludes that patients with liver cirrhosis who have undergone instrumented lumbar surgery carry a high risk of developing perioperative complications, especially in those with a Child-Turcotte-Pugh score of 6 or more.	Retrospective cohort study with few patients, including those treated as early as 1997. Uncontrolled for confounding factors other than liver function. Study showed higher risk of complications in patients with cirrhosis (Child-Turcotte-Pugh* score of 6 or more). **→ Supports use of Child-Turcotte-Pugh score for assessing risk for perioperative complications and recommending caution in patients with cirrhosis, particularly w/ score of 6 or more.** * C-T-P score is composite of five clinical indicators of liver disease: total bilirubin, serum albumin, PT INR, ascites, and hepatic encephalopathy.
63	II / A / 5	Opioids	Washington State Department of Labor and Industries. Guideline for prescribing opioids to treat pain in injured workers. Effective July 1, 2013.	VM Tier-2 Source	http://www.lni.wa.gov/claimsins/Files/OMD/MedTreat/FINALOpioidGuideline010713.pdf	The Washington State Department of Labor & Industries (L&I, or the department) is officially adopting the Interagency Guideline on Opioid Dosing for Chronic Non-Cancer Pain as developed by the Agency Medical Directors' Group (AMDG Guideline) and revised in June 2010 [1]. The AMDG Guideline represents the best practices and universal precautions necessary to safely and effectively prescribe opioids to treat patients with chronic non-cancer pain. This guideline is a supplement to both the AMDG Guideline and the Department of Health's (DOH) pain management rules, and provides information specific to treating injured workers covered by Washington State workers' compensation [3]. Both the AMDG Guideline and this guideline are intended for use by health care providers, the department, insurers, and utilization review staff. This guideline was developed in 2011-2012 by the Industrial Insurance Medical Advisory Committee (IIMAC) and its subcommittee on chronic non-cancer pain. It is based on the best available clinical and scientific evidence from a systematic review of the literature and a consensus of expert opinion. The IIMAC's primary goal is to provide standards that ensure the highest quality of care for injured workers in Washington State.	Recommends postoperative use of opioids should be limited to no longer than six weeks. Also provides recommendations for perioperative management of patients on chronic opioid therapy. **→ L&I guide to use of opioids.**
64	II / A / 6	Smoking Cessation	Møller AM, Villebro N, Pedersen T, Tønnesen H. Effect of preoperative smoking intervention on postoperative complications: a randomised clinical trial. Lancet. 2002 Jan 12; 359(9301): 114-7. PMID: 11809253	1/A	http://dx.doi.org/10.1016/S0140-6736(02)07369-5	BACKGROUND: Smokers are at higher risk of cardiopulmonary and wound-related postoperative complications than non-smokers. Our aim was to investigate the effect of preoperative smoking intervention on the frequency of postoperative complications in patients undergoing hip and knee replacement. METHODS: We did a randomised trial in three hospitals in Denmark. 120 patients were randomly assigned 6-8 weeks before scheduled surgery to either the control (n=60) or smoking intervention (60) group. Smoking intervention was counselling and nicotine replacement therapy, and either smoking cessation or at least 50% smoking reduction. An assessor, who was masked to the intervention, registered the occurrence of cardiopulmonary, renal, neurological, or surgical complications and duration of hospital admittance. The main analysis was by intention to treat. FINDINGS: Eight controls and four patients from the intervention group were excluded from the final analysis because their operations were either postponed or cancelled. Thus, 52 and 56 patients, respectively, were analysed for outcome. The overall complication rate was 18% in the smoking intervention group and 52% in controls (p=0.0003). The most significant effects of intervention were seen for wound-related complications (5% vs 31%, p=0.001), cardiovascular complications (0% vs 10%, p=0.08), and secondary surgery (4% vs 15%, p=0.07). The median length of stay was 11 days (range 7-55) in the intervention group and 13 days (8-65) in the control group. INTERPRETATION: An effective smoking intervention programme 6-8 weeks before surgery reduces postoperative morbidity, and we recommend, on the basis of our results, this programme be adopted	Supports the conclusion that smoking intervention prior to surgery reduces postoperative morbidity. **→ Cohort is patients undergoing hip or knee replacement.**

65	II / A / 6	Smoking Cessation	Thomsen T, Villebro N, Møller AM. Interventions for preoperative smoking cessation. Cochrane Database Syst Rev. 2010 Jul 7;(7):CD002294. PMID: 20614429	VM Tier-1 Source	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-01675&LSLINK=450&D=coch	BACKGROUND: Smokers have a substantially increased risk of postoperative complications. Preoperative smoking intervention may be effective in decreasing this incidence, and surgery may constitute a unique opportunity for smoking cessation interventions. OBJECTIVES: The objective of this review was to assess the effect of preoperative smoking intervention on smoking cessation at the time of surgery and 12 months postoperatively and on the incidence of postoperative complications. SEARCH STRATEGY: The specialized register of the Cochrane Tobacco Addiction Group was searched using the free text and keywords (surgery) or (operation) or (anaesthesia) or (anesthesia). MEDLINE, EMBASE and CINAHL were also searched, combining tobacco- and surgery-related terms. Most recent search April 2010. SELECTION CRITERIA: Randomized controlled trials that recruited people who smoked prior to surgery, offered a smoking cessation intervention, and measured preoperative and long-term abstinence from smoking and/or the incidence of postoperative complications. DATA COLLECTION AND ANALYSIS: The authors independently assessed studies to determine eligibility. Results were discussed between the authors. MAIN RESULTS: Eight trials enrolling a total of 1156 people met the inclusion criteria. One of these did not report cessation as an outcome. Two trials initiated multisession face to face counselling at least 6 weeks before surgery whilst six used a brief intervention. Nicotine replacement therapy (NRT) was offered or recommended to some or all participants in seven trials. Six trials detected significantly increased smoking cessation at the time of surgery, and one approached significance. Subgroup analyses showed that both intensive and brief intervention significantly increased smoking cessation at the time of surgery; pooled RR 10.76 (95% confidence interval (CI) 4.55 to 25.46, two trials) and RR 1.41 (95% CI 1.22 to 1.63, five trials) respectively. Four trials evaluating the effect on long-term smoking cessation found a significant effect; pooled RR 1.61 (95% CI 1.12 to 2.33). However, when pooling intensive and brief interventions separately, only intensive intervention retained a significant effect on long-term smoking cessation; RR 2.96 (95% CI 1.57 to 5.55, two trials).Five trials examined the effect of smoking intervention on postoperative complications. Pooled risk ratios were 0.70 (95% CI 0.56 to 0.88) for developing any complication; and 0.70 (95% CI 0.51 to 0.95) for wound complications. Exploratory subgroup analyses showed a significant effect of intensive intervention on any complications; RR 0.42 (95% CI 0.27 to 0.65) and on wound complications RR 0.31 (95% CI 0.16 to 0.62). For brief interventions the effect was not statistically significant but CIs do not rule out a clinically significant effect (RR 0.96 (95% CI 0.74 to 1.25) for any	Meta-analysis of RCTs addressing issue of pre-op smoking intervention on shsosrt and long-term smoking cessation and post-op complications. **→ Supports the value of smoking interventions to reduce post-operative surgical morbidity.**
66	II / A / 6	Smoking Cessation	Lindström D, Sadr Azodi O, Wladis A, Tønnesen H, Linder S, Nåsell H, Ponzer S, Adami J. Effects of a perioperative smoking cessation intervention on postoperative complications: a randomized trial. Ann Surg. 2008 Nov; 248(5): 739-45. PMID: 18948800	1/A	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00000658-200811000-00008&LSLINK=80&D=ovft	OBJECTIVE: To determine whether an intervention with smoking cessation starting 4 weeks before general and orthopedic surgery would reduce the frequency of postoperative complications. SUMMARY BACKGROUND DATA: Complications are a major concern after elective surgery and smokers have an increased risk. There is insufficient evidence concerning how the duration of preoperative smoking intervention affects postoperative complications. METHODS: A randomized controlled trial, conducted between February 2004 and December 2006 at 4 university-affiliated hospitals in the Stockholm region, Sweden. The outcome assessment was blinded. The follow-up period for the primary outcome was 30 days. Eligibility criteria were active daily smokers, aged 18 to 79 years. Of the 238 patients assessed, 76 refused participating, and 117 men and women undergoing surgery for primary hernia repair, laparoscopic cholecystectomy, or a hip or knee prosthesis were enrolled. INTERVENTION: Smoking cessation therapy with individual counseling and nicotine substitution started 4 weeks before surgery and continued 4 weeks postoperatively. The control group received standard care. The main outcome measure was frequency of any postoperative complication. RESULTS: An intention-to-treat analysis showed that the overall complication rate in the control group was 41%, and in the intervention group, it was 21% (P = 0.03). Relative risk reduction for the primary outcome of any postoperative complication was 49% and number needed to treat was 5 (95% CI, 3-40). An analysis per protocol showed that abstainers had fewer complications (15%) than those who continued to smoke or only reduced smoking (35%), although this difference was not statistically significant. CONCLUSION: Perioperative smoking cessation seems to be an effective tool to reduce postoperative complications even if it is introduced as late as 4 weeks before surgery.	RCT at four Swedish hospitals of smokers undergoing orthopedic or general surgery.Relative risk reduction for any postop complication was 49% and number needed to treat was 5. **→ Supports the conclusion that smoking cessation prior to surgery reduces postoperative complications if smoking discontinued as late as four weeks prior to surgery.**
67	II / A / 7	Unhealthy alcohol use	Smith PC, Schmidt SM, Allensworth-Davies D, Saitz R. Primary care validation of a single-question alcohol screening test. J Gen Intern Med. 2009 Jul; 24(7): 783-8. PMID: 19247718	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2695521/	BACKGROUND: Unhealthy alcohol use is prevalent but under-diagnosed in primary care settings. OBJECTIVE: To validate, in primary care, a single-item screening test for unhealthy alcohol use recommended by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). DESIGN: Cross-sectional study. PARTICIPANTS: Adult English-speaking patients recruited from primary care waiting rooms. MEASUREMENTS: Participants were asked the single screening question, "How many times in the past year have you had X or more drinks in a day?", where X is 5 for men and 4 for women, and a response of 1 or greater [corrected] is considered positive. Unhealthy alcohol use was defined as the presence of an alcohol use disorder, as determined by a standardized diagnostic interview, or risky consumption, as determined using a validated 30-day calendar method. MAIN RESULTS: Of 394 eligible primary care patients, 286 (73%) completed the interview. The single-question screen was 81.8% sensitive (95% confidence interval (CI) 72.5% to 88.5%) and 79.3% specific (95% CI 73.1% to 84.4%) for the detection of unhealthy alcohol use. It was slightly more sensitive (87.9%, 95% CI 72.7% to 95.2%) but was less specific (66.8%, 95% CI 60.8% to 72.3%) for the detection of a current alcohol use disorder. Test characteristics were similar to that of a commonly used three-item screen, and were affected very little by subject demographic characteristics. CONCLUSIONS: The single screening question recommended by the NIAAA accurately identified unhealthy alcohol use in this sample of primary care patients. These findings support the use of this brief screen in primary care.	**→ Supports use of a single question screen to identify unhealthy alcohol use.**

68	II / A /3	Nutritional status; Reduced serum albumin	van Stijn MF, Korkic-Halilovic I, Bakker MS, van der Ploeg T, van Leeuwen PA, Houjijk AP. Preoperative nutrition status and postoperative outcome in elderly general surgery patients: a systematic review. JPEN: Journal of Parenteral & Enteral Nutrition, 2013 Jan; 37(1): 37-43. PMID: 22549764	2/B	http://pen.sagepub.com/content/37/1/37.full.pdf+html	BACKGROUND: Poor nutrition status is considered a risk factor for postoperative complications in the adult population. In elderly patients, who often have a poor nutrition status, this relationship has not been substantiated. Thus, the aim of this systematic review was to assess the merit of preoperative nutrition parameters used to predict postoperative outcome in elderly patients undergoing general surgery. METHODS: A systematic literature search of 10 consecutive years, 1998-2008, in PubMed, EMBASE, and Cochrane databases was performed. Search terms used were nutrition status, preoperative assessment, postoperative outcome, and surgery (hip or general), including their synonyms and MeSH terms. Limits used in the search were human studies, published in English, and age (65 years or older). Articles were screened using inclusion and exclusion criteria. All selected articles were checked on methodology and graded. RESULTS: Of 463 articles found, 15 were included. They showed profound heterogeneity in the parameters used for preoperative nutrition status and postoperative outcome. The only significant preoperative predictors of postoperative outcome in elderly general surgery patients were serum albumin and >= 10% weight loss in the previous 6 months. CONCLUSIONS: This systematic review revealed only 2 preoperative parameters to predict postoperative outcome in elderly general surgery patients: weight loss and serum albumin. Both are open to discussion in their use as a preoperative nutrition parameter. Nonetheless, serum albumin seems a reliable preoperative parameter to identify a patient at risk for nutrition deterioration and related complicated postoperative course.	Focus is pre-operative nutritional state as a risk factor for complications for patients 65 years of age or older. **→ Supports conclusion that reduced serum albumin and weight loss over previous six months predicts postoperative complications for elderly general surgery patients.**
69	II / B / 1	Shared Decision Making	Chou R, et al. Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: an evidence-based clinical practice guideline from the American Pain Society. Spine 2009 May 1; 34(10): 1066-77. PMID: 19363457	VM Tier 2 Source	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00007632-200905010-00014&D=ovft&PDF=y	STUDY DESIGN: Clinical practice guideline. OBJECTIVE: To develop evidence-based recommendations on use of interventional diagnostic tests and therapies, surgeries, and interdisciplinary rehabilitation for low back pain of any duration, with or without leg pain. SUMMARY OF BACKGROUND DATA: Management of patients with persistent and disabling low back pain remains a clinical challenge. A number of interventional diagnostic tests and therapies and surgery are available and their use is increasing, but in some cases their utility remains uncertain or controversial. Interdisciplinary rehabilitation has also been proposed as a potentially effective noninvasive intervention for persistent and disabling low back pain. METHODS: A multidisciplinary panel was convened by the American Pain Society. Its recommendations were based on a systematic review that focused on evidence from randomized controlled trials. Recommendations were graded using methods adapted from the US Preventive Services Task Force and the Grading of Recommendations, Assessment, Development, and Evaluation Working Group. RESULTS: Investigators reviewed 3348 abstracts. A total of 161 randomized trials were deemed relevant to the recommendations in this guideline. The panel developed a total of 8 recommendations. CONCLUSION: Recommendations on use of interventional diagnostic tests and therapies, surgery, and interdisciplinary rehabilitation are presented. Due to important trade-offs between potential benefits, harms, costs, and burdens of alternative therapies, shared decision-making is an important component of a number of the recommendations.	Well-defined methodology and grading scheme. Recommendation #2: In patients with nonradicular low back pain who do not respond to usual, noninterdisciplinary interventions, it is recommended that clinicians consider intensive interdisciplinary rehabilitation with a cognitive/behavioral emphasis (strong recommendation, high-quality evidence). Recommendation #4: "It is recommended that shared decision-making regarding surgery for nonspecific low back pain include a specific discussion about intensive interdisciplinary rehabilitation as a similarly effective option, the small to moderate average benefit from surgery versus noninterdisciplinary nonsurgical therapy, and the fact that the majority of such patients who undergo surgery do not experience an optimal outcome (defined as minimum or no pain, discontinuation of or occasional pain medication use, and return of high level function)." Recommendation #7: "It is recommended that shared decision-making regarding surgery include a specific discussion about moderate average benefits, which appear to decrease over time in patients who undergo surgery." supports shared decision making **→ Supports shared decision making.**
70	II / B / 1	Shared Decision Making	Arterburn D. Introducing decision aids at Group Health was linked to sharply lower hip and knee surgery rates and costs. Health Affairs, 2012, Sep; 31(9): 2094-104. PMID: 22949460	2/B	http://content.healthaffairs.org/content/31/9/2094.full.pdf+html	Decision aids are evidence-based sources of health information that can help patients make informed treatment decisions. However, little is known about how decision aids affect health care use when they are implemented outside of randomized controlled clinical trials. We conducted an observational study to examine the associations between introducing decision aids for hip and knee osteoarthritis and rates of joint replacement surgery and costs in a large health system in Washington State. Consistent with prior randomized trials, our introduction of decision aids was associated with 26 percent fewer hip replacement surgeries, 38 percent fewer knee replacements, and 12-21 percent lower costs over six months. These findings support the concept that patient decision aids for some health conditions, for which treatment decisions are highly sensitive to both patients' and physicians' preferences, may reduce rates of elective surgery and lower costs.	Cohort is patients considering joint replacement surgery. **→ Supports use of shared decision-making to avoid surgery that the patient with otherwise not choose.**

71		Shared Decision Making	Boss EF, Mehta N, Nagarajan N, Links A, Benke JR, Berger Z, Espinel A, Meier J, Lipstein EA. Shared Decision Making and Choice for Elective Surgical Care: A Systematic Review. Otolaryngol Head Neck Surg. 2016 Mar;154(3):405-20. PMID: 26645531	2/B	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4857133/	OBJECTIVE: Shared decision making (SDM), an integrative patient-provider communication process emphasizing discussion of scientific evidence and patient/family values, may improve quality care delivery, promote evidence-based practice, and reduce overuse of surgical care. Little is known, however, regarding SDM in elective surgical practice. The purpose of this systematic review is to synthesize findings of studies evaluating use and outcomes of SDM in elective surgery. DATA SOURCES: PubMed, Cochrane CENTRAL, EMBASE, CINAHL, and SCOPUS electronic databases. REVIEW METHODS: We searched for English-language studies (January 1, 1990, to August 9, 2015) evaluating use of SDM in elective surgical care where choice for surgery could be ascertained. Identified studies were independently screened by 2 reviewers in stages of title/abstract and full-text review. We abstracted data related to population, study design, clinical dilemma, use of SDM, outcomes, treatment choice, and bias. RESULTS: Of 10,929 identified articles, 24 met inclusion criteria. The most common area studied was spine (7 of 24), followed by joint (5 of 24) and gynecologic surgery (4 of 24). Twenty studies used decision aids or support tools, including modalities that were multimedia/video (13 of 20), written (3 of 20), or personal coaching (4 of 20). Effect of SDM on preference for surgery was mixed across studies, showing a decrease in surgery (9 of 24), no difference (8 of 24), or an increase (1 of 24). SDM tended to improve decision quality (3 of 3) as well as knowledge or preparation (4 of 6) while decreasing decision conflict (4 of 6). CONCLUSION: SDM reduces decision conflict and improves decision quality for patients making choices about elective surgery. While net findings show that SDM may influence patients to choose surgery less often, the impact of SDM on surgical utilization cannot be clearly ascertained.	A systematic review of 24 studies evaluating the effect of shared decision-making on decision conflict and decision quality. 17 out of 20 measured outcomes related to the use of a decision aid without additional personal communication with providers. Deficiencies in methods include lack of attention to confounding variables (e.g. literacy, age, race, ethnicity, socioeconmic status). Authors conclude that "the effect of SDM on preference-sensitive surgery choice is" unclear but appears to improve the healthcare experience of the patient regardless of the decision. **--> This area remains one of substantial uncertainty but it appears that SDM improves the patient experience regardless of the choice of therapy.**
72	II / B / 2	Care partner		3/C			Unable to identify relevant citation for use of lay care partner to support patient through pre- and post-operative care. **→ Unvalidated usual practice with face value.**
73	II / B / 3	Advance Directives	Nicholas LH. Langa KM. Iwashyna TJ. Regional variation in the association between advance directives and end-of-life Medicare expenditures. JAMA, 2011 Oct 5; 306(13): 1447-53. PMID: 21972306	2/B	http://jama.jamanetwork.com/article.aspx?articleid=1104465	CONTEXT: It is unclear if advance directives (living wills) are associated with end-of-life expenditures and treatments. OBJECTIVE: To examine regional variation in the associations between treatment-limiting advance directive use, end-of-life Medicare expenditures, and use of palliative and intensive treatments. DESIGN, SETTING, AND PATIENTS: Prospectively collected survey data from the Health and Retirement Study for 3302 Medicare beneficiaries who died between 1998 and 2007 linked to Medicare claims and the National Death Index. Multivariable regression models examined associations between advance directives, end-of-life Medicare expenditures, and treatments by level of Medicare spending in the decedent's hospital referral region. MAIN OUTCOME MEASURES: Medicare expenditures, life-sustaining treatments, hospice care, and in-hospital death over the last 6 months of life. RESULTS: Advance directives specifying limits in care were associated with lower spending in hospital referral regions with high average levels of end-of-life expenditures (-$5585 per decedent; 95% CI, -$10,903 to -$267), but there was no difference in spending in hospital referral regions with low or medium levels of end-of-life expenditures. Directives were associated with lower adjusted probabilities of in-hospital death in high- and medium-spending regions (-9.8%; 95% CI, -16% to -3% in high-spending regions; -5.3%; 95% CI, -10% to -0.4% in medium-spending regions). Advance directives were associated with higher adjusted probabilities of hospice use in high- and medium-spending regions (17%; 95% CI, 11% to 23% in high-spending regions, 11%; 95% CI, 6% to 16% in medium-spending regions), but not in low-spending regions. CONCLUSION: Advance directives specifying limitations in end-of-life care were associated with significantly lower levels of Medicare spending, lower likelihood of in-hospital death, and higher use of hospice care in regions characterized by higher levels of end-of-life spending.	**→ Supports the use of advance directives to reduce the use of inappropriate and costly end-of-life care.**
74	II / C / 1 / a	Fitness for Surgery; Cardiopulmonary Fitness	~~Fleisher LA, et al.; American College of Cardiology/American Heart Association Task Force on Practice Guidelines; American Society of Echocardiography; American Society of Nuclear Cardiology; Heart Rhythm Society; Society of Cardiovascular Anesthesiologists; Society for Cardiovascular Angiography and Interventions; Society for Vascular Medicine and Biology; Society for Vascular Surgery. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: a report... Circulation. 2007 Oct 23; 116(17): e418-99. PMID: 17901357~~ ** See below for update to this citation	VM Tier-2 Source	http://circ.ahajournals.org/content/116/17/e418.full	Presents guideline for cardiovascular evaluation for patients that will have non cardiac surgery.	Society guideline. **→ Guide to preoperative evaluation for non-cardiac surgery.**

75	II / C / 1 / a	Fitness for Surgery; Cardiopulmonary Fitness	Fleisher LA, Fleischmann KE, Auerbach AD, Barnason SA, Beckman JA, Bozkurt B, Davila-Roman VG, Gerhard-Herman MD, Holly TA, Kane GC, Marine JE, Nelson MT, Spencer CC, Thompson A, Ting HH, Uretsky BF, Wijeysundera DN. 2014 ACC/AHA guideline on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. Developed in collaboration with the American College of Surgeons, American Society of Anesthesiologists, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Vascular Medicine Endorsed by the Society of Hospital Medicine. J Nucl Cardiol. 2015 Feb;22(1):162-215. PMID: 25523415	VM Tier-2 Source	http://circ.ahajournals.org/content/early/2014/07/31/CIR.0000000000000106	Abstract not available	High quality society guideline with evidence appraisals --> "The focus of this clinical practice guideline is the perioperative cardiovascular evaluation and management of the adult patient undergoing noncardiac surgery."
76	II / C / 1 / c	Nasal culture; Chlorhexidine	Bode LGM. Et.al. Preventing surgical-site infections in nasal carriers of Staphylococuccus aureus. New England Journal of Medicine, 2010 Jan 7; 362(1): 9-17. PMID: 20054045	1/B	http://www.nejm.org/doi/pdf/10.1056/NEJMoa0808939	BACKGROUND: Nasal carriers of Staphylococcus aureus are at increased risk for health care-associated infections with this organism. Decolonization of nasal and extranasal sites on hospital admission may reduce this risk. METHODS: In a randomized, double-blind, placebo-controlled, multicenter trial, we assessed whether rapid identification of S. aureus nasal carriers by means of a real-time polymerase-chain-reaction (PCR) assay, followed by treatment with mupirocin nasal ointment and chlorhexidine soap, reduces the risk of hospital-associated S. aureus infection. RESULTS: From October 2005 through June 2007, a total of 6771 patients were screened on admission. A total of 1270 nasal swabs from 1251 patients were positive for S. aureus. We enrolled 917 of these patients in the intention-to-treat analysis, of whom 808 (88.1%) underwent a surgical procedure. All the S. aureus strains identified on PCR assay were susceptible to methicillin and mupirocin. The rate of S. aureus infection was 3.4% (17 of 504 patients) in the mupirocin-chlorhexidine group, as compared with 7.7% (32 of 413 patients) in the placebo group (relative risk of infection, 0.42; 95% confidence interval [CI], 0.23 to 0.75). The effect of mupirocin-chlorhexidine treatment was most pronounced for deep surgical-site infections (relative risk, 0.21; 95% CI, 0.07 to 0.62). There was no significant difference in all-cause in-hospital mortality between the two groups. The time to the onset of nosocomial infection was shorter in the placebo group than in the mupirocin-chlorhexidine group (P=0.005). CONCLUSIONS: The number of surgical-site S. aureus infections acquired in the hospital can be reduced by rapid screening and decolonizing of nasal carriers of S. aureus on admission. (Current Controlled Trials number, ISRCTN56186788.	Cohort included a variety of surgical procedures, as well as patients hospitalized for medical issues. **→ Supports treatment of nasal carriers of Staphylococcus aureus to reduce incidence of surgical site infections.**
77	II / C / 1 / c	Reducing nasal colonization; Reducing skin colonization; Chlorhexidine	Rao N. Cannella BA. Crossett LS. Yates AJ. McGough RL. Hamilton CW. Preoperative screening/decolonization for Staphylococcus aureus to prevent orthopedic surgical site infection: prospective cohort study with 2-year follow-up. J Arthroplast, 2011 Dec; 26(8): 1501-7. PMID: 21507604	2/B		Abstract: We quantified surgical site infections (SSIs) after preoperative screening/selective decolonization before elective total joint arthroplasty (TJA) with 2-year follow-up and 2 controls. Concurrent controls (n = 2284) were patients of surgeons not participating in screening/decolonization. Preintervention controls (n = 741) were patients of participating surgeons who underwent TJA the previous year. Staphylococcus aureus nasal carriers (321/1285 [25%]) used intranasal mupirocin and chlorhexidine baths as outpatients. Staphylococcal SSIs occurred in no intervention patients (0/321) and 19 concurrent controls. If all SSIs occurred in carriers and 25% of controls were carriers, staphylococcal SSI rate would have been 3.3% in controls (19/571; P = .001). Overall SSI rate decreased from 2.7% (20/741) in reintervention controls to 1.2% (17/1440) in intervention patients (P = .009). Preoperative screening/selective decolonization was associated with fewer SSIs after elective TJA.	Cohort is patients undergoing total joint replacement. **→ Supports the use of mupirocin nasal swabs and chlorhexidine bath to reduce surgical site infections after total joint surgery.**

78	II / C / 1 / d	Glycemic Control	Dronge AS, Perkal MF, Kancir S, Concato J, Aslan M, Rosenthal RA. Long-term glycemic control and postoperative infectious complications. Arch Surg. 2006 Apr; 141(4): 375-80; discussion 380. PMID: 16618895	2/B	http://archsurg.jamanetwork.com/article.aspx?articleid=398289	Abstract: HYPOTHESIS: Good preoperative glycemic control (hemoglobin A(1c) [HbA(1c)] levels <7%) is associated with decreased postoperative infections. DESIGN: Retrospective observational study using Veterans Affairs National Surgical Quality Improvement Program data from the Veterans Affairs Connecticut Healthcare System from January 1, 2000, through September 30, 2003. SETTING: Veterans Affairs Connecticut Healthcare System, a tertiary referral center and major university teaching site. PATIENTS: Six hundred forty-seven diabetic patients underwent major noncardiac surgery during the study period; 139 were excluded because the HbA(1c) levels were more than 180 days prior to surgery; 19 were excluded for other reasons; 490 diabetic patients were analyzed. The study patients were predominantly nonblack men with a median age of 71 years. MAIN OUTCOME MEASURES: Primary outcomes were infectious complications, including pneumonia, wound infection, urinary tract infection, or sepsis. Bivariate analysis was used first to determine the association of each independent variable (age, race, diabetic treatment, American Society of Anesthesiologists classification, Activities of Daily Living assessment, elective vs emergent procedure, wound classification, operation length, and HbA(1c) levels) with outcome. Factors significant at P<.05 were used in a multivariable logistic regression model. RESULTS: In the multivariable model, age, American Society of Anesthesiologists class, operation length, wound class, and HbA(1c) levels were significantly associated with postoperative infections. Emergency/urgent cases and dependence in Activities of Daily Living were significant in bivariate analysis but failed to reach statistical significance in the multivariable model. An HbA(1c) level of less than 7% was significantly associated with decreased infectious complications with an adjusted odds ratio of 2.13 (95% confidence interval, 1.23-3.70) and a P value of .007. CONCLUSION: Good preoperative glycemic control (HbA(1c) levels <7%) is associated with a decrease in infectious complications across a variety of surgical procedures.	Cohort includes only male patients. **→ Supports value of preoperative blood sugar control in surgical patients.**
79	II / C / 1 / f	Delirium & Adverse Outcomes	Witlox J, Eurelings LS, de Jonghe JF, Kalisvaart KJ, Eikelenboom P, van Gool WA. Delirium in elderly patients and the risk of postdischarge mortality, institutionalization, and dementia: a meta-analysis. JAMA. 2010 Jul 28; 304(4): 443-51. PMID: 20664045	1/A	http://jama.jamanetwork.com/data/Journals/JAMA/4522/jrv05005_443_451.pdf	CONTEXT: Delirium is a common and serious complication in elderly patients. Evidence suggests that delirium is associated with long-term poor outcome but delirium often occurs in individuals with more severe underlying disease. OBJECTIVE: To assess the association between delirium in elderly patients and long-term poor outcome, defined as mortality, institutionalization, or dementia, while controlling for important confounders. DATA SOURCES: A systematic search of studies published between January 1981 and April 2010 was conducted using the databases of MEDLINE, EMBASE, PsycINFO, and CINAHL. STUDY SELECTION: Observational studies of elderly patients with delirium as a study variable and data on mortality, institutionalization, or dementia after a minimum follow-up of 3 months, and published in the English or Dutch language. Titles, abstracts, and articles were reviewed independently by 2 of the authors. Of 2939 references in the original search, 51 relevant articles were identified. DATA EXTRACTION: Information on study design, characteristics of the study population, and outcome were extracted. Quality of studies was assessed based on elements of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for cohort studies. DATA SYNTHESIS: The primary analyses included only high-quality studies with statistical control for age, sex, comorbid illness or illness severity, and baseline dementia. Pooled-effect estimates were calculated with random-effects models. The primary analysis with adjusted hazard ratios (HRs) showed that delirium is associated with an increased risk of death compared with controls after an average follow-up of 22.7 months (7 studies; 271/714 patients [38.0%] with delirium, 616/2243 controls [27.5%]; HR, 1.95 [95% confidence interval {CI}, 1.51-2.52]; I(2), 44.0%). Moreover, patients who had experienced delirium were also at increased risk of institutionalization (7 studies; average follow-up, 14.6 months; 176/527 patients [33.4%] with delirium and 219/2052 controls [10.7%]; odds ratio [OR], 2.41 [95% CI, 1.77-3.29]; I(2), 0%) and dementia (2 studies; average follow-up, 4.1 years; 35/56 patients [62.5%] with delirium and 15/185 controls [8.1%]; OR, 12.52 [95% CI, 1.86-84.21]; I(2), 52.4%). The sensitivity, trim-and-fill, and secondary analyses with unadjusted high-quality risk estimates stratified according to the study characteristics confirmed the robustness of these results. CONCLUSION: This meta-analysis provides evidence that delirium in elderly patients is associated with poor outcome independent of important confounders, such as age, sex, comorbid illness or illness severity, and baseline dementia.+I37:I44	Cohort is elderly patients treated in hospital or acute care setting for medical or surgical conditions. **→ Supports the conclusion that delerium is associated with poor outcomes.**
80	II / C / 2 /a	Dental screening	American Academy of Orthopaedic Surgeons. Prevention of orthopaedic implant infection in patients undergoing dental procedures. Evidence-based guideline and evidence report. 2012	VM Tier-2 Source	http://www.aaos.org/research/guidelines/PUDP/PUDP_guideline.pdf	Recommendation #3: In the absence of reliable evidence linking poor oral health to prosthetic joint infection, it is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene. Grade of Recommendation: Consensus.	"Recommendation #3: In the absence of reliable evidence linking poor oral health to prosthetic joint infection, it is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene. Consensus" **→ Supports patients with implants maintaining good oral health.**

81	II / C / 3 / a	Patient Reported Outcomes	Cella D, Riley W, Stone A, Rothrock N, Reeve B, Yount S, Amtmann D, Bode R, Buysse D, Choi S, Cook K, Devellis R, DeWalt D, Fries JF, Gershon R, Hahn EA, Lai JS, Pilkonis P, Revicki D, Rose M, Weinfurt K, Hays R; PROMIS Cooperative Group. The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005-2008. J Clin Epidemiol. 2010 Nov; 63(11): 1179-94. PMID: 20685078	1/B	http://dx.doi.org/10.1016/j.jclinepi.2010.04.011	OBJECTIVES: Patient-reported outcomes (PROs) are essential when evaluating many new treatments in health care; yet, current measures have been limited by a lack of precision, standardization, and comparability of scores across studies and diseases. The Patient-Reported Outcomes Measurement Information System (PROMIS) provides item banks that offer the potential for efficient (minimizes item number without compromising reliability), flexible (enables optional use of interchangeable items), and precise (has minimal error in estimate) measurement of commonly studied PROs. We report results from the first large-scale testing of PROMIS items. STUDY DESIGN AND SETTING: Fourteen item pools were tested in the U.S. general population and clinical groups using an online panel and clinic recruitment. A scale-setting subsample was created reflecting demographics proportional to the 2000 U.S. census. RESULTS: Using item-response theory (graded response model), 11 item banks were calibrated on a sample of 21,133, measuring components of self-reported physical, mental, and social health, along with a 10-item Global Health Scale. Short forms from each bank were developed and compared with the overall bank and with other well-validated and widely accepted ("legacy") measures. All item banks demonstrated good reliability across most of the score distributions. Construct validity was supported by moderate to strong correlations with legacy measures. CONCLUSION: PROMIS item banks and their short forms provide evidence that they are reliable and precise measures of generic symptoms and functional reports comparable to legacy instruments. Further testing will continue to validate and test PROMIS items and banks in diverse clinical populations.	Test cohort reflected demographics proportional to US population, not individual subsets of population. **→ Validates the PROMIS tool to measure patient-related outcomes.**
Cycle 3: Optimal surgical process							
	III / A		NICE Guideline. Interventional procedures guidance [IPG574] Lateral interbody fusion in the lumbar spine for low back pain. Published date: February 2017	VM Tier 1 Source	https://www.nice.org.uk/guidance/ipg574 Guidance evidence table can be found here: https://www.nice.org.uk/guidance/ipg574/documents/overview-2	"Do not offer spinal fusion for people with low back pain unless as part of a randomised controlled trial." "1.1 Current evidence on the safety of lateral (including extreme, extra and direct lateral) interbody fusion in the lumbar spine for low back pain shows there are serious but well-recognised complications. Evidence on efficacy is adequate in quality and quantity. Therefore, this procedure may be used provided that standard arrangements are in place for clinical governance, consent and audit. 1.2 This procedure should only be done by surgeons with specific training in the technique, who should carry out their initial procedures with an experienced mentor. 1.3 Clinicians should enter details about all patients having lateral interbody fusion in the lumbar spine for low back pain onto the British Spine Registry."	Respected source with robust evidence appraisal. **--> Presents risks and benefits of lateral interbody fusion for low back pain. Guidance does not recommend spinal fusion for low back pain unless part of an RCT.**
	III / A		NICE Interventional Procedures Guidance [IPG578] Minimally invasive sacroiliac joint fusion surgery for chronic sacroliac pain. Published date: April 2017.	VM Tier 1 Source	https://www.nice.org.uk/guidance/ipg578/chapter/1-Recommendations	"1.1 Current evidence on the safety and efficacy of minimally invasive sacroiliac (SI) joint fusion surgery for chronic SI pain is adequate to support the use of this procedure provided that standard arrangements are in place for clinical governance, consent and audit. 1.2 Patients having this procedure should have a confirmed diagnosis of unilateral or bilateral SI joint dysfunction due to degenerative sacroiliitis or SI joint disruption. 1.3 This technically challenging procedure should only be done by surgeons who regularly use image-guided surgery for implant placement. The surgeons should also have had specific training and expertise in minimally invasive SI joint fusion surgery for chronic SI pain."	Respected source with robust evidence appraisal. **--> Guideline for minimally invasive sacrolilia joint fusion surgery for chronic sacroiliac pain.** **Is this procedure out of scope?**
	III / A		NICE Interventional Procedures Guidance [IPG387]. Transaxial interbody lumbosacral fusion. Published date: March 2011		https://www.nice.org.uk/guidance/ipg387	"As a person gets older, the discs that provide support between the bones of the spine can deteriorate because of wear and tear. Sometimes this causes such severe pain and disability that surgery is considered.Transaxial interbody lumbosacral fusion is done through a small cut over the bony structure at the base of the spine connected to the pelvis. It involves removing all, or part, of the damaged disc and inserting an artificial implant and bone graft material into the remaining disc space. The aim is to encourage two spine bones to join together to prevent movement of the painful joint."	**Is this procedure out of scope?**
	III / A		NICE Interventional Procedures Guidance [IPG556]. Percutaneous transforaminal endoscopic lumbar discectomy for sciatica. Published date: April 2016		https://www.nice.org.uk/guidance/ipg556	"Evidence-based recommendations on percutaneous transforaminal endoscopic lumbar discectomy for sciatica in adults. This involves removing part of the damaged spinal disc to relieve the symptoms of sciatica."	**Is this procedure out of scope?**
	III / A		NICE Interventional Procedures Guidance [IPG365]. Interspinous distraction procedures for lumbar spinal stenosis causing neurogenic claudication. Published date: November 2010		https://www.nice.org.uk/guidance/ipg365	"Lumbar spinal stenosis is a narrowing of the spinal canal in the lower part of the back. This causes discomfort in the legs when standing or walking because of pressure on the spinal nerves. This procedure involves implanting a device into the space between two back bones to relieve pressure on the nerves and, therefore, pain in the legs."	**Is this procedure out of scope?**
	III / A		NICE Interventional Procedures Guidance [IPG306]. Prosthetic intervertebral disc replacement in the lumbar spine. Published date: July 2009		https://www.nice.org.uk/guidance/ipg306	"Artificial intervertebral discs have been developed to act as a functional prosthetic replacement unit for intervertebral units in much the same way as prostheses have been developed for a variety of joints such as the hip or knee. The design of most prosthetic discs is similar, with two metallic endplates separated by a more pliable inner core designed to emulate the biomechanical properties of the nucleus pulposus. The implantation of the prosthetic discs involves a small incision below the umbilicus. The diseased disc is partially or fully excised (depending on the prosthesis used). The vertebral endplates and surrounding spinal ligaments are preserved and help maintain implant stability. Single discs can be replaced, or alternatively, several levels can be replaced during the same surgery."	**Is this procedure out of scope?**

	III / A		Machado GC, Ferreira PH, Yoo RI, Harris IA, Pinheiro MB, Koes BW, van Tulder MW, Rzewuska M, Maher CG, Ferreira ML. Surgical options for lumbar spinal stenosis. Cochrane Database Syst Rev. 2016 Nov 1;11:CD012421. PMID: 27801521	2/B	http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD012421/full	BACKGROUND: Hospital charges for lumbar spinal stenosis have increased significantly worldwide in recent times, with great variation in the costs and rates of different surgical procedures. There have also been significant increases in the rate of complex fusion and the use of spinal spacer implants compared to that of traditional decompression surgery, even though the former is known to incur costs up to three times higher. Moreover, the superiority of these new surgical procedures over traditional decompression surgery is still unclear. OBJECTIVES: To determine the efficacy of surgery in the management of patients with symptomatic lumbar spinal stenosis and the comparative effectiveness between commonly performed surgical techniques to treat this condition on patient-related outcomes. We also aimed to investigate the safety of these surgical interventions by including perioperative surgical data and reoperation rates. SEARCH METHODS: Review authors performed electronic searches of the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, CINAHL, AMED, Web of Science, LILACS and three trials registries from their inception to 16 June 2016. Authors also conducted citation tracking on the reference lists of included trials and relevant systematic reviews. SELECTION CRITERIA: This review included only randomised controlled trials that investigated the efficacy and safety of surgery compared with no treatment, placebo or sham surgery, or with another surgical technique in patients with lumbar spinal stenosis. DATA COLLECTION AND ANALYSIS: Two reviewers independently assessed the studies for inclusion and performed the 'Risk of bias' assessment, using the Cochrane Back and Neck Review Group criteria. Reviewers also extracted demographics, surgery details, and types of outcomes to describe the characteristics of included studies. Primary outcomes were pain intensity, physical function or disability status, quality of life, and recovery. The secondary outcomes included measurements related to surgery, such as perioperative blood loss, operation time, length of hospital stay, reoperation rates, and costs. We grouped trials according to the types of surgical interventions being compared and categorised follow-up times as short-term when less than 12 months and long-term when 12 months or more. Pain and disability scores were converted to a common 0 to 100 scale. We calculated mean differences for continuous outcomes and relative risks for dichotomous outcomes. We pooled data using the random-effects model in Review Manager 5.3, and used the GRADE approach to assess the quality of the evidence. MAIN RESULTS: We included a total of 24 randomised controlled trials (reported in 39 published research articles or abstracts) in this review. The trials included	A meta-analysis of 24 randomized controlled trials to determine the efficacy of surgery in patients with symptomatic lumbar spinal stenosis and the comparative effectiveness surgical techniques. No trials compared surgery to nonsurgical care and all trials were judged to be subject to bias. --> "Our results demonstrate that at present, decompression plus fusion and interspinous process spacers have not been shown to be superior to conventional decompression alone."
58	III / A		Sethi RK, Pong RP, Leveque JC, Dean TC, Olivar SJ, Rupp SM. The Seattle Spine Team approach to adult deformity surgery: a systems-based approach to perioperative care and subsequent reduction in perioperative complication rates. Spine Deformity, 2014 March; 2(2): 95-103.	2/B		Abstract Study Design: Retrospective consecutive case review pre- and postintervention. Objectives: Characterize the effects of the intervention. Summary of Background Data: Complication rates in adult spinal deformity surgery are unacceptable. System approaches are necessary to increase patient safety. This group reported on the dualeattending surgeon approach, a live multidisciplinary preoperative screening conference, and the intraoperative protocol for the management of coagulopathy. The outcomes were demonstrated by complication rates before and after the institution of this protocol. Methods: Forty consecutive patients in Group A were managed without the 3-pronged approach. A total of 124 consecutive patients in Group B had a dualeattending surgeon approach, were presented and cleared by a live multidisciplinary preoperative conference, and were managed according to the intraoperative protocol. Results: Group A had an average age of 62 years (range, 39e84 years). Group B had an average age of 64 years (range, 18e84 years). Most patients in both groups had fusions from 9 to 15 levels. Complication rates in Group B were significantly lower (16% vs. 52%) (p!.001). Group B showed significantly lower return rates to the operating room during the perioperative 90-day period (0.8% vs. 12.5%) (p ! .001). Group B also had lower rates of wound infection requiring debridement (1.6% vs. 7.5%), lower rates of deep vein thrombosis/ pulmonary embolism (3.2% vs. 10%), and lower rates of postoperative neurological complications (0.5% vs. 2.5%) (not significant). Group B had significantly lower rates of urinary tract infection requiring antibiotics (9.7% vs. 32.5%) (p ! .001). Conclusions: These data suggests that a team approach consisting of a dualeattending surgeon approach in the operating room, a live preoperative screening conference, and an intraoperative protocol for managing coagulopathy will significantly reduce perioperative complication rates and enhance patient safety in patients undergoing complex spinal reconstructions for adult spinal deformity. _ 2014 Scoliosis Research Society	Retrospective cohort study demonstrating substantial reduction in complications for patients undergoing multilevel fusions. Interventions included dual surgeons, live multidisciplinary conference, and intraoperative management of coagulopathy. Most patients had 9 to 15 fusions. **→ The three interventions were associated with a dramatic reduction in complications-in patients with multilevel fusions.**
59	III / A / 1	Surgical team	Martin BI, Mirza SK, Franklin GM, Lurie JD, MacKenzie TA, Deyo RA. Hospital and surgeon variation in complications and repeat surgery following incident lumbar fusion for common degenerative diagnoses. Health Serv Res. 2013 Feb; 48(1): 1-25. PMID: 22716168	1/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3465627/pdf/nihms379467.pdf	Abstract: OBJECTIVE: To identify factors that account for variation in complication rates across hospitals and surgeons performing lumbar spinal fusion surgery. DATA SOURCES: Discharge registry including all nonfederal hospitals in Washington State from 2004 to 2007. STUDY DESIGN: We identified adults (n = 6,091) undergoing an initial inpatient lumbar fusion for degenerative conditions. We identified whether each patient had a subsequent complication within 90 days. Logistic regression models with hospital and surgeon random effects were used to examine complications, controlling for patient characteristics and comorbidity. PRINCIPAL FINDINGS: Complications within 90 days of a fusion occurred in 4.8 percent of patients, and 2.2 percent had a reoperation. Hospital effects accounted for 8.8 percent of the total variability, and surgeon effects account for 14.4 percent. Surgeon factors account for 54.5 percent of the variation in hospital reoperation rates, and 47.2 percent of the variation in hospital complication rates. The discretionary use of operative features, such as the inclusion of bone morphogenetic proteins, accounted for 30 and 50 percent of the variation in surgeons' reoperation and complication rates, respectively. CONCLUSIONS: To improve the safety of lumbar spinal fusion surgery, quality improvement efforts that focus on surgeons' discretionary use of operative techniques may be more effective than those that target hospitals.	Level 1 prognosis study -- large, representative population, objective and reasonable definitions of exposure and outcome, excellent f/u. Cohort study of patients undergoing lumbar fusion that measures complication rates related to hospital- or surgeon-factors. Hospital effects accounted for 8.8% of the total variability, and surgeon effects account for 14.4%. Surgeon-factors account for 54.5% of the variation in hospital reoperation rates, and 47.2% of the variation in hospital complication rates. **→ Suggests that QI effort should be targeted at the indvidual surgeon level (rather than hospital level) to reduce complication rate.**

60	III / A / 4	Time of surgery start	Kelz RR, Freeman KM, Hosokawa PW, Asch DA, Spitz FR, Moskowitz M, Henderson WG, Mitchell ME, Itani KM. Time of day is associated with postoperative morbidity: an analysis of the national surgical quality improvement program data. Ann Surg. 2008 Mar; 247(3): 544-52. PMID: 18376202	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00000658-200803000-00022&LSLINK=80&D=ovft	OBJECTIVE: To examine the association between surgical start time and morbidity and mortality for nonemergent procedures. SUMMARY BACKGROUND DATA: Patients require medical services 24 hours a day. Several studies have demonstrated a difference in outcomes over the course of the day for anesthetic adverse events, death in the ICU, and dialysis care. The relationship between operation start time and patient outcomes is yet undefined. METHODS: We performed a retrospective cohort study of 144,740 nonemergent general and vascular surgical procedures performed within the VA Medical System 2000-2004 and entered into the National Surgical Quality Improvement Program Database. Operation start time was the independent variable of interest. Logistic regression was used to adjust for patient and procedural characteristics and to determine the association between start time and, in 2 independent models, mortality and morbidity. RESULTS: Unadjusted later start time was significantly associated with higher surgical morbidity and mortality. After adjustment for patient and procedure characteristics, mortality was not significantly associated with start time. However, after appropriate adjustment, operations starting between 4 pm and 6 pm were associated with an elevated risk of morbidity (OR = 1.25, P < or = 0.005) over those starting between 7 am and 4 pm as were operations starting between 6 pm and 11 pm (OR = 1.60, P < or = 0.005). CONCLUSIONS: When considering a nonemergent procedure, surgeons must bear in mind that cases that start after routine "business" hours within the VA System may face an elevated risk of complications that warrants further evaluation.	Cohort comprised of general and cardiovascular surgery in VA System. **→ Supports starting surgeries during "business hours" rather than after-hours to reduce risk of complications.**
61	III / A / 6	Industry reps in OR	American College of Surgeons. ST-33: Statement on health care industry representatives in the operating room. Reviesed September 2005.	3/C	http://www.facs.org/fellows_info/statements/st-33.html		**→ Professional society statement on managing presentce of industry representatives in the operating room.**
	III/A/7	Overlapping surgeries	Ravi B, Pincus D, Wasserstein D, Govindarajan A, Huang A, Austin PC, Jenkinson R, Henry PDG, Paterson JM, Kreder HJ. Association of Overlapping Surgery With Increased Risk for Complications Following Hip Surgery: A Population-Based, Matched Cohort Study. JAMA Intern Med. 2017 Dec 4. [Epub ahead of print] PMID: 29204597	2/B	Not available without a subscription. Please contact your local Library to obtain a copy of this article.	Importance: Overlapping surgery, also known as double-booking, refers to a controversial practice in which a single attending surgeon supervises 2 or more operations, in different operating rooms, at the same time. Objective: To determine if overlapping surgery is associated with greater risk for complications following surgical treatment for hip fracture and arthritis. Design, Setting, and Participants: This was a retrospective population-based cohort study in Ontario, Canada (population, 13.6 million), for the years 2009 to 2014. There was 1 year of follow-up. This study encompassed 2 large cohorts. The "hip fracture" cohort captured all persons older than 60 years who underwent surgery for a hip fracture during the study period. The "total hip arthroplasty" (THA) cohort captured all primary elective THA recipients for arthritis during the study period. We matched overlapping and nonoverlapping hip fractures by patient age, patient sex, surgical procedure (for the hip fracture cohort), primary surgeon, and hospital. Exposures: Procedures were identified as overlapping if they overlapped with another surgical procedure performed by the same primary attending surgeon by more than 30 minutes. Main Outcomes and Measures: Complication (infection, revision, dislocation) within 1 year. Results: There were 38 008 hip fractures, and of those, 960 (2.5%) were overlapping (mean age of patients, 66 years [interquartile range, 57-74 years]; 503 [52.4%] were female). There were 52 869 THAs and of those, 1560 (3.0%) overlapping (mean age, 84 years [interquartile range, 77-89 years]; 1293 [82.9%] were female). After matching, overlapping hip fracture procedures had a greater risk for a complication (hazard ratio [HR], 1.85; 95% CI, 1.27-2.71; P = .001), as did overlapping THA procedures (HR, 1.79; 95% CI, 1.02-3.14; P = .04). Among overlapping hip fracture operations, increasing duration of operative overlap was associated with increasing risk for complications (adjusted odds ratio, 1.07 per 10-minute increase in overlap; P = .009). Conclusions and Relevance: Overlapping surgery was relatively rare but was associated with an increased risk for surgical complications. Furthermore, increasing duration of operative overlap was associated with an increasing risk for complications. These findings support the notion that overlapping provision of surgery should be part of the informed consent process.	Retrospective cohort study from Ontario comparing rate of infection, revision and dislocation in patients within one year following surgery for either hip fracture or total hip arthroplasty who had either overlapping or non-overlapping surgery. Spine surgery not included in this study. Rate of overlapping surgery was relatively low. Data indicated that patients with overlapping surgery had a higher rate of complications. **--> Supports the conclusion that overlapping surgery increases the risk of postoperative complications**
62	III / B / 1 / a, b	Multimodal anesthesia; Minimize opioids	Loftus RW(1), Yeager MP, Clark JA, Brown JR, Abdu WA, Sengupta DK, Beach ML. Intraoperative ketamine reduces perioperative opiate consumption in opiate-dependent patients with chronic back pain undergoing back surgery. Anesthesiology. 2010 Sep;113(3):639-46. PMID: 20693876	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00000542-201009000-00025&LSLINK=80&D=ovft	BACKGROUND: Ketamine is an N-methyl-d-aspartate receptor antagonist that has been shown to be useful in the reduction of acute postoperative pain and analgesic consumption in a variety of surgical interventions with variable routes of administration. Little is known regarding its efficacy in opiate-dependent patients with a history of chronic pain. We hypothesized that ketamine would reduce postoperative opiate consumption in this patient population. METHODS: This was a randomized, prospective, double-blinded, and placebo-controlled trial involving opiate-dependent patients undergoing major lumbar spine surgery. Fifty-two patients in the treatment group were administered 0.5 mg/kg intravenous ketamine on induction of anesthesia, and a continuous infusion at 10 microg kg(-1) min(-1) was begun on induction and terminated at wound closure. Fifty patients in the placebo group received saline of equivalent volume. Patients were observed for 48 h postoperatively and followed up at 6 weeks. The primary outcome was 48-h morphine consumption. RESULTS: Total morphine consumption (morphine equivalents) was significantly reduced in the treatment group 48 h after the procedure. It was also reduced at 24 h and at 6 weeks. The average reported pain intensity was significantly reduced in the postanesthesia care unit and at 6 weeks. The groups had no differences in known ketamine- or opiate-related side effects. CONCLUSIONS: Intraoperative ketamine reduces opiate consumption in the 48-h postoperative period in opiate-dependent patients with chronic pain. Ketamine may also reduce opioid consumption and pain intensity throughout the postoperative period in this patient population. This benefit is without an increase in side effects.	101 out of 165 eligible patients were randomized which might limit external validity. Otherwise, appears to be a very high quality study. Would feel more confident if findings were replicated in another study. Hard to draw firm saftely conclusions from study of this size.Cohort is opioid-dependent patients receiving average of 1.6-2.0 level lumbar fusions. **→ Offers an option to reduce postoperative opioid consumption in opioid-dependent patients.**

63	III / B / 1 / a, b	Multimodal anesthesia	Elia N(1), Lysakowski C, Tramèr MR. Does multimodal analgesia with acetaminophen, nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors and patient-controlled analgesia morphine offer advantages over morphine alone? Meta-analyses of randomized trials. Anesthesiology. 2005 Dec;103(6):1296-304. PMID: 16306743	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00000542-200512000-00025&LSLINK=80&D=ovft	The authors analyzed data from 52 randomized placebo-controlled trials (4,893 adults) testing acetaminophen, nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors given in conjunction with morphine after surgery. The median of the average 24-h morphine consumption in controls was 49 mg (range, 15-117 mg); it was significantly decreased with all regimens by 15-55%. There was evidence of a reduction in pain intensity at 24 h (1 cm on the 0- to 10-cm visual analog scale) only with nonsteroidal antiinflammatory drugs. Nonsteroidal antiinflammatory drugs also significantly reduced the incidence of nausea/vomiting from 28.8% to 22.0% (number needed to treat, 15) and of sedation from 15.4% to 12.7% (number needed to treat, 37) but increased the risk of severe bleeding from 0% to 1.7% (number needed to harm, 59). Selective cyclooxygenase-2 inhibitors increased the risk of renal failure in cardiac patients from 0% to 1.4% (number needed to harm, 73). A decrease in morphine consumption is not a good indicator of the usefulness of a supplemental analgesic. There is evidence that the combination of nonsteroidal antiinflammatory drugs with patient-controlled analgesia morphine offers some advantages over morphine alone.	Acetaminophen, NSAIDs, and /or COX-2 inhibitors all reduce morphine need after surgery. NSAIDs in combination with morphine reduce nausea/vomiting and sedation but increase the risk for severe bleeding. COX-2 inhibitors increase risk for renal failure in cardiac patients. **→ Supports use of multimodal analgesia to reduce opiate need.**
64	III / B / 2	Urinary catheter < 48 hours	Technical specifications for ACE Demonstration Quality Monitoring Program. Measures 1-4: Surgical Care Improvement Project measures. CMS, [revised] 2011.	VM Tier-1 Source	http://www.cms.gov/Medicare/Demonstration-Projects/DemoProjectsEvalRpts/downloads/ACEQualityMeasures.pdf	Introduction: The CMS Surgical Care Improvement Project (SCIP) measures are a subset of National Quality Hospital Measures created through the joint efforts of the Centers for Medicare & Medicaid and the Joint Commission (Specifications Manual for National Hospital Quality Measures Version 2.5 effective for discharges 10-01-2008 through 03-31-2009). The SCIP measures have been endorsed by the National Quality Forum, and are used by Hospital Compare, the Premier demonstration, and RHQDAPU. Corresponding measures are used by PQRI at the individual physician level. The NQF endorsed measures are calculated across a defined list of major surgical procedures and separately for the MS-DRG ACE demonstration surgical procedure groups of CABG, Cardiac Valves, and Hip and Knee Replacement.	**→ CMS standard for measures to prevent infection and venous thromboembolism for surgical patients.**
65	III / B / 2 / a	Chlorhexidine; Reducing skin colonization; Reducing nasal colonization	Rao N. Cannella BA. Crossett LS. Yates AJ. McGough RL. Hamilton CW. Preoperative screening/decolonization for Staphylococcus aureus to prevent orthopedic surgical site infection: prospective cohort study with 2-year follow-up. J Arthroplast, 2011 Dec; 26(8): 1501-7. PMID: 21507604	2/B		Abstract: We quantified surgical site infections (SSIs) after preoperative screening/selective decolonization before elective total joint arthroplasty (TJA) with 2-year follow-up and 2 controls. Concurrent controls (n = 2284) were patients of surgeons not participating in screening/decolonization. Preintervention controls (n = 741) were patients of participating surgeons who underwent TJA the previous year. Staphylococcus aureus nasal carriers (321/1285 [25%]) used intranasal mupirocin and chlorhexidine baths as outpatients. Staphylococcal SSIs occurred in no intervention patients (0/321) and 19 concurrent controls. If all SSIs occurred in carriers and 25% of controls were carriers, staphylococcal SSI rate would have been 3.3% in controls (19/571; P = .001). Overall SSI rate decreased from 2.7% (20/741) in reintervention controls to 1.2% (17/1440) in intervention patients (P = .009). Preoperative screening/selective decolonization was associated with fewer SSIs after elective TJA.	Cohort is arthroplasty patients. **→ Supports the use of mupirocin nasal swabs and chlorhexidine bath to reduce surgical site infections after total joint surgery.**
66	III / B / 2 / b	Perioperative antibiotics; anticoagulation	Technical specifications for ACE Demonstration Quality Monitoring Program. Measures 1-4: Surgical Care Improvement Project measures. CMS, [revised] 2011.	VM Tier-1 Source	http://www.cms.gov/Medicare/Demonstration-Projects/DemoProjectsEvalRpts/downloads/ACEQualityMeasures.pdf	Introduction: The CMS Surgical Care Improvement Project (SCIP) measures are a subset of National Quality Hospital Measures created through the joint efforts of the Centers for Medicare & Medicaid and the Joint Commission (Specifications Manual for National Hospital Quality Measures Version 2.5 effective for discharges 10-01-2008 through 03-31-2009). The SCIP measures have been endorsed by the National Quality Forum, and are used by Hospital Compare, the Premier demonstration, and RHQDAPU. Corresponding measures are used by PQRI at the individual physician level. The NQF endorsed measures are calculated across a defined list of major surgical procedures and separately for the MS-DRG ACE demonstration surgical procedure groups of CABG, Cardiac Valves, and Hip and Knee Replacement.	**→ CMS standard for measures to prevent infection and venous thromboembolism for surgical patients.**
67	III / B / 3	Tranexamic acid to reduce bleeding	Yang B(1), Li H, Wang D, He X, Zhang C, Yang P. Systematic review and meta-analysis of perioperative intravenous tranexamic acid use in spinal surgery. PLoS One. 2013;8(2):e55436. PMID: 23424632	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3570541/	BACKGROUND: Tranexamic acid (TXA) is well-established as a versatile oral, intramuscular, and intravenous (IV) antifibrinolytic agent. However, the efficacy of IV TXA in reducing perioperative blood transfusion in spinal surgery is poorly documented. METHODOLOGY: We conducted a meta-analysis of randomized controlled trials (RCTs) and quasi-randomized (qi-RCTs) trials that included patients for various spinal surgeries, such as adolescent scoliosis surgery administered with perioperative IV TXA according to Cochrane Collaboration guidelines using electronic PubMed, Cochrane Central Register of Controlled Trials, and Embase databases. Additional journal articles and conference proceedings were manually located by two independent researchers. RESULTS: Totally, nine studies were included, with a total sample size of 581 patients. Mean blood loss was decreased in patients treated with perioperative IV TXA by 128.28 ml intraoperatively (ranging from 33.84 to 222.73 ml), 98.49 ml postoperatively (ranging from 83.22 to 113.77 ml), and 389.21 ml combined (ranging from 177.83 to 600.60 ml). The mean volume of transfused packed cells were reduced by 134.55 ml (ranging 51.64 to 217.46) (95% CI; P = 0.0001). Overall, the number of patients treated with TXA who required blood transfusions was lower by 35% than that of patients treated with the comparator and who required blood transfusions (RR 0.65; 95% CI; 0.53 to 0.85; P<0.0001, I(2) = 0%). A dose-independent beneficial effect of TXA was observed, and confirmed in subgroup and sensitivity analyses. A total of seven studies reported DVT data. The study containing only a single DVT case was not combined. CONCLUSIONS: The blood loss was reduced in spinal surgery patients with perioperative IV TXA treatment. Also the percentage of spinal surgery patients who required blood transfusion was significantly decreased. Further evaluation is required to confirm our findings before TXA can be safely used in patients undergoing spine surgery.	Meta-analysis of high-quality studies. Heterogeneity of some outcomes. Insufficient safety data. Are blood loss and transfusion needs intermediate or patient-oriented outcomes? **→ Provides modest support for use of TXA to reduce blood loss and transfusion need in spinal surgery.**

68	III / B / 3	Tranexamic acid to reduce bleeding	Wong J(1), El Beheiry H, Rampersaud YR, Lewis S, Ahn H, De Silva Y, Abrishami A, Baig N, McBroom RJ, Chung F. Tranexamic Acid reduces perioperative blood loss in adult patients having spinal fusion surgery. Anesth Analg. 2008 Nov;107(5):1479-86. PMID: 18931202	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS	BACKGROUND: Spinal reconstructive surgery in adults can be associated with significant blood loss, often requiring allogeneic blood transfusion. The objective of this randomized, prospective, double-blind, multicenter study was to evaluate the efficacy of tranexamic acid (TXA) in reducing perioperative blood loss and transfusion in adult patients having elective posterior thoracic/lumbar instrumented spinal fusion surgery. METHODS: One hundred fifty-one adult patients were randomized to receive either a bolus of 10 mg/kg IV of TXA after induction followed by a maintenance infusion of 1 mg/kg/hr of TXA, or an equivalent volume of placebo (normal saline). The primary outcome was the total perioperative estimated and calculated blood loss intraoperatively and 24 h postoperatively. Secondary outcomes were incidence of allogeneic blood exposure, and duration of hospital stay. RESULTS: Four patients were withdrawn for identifiable surgical bleeding, therefore 147 patients were included in the analysis. The total estimated and calculated perioperative blood loss was approximately 25% and 30% lower in patients given TXA versus placebo (1592 +/- 1315 mL vs 2138 +/- 1607 mL, P = 0.026; 3079 +/- 2558 vs 4363 +/- 3030, P = 0.017), respectively. There was no difference in the amounts of blood products transfused, and length of stay between the two groups. TXA, surgical duration, and number of vertebrae fused were independent factors related to perioperative blood loss. Predictors for the need for allogeneic red blood cell transfusion were ASA classification, surgical duration and number of levels fused. CONCLUSIONS: TXA significantly reduced the estimated and calculated total amount of perioperative blood loss in adult patients having elective posterior thoracic/lumbar instrumented spinal fusion surgery.	High-quality RCT showing that tranexamic acid reduces blood loss in patients undergoing spinal fusion surgery. 2/B grade based on: the outcome was intermediate (blood loss), insufficient safety data (see citation #60). **→ Provides modest support for use of TXA to reduce blood loss in spinal fusion surgery.**
69	III / B / 3	Tranexamic acid to reduce bleeding	Henry DA(1), Carless PA, Moxey AJ, O'Connell D, Stokes BJ, Fergusson DA, Ker K. Anti-fibrinolytic use for minimising perioperative allogeneic blood transfusion. Cochrane Database Syst Rev. 2011 Mar 16;(3):CD001886.	VM Tier-1 Source	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-01425&LSLINK=450&D=coch	BACKGROUND: Concerns regarding the safety of transfused blood have led to the development of a range of interventions to minimise blood loss during major surgery. Anti-fibrinolytic drugs are widely used, particularly in cardiac surgery, and previous reviews have found them to be effective in reducing blood loss, the need for transfusion, and the need for re-operation due to continued or recurrent bleeding. In the last few years questions have been raised regarding the comparative performance of the drugs. The safety of the most popular agent, aprotinin, has been challenged, and it was withdrawn from world markets in May 2008 because of concerns that it increased the risk of cardiovascular complications and death. OBJECTIVES: To assess the comparative effects of the anti-fibrinolytic drugs aprotinin, tranexamic acid (TXA), and epsilon aminocaproic acid (EACA) on blood loss during surgery, the need for red blood cell (RBC) transfusion, and adverse events, particularly vascular occlusion, renal dysfunction, and death. SEARCH STRATEGY: We searched: the Cochrane Injuries Group's Specialised Register (July 2010), Cochrane Central Register of Controlled Trials (The Cochrane Library 2010, Issue 3), MEDLINE (Ovid SP) 1950 to July 2010, EMBASE (Ovid SP) 1980 to July 2010. References in identified trials and review articles were checked and trial authors were contacted to identify any additional studies. The searches were last updated in July 2010. SELECTION CRITERIA: Randomised controlled trials (RCTs) of anti-fibrinolytic drugs in adults scheduled for non-urgent surgery. Eligible trials compared anti-fibrinolytic drugs with placebo (or no treatment), or with each other. DATA COLLECTION AND ANALYSIS: Two authors independently assessed trial quality and extracted data. This version of the review includes a sensitivity analysis excluding trials authored by Prof. Joachim Boldt. MAIN RESULTS: This review summarises data from 252 RCTs that recruited over 25,000 participants. Data from the head-to-head trials suggest an advantage of aprotinin over the lysine analogues TXA and EACA in terms of reducing perioperative blood loss, but the differences were small. Compared to control, aprotinin reduced the probability of requiring RBC transfusion by a relative 34% (relative risk [RR] 0.66, 95% confidence interval [CI] 0.60 to 0.72). The RR for RBC transfusion with TXA was 0.61 (95% CI 0.53 to 0.70) and was 0.81 (95% CI 0.67 to 0.99) with EACA. When the pooled estimates from the head-to-head trials of the two lysine analogues were combined and compared to aprotinin alone, aprotinin appeared more effective in reducing the need for RBC transfusion (RR 0.90; 95% CI 0.81 to 0.99).Aprotinin reduced the need for re-operation due to bleeding by a relative 54% (RR 0.46, 95% CI 0.34 to 0.62). This translates into an absolute risk reduction of 2% and a number needed-to-treat (NNT) of 50 (95% CI 33 to 100). A similar trend was	Cohort is adults with non-emergent surgery. **→ Study evaluates benefits and risks of different drugs to reduce surgical blood loss.**

70	III / B / 4	Anticoagulation	Geerts WH, Bergqvist D, Pineo GF, Heit JA, Samama CM, Lassen MR, Colwell CW; American College of Chest Physicians. Prevention of venous thromboembolism: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest. 2008 Jun; 133(6 Suppl): 381S-453S. PMID: 18574271	VM Tier-2 Source	http://journal.publications.chestnet.org/article.aspx?articleid=1085923	This article discusses the prevention of venous thromboembolism (VTE) and is part of the Antithrombotic and Thrombolytic Therapy: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Grade 1 recommendations are strong and indicate that the benefits do or do not outweigh risks, burden, and costs. Grade 2 suggestions imply that individual patient values may lead to different choices (for a full discussion of the grading, see the "Grades of Recommendation" chapter by Guyatt et al). Among the key recommendations in this chapter are the following: we recommend that every hospital develop a formal strategy that addresses the prevention of VTE (Grade 1A). We recommend against the use of aspirin alone as thromboprophylaxis for any patient group (Grade 1A), and we recommend that mechanical methods of thromboprophylaxis be used primarily for patients at high bleeding risk (Grade 1A) or possibly as an adjunct to anticoagulant thromboprophylaxis (Grade 2A). For patients undergoing major general surgery, we recommend thromboprophylaxis with a low-molecular-weight heparin (LMWH), low-dose unfractionated heparin (LDUH), or fondaparinux (each Grade 1A). We recommend routine thromboprophylaxis for all patients undergoing major gynecologic surgery or major, open urologic procedures (Grade 1A for both groups), with LMWH, LDUH, fondaparinux, or intermittent pneumatic compression (IPC). For patients undergoing elective hip or knee arthroplasty, we recommend one of the following three anticoagulant agents: LMWH, fondaparinux, or a vitamin K antagonist (VKA); international normalized ratio (INR) target, 2.5; range, 2.0 to 3.0 (each Grade 1A). For patients undergoing hip fracture surgery (HFS), we recommend the routine use of fondaparinux (Grade 1A), LMWH (Grade 1B), a VKA (target INR, 2.5; range, 2.0 to 3.0) [Grade 1B], or LDUH (Grade 1B). We recommend that patients undergoing hip or knee arthroplasty or HFS receive thromboprophylaxis for a minimum of 10 days (Grade 1A); for hip arthroplasty and HFS, we recommend continuing thromboprophylaxis > 10 days and up to 35 days (Grade 1A). We recommend that all major trauma and all spinal cord injury (SCI) patients receive thromboprophylaxis (Grade 1A). In patients admitted to hospital with an acute medical illness, we recommend thromboprophylaxis with LMWH, LDUH, or fondaparinux (each Grade 1A). We recommend that, on admission to the ICU, all patients be assessed for their risk of VTE, and that most receive thromboprophylaxis (Grade 1A).	Specialty society guideline. **→ Recommends anticoagulant therapy for elective surgical patients with emphasis on patients undergoing joint surgery.**
71	III / B / 5	Glycemic Control	Frisch A, Chandra P, Smiley D, Peng L, Rizzo M, Gatcliffe C, Hudson M, Mendoza J, Johnson R, Lin E, Umpierrez GE. Prevalence and clinical outcome of hyperglycemia in the perioperative period in noncardiac surgery. Diabetes Care. 2010 Aug; 33(8): 1783-8. PMID: 20435798	2/B	http://care.diabetesjournals.org/content/33/8/1783.full.pdf+html?sid=44de51a6-1155-4c55-ae25-d952b8775d86	OBJECTIVE: Hospital hyperglycemia, in individuals with and without diabetes, has been identified as a marker of poor clinical outcome in cardiac surgery patients. However, the impact of perioperative hyperglycemia on clinical outcome in general and noncardiac surgery patients is not known. RESEARCH DESIGN AND METHODS: This was an observational study with the aim of determining the relationship between pre- and postsurgery blood glucose levels and hospital length of stay (LOS), complications, and mortality in 3,184 noncardiac surgery patients consecutively admitted to Emory University Hospital (Atlanta, GA) between 1 January 2007 and 30 June 2007. RESULTS: The overall 30-day mortality was 2.3%, with nonsurvivors having significantly higher blood glucose levels before and after surgery (both $P < 0.01$) than survivors. Perioperative hyperglycemia was associated with increased hospital and intensive care unit LOS ($P < 0.001$) as well as higher numbers of postoperative cases of pneumonia ($P < 0.001$), systemic blood infection ($P < 0.001$), urinary tract infection ($P < 0.001$), acute renal failure ($P = 0.005$), and acute myocardial infarction ($P = 0.005$). In multivariate analysis (adjusted for age, sex, race, and surgery severity), the risk of death increased in proportion to perioperative glucose levels; however, this association was significant only for patients without a history of diabetes ($P = 0.008$) compared with patients with known diabetes ($P = 0.748$). CONCLUSIONS: Perioperative hyperglycemia is associated with increased LOS, hospital complications, and mortality after noncardiac general surgery. Randomized controlled trials are needed to determine whether perioperative diabetes management improves clinical outcome in noncardiac surgery patients.	**→ Supports the conclusion that peri-operative hyperglycemia is associated with post-operative complications.**
72	III / B / 6	BMP in surgery	Health Technology Clinical Committee, Washington State Health care Authority. Bone morphogenic proteins for use in lumbar fusion. Final adoption: May 18, 2012. HTA: 20120316B.	VM Tier-1 Source	http://www.hca.wa.gov/hta/Documents/findings_decision_bmp.pdf	Based on the deliberations of key health outcomes, the committee decided that it had the most complete information: a comprehensive and current evidence report, public comments, and agency and state utilization information. The committee concluded that the current evidence on Bone Morphogenetic Protein-2 (BMP-2) demonstrates that there is sufficient evidence to cover with conditions. The committee concluded that the current evidence on Bone Morphogenetic Protein-7 (BMP-7) is insufficient evidence to cover. The committee considered all the evidence and gave greatest weight to the evidence it determined, based on objective factors, to be the most valid and reliable. Based on these findings, the committee voted to cover with conditions BMP-2 for use in lumbar fusion. Based on these findings, the committee voted to not cover BMP-7.	Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal. **→ HTAP reimbursement recommendations on Bone Morphogenic Protein.**
Cycle 4: Post-operative Care and Return to Function							

73	IV / A / 1	Early mobilization	Ferrel J. Obstacles to early mobilization after spinal fusion and effect on hospital length of stay. Spine Journal, 2013; 13(9): suppl, 168S.	2/B		BACKGROUND CONTEXT: Recovery after spinal fusion continues to be refined through better multidisciplinary care. Various recovery protocols exist, all which incorporate and emphasize early and immediate postoperative mobilization. Mobilizing patients on the day of surgery is thought to improve functional recovery of range of motion and reduce hospital length of stay (LOS). METHODS: All patients undergoing elective primary or revision spinal fusion between August 2010 and June 2011 within a four-hospital health system were retrospectively reviewed. Patients evaluated by physical therapy (PT) the day of surgery were included in the study analysis. Ambulation was attempted the day of surgery with PT, with or without the use of assistive devices. If a distance of at least 30 feet was not reached, a questionnaire indicating the reason(s) was completed. Distance ambulated on the day of surgery, obstacles impeding ambulating 30 feet, and LOS were recorded. Patients reaching the in-patient unit after 1500 hours were excluded. RESULTS: Seventy percent of patients (320/457) successfully ambulated at least 30 feet on the date of surgery. Forty-seven patients were not evaluated secondary to personnel related factors. A total of 85 patients ambulated under 30 feet, citing most commonly: orthostasis/hypotension 29.4 % (25/85), drowsiness 25.9% (22/85), nausea (23.5%), pain (17.6%), drowsiness (15%), fatigue (8.2%), and pain (10%), as limiting reasons. The average LOS of patients ambulating at least 30 feet the day of surgery was 1.85 days versus 2.79 days in those ambulating less ($p<0.05$). CONCLUSIONS: The benefits of early postoperative mobilization are well recognized and this study highlights major obstacles limiting early ambulation after spinal fusion. Focusing continued multidisciplinary efforts towards such factors as postoperative hypotension, nausea, drowsiness, and pain after elective spinal fusion may further improve our development of rapid recovery programs. Furthermore, ambulating a distance of at least 30 feet the day of surgery correlates with a statistically significant shorter LOS	Meeting abstract. Retrospective cohort study that associates early ambulation to reduce length of stay in patients following spinal surgery. **→ Abstract suggests early ambulation is associated with reduced length of stay.**
74	IV / B	Discharge Process	Wagner C, Zabari M. Reducing readmissions: care transitions toolkit. Washington State Hospital Association, 2013	3/C	https://www.wsha.org/images/activEdit/1.18.13_FINAL_CT_Toolkit_Web.pdf	"Washington State Care Transitions" is a state-wide initiative to foster safe, timely, effective, and coordinated care as patients move between settings. The six strategies are as follows: consistent plan of care with primary care provider and home health care (if applicable) upon arrival and discharge from the hospital; coordinated follow up call or visit at discharge; timely visit to primary care provider; reconciliation of medications soon after transition; patient education coordinated between settings; and support through increased care management for high-risk patients.	Washington State standard with numerous stakeholders contributing to document. **→ A consensus document that proposes a community standard for hospital discharge process.**
75	IV / B	Discharge Process	Jack BW, Chetty VK, Anthony D, Greenwald JL, Sanchez GM, Johnson AE, Forsythe SR, O'Donnell JK, Paasche-Orlow MK, Manasseh C, Martin S, Culpepper L. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. Ann Intern Med. 2009 Feb 3; 150(3): 178-87. PMID: 19189907	2/B	http://annals.org/article.aspx?articleid=744252	BACKGROUND: Emergency department visits and rehospitalization are common after hospital discharge. OBJECTIVE: To test the effects of an intervention designed to minimize hospital utilization after discharge. DESIGN: Randomized trial using block randomization of 6 and 8. Randomly arranged index cards were placed in opaque envelopes labeled consecutively with study numbers, and participants were assigned a study group by revealing the index card. SETTING: General medical service at an urban, academic, safety-net hospital. PATIENTS: 749 English-speaking hospitalized adults (mean age, 49.9 years). INTERVENTION: A nurse discharge advocate worked with patients during their hospital stay to arrange follow-up appointments, confirm medication reconciliation, and conduct patient education with an individualized instruction booklet that was sent to their primary care provider. A clinical pharmacist called patients 2 to 4 days after discharge to reinforce the discharge plan and review medications. Participants and providers were not blinded to treatment assignment. MEASUREMENTS: Primary outcomes were emergency department visits and hospitalizations within 30 days of discharge. Secondary outcomes were self-reported preparedness for discharge and frequency of primary care providers' follow-up within 30 days of discharge. Research staff doing follow-up were blinded to study group assignment. RESULTS: Participants in the intervention group (n = 370) had a lower rate of hospital utilization than those receiving usual care (n = 368) (0.314 vs. 0.451 visit per person per month; incidence rate ratio, 0.695 [95% CI, 0.515 to 0.937]; P = 0.009). The intervention was most effective among participants with hospital utilization in the 6 months before index admission (P = 0.014). Adverse events were not assessed; these data were collected but are still being analyzed. LIMITATION: This was a single-center study in which not all potentially eligible patients could be enrolled, and outcome assessment sometimes relied on participant report. CONCLUSION: A package of discharge services reduced hospital utilization within 30 days of discharge. FUNDING: Agency for Healthcare Research and Quality and National Heart, Lung, and Blood Institute, National Institutes of Health.	Study cohort is general medicine patients. **→ Supports the value of a systematic approach to discharge process to reduce aggregate hospital readmissions.**
76	IV / C / 1	Post-operative care / Rehab	McGregor AH, Probyn K, Cro S, Doré CJ, Burton AK, Balagué F, Pincus T, Fairbank J. Rehabilitation following surgery for lumbar spinal stenosis. Cochrane Database of Systematic Reviews 2013 Dec 9, Issue 12. Art. No.: CD009644. PMID: 24323844	2/B	http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009644.pub2/abstract	We found that specially designed exercise programmes for people who have had back decompression surgery can help to reduce back pain and can improve their ability to carry out everyday tasks. This was true both in the short term (within six months of surgery) and over the long term (at 12 months). Because only three studies were suitable to be included, we cannot be certain that future studies will not change these conclusions.	Respected source. **→ Very limited evidence concerning benefit of exercise programs following back decompression surgery.**